

Botanical Assessment, 2008 (Dr Dave MacDonald)

# Botanical Evaluation of Erf 2224 Hout Bay, City of Cape Town, Western Cape



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**Report prepared for Sillito Environmental Consulting (SEC)**

**Client: Mesdames B I Scher and M H Derman.**

**8 February 2008**

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## **1. Introduction**

The evaluation reported here was commissioned by Sillito Environmental Consulting on behalf of Mesdames B I Scher and M H Derman. The proposal is to develop 18 ha of land known as Erf 2224 Hout Bay above Oakhurst and to the west of Bokkemenskloof. The main objective therefore was to assess the status of the vegetation on the designated property to identify any natural vegetation and then determine if there are any botanically sensitive elements that would require mitigation should they be impacted by the proposed development changes on the property.

An assessment of three erven on the nearby Oakhurst Farm was carried out by McDonald (2007) and the general details of the study area at Erf 2224 Hout Bay, such as aspect, climate and geology are similar to those at Oakhurst.

This assessment takes careful note of the requirements and recommendations of CapeNature and the Botanical Society of South Africa for proactive assessment of 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, De Villiers *et al.* 2005).

## **2. Terms of Reference**

- ☞ To conduct a botanical assessment of Erf 2224, Hout Bay, City of Cape Town, Cape where it is proposed to develop a housing estate.
- ☞ To determine if there is any natural vegetation present on Erf 2224, Hout Bay and if so whether it harbours any rare, threatened or endemic plant species.
- ☞ To identify 'no go' zones and areas of opportunities and constraints from a botanical perspective.
- ☞ To identify botanically sensitive areas that may require special consideration and mitigation in the planning of the residential erven.

### 3. Study Area

#### 3.1 General description

The broad study area is Erf 2224 Hout Bay, situated on the north-west –facing slopes of Vlakkenberg, overlooking the Hout Bay River valley and straddling the Bokkemanskloof stream. The property lies to the west of Constantia Nek and east of the town of Hout Bay. In the south the property has a common boundary with the Table Mountain National Park. In the north, a dirt road marks part of the boundary but a ‘narrow’ portion on the eastern side extends to Hout Bay Main Road (Figures 1 & 2). To the north-west and east Erf 2224 is bounded by residential suburbs and on the west side of the ‘narrow’ portion by agricultural land. A ‘centroid’ position is given by the geographical co-ordinates S 34° 01’ 23.74” E 18° 22’ 46.61”.

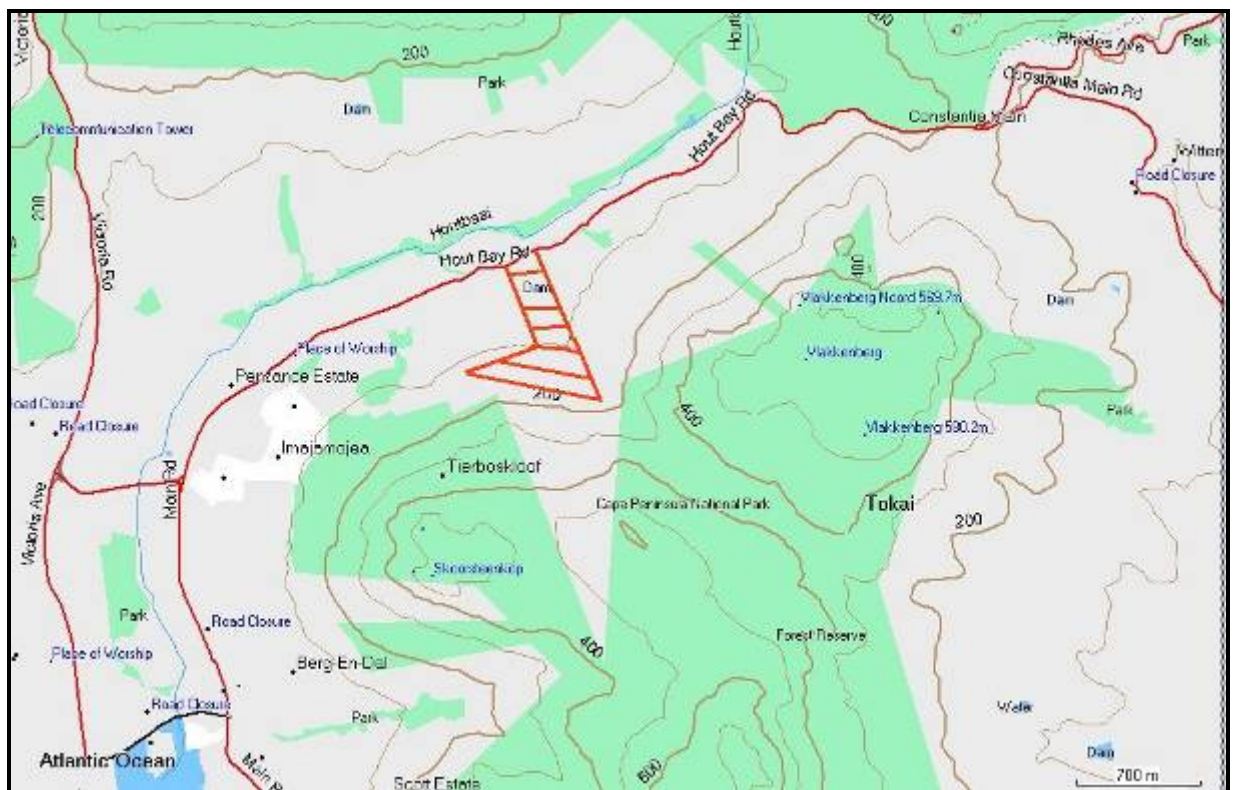


Figure 1. General locality of the study area on the slopes of Skoorsteenkop near Hout Bay.

## **3.2 Physiography**

**: 3.2.1 Topography:** The study area lies on north-west-facing slopes that have a moderate gradient at the lower end of the erf to much steeper gradients with an increase in elevation. The slopes are fairly uniform with no major relief except for the area incised by the Bokkemanskloof stream. Altitude ranges between approximately 40 m a.s.l. at the lower boundary to 200 m a.s.l. at the upper boundary.

**3.2.2 Geology and Soil:** The Cape Peninsula has three main rock types, the shales of the Malmesbury Group, granites of the intrusive Cape Granite Suite and sandstones of the Table Mountain Group. At Hout Bay rock of the Cape Granite Suite lie unconformably under the sedimentary rocks of the Table Mountain Group (Compton, 2004). On the slopes of Skoorsteenkop at Erf 2224 the sandstone boulders and colluvial debris have eroded downwards forming a colluvial mix with the granitic material which has weathered to form clay-rich gravely material. The result is a well-drained colluvial soil. Kaolin, a weathering product of granite that occurs at places like the nearby Hout Bay Forest Station, may be found on the site but this was not identified.

**3.3.3 Climate:** Hout Bay has a Mediterranean-type climate is influenced by the Atlantic Ocean that is typical of the western side of the Cape Peninsula. It receives approximately 400 mm rain annually, mainly in winter (June – August) and experiences a long warm to hot summer (December – March). Temperatures range from 8 -- 18 °C in the winter and 15 -- 27°C in the summer.

## **4. Evaluation Method**

The site was visited on 31 October 2007 and covered on foot from a point near the Clay Café Pottery (waypoint Sk1 in Figure 2) upwards in a circular route via a high point (waypoint Sk4) near the uppermost houses of Bokkemanskloof and then down in a north-westerly direction to the gravel road (position of red dot in Figure 2 forming the lower boundary of Enclave 2 of the proposed housing development (see Figure 2).

The vegetation and flora were recorded at a series of waypoints and photographs were taken to augment the record.



**Figure 2.** Annotated aerial image (Google Earth 2007 ©) of the study area showing the 'sample track' in light blue with the waypoints denoted Sk#. The yellow line indicates the approximate boundaries of the site with Enclaves 1 & 2 as interpreted from the

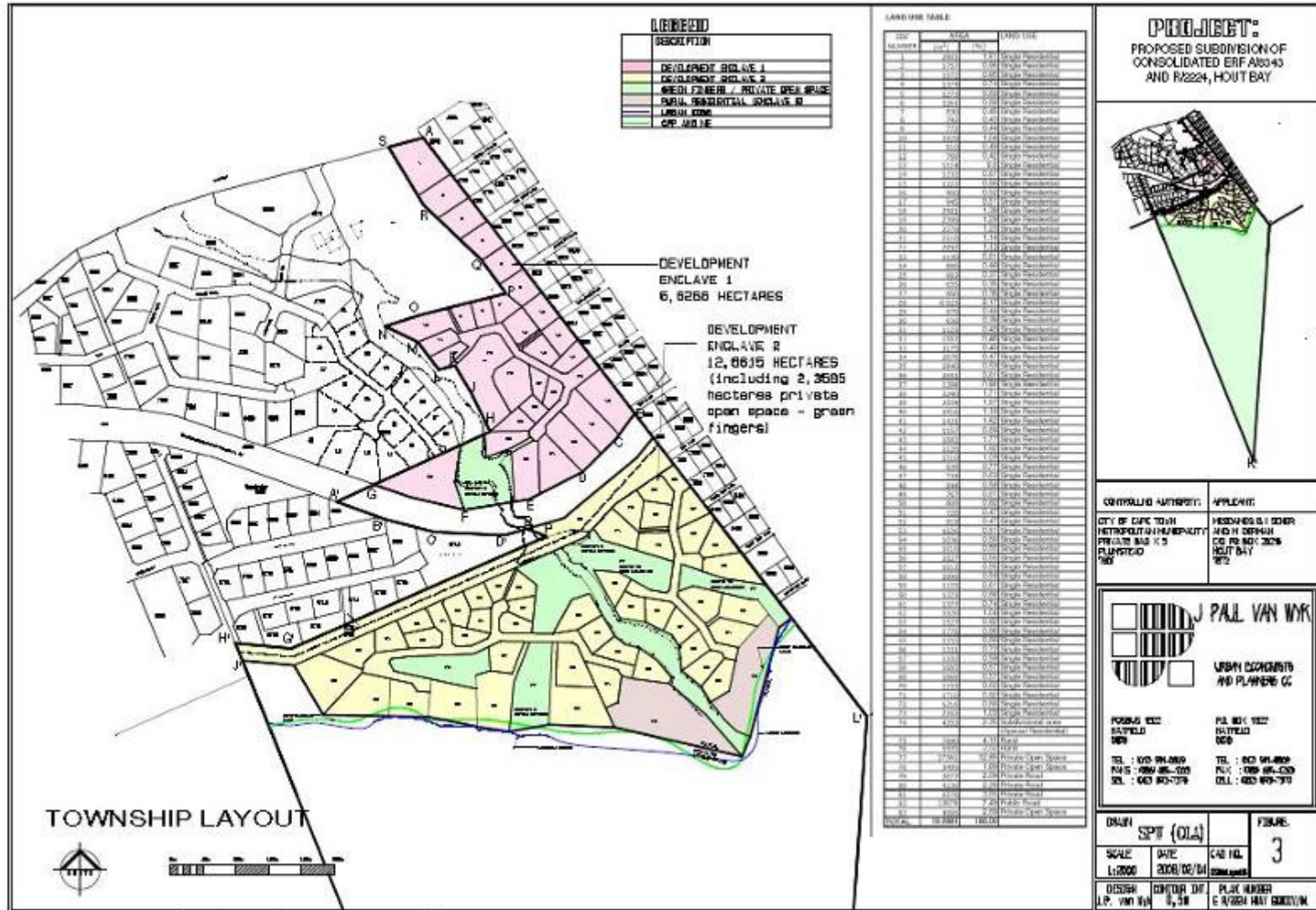


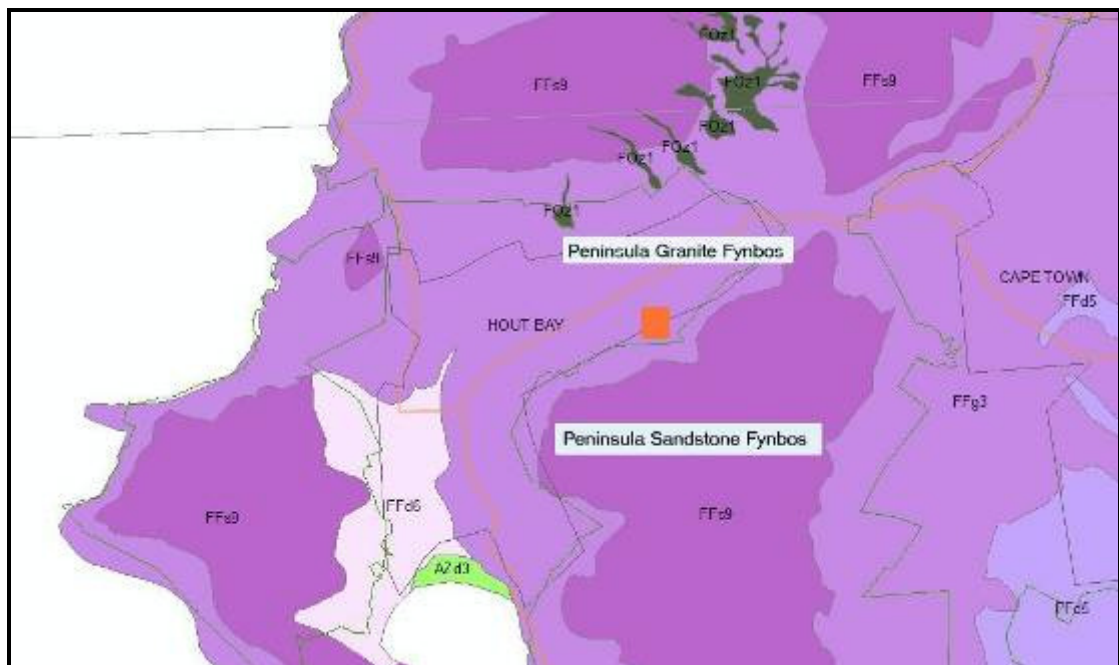
Figure 2. Plan of proposed residential township layout on Erf 2224, Hout Bay (Diagram supplied by J Paul van Wyk)



## 5. The Vegetation

Apart from the riparian vegetation along the upper Bokkemanskloof Stream which is an azonal vegetation type, the original vegetation that would have occurred on Erf 2224 is Peninsula Granite Fynbos, given the nature of the soils and climate (Mucina & Rutherford 2006) (Figure 3). This vegetation type is rated as ENDANGERED in the National Spatial Biodiversity Assessment (Rouget *et al.* 2004) since although some is conserved in the Table Mountain National Park and at Kirstenbosch National Botanical Gardens, much of its original extent has been lost to urbanisation or agriculture on the Cape Peninsula.

According to Mucina & Rutherford (2006) Peninsula Granite Fynbos (Figure 3) is variable but may be described as 'medium dense to open trees in tall, dense proteoid shrubland'. It is generally dominated by asteraceous and proteoid fynbos but can be more restionaceous or ericaceous where it is wetter. The Peninsula Granite Fynbos is much drier on the north-facing slopes the mountain above Hout Bay compared with similar vegetation on the moister slopes around Constantia and Wynberg with the result that the vegetation is shrubby with almost no trees.



**Figure 3.** Portion of the national vegetation map of southern Africa (Mucina *et al.* 2005) showing the approximate position of Erf 2224 (red rectangle) in an area that is potentially Peninsula Granite Fynbos (light mauve). Peninsula Sandstone Fynbos that occurs on the higher slopes is denoted by purple.

The historical natural vegetation at Erf 2224 was very different to what the vegetation is now. The greater part of the area has at one or another time been impacted by cultivation of *Eucalyptus* trees, probably initially as a firebreak plantation, and then the subsequent spread of those trees up and down the mountain slopes. The eucalyptus trees are now dominant but other alien invasive species also gained a foothold and spread. The woody species include *Acacia saligna* (Port Jackson Willow), *Acacia mearnsii* (Black wattle), and *Paraserianthes lophantha* (Stinkbean) and there are also numerous herbaceous alien species such as *Avena fatua* (wild oats), *Bromus* spp. (bromes), *Pennisetum clandestinum* (Kikuyu grass), *Briza maxima*, *Taraxacum officinale* (dandelion), *Sonchus oleraceus* (common sowthistle) and numerous others (Figure 4).

The eucalyptus trees have a very negative effect on lower growing vegetation and particularly fynbos. Apart from shading out the fynbos shrubs and herbs the eucalyptus trees also out-compete the fynbos for water while producing chemical allelopathic substances that inhibit the growth of other plants species. The fynbos plants are sensitive to these substances and the result is that they have largely disappeared from under the dense canopy of the eucalyptus trees (Figure 5).



**Figure 4.** Part of the area of Erf 2224 designated as Enclave 2 with a band of tall *Eucalyptus* sp. trees ostensibly forming a firebreak but with dense alien invasive growth above and below it. The area below was cleared of alien plants that have subsequently re-grown from seed and coppice. The area in the foreground has been successfully cleared of alien shrubs and trees but is covered in alien grasses.



**Figure 5.** Dense growth of *Eucalyptus* sp. on a rocky slope with almost no vegetation in the understorey.



**Figure 6.** Young *Eucalyptus* sp. and wattle saplings that have re-grown vigorously due to lack of follow-up control in an area of Enclave 2 that was cleared.

Attempts have been made to control and remove both the wattles and eucalyptus. On the eastern edge of Enclave 2 wattles (mainly *A. saligna*) and eucalyptus have been cut and poisoned to prevent re-growth by coppicing. The results have been successful to a certain extent but where the herbicide has not been adequately applied the trees are re-growing. The removal of the canopy of trees has also allowed the grasses to flourish with *Briza maxima* and *Bromus* sp. dominating the herbaceous stratum. In the central area of Enclave 2 the eucalyptus was cut but not poisoned and it is returning vigorously by re-sprouting from the cut stumps. The situation is thus almost as bad as prior to the attempts to clear the alien vegetation (Figure 6). A large amount of cut branches and debris litters the lower part of Enclave 2 as well (Figure 7).



**Figure 7.** Large amounts of cut branches and debris litter the ground over a wide area in Enclave 2.

In the area designated as Enclave 2 (Figure 2) one is hard-pressed to find any natural vegetation. *Rhus* spp., mainly *R. lucida* is found persisting in rocky places with *Passerina corymbosa* and a few restios under the eucalyptus canopy. In openings caused by gaps in the canopy there are occasional remnants of fynbos vegetation represented by *Muraltia heisteria*, *Selago corymbosa*, *Pelargonium capitatum*, *Pelargonium cucullatum*, *Chrysanthemoides monilifera*, *Pentaschistis* spp., *Pteridium aquilinum*, *Cliffortia* sp. and *Rhus tomentosa*. No recognisable fynbos plant community can be found anywhere on the slopes covered by Enclave 2 and no rare or threatened

plant taxa were observed during the survey. There has been intense disturbance of these slopes over a long period, with additional evidence of fire which has exacerbated the situation. The disturbance and present state of the vegetation leaves little hope of successful rehabilitation of Peninsula Granite Fynbos on the slopes of Enclave 2.

The area designated as Enclave 1 (Figure 2) is as disturbed as Enclave 2 but for other reasons. There has been an array of agricultural and habitation impacts on this area also over a long period. Exotic trees such as European oak (*Quercus robur*), *Eucalyptus* sp. and pine trees (*Pinus radiata*) have been planted, paddocks with Kikuyu grass (*Pennisetum clandestinum*) created and a reservoir for water-supply built. Roads and tracks have also been constructed for access to the variety of buildings that have been built over time (Figure 8). These various disturbances have almost completely changed the environment in Enclave 2 from its natural condition to a rural landscape with no remaining natural vegetation. No Peninsula Granite Fynbos persists here. The only natural vegetation is within the riparian zone as described by McDonald (2007) and in the report of the aquatic ecologist pertaining to this area.



**Figure 8.** Various roads and infrastructure together with agricultural activity have impacted the area designated as Enclave 2 over a long period of time.

## **6. Sensitivity Assessment and Conservation Value**

The Hout Bay River valley has had a long history of human influence with the development of the rural landscape. The disturbance associated with human activity has permitted the invasion into the landscape of exotic plant species that have now become well-established and in many places a difficult problem to control. This is clearly the case at Erf 2224 Hout Bay. The invasion of the land by alien invasive plant species is almost complete and little if any natural vegetation is left. In the Enclave 2 area the sensitive diverse fynbos has been effectively replaced by nothing less than monotypic stands of large trees that have very detrimental effects on the environment in general. The result is that the present land cover (vegetation) has a very low sensitivity and equally low conservation value. In the Enclave 1 area the botanical sensitivity is also very low with low conservation value. With the very limited possibilities of these areas ever being rehabilitated to natural vegetation there is no reason to offer any objection to the proposed developments on Erf 2224 from a botanical perspective.

The layouts proposed as shown in Figure 2 integrate 'green' areas into the plan. The green areas (private open space) are mainly to buffer the streams and watercourses in the area and their inclusion in the layout is strongly supported. It is recommended that the existing trees, of which there are a few along the streams, should be conserved and tree species typical of these streams (see list in McDonald 2007) ought to be used to enhance the vegetation along the streams. The so-called 'green fingers' should also be appropriately planted with indigenous plants typical of the local environment. Potentially invasive exotic species should be avoided.

## **7. Conclusions**

- Erf 2224 Hout Bay has a long history of agricultural activity and human intervention which together with aggressive invasion of large parts has meant that the natural Peninsula Granite Fynbos that would have occurred on the site has disappeared.
- A few remnant indigenous plant species persist here and there but these are of little value in the present context since no intact fynbos plants communities remain. The only indigenous plants of importance are the trees along the drainage lines and streams. These must be conserved.

- No rare or threatened plant species were found and given the condition of the site none are likely to occur.
- No major constraints can be placed on the proposed development from a botanical point of view but the 'green fingers' are strongly supported and it is highly recommended that any landscaping be done with indigenous plants that are acceptable in the local context. Augmentation of the tree flora along the streams with species found in the area is also strongly recommended.

## 8. References

- 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.
- Compton, J.S. 2004. *The Rocks and Mountains of Cape Town*. Double Storey.
- De Villiers, C.C. et al. 2005. *Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape*. Fynbos Forum, Cape Town.
- McDonald, D.J. 2007. Botanical Assessment of site for proposed development at Oakhurst, Bokkemenskloof, Hout Bay. Report for Sillito Environmental Consultants.
- Mucina, L., Rutherford, M.C., & Powrie, L.W. (Eds.). 2005. 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.
- Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2005. *South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component*. Pretoria: South African National Biodiversity Institute.

Specialist Input on Botanical Aspects of Erf 2224  
Hout Bay, May 2010 (Nick Helme Botanical  
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**SPECIALIST INPUT ON BOTANICAL ASPECTS  
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**Submitted to :** Sillito Environmental Consulting, Tokai

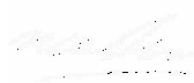
**Client:** B. Scher and M. Derman, Cape Town

**21 May 2010**

## **DECLARATION OF INDEPENDENCE AND EXPERTISE**

In terms of Section 33 of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations specialists involved in Impact Assessment processes must declare their independence and present the details of the person who prepared the report and their expertise.

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.



NA Helme

### **CONDITIONS RELATING TO THIS REPORT:**

The methodology, findings, results, conclusions and recommendations in this report are based on the author's best scientific and professional knowledge, and on referenced material and available knowledge. Nick Helme Botanical Surveys and its staff reserve the right to modify aspects of the report, including the recommendations and conclusions, if and when additional relevant information becomes available.

This report may not be altered or added to without the prior written consent of the author, and this also applies to electronic copies of this report, which are supplied for purposes of inclusion in other reports, including in the report of EAPs. Any recommendations, statements or conclusions drawn from or based on this report must cite this report, and should not be taken out of context, and may not change, alter or distort the intended meaning of the original in any way. If these extracts or summaries form part of a main report relating to this study or investigation this report must be included in its entirety as an appendix or separate section to the main report.

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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 south-western Cape. Since the end of 2001 I have been working on my own and trade as Nick Helme Botanical Surveys.

**A selection of relevant previous botanical work is as follows:** Melkbos CBD (CCA Environmental 2010), Oudekraal botanical constraints study (Doug Jeffery Environmental Consultants 2009); Yzerfontein Heights BA (EnviroLogic 2009); Melkbos CBD survey (Level 7 Planning Services 2008); Strandfontein Road widening Impact Assessment (IA) (CoCT 2008); Pelikan Park IA (CoCT 2008); BlueDowns Erf 1897 (Environmental Partnership 2008); Driftsands NR Sensitivity Study (CapeNature 2006); Woodgreen housing Mitchell's Plain (CCA; 2006); Muizenberg erf 108161 (CndeV; 2005); Muizenberg erf 159848 (Headland; 2005); Muizenberg erf 159850 (Headland; 2005); Kommetjie Riverside Ext 2. (Headland; 2005); Ocean View extension (Ecosense; 2005); Erf 617, Melkbos (Doug Jeffery Environmental Consultants 2005); Imhoffs farm (Headland; 2005); Rocklands, Simonstown (CCA; 2005); Erf 35069 and Ptn. Erf 3418, Kuils River (SEC; 2005); proposed Grand Prix site next to CT International, Belhar (EnviroDinamik; 2005; Environmental Partnership 2007); Dreamworld / Cape Town film studio survey and IA (Environmental Partnership; 2004 & 2005); Kompanjiesuin survey and IA (Ecosense; 2004); Erf 11825, Fish Hoek (private client, 2004); R300 Cape Flats Ring Road surveys (Ecosense and Ecosense/Chand jv; 2003-2007); Bordjiesrif environmental education centre in the TMNP (for SRK & NPB; 2002); Elsie's Peak development (private client, 2003); Pelican Park, Capricorn Park, Millers Point, and Soetwater (for CoCT and Jessica Hughes, Afridev; 2000 & 2001).

## EXECUTIVE SUMMARY

This specialist botanical input was commissioned in order to help inform the development application process for Erf 2224 (Oakhurst), Hout Bay. This is not intended to be a botanical basic assessment, but was instead requested to provide clarity on the rehabilitation potential of the portion of the property that is proposed for development (Enclaves 1 and 2), and to contextualise this area in terms of the greater property, and in terms of the Cape Peninsula as a whole. Particular reference is made to the occurrence, extent and rehabilitation potential of the Peninsula Granite Fynbos on site, as this is now regarded as a Critically Endangered vegetation type on a national basis.

As described in McDonald (2008) there is little natural vegetation remaining within the proposed development area. The habitat degradation has been caused by mechanical disturbance; dumping of soil and building rubble; establishment of grazing meadows; long term grazing, trampling and eutrophication of various areas; and invasion of various alien plants. The indigenous plant diversity on site is perhaps only 30% of what would be expected in a pristine example of this habitat. This means that indigenous plant diversity is fairly low, but this total would be expected to rise gradually with time, such that in about ten years a further 20% could be added to the species list, provided that surveys were undertaken at the appropriate time of the year. No plant Species of Conservation were recorded anywhere on site, with the exception of a single young plant of *Leucospermum conocarpodendron* subspecies *viridum*.

On balance it is this author's view that the proposed development area Enclave 1 has a Very Low or Negligible conservation value, and that most of Enclave 2 has a Low to Medium regional conservation value, with a pocket of High conservation value along the river. In this respect the current study concurs with McDonald (2008) regarding Enclave 1, and differs slightly regarding Enclave 2 (McDonald concluded that this area was of Low conservation value).

The more heavily degraded or transformed an area the more difficult it will be to restore the original natural vegetation. In this regard the Very Low sensitivity area indicated in Figure 4 is considered effectively unrestorable.

Any area with at least a largely intact soil structure and chemistry is technically restorable, and the success thereof depends, among other factors, on:

- time and money available
- expertise available
- seed and propagule availability
- irrigation potential
- rainfall seasonality and amount

and availability of other potential key ecosystem drivers, such as fire.

It is this author's view that the Peninsula Granite Fynbos in the area designated as "Low to Medium Sensitivity" in Figure 4 (mainly Enclave 2) is technically rehabilitable, to a certain degree. In other words, given the availability of all the criteria listed in the previous paragraph, the original natural vegetation in this area could be restored to a point where it is considered ecologically valuable, functional and self-sustaining (although this latter point will be dependant on fire at appropriate intervals, which may not be possible in this context).

The reality of the situation is that the study area is within the designated Urban Edge, full rehabilitation will be expensive, it will be expensive to maintain, and few landowners are likely to be prepared to take on this challenge and financial burden.

In conclusion, Enclave 1 presents no botanical constraints to development, whilst the natural vegetation in Enclave 2 is considered to be technically rehabilitable, but only with substantial inputs. There seems no strong reason why these inputs should be forthcoming or required, given that the site is not a designated conservation priority area, and that the underlying vegetation is well conserved. There thus seems to be no sound ecological reason why the proposed development cannot be seriously considered, provided that all suggested mitigation is considered part of the plan.

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## **1. INTRODUCTION**

This specialist botanical input was commissioned in order to help inform the development application process for Erf 2224 (Oakhurst), Hout Bay. This is not intended to be a botanical basic assessment, but was instead requested to provide clarity on the rehabilitation potential of the portion of the property that is proposed for development, and to contextualise this area in terms of the greater property, and in terms of the Cape Peninsula as a whole. Particular reference is made to the occurrence, extent and rehabilitation potential of the Peninsula Granite Fynbos on site, as this is regarded as an Endangered vegetation type on a national basis.

## **2. TERMS OF REFERENCE**

The Terms of Reference for this study were as follows:

- Undertake a site visit.
- Investigate the extent, conservation value and rehabilitation potential of the Peninsula Granite Fynbos on the site.
- Identify and map any alterations that may need to be made to the proposed development layout.
- Compile a report documenting and integrating the above components.

## **3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY**

The site survey was undertaken on 22 April 2010. The site was walked and photographed, and observations were recorded in a notebook, including a basic plant species list. The seasonality of the site visit was not ideal in that it took place towards the end of the summer dry season, and thus many species (notably annuals and bulbs) that are or could be present are unlikely to have been recorded, or could not be identified to species level with any certainty. There is a very low likelihood that some of the unobserved species may be Species of Conservation Concern. A habitat based approach was thus used to help inform the sensitivity analysis and supplement the species information. Botanical sensitivity was determined based partly on the regional and national products noted below, in combination with 20 years of experience in botanical surveys in the Western Cape, drawing on knowledge of species diversity, distribution of rare plant species, habitat rarity and integrity, ecological connectivity, and rehabilitation potential.

Reference is made to the South African Vegetation Map (Mucina & Rutherford 2006) and to the National Spatial Biodiversity Assessment (Rouget *et al* 2004). In addition,

the City of Cape Town's Biodiversity Network (groundtruthed and updated in 2008; Holmes et al 2008) was also referenced.

This report is not a Basic Assessment or a full botanical assessment, as per the Terms of Reference provided. For detailed botanical observations and a site description see the botanical assessment of McDonald (2008).

The proposed development layout (Figure 3) indicates that Enclave 1 will cover 5.6ha and that Enclave 2 will cover 12.6ha, which includes open space of 2.3ha.

#### **4. BRIEF DESCRIPTION OF THE VEGETATION**

##### **4.1 Physical Characteristics of the Study Area**

Soils on site are of two main types. The underlying rock in the lower parts of the site is granite of the Peninsula pluton, and this can be seen outcropping in various places, and is visible as high up as 146masl (in the southwestern corner). Granites weather to form nutrient rich sands and sandy loams, with dense white clays (known as kaolin) in wetter areas. The upper parts of the site are underlain by Table Mountain group sandstones, and these typically weather to form acid, nutrient poor sands. The interface between these basic soil types is often blurred as a result of downslope erosion, with the sandstone derived soils overlying the granite derived soils. This effect can also be seen where numerous sandstone rocks and boulders have rolled down the mountain and have come to rest on pure granitic loam. These mixed, transported soils are known as colluvial soils and normally give rise to ecotonal (transitional) plant communities. It can thus be difficult, if not impossible to firmly identify an exact point where granite soils change over to sandstone soils, and in many areas this transition actually occurs over a distance of 50 to 80m.

The Bokkemanskloof river bisects the site, and appears to be perennial, as it was flowing quite strongly at the end of the dry season. The river has eroded a deep channel in various parts of the site.

The exact fire history of the upper parts of the site is not known, but it appears that most of the dense alien dominated vegetation between 150 and 250masl has not burnt in at least ten years.

The central section of the site was cleared of alien vegetation within the last five years, and parts of it have again been cleared more recently as part of follow-up



clearing operations. The dense alien vegetation that has established in the area between 150 and 250masl appears not to have been formally cleared at any stage, and is now very dense, with many trees appearing to be at least fifteen years old.

All of the lower area (Enclave 1 in Figure 3) and at least half the central area (Enclave 2) has been heavily disturbed or cultivated in the past. The property was part of a farm, and as such parts of it were cultivated, and all of the remaining areas was used as grazing for cattle, with areas being sown with the grazing grasses *Cynodon dactylon* (kweekgras) and *Pennisetum clandestinum* (kikuyu grass; see Plates 1-3). Large areas were also presumably impacted by fertilisation with animal manure, which would have encouraged grass growth at the expense of the indigenous vegetation.

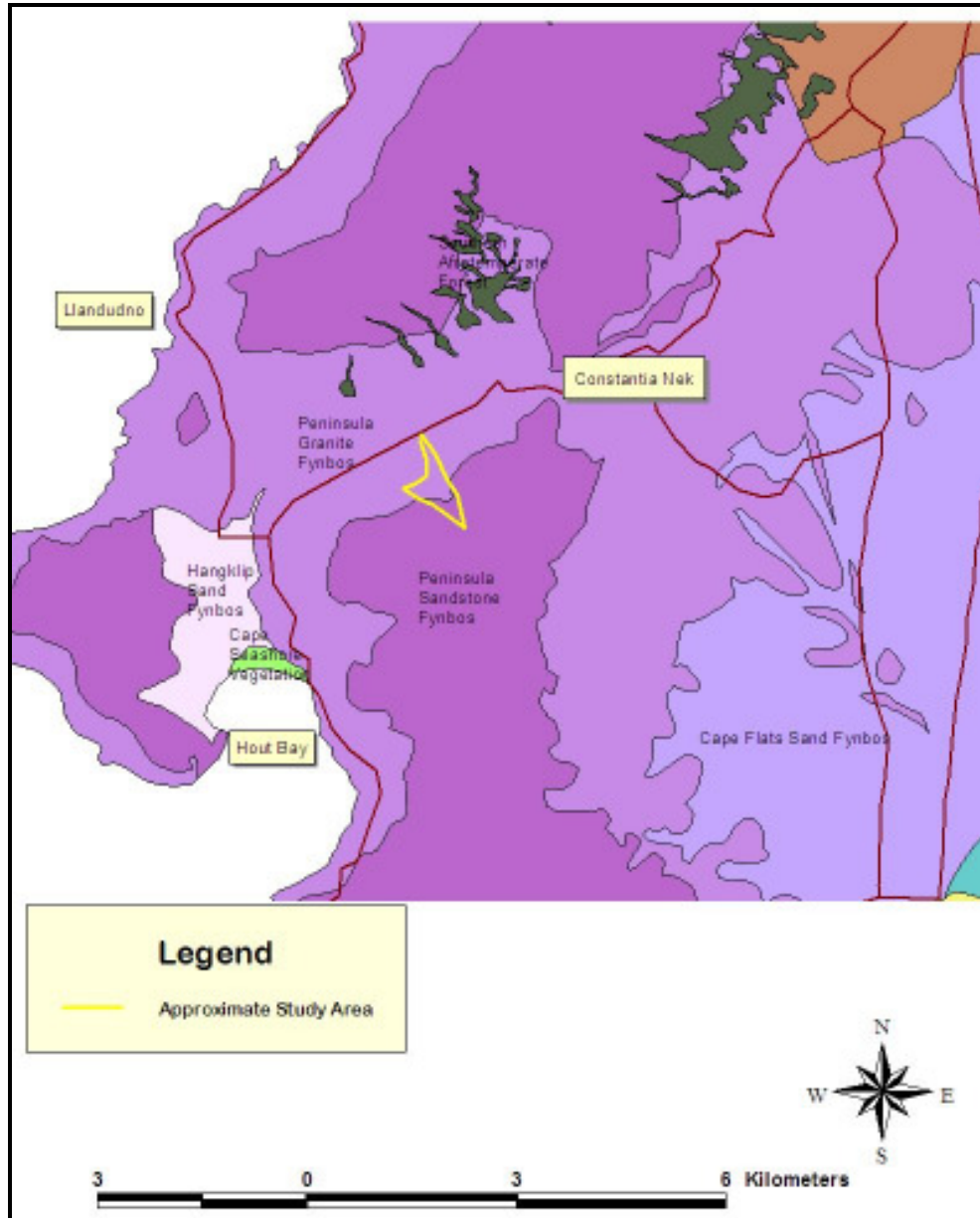
## 4.2 Context

The site is located on the lower north facing slopes of the Vlakkenberg, and is part of the Hout Bay valley.

The area falls within the Cape Peninsula region of the Cape Floristic Region (CFR), and the region is firmly part of the Fynbos biome. The CFR is one of only six floristic regions in the world, is the only one confined to a single country, and is part of the richest temperate flora in the world. It is also by far the smallest floristic region, occupying only 0.1% of the world's land surface, and supporting about 9000 plant species, almost half of all the plant species in South Africa. At least 70% of all the species in the CFR do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats (those below 350m) 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. The latest data from the Red Listing process recently 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.

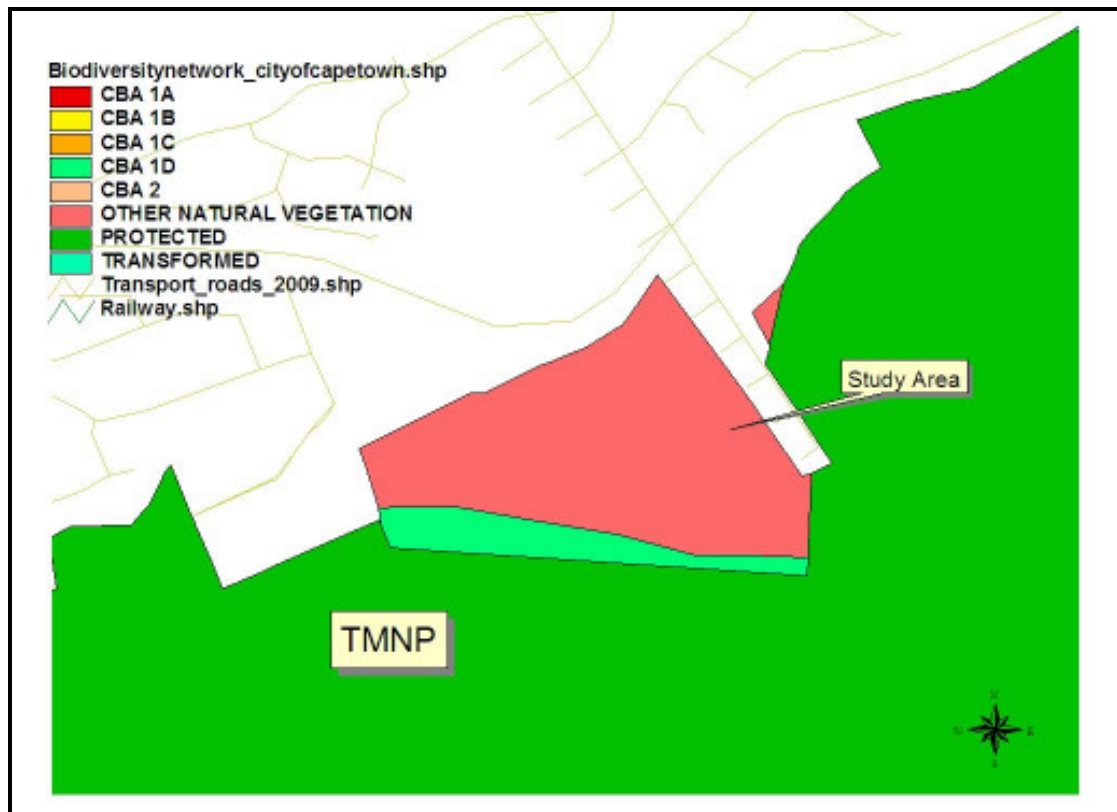
The Cape Peninsula itself is an acknowledged centre of plant diversity and endemism, with 161 plant species thought to be restricted to this area (Helme and Trinder Smith 2006). Although a significant percentage of the upper slopes of the Peninsula are conserved within the Table Mountain National Park (TMNP) the

foothills and flats are under severe development pressure and are part of what has been termed a “conservation megadisaster” area (Wood *et al* 1994), extending from Malmesbury to the Cape Peninsula.



**Figure 1:** Extract of SA Vegetation Map showing the Peninsula context of the study area. Note that this map indicates original likely extent of vegetation types, prior to modern human influence.

The latest City of Cape Town Biodiversity Network (Holmes *et al* 2008) shows that the entire part of the site that is proposed as a development area is categorised as “Other Natural Vegetation” (see Figure 2), and is described as “Unselected natural vegetation; in good or restorable condition”.

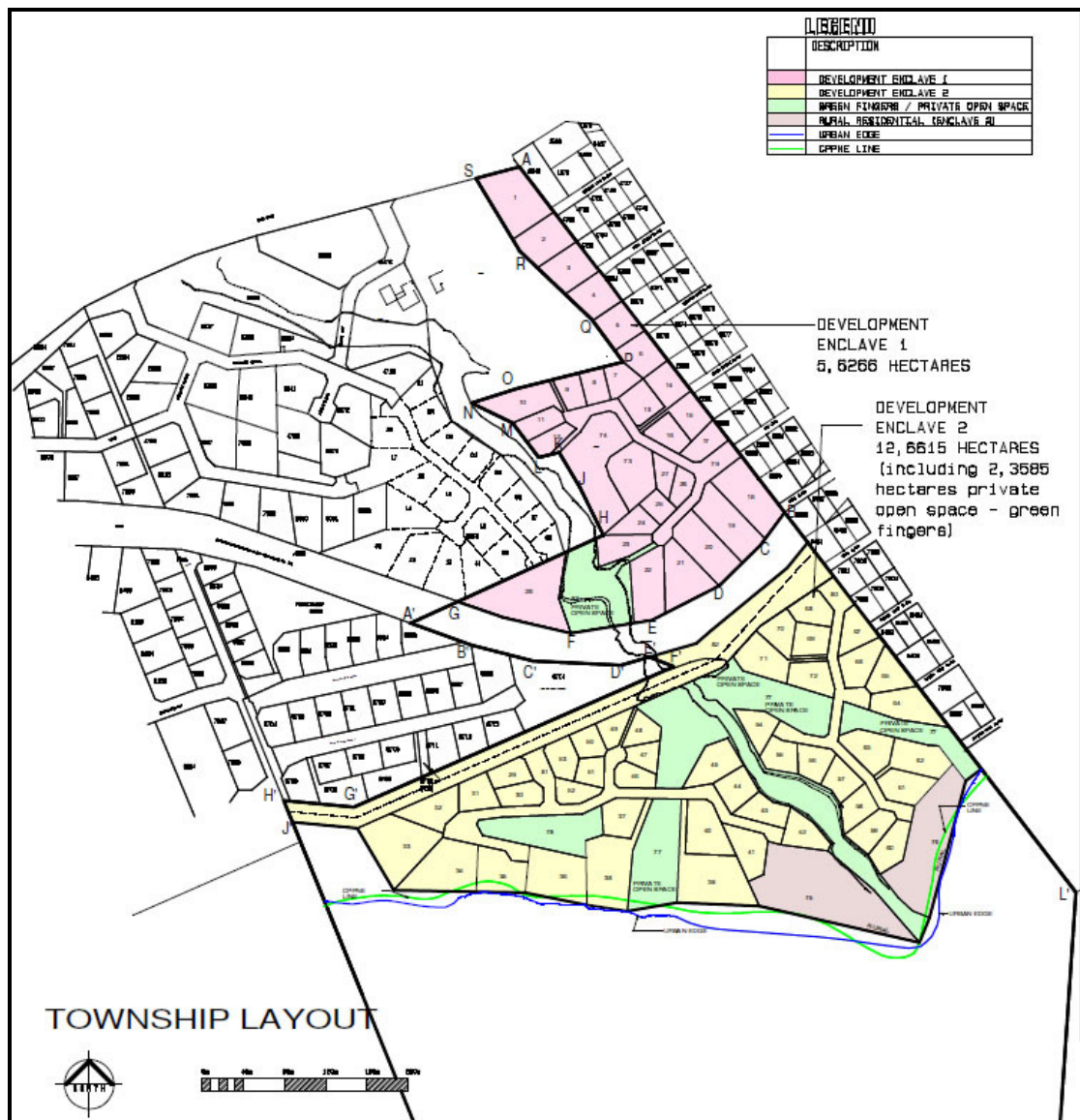


**Figure 2:** Extract of November 2008 version of City of Cape Town Biodiversity Network map, showing that all of the proposed development area is classified as “Other Natural Vegetation”, and is not a CBA (Critical Biodiversity Area).

### 4.3 The vegetation on site

The vegetation map of South Africa (Mucina & Rutherford 2006) indicates that the original natural vegetation on the proposed development area was Peninsula Granite Fynbos. The National Spatial Biodiversity Assessment (Rouget *et al* 2004) has determined that as of 1996 only about 45% of the original extent of this vegetation type still remained. Some 33% of its original extent is conserved (entirely within the Table Mountain National Park), with a conservation target of 30%, and the vegetation type was regarded as Endangered (Rouget *et al* 2004), but has recently been upgraded to Critically Endangered in the Draft National List of Threatened Ecosystems (DEA 2009), due to further loss of habitat extent since 1996. The important messages to emphasise are that the vegetation type is highly threatened, that national conservation targets have been achieved, and that most of what is left is well conserved within the Table Mountain National Park. Key portions of this habitat

that are not yet conserved are mainly within the Oudekraal area between Llandudno and Camps Bay (Helme 2009).



**Figure 3:** Copy of proposed development layout, showing Enclave 1 (pink) and 2 (yellow) and ecological corridors and open spaces (green).

As described in McDonald (2008) there is little natural vegetation remaining within the proposed development area. The habitat degradation has been caused by mechanical disturbance; dumping of soil and building rubble; establishment of grazing meadows; long term grazing, trampling and eutrophication of various areas; and invasion of various alien plants.

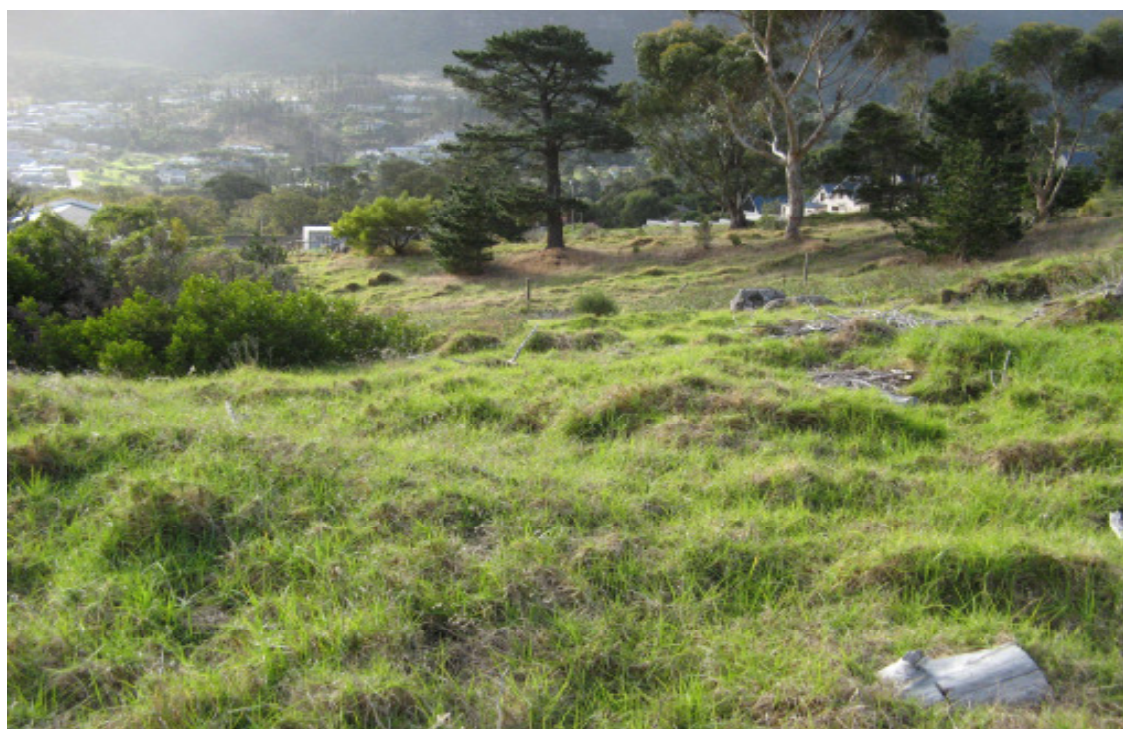
A list of about thirty indigenous plant species was compiled. These species are all common and widespread species, and many are pioneer species or those tolerant of disturbance. Very few bulbs were recorded (only *Lanaria lanata*), and no succulents were found. It is estimated that about half the species recorded are reproters. A list of at least twenty alien species was also compiled, most of which are invasive or responsive to disturbance.



**Plate 1:** View of upper eastern portion of site looking towards Vlakkenberg. This part of the site is dominated by alien invasive kikuyu grass and was probably previously cultivated.



**Plate 2:** View of upper western part of property, showing solid line of gum trees above outcropping granite. Various invasive species dominate the foreground.



**Plate 3:** View of lower eastern part of property (Enclave 1), showing dense sward of alien kikuyu grass, scattered gums and pines, and patches of indigenous taaibos shrubs (*Searsia lucida*).



**Plate 4:** The single plant of the only Species of Conservation Concern found on the property – *Leucospermum conocarpodendron* ssp. *viridum* (kreupelhout). This plant is probably about five years old, and probably germinated from an underground seedbank after the first alien clearing operations in the area.



**Plate 5:** View of large specimens of kliphout (*Maytenus oleoides*) on the eastern bank of the Bokkemanskloof river. The open space area should be expanded to include these trees, plus a 5m buffer.

The indigenous plant diversity on site is perhaps only 30% of what would be expected in a pristine example of this habitat. This means that indigenous plant diversity is fairly low, but this total would be expected to rise gradually with time, such that in about ten years a further 20% could be added to the species list, provided that surveys were undertaken at the appropriate time of the year.

The largest indigenous plants on site are a fine patch of *Maytenus oleoides* (kliphout) growing near the eastern bank of the Bokkemenskloof river (see Plate 5).

No plant Species of Conservation were recorded anywhere on site, with the exception of a single young plant of *Leucospermum conocarpodendron* subspecies *viridum* (kreupelhout; Plate 4). This subspecies is listed as Near Threatened (Raimondo et al 2009), and is fairly common on this part of the Peninsula, and is very common on the south Peninsula. This plant was recorded just below the westernmost open space area indicated in Figure 3.

There is considered to be a very low likelihood of plant Species of Conservation Concern occurring within Enclave 2 on this site, most of which are likely to be bulbs or even annuals. It would thus probably be necessary to burn the site and then undertake a late winter or spring survey in order to find most of these more cryptic species, if indeed any are still present in the ground as seed or bulbs.

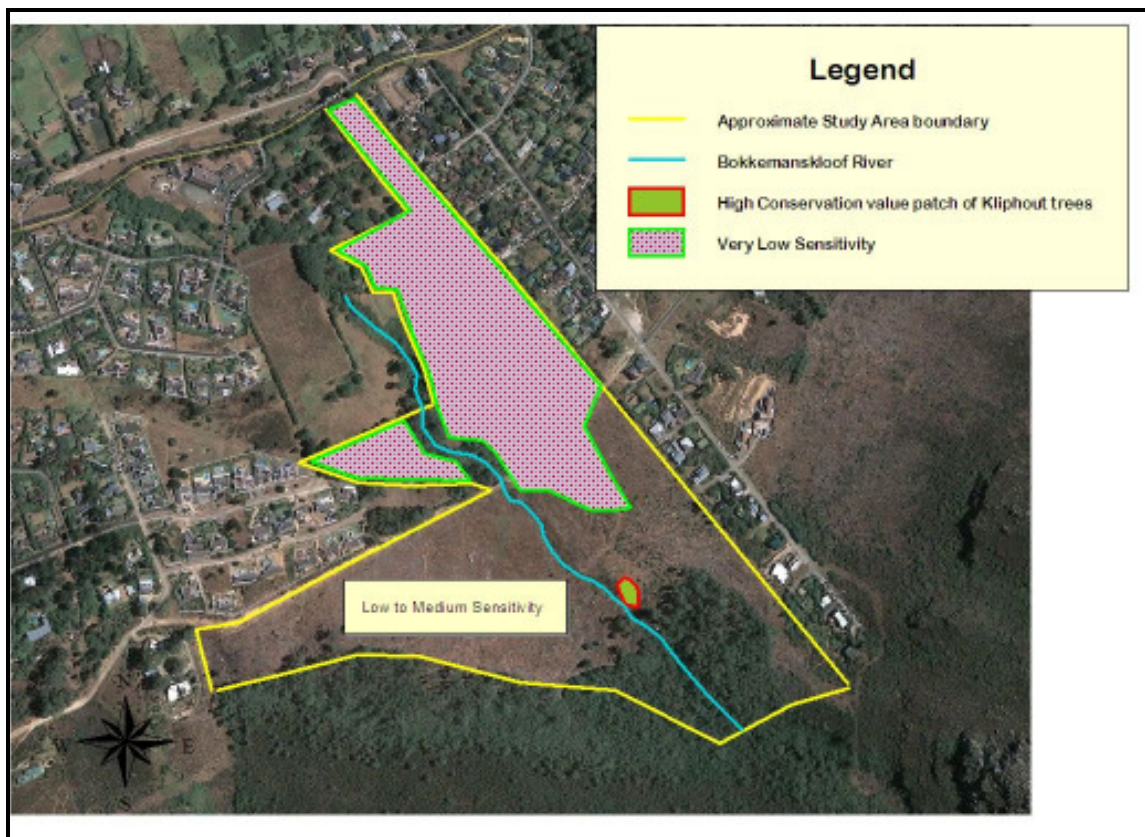
#### **4.4 Conservation Assessment**

Given that the underlying vegetation type within the proposed development area is now regarded as Critically Endangered, and it at least partly intact, it would appear that the area should in theory be viewed as an area of High conservation value. However, this view needs to be balanced by the following observations: Peninsula Granite Fynbos is in the fortunate and unusual position of being “fully conserved”, in that its national conservation target of 30% has already been achieved (33% conserved; Rouget et al 2004); far higher priority areas of this vegetation type remain unconserved (Helme 2009); the City of Cape Town’s Biodiversity network (Holmes 2008) has not identified this as a priority conservation area; species diversity on site is currently less than 33% of what would be expected in an undisturbed example of this habitat, and there is little evidence of plant Species of Conservation Concern returning to the site in the last 5 years since it was first cleared of dense woody alien vegetation; the site will require ongoing ecological maintenance in order to remain relatively alien free and thus to have any chance of successful rehabilitation; and that



Species of Conservation Concern will probably have to be deliberately reestablished in the area, or in other words active rather than just passive rehabilitation would be necessary if the area is to support a sample of the more sensitive plant species that were lost due to the previous disturbances.

On balance it is this author's view that the proposed development area Enclave 1 has a Very Low or Negligible conservation value, and that most of Enclave 2 has a Low to Medium regional conservation value, with a pocket of High conservation value along the river. In this respect the current study concurs with McDonald (2008) regarding Enclave 1, and differs slightly regarding Enclave 2 (McDonald concluded that this area was of Low conservation value).



**Figure 4:** Basic Botanical Sensitivity map of the study area.

## 5. RESTORATION POTENTIAL

The more heavily degraded or transformed an area the more difficult it will be to restore the original natural vegetation. In this regard the Very Low sensitivity area indicated in Figure 4 is considered effectively unrestorable.

Any area with at least a largely intact soil structure and chemistry is technically restorable, and the success thereof depends, among other factors, on:

- time and money available
- expertise available
- seed and propagule availability
- irrigation potential
- rainfall seasonality and amount
- and availability of other potential key ecosystem drivers, such as fire.

It is this author's view that the Peninsula Granite Fynbos in the area designated as "Low to Medium Sensitivity" in Figure 4 is technically rehabilitable, to a certain degree. In other words, given the availability of all the criteria listed in the previous paragraph, the original natural vegetation in this area could be restored to a point where it is considered ecologically valuable, functional and self-sustaining (although this latter point will be dependant on fire at appropriate intervals, which may not be possible in this context).

The reality of the situation is that the study area is within the designated Urban Edge, full rehabilitation will be expensive, it will be expensive to maintain, and few landowners are likely to be prepared to take on this challenge and financial burden.

## 6. BOTANICAL MITIGATION AND MANAGEMENT MEASURES

This is not a basic assessment or impact assessment, but the following mitigation for any future development on this site is noted.

### 6.1 Planning Phase

- The High conservation value area indicated along the Bokkemanskloof river, indicated in Figure 4, should be incorporated into the proposed green space system, and must have a 5m development buffer.
- It is suggested that all drainage lines and rivers have a 10m development buffer, taken from the current upper, outer edge of all channels.

## 6.2 Construction Phase

There is little that can be done during the construction phase to mitigate botanical impacts, apart from ensuring that disturbance to the proposed green spaces is minimised. No material should be dumped in these areas, and specifically no concrete or cement (both highly poisonous to soil and plants) should be allowed in these areas, which must be clearly demarcated prior to any site preparation, using temporary fencing and signage. An ECO should oversee the main development phase. A freshwater ecologist should advise regarding mitigation for all wetland areas.

## 6.3 Operational Phase

- All landscaping should be with suitable indigenous plant species. None of these species should be invasive. Ideally the bulk of the plants should be locally indigenous Granite and Sandstone Fynbos species, but selected other species could be used.
- No kikuyu grass (*Pennisetum clandestinum*) or pampas grass (*Cortaderia species*) may be used on site.
- The private gardens on site, and all public spaces, should be kept free of alien invasive vegetation.
- It is recommended that the Endangered silver tree (*Leucadendron argenteum*) be extensively planted, as it occurs naturally on the northern Peninsula, typically on richer soils just below the sandstone layer.
- The riverine areas should be rehabilitated with a suitable mix of indigenous riverine and Thicket tree species.

## 7. CONCLUSIONS

- Enclave 1 presents no botanical constraints to development.
- The natural vegetation in Enclave 2 is considered to be technically rehabilitable, but only with substantial inputs. There seems no strong reason why these inputs should be forthcoming or required, given that the site is not a designated conservation priority area, and that the underlying vegetation is well conserved. There thus seems to be no sound ecological reason why the proposed development cannot be seriously considered, provided that all suggested mitigation is considered part of the plan.

## 8. REFERENCES

- DEA. 2009. The Draft National List of Threatened Ecosystems. *Government Gazette* Vol 533: No. 32689. National Printer, Pretoria.
- De Villiers, C., Driver, A., Brownlie, S., Clark, B., Euston Brown, D., Helme, N., Holmes, P., Job, N., and Rebelo, A. 2005. Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum c/o Botanical Society of SA: Conservation Unit, Kirstenbosch, Cape Town.
- Driver, M., Raimondo, D., Maze, K., Pfab, M., and N. Helme. 2009. Applications of the Red List for conservation practitioners. *In*: 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.
- Helme, N. and T. Trinder-Smith. 2006. The endemic flora of the Cape Peninsula, South Africa. *South African Journal of Botany* 72 : 205-210.
- Helme, N. 2009. Botanical constraints study of Oudekraal property, Camps Bay. Unpublished report for Doug Jeffery Environmental Consultants, Klapmuts. Nick Helme Botanical Surveys, Scarborough.
- Holmes, P., J. Wood and C. Dorse. 2008. Updated and groundtruthed CoCT Biodiversity Network on GIS (cd), together with City of Cape Town – Biodiversity Report. Environmental Management Branch, City of Cape Town. Available from: [www.iclei.org/lab](http://www.iclei.org/lab)
- McDonald, D. 2008. Botanical evaluation of Erf 2224, Hout Bay, City of Cape Town, Western Cape. Unpublished report for Sillito Environmental Consulting, Tokai. Bergwind Botanical Surveys and Tours, Claremont.
- Mucina, L. and M. Rutherford. Eds. 2006. Vegetation map of South Africa, Lesotho, and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- 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.

Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2004. *South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component*. Pretoria: South African National Biodiversity Institute.

Wood, J., A. Low, J. Donaldson and A. Rebelo. 1994. Threats to plant species diversity through urbanization and habitat fragmentation in the Cape Metropolitan Area, South Africa. *In*: Huntley, B (ed.). *Botanical Diversity in Southern Africa. Strelitzia 1*. SANBI, Pretoria.