INTEGRATED
RESERVE MANAGEMENT PLAN

BRACKEN NATURE RESERVE

June 2011

CITY OF CAPE TOWN | ISIXEKO SASEKAPA | STAD KAAPSTAD

THIS CITY WORKS FOR YOU

AUTHORIZATION PAGE

This Integrated Management Plan for the Bracken Nature Reserve was drafted by the Area Manager and recommended by the Reserve Planning Team, a multi-disciplinary team consisting of:

Reserve Planning Team:

Branch Manager, Regional Manager, Area Manager, Biophysical Specialist, Biodiversity Coordinator, Sustainable Resource Specialist and Monitoring and Evaluation Coordinator

_____

Tshepo Mamabolo – Area Manager

Biodiversity Management Branch

Environmental Resource Management Department

City of Cape Town

Name and Title	**Signature and Date**
Mr Jacob Hugo Executive Director: Economic, Environment and Spatial Planning Directorate	

Approved by:

Name and Title	**Signature and Date**
Mr Anton Bredell Minister of Local Government, Environmental Affairs and Development Planning	

DOCUMENTED

Integrated Reserve Management Plan ***This management plan replaces any previous versions***	
Document Version: *Version.02*: June 2011	Prepared by: Adele Pretorius Responsibility: Reserve Management plans
Document reference: (*DEA&DP reference to be inserted*)	Approved by: Mr Anton Bredell Position: Minister of Local Government, Environmental Affairs and Development Planning Date of approval: Date of implementation : Immediate
Distribution: Distribute as Reserve Management Plan to relevant staff in the City of Cape Town for immediate implementation.	
Date for Revision: June 2016	

INTEGRATED RESERVE MANAGEMENT PLAN

Compiled by

Tshepo Mamabolo

Biodiversity Management Branch

Environmental Resource Management Department

City of Cape Town

Bracken Nature Reserve

June 2011

ISBN NUMBER

TABLE OF CONTENTS

List of Appendices

A. Charts and Tables

B. Legal Agreements

C. Species Checklists

D. Other documents as required

List of abbreviations used

APO	**annual plan of operations**
C.A.P.E	**Cape Action for People and the Environment**
CDF	**Conservation Development Framework**
CFR	**Cape Floristic Region**
EIA	**environmental impact assessment**
EMP	**Environmental Management Plan**
FoB	**Friends of Bracken**
GIS	**geographic information system**
IDP	**Integrated Development Plan**
IMEP	**Integrated Metropolitan Environmental Policy**
IRMP	**Integrated Reserve Management Plan**
LBSAP	**Local Biodiversity Strategy and Action Plan**
METT-SA	**Management Effectiveness Tracking Tool South Africa**
MOU	**memorandum of understanding**
NEMA	**National Environmental Management Act**
NEMBA	**National Environment Management Biodiversity Act**
PAR	**protected-area review**
RPC	**Reserve Planning Committee**

PART 1

DESCRIPTION

1. INTRODUCTION

Bracken Nature Reserve is one of the Core Floral Conservation Sites in the heart of the Brackenfell suburb, surrounded by a small industrial area. The reserve has several breathtaking view points, one being Kanonkop (Cannon Hill), the hill overlooking the Brackenfell residential area, Table Mountain and Bottelary Hills. The hill got its name in the 1700s, when a cannon would be fired from the top of the hill to inform the farmers in surrounding areas when the ships would be approaching the harbour. The farmers took this as their cue to bring their produce to the harbour.

East of Bracken Nature Reserve is the 2,2 ha Perdekop section, which acts as a satellite site of Bracken Nature Reserve. This precious jewel is well renowned among botanists and conservationists for its rich biodiversity and high number of endemic species. More than 240 plant species have been recorded on both sites. The vegetation types on these sites consist mainly of Swartland Granite Renosterveld and Cape Flats Sand Fynbos. Both vegetation types are poorly conserved and severely threatened with extinction. The reserve also supports a myriad of rodents, mammal and bird life. Regularly sighted birds on site include *Falco peregrinus* (Peregrine Falcon), *Elanus caeruleus* (Black-shouldered Kite), *Calandrella cinerea* (Red-capped Lark) and *Francolinus africanus* (Grey-winged Francolin).

The strategic management planning process (which resulted in the development of an Integrated Reserve Management Plan, or IRMP) for Bracken Nature Reserve, including the Perdekop section, began with the definition of the vision followed by the purpose for the reserve. This purpose is then supported by desired states for the reserve. The reserve objectives contribute to realising the purpose and desired states. For each desired state, a number of management objectives are identified. These management objectives are then implemented through the identification of outputs. Objectives for each desired state are prioritized for the five-year time horizon of the plan. Time frames, deliverables, performance indicators and targets are then allocated to each objective, or a group of linked outputs contributing to the desired state.

1.1 Aim of the Integrated Reserve Management Plan

The aim of the IRMP is to ensure that Bracken Nature Reserve has clearly defined objectives and activities to direct the protection and sustainable use of its natural, scenic and heritage resources over a five-year period. The IRMP thus provides the medium-term operational framework for the prioritised allocation of resources and capacity in the management, use and development of the reserve. The IRMP intends to add value and continuity by clearly stating management objectives, scheduling action, and providing management guidelines.

The planning process for Bracken Nature Reserve takes place against the backdrop of (i) the City of Cape Town's Integrated Development Plan (IDP) (Anon 2010); (ii) the City of Cape Town's Integrated Metropolitan Environmental Policy (IMEP) (Anon 2003[1]); (iii) the biodiversity strategy (Anon 2003[2]) and the Local Biodiversity Strategy and Action Plan (LBSAP) (Anon 2009[1]), and (iv) the bioregion (Cape Action for People and the Environment, or C.A.P.E). The major elements of the IRMP are this document (overall strategy, vision and context); the detailed subsidiary plans (as required), and an annual plan of operations (APO). The IRMP for Bracken Nature Reserve is supported by a State of Biodiversity report, operational guidelines, and a monitoring and evaluation framework to ensure ongoing implementation and review of protected-area management activities (figure 1).

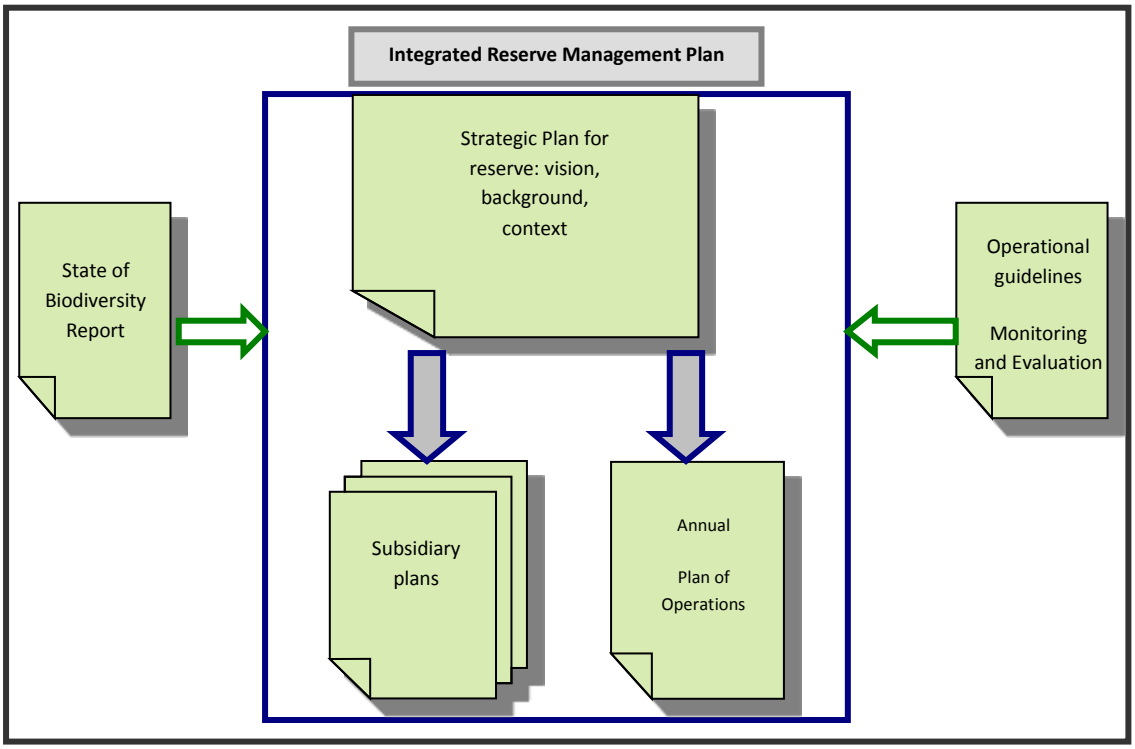


Figure 1: Elements of the IRMP

The IRMP for Bracken Nature Reserve forms part of a tiered series of policies, legislation and related planning documents at the sector, institutional, agency and local levels (see figure 2).

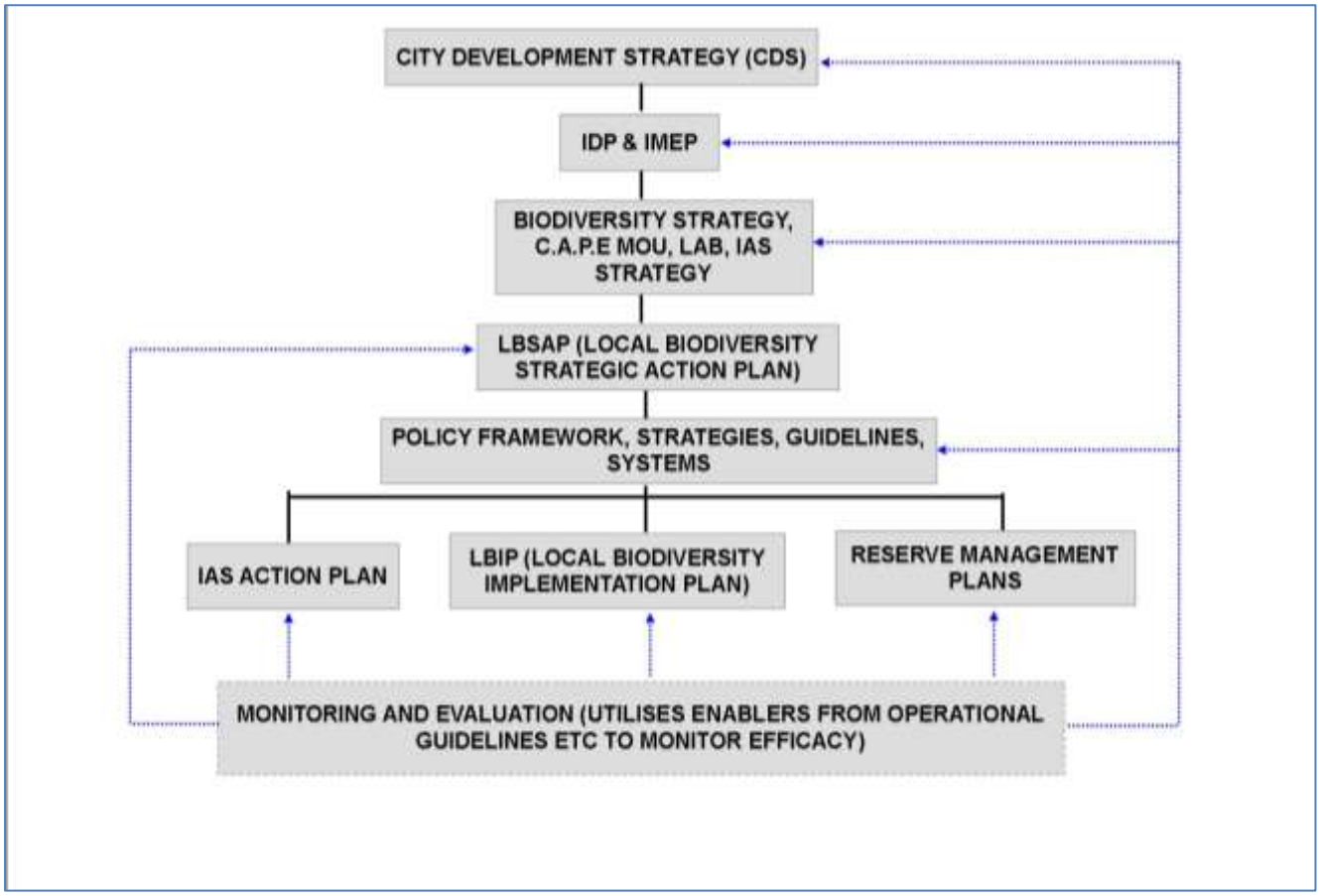


Figure 2: Legal and planning framework for the IRMP

Where possible, emphasis has been placed on the following:

- Assigning responsibility for management interventions
- Scheduling said management interventions
- Quantifying management costs

This approach is specifically intended to create a mechanism whereby management intervention can be monitored and audited on an annual basis.

In context, this IRMP is a dynamic document, and the detailed subsidiary plans should be updated on an annual basis or as soon as new information comes to light that may better inform decisions on responsible land management. The IRMP should be updated every five years.

The drafting of this management plan has been guided by a small interdisciplinary Reserve Planning Committee (RPC) comprising the branch manager, the regional manager, the area manager, various specialists, and other interested and affected persons. Repeated drafts of the IRMP were presented to, and discussed by, the RPC before broader circulation for public participation.

Pre-engagement workshops were held with community partners from March to May 2010. This afforded key community partners an opportunity to provide their input at an early stage. Where practical, the ideas and outputs from the workshops have been incorporated into the IRMP. In the past, during the drafting of the Bracken Environmental Management Plan (EMP) in 2002, public engagement was regarded as the crucial component of the project. Numerous public participation meetings were held from February to April 2002. All issues raised were used as the basis of formulating a vision for the reserve. A possibility of a management forum was proposed; the forum was formed and consisted of City of Cape Town officials, consultants and members of the public. The main aim of the forum was to ensure that the public views are incorporated into the EMP. June 2002 was the last formal meeting of the management forum, when the EMP was handed over to Oostenberg Municipality.

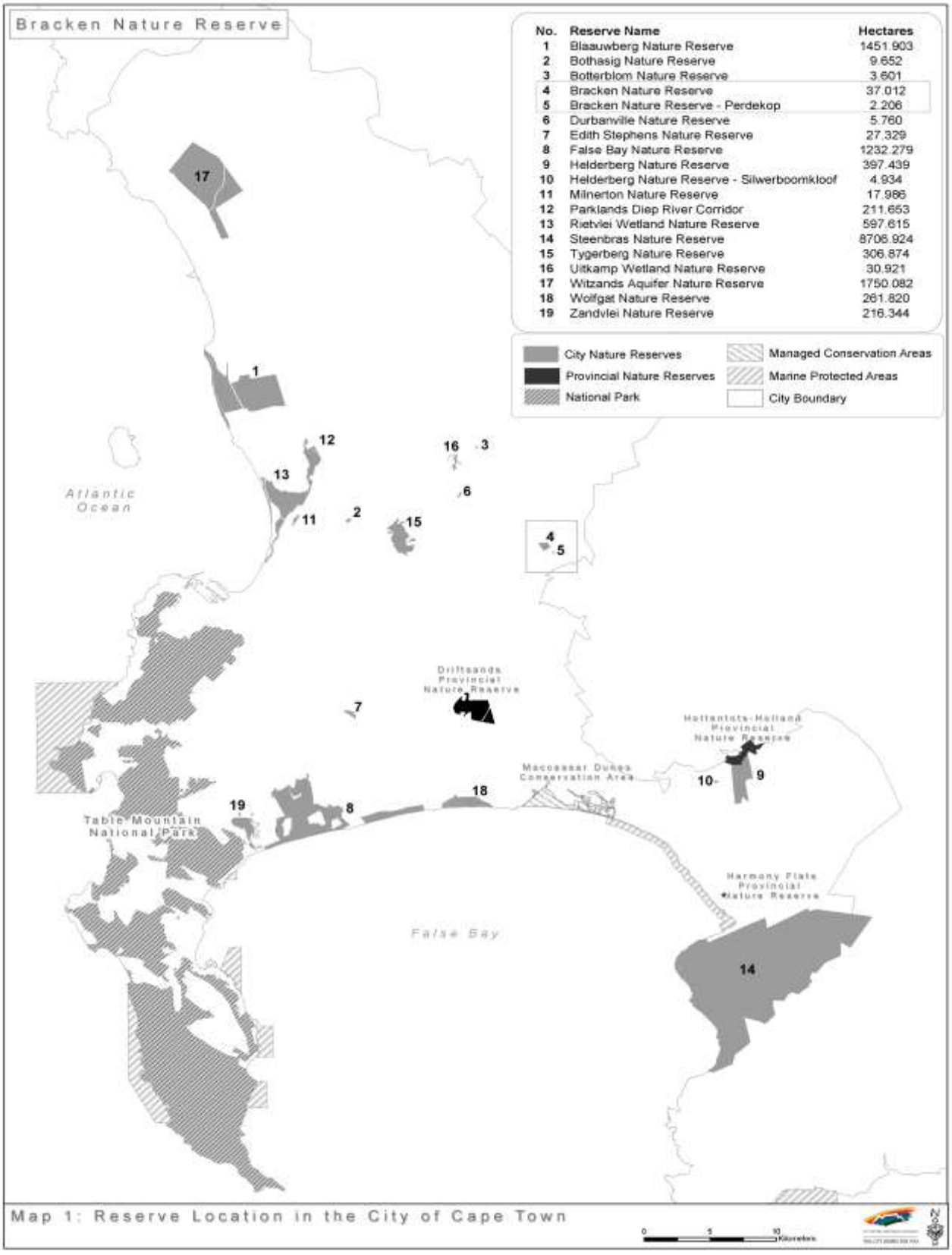
1.2 Location and extent

Bracken Nature Reserve is situated within the City of Cape Town metropolitan boundaries in the Brackenfell region. It is located in the Biodiversity Management Branch's central region. The reserve is surrounded by light industrial and residential areas. The reserve is approximately 40 km west of the Cape Town city centre and approximately 4 km from Bottelary Hills. Please see map 1 for Bracken Nature Reserve's location in Cape Town.

The reserve covers an area of 36 ha, and is located at the following grid references: 33°52'45.576"S 18°42'46.717"E

The Perdekop section is a granite outcrop of 2,2 ha east of Bracken Nature Reserve. The site is of high conservation value, and is well renowned for its rich biodiversity and high number of endemic species. The Perdekop section is located at the following grid references: 33°53'3.31"S 18°43'14.049"E

(see map 2 for Bracken Nature Reserve boundaries).



Map 1: Nature reserve location in Cape Town

Map 2: Bracken Nature Reserve boundaries

2. DESCRIPTION OF LANDHOLDINGS AND OWNERSHIP

2.1 Property details and title deed information

Bracken Nature Reserve was proclaimed a local-authority nature reserve in June 1976 in terms of the Provincial Nature and Environmental Conservation Ordinance, No 19 of 1974 (Proclamation Gazette P.K 613/1976) (see appendix 3).

Perdekop section is currently zoned as public open space. The site consists of erf 11072 and erf 11073. The City of Cape Town purchased the latter from a private landowner in 1996 under title deed no. T23276/1996 (see appendix 4).

- Erf 2981, Bracken Nature Reserve, size 35,66 ha, property owner City of Cape Town
- Erf 3508, Bracken Nature Reserve, size 1,05 ha, property owner City of Cape Town
- Erf 2979, Bracken Nature Reserve, size 0,18 ha, property owner City of Cape Town
- Erf 11072, Perdekop section, size 1,57 ha, property owner City of Cape Town
- Erf 11073, Perdekop section, size 0,64 ha, property owner City of Cape Town

(see map 3 for reserve erven)
(see appendix 5 for Surveyor General diagrams)

Map 3: Reserve erven

2.2 Landscape perspective

The reserve falls within the Cape Floristic Region (CFR), the smallest yet richest of the world's six floral kingdoms, and the only one to be found entirely within one country. This rich biodiversity is under serious threat due to the conversion of natural habitat to permanent agricultural area, inappropriate fire management, rapid and insensitive development, overexploitation of water resources, and infestation by invasive species. The region has been identified as one of the world's 'hottest' biodiversity hot spots (Myers *et al*. 2000).

In response to this challenge, a process of extensive consultation involving various interested parties, including local government and non-governmental organisations, resulted in the establishment of a strategic plan (C.A.P.E Project Team 2000) referred to as Cape Action Plan for People and the Environment, which identified the key threats and root causes of biodiversity losses that need to be addressed in order to conserve the CFR. This resulted in a spatial plan identifying areas that need to be conserved and a series of broad programme activities that need to take place over a 20-year period. Based on the situation assessment and analysis of threats, three overarching, mutually complementing and reinforcing themes were developed:

- To establish an effective reserve network, enhance off-reserve conservation, and support bioregional planning
- To strengthen and enhance institutions, policies, laws, cooperative governance and community participation
- To develop methods to ensure sustainable yields, promote compliance with laws, integrate biodiversity concerns with catchment management, and promote sustainable eco-tourism

The Cape Action for People and the Environment (C.A.P.E) partnership was formed and works together to implement the C.A.P.E vision and plan by strengthening institutions, supporting conservation efforts, enhancing education, developing tourism benefits, and involving people in conservation. The City of Cape Town was one of the 19 founding signatories of the C.A.P.E memorandum of understanding (MOU).

Bracken Nature Reserve forms an important platform and integral link in the City of Cape Town's biodiversity network (Anon 2009[2]). This network ensures that parcels of land worthy of conservation are included in a protective network, connected to other parcels of conservation-worthy land.

2.3 Physical environment

2.3.1 Climate

The climate of Bracken Nature Reserve and surrounding areas is typically Mediterranean, with rain falling predominantly in winter (May–September). Average precipitation (524mm per annum), Refer to appendix 1 and figure 3. The summers are warm to hot, with the maximum temperatures ranging from 20,8 ºC to 38,4 ºC, while the average minimum temperatures in June (mid-winter) are between 1,3 ºC and 13,2 ºC. The strongest and most frequent winds blow predominantly in summer from the south to south-east. During the winter months, the winds blow mostly from the north-west.

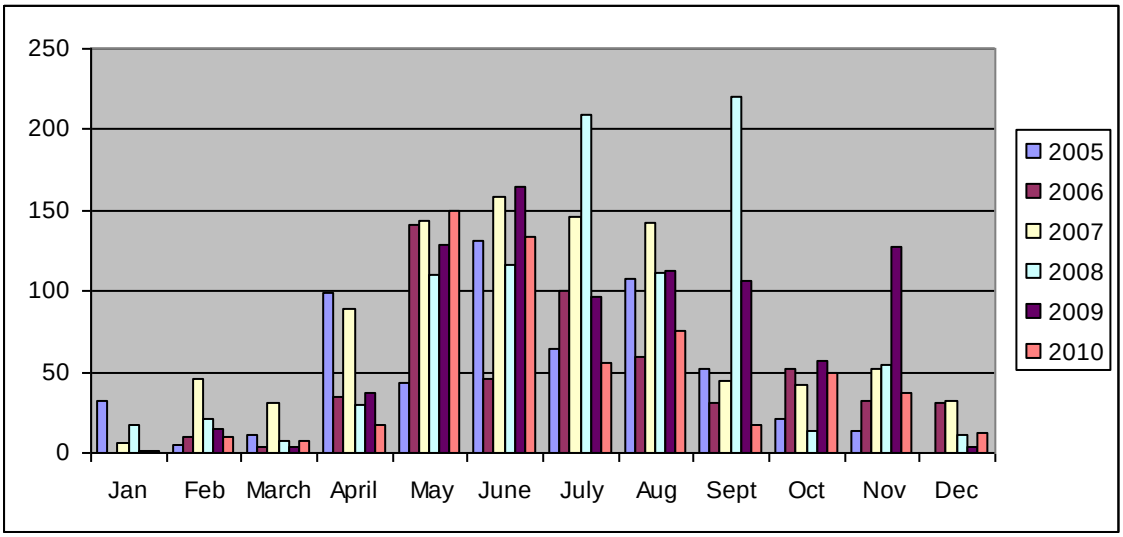


Figure 3: Rainfall data from January 2005 to December 2010 Recorded at Cape Town International Airport Weather Station

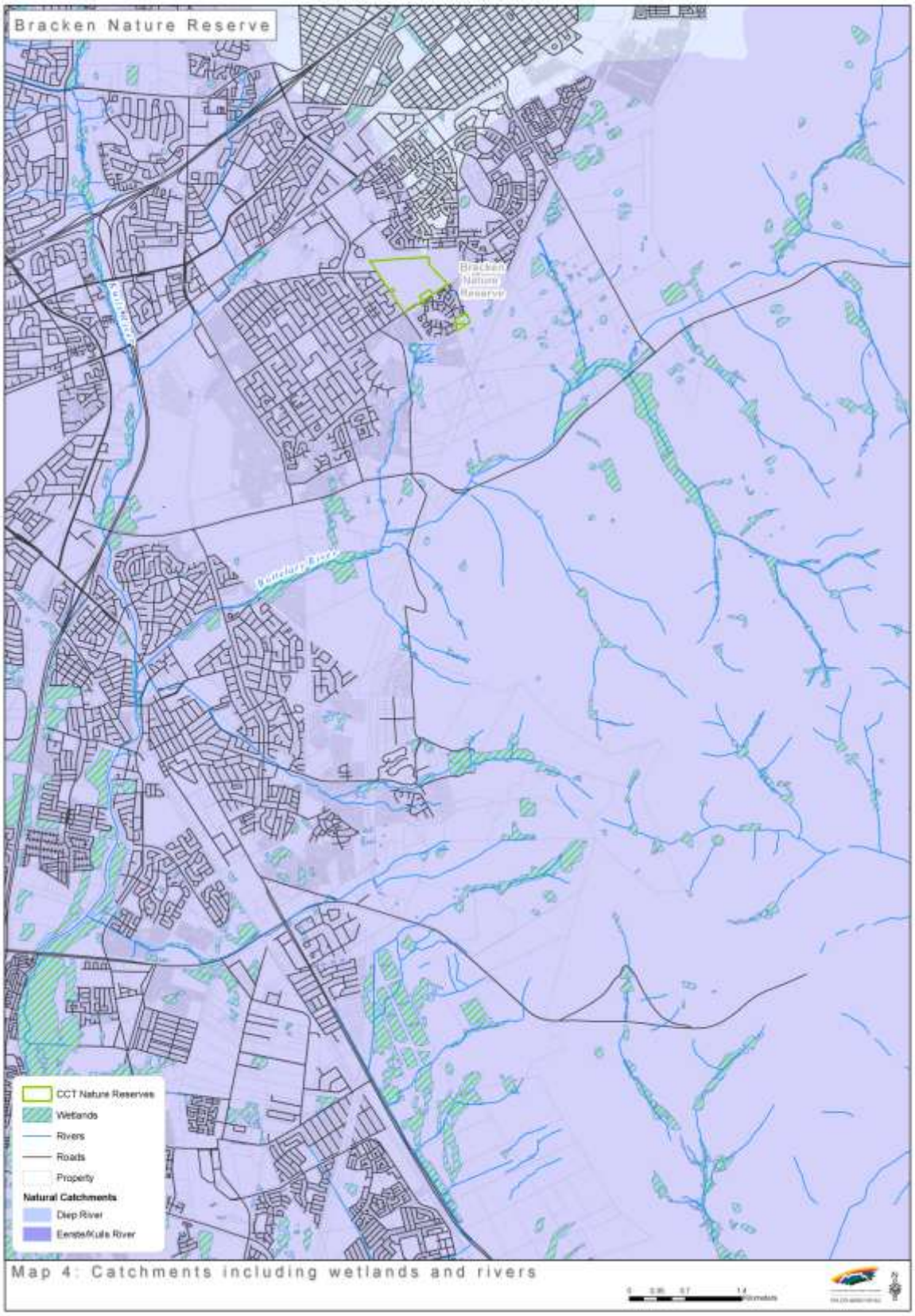
2.3.2 Geology, geomorphology, soils and land types

The soils are granite-derived, with an underlying geology constituting fractured Cape suite granites that have intruded into the Malmesbury group. Originally, the centre of the site comprised a granite outcrop. This outcrop was later quarried out and, in 1970, the local authority at the time, Oostenberg Municipality, decided to use the quarry as a landfill facility.

2.3.3 Hydrology and aquatic systems

2.3.3.1 Catchments

Bracken Nature Reserve has no significant rivers or wetlands. The information below is included as reference only. Map 4 illustrates the reserve in relation to the closest rivers and wetland systems. The hydrological sensitivity layer has two purposes: to identify areas important for maintaining hydrological processes and to identify areas where infrastructure could be damaged by flooding.



Map 4: Catchments, including wetlands and rivers

2.4 Biological environment

2.4.1 Vegetation

Swartland Granite Renosterveld is the dominant vegetation type at Bracken Nature Reserve (Rebelo *et al*. 2006). It is known for its richness in unique species diversity, including localised and endemic plant species that are threatened due to habitat degradation, agriculture and urban sprawl. This is a Critically Endangered vegetation type, of which almost 80% of its extent has already been transformed due to the prime quality of the land for agriculture, and also urban sprawl. The conservation target of 26% remains unattainable. To date, more than 200 plant species have been recorded in the reserve, of which six have been recorded and confirmed as endemic and threatened. These include *Xiphotheca reflexa* (Silver Pea) (Critically Endangered) and the *Lampranthus explanatus* (Geel SandVygie) (Critically Endangered).

Small portions of the reserve (0,5%) have statutory protection in Paarl Mountain Nature Reserve and the Pella research site, and also in the Paardenberg and Tienie Versveld Flower reserves near Darling (2%). Alien grasses are particularly pervasive, the most important being *Lolium multiflorum*, *Avena fatua* and *Bromus diandrus*. Alien woody species include *Acacia saligna*, *Pinus pinaster* as well as various species of *Eucalyptus*.

Distribution: Western Cape: Discrete areas in the Swartland: Largest patch centred on Darling, from Ratelberg in the north to Dassenberg near Mamre and Pella; several centred on Malmesbury, from Darmstadt in the north to the lower slopes of the Perdeberg (and small patches to the west towards Atlantis); east of Wellington from Micha to Valencia, lower surroundings of Paarl Mountain; Joostenberg, Muldersvlei, Bottelaryberg, Papegaaiberg (Stellenbosch West), to Firgrove and northern Somerset West. Altitude 50–350 m. Of this vegetation type, 6,8% occurs in and 93,2% occurs outside the City of Cape Town area. The rate of transformation nationally (75%) seems to have been lower than inside City of Cape Town borders (86%).

Vegetation and landscape features: Moderate foot slopes and undulating plains, supporting a mosaic of grasslands/herblands and medium-dense, microphyllous shrublands dominated by renosterbos. Groups of small trees and tall shrubs are associated with small hillocks (heuweltjies) and rock outcrops.

Geology and soils: Coarse, sandy to loamy soils of a variety of forms, ranging from Glenrosa and Mispah, to prismacutanic and pedocutanic diagnostic horizons, to red-yellow apedal soils – all derived from Cape Granite. The soils can contain a considerable volume of moisture in winter and spring.

Endemic taxa: Low shrubs – *Agathosma hispida, A. latipetala, Aspalathus glabrata, A. rycroftii*; succulent shrubs – *Antimima menniei, Erepsia hallii, Lampranthus citrinus, L. scaber, Phyllobolus suffruticosus, Ruschia klipbergensis*; herbs – *Arctopus dregei, Oncosiphon glabratum*; geophytic herbs – *Babiana pygmaea, B. regia, B. rubrocyanea, Geissorhiza darlingensis, G. eurystigma, G. malmesburiensis, G. mathewsii, G. radians, Haemanthus pumilio, Ixia aurea, I. curta, Lachenalia purpureo-caerulea, Moraea amissa, Oxalis stictocheila, Watsonia humilis.*

A small section (4 ha) of the western section of the reserve contains **Cape Flats sand fynbos**, of which less than 1% of its former extent is statutorily conserved. The national conservation target of 30% is unattainable, as only about 14% remains. See appendix 6 for a current species list.

Distribution: Largely endemic to the City of Cape Town: Cape Flats from Blouberg and Koeberg Hills west of the Tygerberg Hills, to Lakeside and Pelican Park in the south near False Bay; from Bellville and Durbanville, to Klapmuts and Joostenberg Hill in the east, and to the south-west of Bottelary Hills to Macassar and Firgrove in the south. Altitude 20–200 m. Nearly 100% of this vegetation type occurs within the City of Cape Town area, and 85% is transformed.

Vegetation and landscape f**eatures**: Moderately undulating and flat plains, with dense, moderately tall, ericoid shrubland containing scattered, emergent, tall shrubs. Proteoid and restioid fynbos are dominant, with asteraceous and ericaceous fynbos occurring in drier and wetter areas, respectively.

Geology and soils: Acid, tertiary, deep, grey regic sands, usually white, often Lamotte form.

Endemic taxa: Low shrubs – *Erica margaritacea, Aspalathus variegata* (probably extinct)*, Athanasia capitata, Cliffortia ericifolia, Erica pyramidalisW, E. turgida, E. verticillata, Leucadendron levisanus, Liparia graminifolia, Serruria aemula, S. foeniculacea, S. furcellata*; succulent shrub – *Lampranthus stenus*; geophytic herb – *Ixia versicolor*; graminoids – *Tetraria variabilis, Trianoptiles solitaria.*

2.4.2 Mammals

Due to the disturbance at the reserve during the previous two decades, the mammal diversity has been severely depleted. Baseline studies are being undertaken to establish updated species lists. To date, ten species of small mammal have been recorded (see appendix 7). A study is under way to determine the feasibility of re-introducing some of the medium-sized species, such as *Raphicerus melanotis* (Cape Grysbok).

2.4.3 Birds

The reserve supports a great diversity of bird species. To date, more than 50 bird species have been recorded. Regularly sighted is the *Calandrella cinerea* (Red -capped Lark), *Falco peregrinus* (Peregrine Falcon) (listed as Near Threatened in the Red Data book 2009). See appendix 8 for a detailed bird species list of the reserve.

2.4.4 Reptiles

The presence of only one Red Data threatened reptile has been confirmed at the reserve, namely *Psammophis leightoni* (Cape Sand Snake). This species is endemic to South Africa, and is currently listed in the Red Data book of South African reptiles as Data Deficient. The new proposed status for this species as in February 2009 is Near Threatened. Please see appendix 9 for reptile species that have been recorded to date at Bracken Nature Reserve.

2.4.5 Amphibians

The reserve supports species of amphibians such as *Tomopterna delalandii* (Cape Sand Frog) and the vulnerable *Brevicepts gibbosus* (Cape Rain Frog). Please see appendix 10 for an amphibian species list.

2.4.6 Invertebrates

The reserve supports a myriad insect life. Please see appendix 11 for a detailed species list.

2.5 Socio-political context

2.5.1 History

The hill overlooking Brackenfell in the reserve was called Kanonkop in the 1700s, as it was home to a large signalling cannon. The cannon would be fired from Signal Hill, overlooking Table Bay Harbour, and the cannons on the surrounding hills would in turn be fired to pass on the message to farmers in the countryside that ships had arrived, providing them with a market to sell their produce. The original cannon remains in the region, and can be found today at Bellview farm in the valley below.

The area was later renamed Brackenfell by G.H. Walton in 1901, after the Scottish Bracken (a hardy fern) and Fell (a stoney hill). This was recorded in 1946 by Mrs Windell in her version of *The History of Brackenfell*. A granite quarry was started in 1903, and the granite was used predominantly for mill stones, milestones and paving stones for the streets of Cape Town. The quarry was closed in the early 1950s, and the site stood empty for years (Ninham Shand & MCA 2002)

In 1970, the local authority (Oostenberg Municipality) began using the old quarry as a dumping site, no records of the initial permit were found. The Department of Water Affairs

and Forestry granted permit number B33/2/720/211/S/P203, dated 26 October 1985, to Brackenfell Municipality to further develop and operate certain portions of the reserve (Erf 2981) as a waste disposal site. The permit was issued in terms of section 20 of the Environmental Conservation Act (Act 73 of 1989). Please see appendix 15.

The entire area was recognised for its biological diversity in the early 1970s, and an effort was made to proclaim it as a nature reserve, which did eventually happen in 1976. An uneasy relationship developed between the two land uses, and the reserve suffered from the growing waste disposal needs of Cape Town. In 1985, the waste site was licensed by the Department of Water Affairs and Forestry, and it was predicted that the site would close in the first decade of the 21st century. The Brackenfell waste disposal site's operational functions were officially stopped in 2007, and site rehabilitation commenced a year later.

2.5.2 Socio-economic context

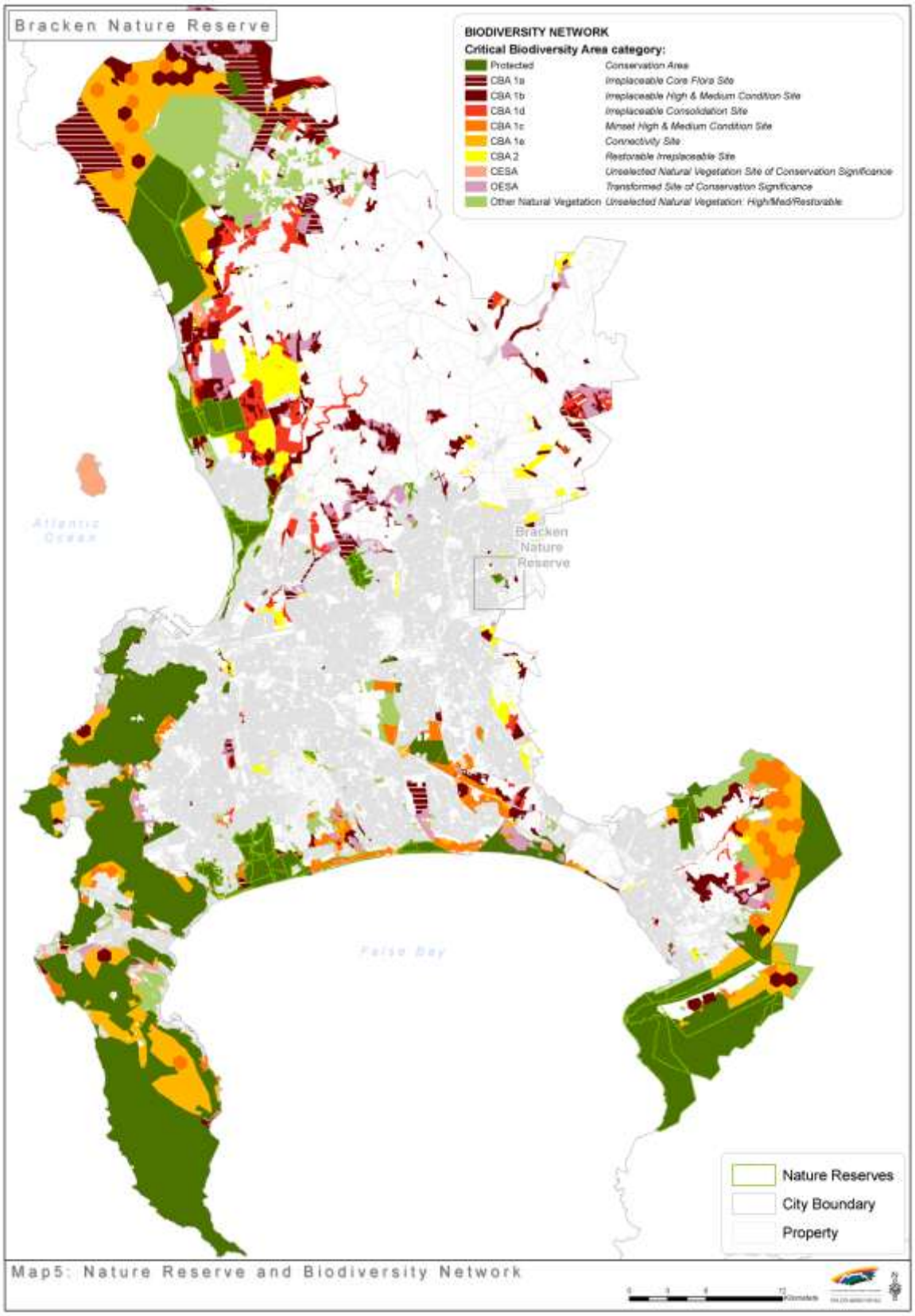
The reserve is surrounded by a wide range of communities. The northern section of the reserve is predominantly neighboured by low to middle-class communities, who are perceived to have very little knowledge of the reserve. As a result, their communication with, and input on, the management of the reserve is minimal. However, through the reserve's environmental education outreach programmes, learners from the surrounding schools are provided with an opportunity to be exposed to conservation in general, and Bracken Nature Reserve specifically. On the north-eastern boundary is Everite hostel, which consists of a population of more than 10 000 disadvantaged people, who are predominantly low-skilled and unemployed. The long-term plan is to contribute to local community development by supporting the Expanded Public Works Programme/poverty relief projects. Please see table 3 for an analysis of the reserve's socio-economic objectives. During stakeholder liaison workshops, the Everite community stated that they would like to be informed on progress in the reserve, and that they hope that the reserve will provide job opportunities.

In the south and east, the reserve is mainly bordered by middle-working class groups, who are partially involved in the reserve through the Friends of Bracken (FoB) volunteer group, which was established in 2006. To date, FoB has signed up 40 members, of whom 80% come from the middle-class communities. The community's expectation is to assist the reserve management in managing biodiversity as well as in marketing the reserve in order to ensure public awareness. However, most importantly, the community wants to encourage the community to visit the reserve. According to Ninham Shand and MCA (2002), public participation processes in February 2002 revealed that the perception of the surrounding communities was that the reserve is useful and has great potential and value to the locals and the Oostenberg area (previous administration). However, the lack of tourism interest in the Brackenfell area is apparently resulting in low visitor numbers to the reserve. Increasing

the number of visitors is still a great challenge for the reserve management, and also one of the community's expectations.

2.6 Protected-area expansion

The long-term expansion plans are to establish an ecological corridor through Crammix brick factory (erf 214/12) on the north-eastern boundary of the adjacent Perdekop section. The outcrop has been formally identified as a mixture of three of the most important and irreplaceable vegetation types in South Africa, namely Swartland Shale Renosterveld, Granite Shale Renosterveld and a small area of Cape Flats Sand Fynbos. The ecological corridor has the potential to act as a link between the 35 ha Bracken Nature Reserve (erf 2981) and Perdekop section (2,2 ha), ensuring the future survival of the sites by acting as an ecological corridor.



Map 5: Nature reserve and the biodiversity network

3. PURPOSE, VISION/MISSION, SIGNIFICANCE/VALUE

3.1 Purpose of the protected area

Bracken Nature Reserve is located in the CFR, an area of global biodiversity significance. The reserve conserves a unique combination of habitats, ecosystems and species, many of which are either rare or endemic to the area.

The primary purpose of the reserve is the **conservation of its unique biodiversity and associated ecosystem features and functions.**

In conserving this unique biodiversity, secondary objectives will include:

- the conservation of Critically Endangered Cape Sand Fynbos and Swartland Granite Renosterveld
- promoting sound environmental education principles; and
- the protection of a landscape of unique beauty and cultural heritage resources.

The purposes of a protected area are described in section 7, chapter 3 of the National Environmental Management: Protected Areas Act. The management plan must state the relevant criteria in section 17 that are used to establish the purpose of this protected area.

The purposes of declaring protected areas are:

- to protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes, in a system of protected areas;
- to preserve the ecological integrity of those areas;
- to conserve biodiversity in those areas;
- to protect areas representative of all ecosystems, habitats and species naturally;
- to protect South Africa's threatened or rare species;
- to protect an area that is vulnerable or ecologically sensitive;
- to assist in ensuring the sustained supply of environmental goods and services;
- to provide for the sustainable use of natural and biological resources;
- to create or augment destinations for nature-based tourism; and
- to manage the interrelationship between natural environment and man-made development.

3.2 Vision and mission

3.2.1 Vision

Integrated Development Plan vision

The vision of the City of Cape Town remains as follows:

- To be a prosperous city that creates an enabling environment for shared growth and economic development
- To achieve effective and equitable service delivery
- To serve the citizens of Cape Town as a well-governed and effectively run administration

To achieve this vision, the City recognises that it must:

- actively contribute to the development of its environmental, human and social capital;
- offer high-quality services to all who live in, do business in, or visit the city as tourists; and
- be known for its efficient, effective and caring government.

C.A.P.E vision

We, the people of South Africa, are proud to be the custodians of our unique Cape Floral Kingdom, and share its full ecological, social and economic benefits now and in the future.

Environmental Resource Management Department vision

To ensure that sustainable and equitable development is combined with sound environmental practice for a healthy local environment, which sustains people and nature, provides protection for our unique resources, and results in an enhanced quality of life for all.

Biodiversity Management Branch vision

To be a City that leads by example in the protection and enhancement of biodiversity; a City within which biodiversity plays an important role, and where the right of present and future generations to healthy, complete and vibrant biodiversity is entrenched; a City that actively protects its biological wealth, and prioritises long-term responsibility over short-term gains.

Bracken Nature Reserve vision

The vision for Bracken Nature Reserve is to be socially and ecologically sustainable and accessible to all. The reserve will protect and conserve the indigenous flora and fauna as well as heritage, while providing environmental education and recreational opportunities to all in a safe environment.

3.2.2 Mission

Biodiversity Management Branch mission

- To manage biodiversity proactively and effectively
- To ensure an integrated approach to biodiversity between City of Cape Town line functions and departments, and actively pursue external partnerships

- To adopt a long-term approach with regard to biodiversity
- To ensure sustainability of our rich biodiversity
- To adopt a holistic and multifaceted approach to biodiversity
- To continue to measure and monitor the City of Cape Town's performance in the protection and enhancement of biodiversity
- To continue to measure and monitor the state of biodiversity in Cape Town

Bracken Nature Reserve mission

To restore and maintain the natural environment and its associated ecological processes and services through the implementation of the management objectives of Bracken Nature Reserve.

3.3 Significance of property (biodiversity, heritage and social)

The natural area of the property contains Swartland Granite Renosterveld and Cape Flats Sand Fynbos, both classified as Critically Endangered by the South African National Spatial Biodiversity Assessment (2004).

Summary of qualifying site assessment criteria:

- The reserve hosts two Critically Endangered vegetation types.
- The reserve is home to over 200 plant species, six of which are threatened with extinction.
- The reserve has great potential to provide environmental education and recreational opportunities to the surrounding communities.

PART 2

MANAGEMENT POLICY FRAMEWORK

4. ADMINISTRATIVE AND LEGAL FRAMEWORK FOR THE MANAGEMENT AUTHORITY

4.1 Legal framework

Table 1: Legal Framework

The following is a list of legislation applicable to the management of the City of Cape Town's Biodiversity Management Branch. Repealed legislation has been included as greyed-out text for information purposes only.

Legislation: **Acts, ordinances, bylaws**	**Relevance:** **Description**	**Amendment:** **Latest amendment date**	**Comment:** **Other notes**
Constitution of the Republic of South Africa, Act 108 of 1996	Lists South African citizens' environmental rights	N/A	Chapter 2: Bill of Rights assigns citizens with particular rights
ENVIRONMENTAL LEGISLATION			
National legislation			
National Environmental Management Act (NEMA), Act 107 of 1998	One of the most important environmental laws relating to most aspects of the environment, including environmental impact assessments (EIAs), environmental information and legal standing, etc.	• Amendment Act 56 of 2002 • Amended by GN 26018, Vol 464 of 13 February 2004	Provides for cooperative environmental governance
National Environmental Management: Biodiversity Act, Act 10 of 2004	The objectives of the Act are to provide for: • the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; • the protection of species and ecosystems that warrant national protection; • the sustainable use of indigenous biological resources; • the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; and • the establishment and functions of a South African National Biodiversity Institute. In essence, the Act was put in place to safeguard the important	N/A	The development of the IRMP will assist in ensuring that the objectives of this Act are achieved in the reserve.

	biodiversity attributes in the country, while allowing people to benefit equally from the natural resources. In order to achieve these goals, the Act made provision for the South African National Biodiversity Institute (SANBI), which has been designated certain functions and afforded powers and duties in respect of this Act.		
National Environmental Management: Protected Areas Act, Act 57 of 2003	To provide for: • the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes and seascapes; • the establishment of a national register of all national, provincial and local protected areas; • the management of those areas in accordance with national norms and standards; • intergovernmental cooperation and public consultation on matters concerning protected areas; and • matters in connection therewith.	• Amendment Act 62 of 2008 • Amendment Act 15 of 2009	Regulations Notice 1029 of 2009 lists specific regulations for reserves proclaimed by the Member of the Executive Council (MEC) (draft August 2009).
Conservation of Agricultural Resources Act (CARA), Act 43 of 1983	The CARA regulations contain a list of alien invasive vegetation categorised according to their legal status. The Act regulates the sale, position and use of listed species.	• Amended by GN R 2687 of 6 December 1985 and GN R 280 of 30 March 2001	Alien invasive plant legislation to be included under the Biodiversity Act in future
National Veld and Forest Fire Act, Act 101 of 1998	Relates to veld fire prevention, fire protection associations, fire danger indexing, enforcement of fire legislation, and the fighting of fires	N/A	A detailed fire management plan will be developed.
Marine Living Resources Act, Act 18 of 1998	Regulates conservation of the marine ecosystem and the long term sustainable utilisation of marine living resources		
Environment Conservation Act, Act 73 of 1989	The Environment Conservation Act is the other law that relates specifically to the environment. Although most of this Act has been replaced by NEMA, some important sections still remain in operation. These sections relate to: • protected natural environments; • littering; • special nature reserves; • waste management; • limited-development areas; • regulations on noise, vibration and shock; and	• Environment Conservation Amendment Act 98 of 1991 • Environment Conservation Amendment Act 79 of 1992 • Environment Conservation Second Amendment Act 115 of 1992 • Environment Conservation Amendment Act 94 of 1993 • Environment Conservation	

	• EIAs.	Second Amendment Act 52 of 1994 • Proclamation R27 of 1995 • Proclamation R43 of 1996 • National Environment Management Act 107 of 1998	
National Water Act, Act 36 of 1998	Relates to all use of water and the management of all water resources in South Africa	•	
National Environmental Management: Air Quality Act, Act 39 of 2004	To provide for enhancing the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of the people		Promulgated to give effect to section 24(b) of the Constitution. The South African Air Quality Information System is a web-based system that provides information on the quality of ambient air across the country.
Animal Protection Act, Act 71 of 1962	To consolidate and amend the laws relating to the prevention of cruelty to animals	Animal Matters Amendment Act, Act 42 of 1993	
Animal Diseases Act, Act 35 of 1985	Provides for control measures relating to animal diseases		
Animal Health Act, Act 7 of 2002	Regulates animal health		
Game Theft Act, Act 105 of 1991	Regulates the ownership and protection of game		
Mountain Catchment Areas Act, Act 63 of 1970	Provides for catchment conservation		Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
National Heritage Resources Act 25 of 1999	Provides for the protection of heritage resources		N/A
World Heritage Conservation Act 49 of 1999	Incorporates the World Heritage Convention into South African law		N/A
Problem Animal Control Ordinance, Ordinance 26 of 1957	Regulates problem animals		Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
Mineral and Petroleum Resources Development Act, Act 28 of 2002	Provides for equitable access to, and sustainable development of, mineral and petroleum resources		
Atmospheric Pollution Prevention Act, Act 45 of 1965		Entire Act repealed on 1 April 2010 in favour of the National Environmental Management: Air Quality Act, Act 39 of 2004	

Provincial legislation			
Land Use Planning Ordinance, Ordinance 15 of 1985	The purpose of the Ordinance is to regulate land use and to provide for incidental matters related to land use.	• Assented to on 22 November 1985 • Western Cape Land Use Planning Ordinance, 1985, Amendment Act, 2004	Although it might not have a direct application in the management of nature reserves, it does affect the surrounding properties, and could possibly be used to control activities/developments around the reserves to minimise negative effects, for example in applying zoning restrictions.
Cape Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974	The purpose of this Ordinance is to regulate wild animals and plants, and the establishment of nature reserves.	Publication date 1 September 1975	Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
Western Cape Nature Conservation Board Act, Act 15 of 1998	The purpose of this Act is to promote and ensure nature conservation, render services and provide facilities for research and training and to generate income		Biodiversity agreements are signed under this Act.
Municipal legislation			
Integrated Metropolitan Environmental Policy (IMEP), 2001	Envisages a set of Citywide aligned strategies dealing with all aspects of the environment.		Influenced the Biodiversity Strategy, 2003
Biodiversity Strategy, 2003	To be a city that leads by example in the protection and enhancement of biodiversity	• Draft amendment for 2009–2019	Influenced the development of the IRMP
City of Cape Town Bylaw relating to Stormwater Management, LA 31420	To provide for the regulation of stormwater management in the area of the City of Cape Town, and to regulate activities that may have a detrimental effect on the development, operation or maintenance of the stormwater system	• Publication date 23 September 2005	Communication strategy and action plan will take effect to address the issues with the relevant departments
City of Cape Town Air Pollution Control Bylaw, LA 12649	The purpose of this bylaw is to give effect to the right contained in section 24 of the Constitution of the Republic of South Africa Act (Act 108 of 1996) by controlling air pollution within the area of the Council's jurisdiction; to ensure that air pollution is avoided, or, where it cannot be altogether avoided, is minimised and remedied.	• Publication date 4 February 2003	
Bylaw relating to Community Fire Safety, Province of the Western Cape, LA 11257	The purpose and scope of the bylaw is to promote the achievement of a fire-safe environment for the benefit of all persons within the	• Publication date 28 February 2002	A fire management plan to be designed

	municipality's area of jurisdiction, and to provide for procedures, methods and practices to regulate fire safety within the municipal area.		
City of Cape Town Draft Animal Bylaw, 2009	The purpose of the Bylaw is to formulate a new single bylaw, including ten different municipal dog bylaws and the Animal Protection Act of 1962. The Bylaw includes chapters on dogs, cats, poultry and working equines.	• Draft, 2009	
HUMAN RESOURCES/ADMINISTRATION LEGISLATION			
National legislation			
Occupational Health and Safety Act, 1993	To provide for the health and safety of persons at work, and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety, and to provide for matters connected therewith.	Occupational Health and Safety Amendment Act, No 181 of 1993	
Basic Conditions of Employment Act, Act 3 of 1997	Provides for control measures pertaining to employment	• Amendment Act 11 of 2002	
Labour Relations Amendment Act, Act 66 of 1995	The Act aims to promote economic development, social justice, labour peace and democracy in the workplace.	• Labour Relations Amendment Act, 42 of 1996 • Afrikaans Labour Relations Amendment Act, 1998 • Labour Relations Amendment Act, 127 of 1998 • Labour Relations Amendment Act, 2000 • Amendment Act 12 of 2002	
Local Government Municipal Systems Act, Act 32 of 2000	Establishes core principles, processes and mechanisms relating to local government		
Promotion of Equality/Prevention of Unfair Discrimination Act, Act 4 of 2000	Provides for the prevention of discrimination and other related matters		

Criminal Procedure Act, Act 51 of 1977	Makes provision for procedures and related matters in criminal proceedings	• Criminal Procedure Amendment Act, Act 65 of 2008	
Firearms Control Act, Act 60 of 2000	To establish a comprehensive and an effective system of firearms control and, to provide for matters connected therewith		
Civil Aviation Act, Act 13 of 2009			
Fencing Act, Act 31 of 1963	Regulates all matters relating to fencing		
Hazardous Substances Act, Act 15 of 1973	Controls substances that may cause injury or ill health to, or death of, human beings by reason of their toxic nature		
Land Survey Act, Act 8 of 1997	Regulates land surveying, beacons and other related matters		
Promotion of Access to Information Act, Act 2 of 2000	Promotes access to information		
Promotion of Administrative Justice Act, Act 3 of 2000	Provides for the promotion of administrative justice	• Amendment Act 53 of 2002	
Regional Services Council Act, Act 109 of 1985	Regulates and controls land, land use and other related matters		
Skills Development Act, Act 97 of 1998	Promotes the development of skills		
State Land Disposal Act, Act 48 of 1961	Regulates the disposal of state-owned land		
Subdivision of Agricultural Land Act, Act 70 of 1970	Regulates the subdivision of agricultural land		
Tourism Act, Act 72 of 1993	Provides for the promotion of tourism, and regulates the tourism industry		A tourism strategy is envisaged.
Public Resorts Ordinance, Ordinance 20 of 1971	Regulates nuisance and pollution control		
Municipal Ordinance, Ordinance 20 of 1974	Regulates pollution and waste management		
South African National Road Agency Limited and National Roads Act, Act 7 of 1998			
Aviation Act, Act 74 of 1962	Provides for the control, regulation and encouragement of aviation activities in the Republic of South Africa	• Repealed in favour of the Civil Aviation Act, Act 13 of 2009	
Provincial legislation			
Western Cape Land Administration Act, Act 6 of 1998	Regulates land and land use		
Western Cape Planning and Development Act, Act 7 of 1999	Regulates planning and development within the province		

Municipal legislation			
City of Cape Town Bylaw relating to Filming, LA30441	The purpose of the Bylaw is to regulate and facilitate filming in Cape Town.	• Provincial Gazette 6277, 24 June 2005	
City of Cape Town Bylaw relating to Streets, Public Places and the Prevention of Noise Nuisances, 2007	The purpose of the Bylaw is to regulate activities in streets and public places, and to prevent excessive noise nuisance	• Promulgated 28 September 2007, PG 6469; LA 44559	
City of Cape Town Bylaw relating to signage		•	

4.2 Administrative framework

Bracken Nature Reserve is managed by the City of Cape Town's Biodiversity Management Branch in the Environmental Resource Management Department of the Strategy and Planning Directorate. The reserve is located in the central region, and falls under the oversight of the regional manager. Bracken Nature Reserve is the management responsibility of an area manager, assisted by one reserve manager, one field ranger and one student and intern (see appendix 2). The operational management of Bracken Nature Reserve is supported by various other City of Cape Town departments, including, but not limited to, Law Enforcement, Bulk Water, Water & Sanitation, City Parks, Human Resources, and Finance.

The district-based administrative officer operates from Tygerberg Nature Reserve, as does the regional manager.

5. PROTECTED-AREA POLICY FRAMEWORK & GUIDING MANAGEMENT PRINCIPLES

5.1 Management objectives

5.1.1 Biodiversity and heritage objectives

Table 2: Bracken Nature Reserve biodiversity and heritage management objectives

High-level objective	*Objective*	*Sub-objective*	*Initiative*	*Low-level plan*
CONSERVATION OF REPRESENTATIVE, FUNCTIONAL ECOSYSTEMS To conserve a representative sample of the region's ecosystems in a linked landscape, and maintain or restore environmental processes to enable natural spatial and temporal variation in structural, functional and compositional components of biodiversity	**Representative ecosystems** To incorporate a spectrum of viable terrestrial ecosystems characteristic of Bracken Nature Reserve, and to re-introduce missing elements where possible	**Consolidation and expansion of land areas** Consolidate protected areas, focusing on underrepresented ecosystems, functional linkages and processes	(1) Identify degraded and neglected habitats/ecosystems (2) Consolidate reserve boundaries (3) Incorporate untransformed pockets of indigenous veld (4) Establish ecological corridors linking Bracken Nature Reserve and the Perdekop section	Nature reserve expansion plan (to be compiled)
		Re-introduction of biota Where possible, re-establish locally extinct or depleted biodiversity components and populations in accordance with International Union for Conservation of Nature principles and guidelines	(1) Re-establish indigenous herbivore complement within constraints of reserve size and urban setting	Faunal management plan (to be compiled)
		Fire management Apply appropriate fire regime in fynbos areas (frequency, season, intensity, size)	(1) Implement a fire management plan in accordance with objectives of conserving biodiversity and threatened biota (2) Monitor impact of fire management regime	Fire management plan (to be compiled)
		Threatened biota Maintain viable populations of threatened species in order to meet obligations in terms of international agreements and conventions	(1) Maintain viable populations of rare/threatened plant and animal species (identify, locate and monitor populations of priority species)	Branch-wide threatened-biota plan (to be compiled)

		Monitoring plan Implement and maintain an approved monitoring plan for the reserve	(1) Implement and maintain a biological monitoring programme for the reserve	Branch-wide monitoring plan Erosion plan (to be compiled)
	Rehabilitation Rehabilitate degraded areas, including the re-establishment of natural biodiversity patterns, and the restoration of key processes that support the long-term persistence of biodiversity	**Vegetation** Re-establish physical, chemical and biological processes in degraded vegetation areas	(1) Rehabilitate all old, degraded sites	Flora management plan (to be compiled)
		Alien plants and other alien biota Control and, where possible, eliminate alien biota to facilitate re-establishment of natural biodiversity patterns and process in invaded areas	(1) Establish the distribution and density of invasive species (2) Prioritise areas for alien removal, focusing on biodiversity restoration (3) Implement removal programmes for priority species and areas	Invasive-plant and animal management plan (draft plans in process to be completed)
MITIGATE INTERNAL and EXTERNAL PRESSURES To reduce threats and pressures and limit environmental impacts resulting from non-biodiversity management aspects and operations on surrounding land and resource use	**Reconciling biodiversity with other reserve objectives** To ensure that non-biodiversity management aspects of reserve operations (revenue generation, including visitor, resource use, developments, management activities, etc.) are informed and constrained by biodiversity conservation objectives, and that the impacts of these activities on biodiversity are minimised	**Internal developments** Minimise the impacts associated with the development of visitor and reserve management infrastructure, and ensure that such developments do not compromise biodiversity objectives	(1) Reserve zoning (2) Develop and implement Conservation Development Framework (CDF) (3) Develop in accordance with environmental impact assessment (EIA) process (NEMA) and corporate policies (4) Establish visitor carrying capacities (5) Implement green standards and environmental best practice based on corporate policy	CDF Infrastructure plan for high-intensity use zone Infrastructure maintenance plan (to be compiled)
		Internal activities Minimise the impacts associated with visitor and reserve management activities, and ensure that such activities do not compromise biodiversity objectives		

		Extractive resource use Minimise the impacts of extractive resource use, and ensure that such activities are aligned with corporate guidelines, are within management capacity constraints, and do not compromise biodiversity objectives	(1) Quantify current extractive resource activities (2) Define opportunities and constraints in line with corporate guidelines (3) Regulate resource use according to adaptive management process	
	Reconciling biodiversity with external threats To reduce external threats and pressures, and limit impacts of surrounding land and resource use on biodiversity conservation within the reserve	**External developments** Minimise the impacts associated with inappropriate developments outside the reserve	(1) Engage regional land management authorities, including IDPs and spatial development frameworks at local and regional level (2) Align with bioregional planning, including explicitly identified areas for the maintenance of important biodiversity patterns and processes with appropriate land use guidelines (3) Provide input into planning and decision-making processes for external development that may compromise reserve and biodiversity network objectives (4) Negotiate to ensure that external developments are not visually obtrusive or out of character with the park	Branch-wide communication strategy and action plan (draft)
		External activities Negotiate to ensure that external resource and land use does not detrimentally affect ecological processes within the reserve	(1) Negotiate to mitigate or improve the management of external, potentially detrimental impacts (2) Encourage eco-friendly resource use and land management practices on adjacent properties (3) Mitigate the impacts of hazardous gases and other pollution events that may result from the previous operations of the waste disposal site, through appropriate contingency planning	Evacuation contingency plan

		Illegal harvesting of resources Prevent the illegal collection, removal and destruction of physical and biological resources	(1) Public liaison (2) Law enforcement	Nature reserve protection plan Safety and security programme (to be compiled)
WILDNESS/ REMOTENESS To maintain and restore wildness/remoteness in Bracken Nature Reserve so that the spiritual and experiential qualities of wildness are maintained, enhanced or, where necessary, restored	**Range of experiences** Provide a range of visitor experiences		(1) Reserve zoning (2) Develop CDF and sensitivity-value analysis	(1) CDF (2) Nature reserve expansion plan (3) Invasive-species management plan
	Sense of place Maintain or restore appropriate sense of place		(1) Implement and update CDF (2) Establish and apply appropriate visitor carrying capacity (3) Negotiate to ensure that external developments are not visually obtrusive or out of character with the reserve	
CULTURAL HERITAGE MANAGEMENT To investigate and manage all cultural assets	Conserve and manage cultural heritage assets		(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Develop site management plans for each cultural heritage site, with monitoring systems in place for management priorities and prescriptions (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	Cultural heritage management plan

5.1.2 Socio-economic objectives

Table 3: Socio-economic objectives for Bracken Nature Reserve

High-level objective	*Objective*	*Sub-objective (where required)*	*Initiative*	*Low-level plan*
Nurture productive and mutually beneficial partnerships that result in gains in economic and/or biodiversity equity	Enhance socio-economic benefits to local communities		(1) Contribute to local community development by supporting the Expanded Public Works Programme/poverty relief project (2) Contribute to local skills development by supporting the skills and learnership programmes (3) Identify and facilitate the creation of business opportunities in association with the reserve (4) Support community-based social development initiatives	Biodiversity socio-economic development plan (to be compiled)
	Increase environmental awareness and encourage participation in conservation initiatives	Inspire visitors and communities to considering the environment as an interrelated and interdependent system, of which they are an integral part	(1) Develop and implement an interpretation plan that feeds into both the education and zoning plans (2) Implement environmental education and youth development programmes suited to the needs of each focus group (i.e. tailor-made programmes for each focus group)	(1) Biodiversity management branch education strategy and action plan (2) Regional environmental education and communication strategy (to be compiled)
		Educate learners, educators and other community focus groups to be able to take environmental action		
		Support educators and community leaders with resource and information materials	(1) Establish and market an environmental resource centre and outdoor classrooms, with a range of interpretive and information resources	
Support cooperative governance that will build custodianship	Maintain good reserve/community/ stakeholder relations	N/A	(1) Identify and involve all relevant stakeholders in the reserve advisory forum (2) Develop effective communication mechanisms and responsibilities for representatives	Biodiversity Management Branch (1) Communication strategy and action plan (2) Stakeholder relationship plan (to be compiled)
	Effective cooperative governance	Minimise degrading impact and consequences of inappropriate development in and around the reserve	(1) Establish and maintain good working relationships with relevant government departments as well as internal City of Cape	

			Town departments	
		Ensure support/buy-in for management decisions through participatory decision-making processes	(1) Define roles and responsibilities with stakeholder groups, partnerships and government through written agreements/terms of reference and MOUs	
Become the nature-based visitor destination of choice in the region	Develop, manage and enhance a range of sustainable visitor products		(1) Design customer satisfaction survey (2) Analyse current product usage, and identify opportunities	Visitor plan
			(1) Plan for visitor infrastructure and facilities, as identified by the CDF (2) Develop and implement the infrastructure management plan (in compliance with State of Infrastructure report) (3) Compile a State of Infrastructure report	Biodiversity Management Branch (1) Infrastructure management plan (2) Visitor facility plan
	Conserve and manage cultural heritage assets		(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Develop management plans for each cultural heritage site, with monitoring systems in place for management priorities and prescriptions (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	Cultural heritage management plan (to be developed)
Grow the domestic visitor profile to be representative of South African society	Grow the domestic visitor profile of reserve to be representative of regional demographics	N/A	(1) Promote and manage access to the reserve (2) Develop and support dedicated access programmes, or incorporate a 'dedicated access' element into existing programmes (3) Actively market reserve resources and services	Biodiversity Management Branch marketing plan
Enhance the City of Cape Town's reputation	Enhance the reserve's reputation	N/A	(1) Develop and implement a communication plan to promote reserve activities	Biodiversity Management Branch communication strategy and action plan

Advance strategic human resource management	Ensure good human resource management	N/A	(1) Implement and support learnerships and volunteer programmes (2) Ensure that all staff have access to training initiatives as per the Workplace Skills Plan (3) Ensure that all corporate human resource policies are adhered to	Regional standard operational procedure manual (to be updated)
Financial management	Ensure sound financial management practices are applied to and underpin the reserve	N/A	Manage cost spending appropriately	Biodiversity Management Branch business plan
Achieve good corporate governance/ management	Effective management of risk profile	N/A	Conduct legal review	

5.2 SWOT analysis

Strengths

- Proclaimed as a local-authority nature reserve
- Staff buy-in and positive attitude of neighbouring landowners
- Active Friends group
- Good radio and telephonic communication systems in place
- Good information technology infrastructure and communications platform
- Management commitment to compiling and implementing management plans and biodiversity action plans
- Legislative support – municipal bylaws, Nature Conservation Ordinance and NEMA
- Constitutional support
- All permanent staff and management have experience and knowledge in managing protected areas
- Existing corporate support services
- Reserve entry and exit are controlled by visitor access gates and security guards
- Defensible boundaries
- Staff determination and will to succeed
- Existing, fully functional ecosystems
- Community development and environmental education awareness opportunities
- Add value to neighbouring communities

Weaknesses

- Insufficient appropriately trained staff to ensure that all biodiversity objectives are met, such as basic field ranger and law enforcement
- Limited knowledge of security threats within reserve
- Operational budget needs review
- Law enforcement tends to be reactive instead of proactive
- Lack of operationally mandated staff to utilise environmental legislation adequately
- Public's ignorance of applicable environmental legislation
- Maintenance requirements of infrastructure
- Serious degradation and undermining of reserve's intrinsic value by unsightly and inappropriate elements and structures
- Inadequate funding for critical management activities

Opportunities

- Aesthetic beauty of the reserve
- Creating buy-in among key stakeholders and role players
- Community constituency building
- Increased community ownership
- Job creation, and career succession and planning
- Accessing funds for Expanded Public Works/Sustainable Livelihoods programmes to assist in job creation, reserve infrastructure maintenance and development
- Proactively engaging communities bordering the reserve, and recognising their needs
- Continuous liaison with, and support for, Friends groups
- Linking up with surrounding landowners, sharing knowledge and resources in order to manage the biodiversity network effectively

Threats

- Unemployment leads to rising crime levels
- Threats and intimidation to conservation staff when enforcing legislation
- Lack of commitment from stakeholders
- Lack of appropriate training
- Personal safety of staff
- Growing external communities with increasing needs
- Increased incidence of crime and other illegal activities
- Lack of sustained funding for students and interns
- Lack of sustainable operational funding
- Loss of biodiversity due to inappropriate fire, invasive alien species, illegal activities and bad land use practices
- Change in local government political structures
- Urban sprawl

5.3 Protected-area management policy framework and guiding principles

5.3.1 Community participation

Bracken Nature Reserve will strive to nurture productive and mutually beneficial partnerships, which, in turn, will result in economic and/or biodiversity equity. This will be achieved through the creation of job opportunities in support of Expanded Public Works Programme and/or poverty relief programmes. By participating in skills development and learnership programmes, the reserve will contribute to the development of local skills.

Through the support of community-based social development initiatives, the reserve can also enhance socio-economic benefits to local communities.

To date, the reserve does not have a permanent environmental education officer, but long-term plans are to appoint someone who will implement the Biodiversity Management Branch's environmental education plan. The plan will be used as a tool to contribute to environmental awareness, and to encourage participation in conservation initiatives.

The main aims of the plan will be:

- to inspire visitors and communities to consider the environment as an interrelated and interdependent system, of which they are an integral part;
- to educate learners, educators and community focus groups to take environmental action, assisted by resource and information materials;
- the development and implementation of environmental education programmes suited to the needs of various focus groups; and
- the development and implementation of an interpretation plan that complements the education plan.

In order to develop and maintain good and sustainable reserve community/stakeholder relations, all relevant stakeholders need to be identified. An effective communication system also needs to be developed in order to liaise with interested and affected parties. Where necessary, task teams and working groups may be established in order to assist the reserve with key issues.

5.3.2 Safety and security

The absence of staff in the reserve over weekends as well as the absence of visible patrols should receive attention, despite the reserve's low security threat. No major additional infrastructure is required, but the construction of ablution facilities/toilets for security guards at the gate would enable the office to be alarmed after hours, while ensuring better security at the gate. It is suggested that a day/night camera with recording support be installed to cover the main access area. The removal of derelict buildings will also enhance the reserve's aesthetical appeal for visitors and surrounding communities. The reserve lends itself to the application of a guard monitoring system. Monitors could be placed at various strategic points away from the public eye, and will require regular inspection. Please see appendix 13 for a detailed security audit.

5.3.3 Culture-historical, archaeological and paleontological management

There are various old ruins on the site, including a packed-stone retaining wall, all associated with the workings of the quarry. Some of the ruins are on the verge of collapse, and need to be propped up to make them safe. The ruins are all in a dilapidated state, and overgrown.

Heritage significance

- Structures older than 60 years
- Association with mining activities at the quarry
- Contributes to the cultural landscape

Wedged between the rocky outcrops is an underground storeroom, allegedly an ammunition store dating back to the Anglo-Boer War, although this is yet to be confirmed. The structure certainly points to a secure vault or bunker of sorts, as it has a double-lined outer skin, and is hidden in a place difficult to locate. The fabric is also clearly quite old. The structure is in a dilapidated state, and is considered to be unsafe.

Heritage significance

- Structure older than 60 years
- Alleged association with Anglo-Boer War
- Contributes to the cultural landscape

5.3.4 Tourism development and management

A sensitivity zoning report has been drafted that identifies broad visitor use zones. These zones are listed as primary conservation, conservation, low and high-intensity and utility zones. In the primary conservation and conservation areas, low tourism activities will take place, while, in the low and high-intensity areas, tourism development can take place in accordance with the guidelines from the precinct development plan (to be compiled).

5.3.5 Infrastructure management

Bracken Nature Reserve contains a lot of infrastructure, for which various departments within the City of Cape Town share responsibility. All moderate infrastructure within the reserve needs to be audited, and their current uses and structural integrities documented. All infrastructure has been mapped as part of a sensitivity analysis of the site (see appendix 12).

Infrastructure that is and could be used should be included in a five-year maintenance plan, while infrastructure with no use should be demolished and the sites rehabilitated according to the rehabilitation protocol compiled by Dr P Holmes, Biodiversity Management Branch biophysical specialist. The long-term objective for the reserve is to rehabilitate and restore the degraded area to Cape Flats sand fynbos.

5.3.6 Biodiversity conservation management

5.3.6.1 Community-based natural resource management

The harvesting of natural resources in Bracken Nature Reserve is currently not permitted. Research on the amount of harvesting and the species harvested across the city is currently under way. Some investigations as to the types and extent of harvesting in the reserve have been initiated, but, to date, no detailed or conclusive data have come to light to determine where current harvesting is sustainable and/or what potential threats are foreseen should these activities persist.

5.3.6.2 Fire management

Fire plays an essential ecological role in the life cycle of fynbos biome species. Fire is crucial to the long-term conservation of species within Bracken Nature Reserve, and is therefore considered an important component of reserve management. Fire management involves varying the season, frequency and intensity of fires, and reconciling ecological and practical requirements. Too frequent fires, or fires that burn out of phase with the natural burning regime, present a threat to slower-growing species, which may be entirely eliminated. If fire is excluded from the area, forest species can invade, resulting in fynbos species being lost. Conversely, if vegetation is allowed to burn too frequently, the area becomes degraded, and alien species, especially grasses, invade. Grasses maintain a shorter fire cycle, and permanently change the vegetation structure and biodiversity value.

The fire management programme for Bracken Nature Reserve involves the monitoring of large wildfires as well as smaller fires, whether natural or unnatural. Historical records of fire events in the reserve area as well as post-fire monitoring records assist in the documentation of veld ages, which, in turn, influence fire management. Minimal interference is applied with the occurrence of naturally ignited fires. In cases where human-induced fires occur that would simulate a natural fire, the same management responses would apply. Natural fires are limited in spread within the constraints of ecological, project and public safety requirements. All possible actions are taken to prevent the spread of fire onto the

adjacent properties. All unnatural fires that threaten the reserve ecologically, or pose a threat to infrastructure and/or public safety, are controlled.

Prescribed burning of vegetation is a management option in areas where vegetation becomes senescent (old) and there is a risk of species loss. The fire cycle for renosterveld vegetation is between five and seven years. The use of prescribed burning practices would assist in maintaining a vegetation mosaic that promotes plant and animal diversity. Accurate fire records and post-fire monitoring data will inform the initiation of prescribed burns in the core area of the reserve. The decision to administer prescribed burns is considered on an annual basis and, if required, planned and implemented accordingly.

Fire may be used to keep fuel loads low so as to reduce the risk of uncontrolled fires, particularly on the urban edge and in areas that become a potential risk to infrastructure and public safety.

Firebreaks and other fire control measures required by law will be implemented where necessary and feasible. The fire breaks at the reserve are cut and maintained in the fire season (October–March).

The nature of the area's terrain, property boundaries and extensive areas of natural veld increases the chances of fire spreading both into and out of the reserve. Reasonable pre-fire protection measures are necessary, as well as a plan of action in the event of wildfire. Interaction with various City of Cape Town departments and independent stakeholders, and continuous public and private landowner involvement, are essential. The development of fire protection and response plans is an important component of the reserve's fire management regime.

Fire management implementation in Bracken Nature Reserve involves the following:

- Application of guidelines on seasonal burning intervals and species requirements acquired from relevant documentation and biophysical specialists
- Accurate record keeping of all fires, including details and maps
- Use of fire data and geographic information system (GIS) for recording and mapping
- Application of post-fire monitoring programmes
- Application of fire data to determine prescribed burning needs

- Development and implementation of a fire protection and response plan, including affected stakeholders, such as additional City of Cape Town departments and private landowners neighbouring the reserve

5.3.6.3 Soil erosion and control

Within Bracken Nature Reserve, natural erosion processes are allowed to take their course without interference, except where necessary. In the case of human-induced and natural areas that are aggravated, appropriate management action will take place.

Potential human impacts should be avoided through correct planning and maintenance of infrastructure. Areas that had been previously degraded by human activities and are no longer in use will be restored as close as possible to their natural state. Disturbed areas and areas affected by unnatural accelerated erosion will be controlled by means of appropriate methods. The cause and management of problem erosion sites will also be considered.

Soil management implementation in Bracken Nature Reserve includes the following:

- The identification and recording of all soil erosion sighted, including the assessment and development of restoration plans, where required
- Use of soil erosion data and GIS for recording and mapping
- Application of fixed-point monitoring programmes at identified soil erosion sites
- Accurate documentation of management actions applied to restoration sites, including results from areas responding to these actions

5.3.6.4 Invasive-species management

The management of invasive and alien species is a priority in Bracken Nature Reserve. Alien biota need to be controlled and, where possible, eliminated in order to facilitate the re-establishment of natural biodiversity and processes in invaded areas.

Invasive and alien-species management in the reserve is applied in accordance with the City of Cape Town's invasive alien species strategy. Invasive alien plant species could spread rapidly should management fail to continue to implement a properly planned and coordinated programme.

Until recently, invasive-species management had focused on woody alien plant species, such as *Acacia* and *Eucalyptus* species. Herbaceous weeds had been largely ignored. However, through the implementation of work load assessments in the reserve, it has

become evident that some herbaceous species already pose a risk to biodiversity in the area, while others have the potential to become one.

Bracken Nature Reserve contains a number of indigenous species that are not endemic to the area, for instance *Searsia lancia* and *Kigeleria africana*. The occurrence of such species is generally a result of attempts to beautify old recreational areas, or to create shade. Horticultural strains of indigenous species also present a risk to naturally occurring specimens. Some species are known to hybridise with endemic species in the area, and pose a potential threat to the genetic diversity of such populations.

In order to protect indigenous vegetation from invasive aliens, the following is required:

- Prioritisation of areas for alien removal, focusing on biodiversity restoration
- The implementation of removal programmes for priority species and areas
- The development and implementation of an invasive and alien management plan as well as a management plan for alien fauna

Invasive and alien faunal species are also eradicated in the reserve. Formal plans outlining the monitoring of the removal of identified species are however required.

5.3.6.5 Species introductions

Species that were historically indigenous to Brackenfell, and for which suitable habitat and eco-niches are available, may be re-introduced. Several fauna species that previously occurred in Bracken Nature Reserve are no longer present or down to small numbers.

Prior to the re-introduction of any species, a full proposal is required. Investigation into the availability of suitable habitat for the species with reference to public utilisation of areas is needed, as is a full investigation into the historical occurrence and status of the species. The effect of re-introducing species to the area must also be researched. Re-introduction of potential dangerous or problematic species may also require public participation. An investigation of suitable sources is also necessary.

All proposed re-introductions need to be recommended and approved by the City of Cape Town's fauna and flora management committees as well as provincial authorities before implementation. The implementation of any re-introduction programmes must be specified in a plan of action, and documented accurately.

5.3.6.6 Strategic research

Research subjects that are beneficial to the management of Bracken Nature Reserve need to be identified. These subjects can then be prioritised and further pursued. Although research does currently take place in the reserve, and is supported by management, many of the projects are conducted by outside student researchers and organisations, and are not informed by the reserve's needs. An effort needs to be made to obtain copies of data and results from projects conducted within the reserve's boundaries.

5.4 Sensitivity analysis of Bracken Nature Reserve

The reserve is a considerable asset to the City of Cape Town, and significantly contributes to national conservation targets of threatened vegetation types, as listed in the National Spatial Biodiversity Assessment (Driver *et al*. 2005), as well as provides a service and facilities to local residents and schools.

The development of the sensitivity and zoning plan is one of the steps required in compiling a CDF for the reserve. CDFs are tools to reconcile the various land use needs, and to delineate visitor user zones and the positioning and nature of new infrastructure, access points, roads and facilities.

The CDF process has grown in response to the requirements of the National Environmental Management Biodiversity Act (2004), and seeks to comply with the spatial planning requirements of the Act. The CDFs will ensure that best practice and sustainable development principles are integrated with spatial planning in protected areas.

The sensitivity-value analysis is the landscape analysis portion of the broader CDF. It is a multi-criteria decision-support tool for spatial planning, designed to present the best available information in a format that enables defensible and transparent decision making. The sensitivity-value process is based on the principle that the acceptability of a development (or placement of a structure) at a site is based on that site's value (arising from the site's biodiversity, heritage, aesthetic or other values) and its sensitivity or vulnerability to a variety of disturbances (Holness 2005).

The sensitivity-value analysis, the CDF and the associated zoning plan should form part of an adaptive management system. They will grow and change over time as the understanding of the landscapes and ecosystems improves. However, they will never replace the need for detailed site and precinct planning and EIA compliance at site level.

The small size of Bracken Nature Reserve did not warrant an extensive analysis, and resulted in a fairly straightforward subsequent zoning process. The methodology used for both the sensitivity-value analysis and the zoning process was adapted from Holness and Skowno (2008) and SRK Consulting (2008[1]; 2008[2]).

All geographic information work was carried out in ESRI's ArcMap, version 9.3.1, using the Arc Info licence level, with Spatial Analyst and 3D Analyst extensions.

5.5 Zoning plan of Bracken Nature Reserve

5.5.1 Zoning informants

This section briefly outlines the values underlying the identification of broad tourism use zones. It is important to remember that the landscape/biodiversity analysis is just one of the informants in the zoning process. Although the biodiversity analysis is intrinsically a relatively objective scientific process, other informants to the zoning process are not.

Although every attempt is made to place high sensitivity-value sites into more protected zones where possible, the zoning process is essentially a compromise between environment and development. In particular, the identified high-value sites are often the key biodiversity assets that need to be made available to the eco-tourism market in an appropriate manner. The biodiversity layers and the spatial management of the reserve are directly linked during the identification of special management areas (where applicable). Even within broad high-tourist use zones, some areas are likely to be subject to very tight conservation controls (potentially involving complete exclusion of human impacts from an area).

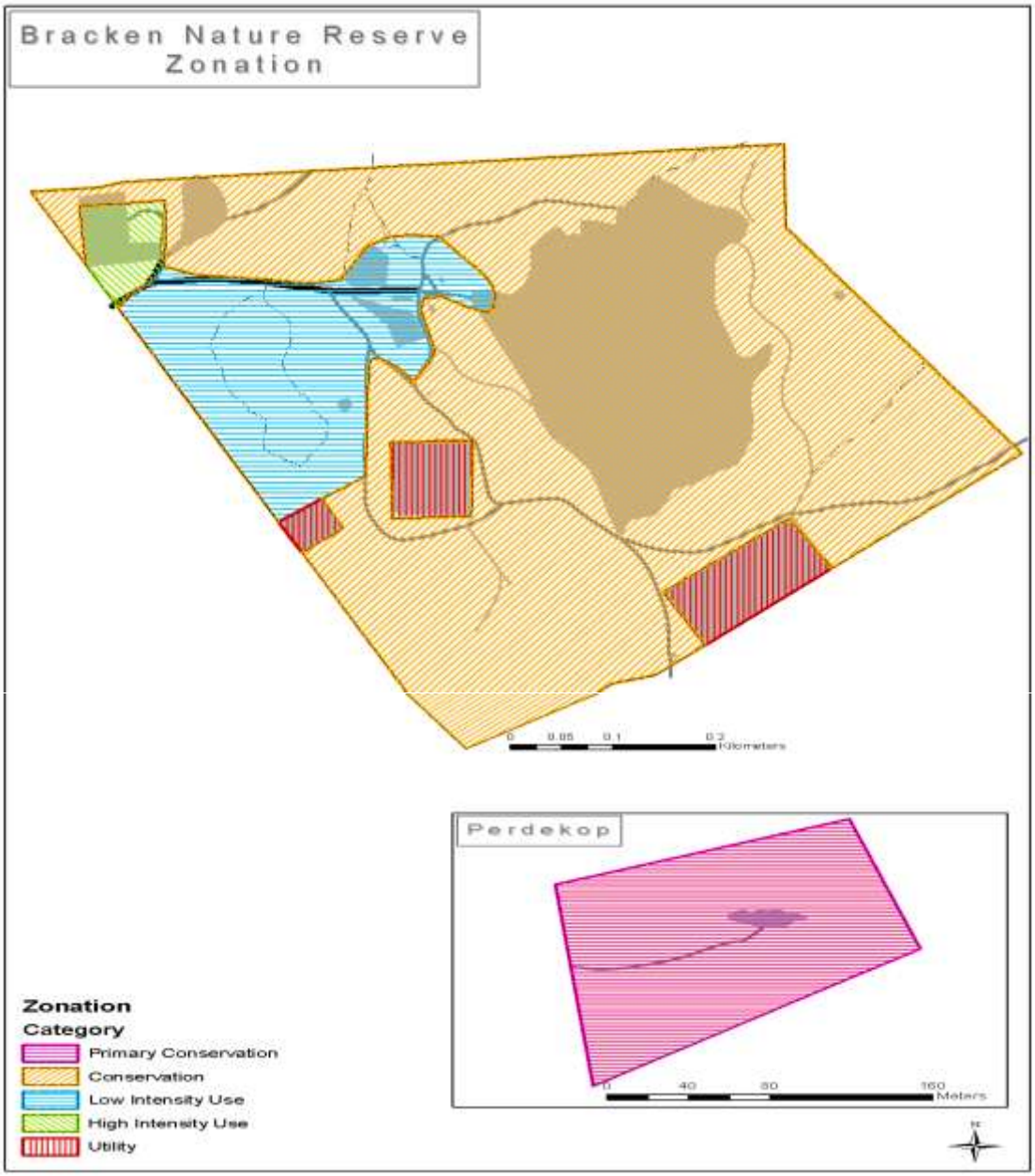
<u>Underlying decision-making rules used in the zoning process</u>

- The zoning process is aimed at striking a *balance* between environmental protection and the development required to meet the broader economic and social objectives of the reserve.
- The zoning process takes into account existing development footprints and tourism access routes.
- This is based on the underlying principle that, all else being equal, an existing transformed site is preferable to a greenfield site, from a biodiversity perspective.
- Infrastructure costs are dramatically increased when developments take place away from existing infrastructure.

- Existing tourism nodes and access routes are a reality of the economic landscape, and it would not be possible to shut down existing tourism sites that compromise the development objectives of the reserve.
- Where existing development nodes, tourist sites and access routes occur in areas with high sensitivity-value, the broad-use zoning aims to keep the development footprint as small as is realistically possible, preferably within the existing transformed site.
- Where possible, sites with high biodiversity sensitivity-value are put into stronger protection zones.
- Peripheral development is favoured and should, where possible, be located outside the conservation area.
- Two key points need to be emphasised:
    - The designation of a broad-use zone does not imply that all sites within that zone would be suitable for all the development types anticipated. Detailed site level planning is still required, and many sites may prove to be unsuitable at a site/precinct/EIA level of planning.
    - Special management areas/overlays need to be formalised and linked to the management plans.

5.5.2 Zoning definitions and descriptions

The zoning definitions and descriptions were workshopped with area and regional managers (appendix 12). Four categories were decided on, namely primary conservation zone, conservation zone, low-intensity leisure zone and high-intensity leisure zone. Please see map 6, which outlines the proposed zoning and zone descriptions. The process is still linked to the zoning used for the CapeNature reserves (Holness & Skowno 2008), as there should be general alignment of the broader-use zones to enable comparison and integration if provincial documents so require.



Map 6: Zoning map of Bracken Nature Reserve

6. DEVELOPMENT PLAN

Still to be completed within the detailed precinct planning for the high-intensity use zone.

7. COSTING PLAN

The following costing plan is based on Bracken Nature Reserve receiving 25% of the approved central-region budget. The budget below is not a true reflection of costs, but merely a guideline. A true costing plan can only be drafted once the CDF has been finalised with associated building and maintenance costs. The costing plan details the broad-category breakdown for management interventions for Bracken Nature Reserve for the period 2011–2016.

Table 4: Broad category breakdown for Management Interventions for the Bracken Nature Reserve for the period 2011 – 2016

Management action	Funding source	Approximate costs 2011–2012	Approximate costs 2012–2013	Approximate costs 2013–2014	Approximate costs 2014–2015	Approximate costs 2015–2016
1. Invasive alien plant programmee • Clearing of important alien species 1, 2 and 4	Invasive alien species fund	R35 000	R30 000	R30 000	R25.000	R20.000
2. Fire management • Maintenance of fire belts • Planned ecological burn	Operating	R15 000 R20 000	R15 750	R16 537,50 -	R17364	R18 232
3. Road and trail maintenance • Footpath maintenance	Operating Operating	R5 000	R5 250	R5 512	R5788	R6 077
4. Fencing and gates • Repairs and maintenance	Operating Capital expenditure	- -	R30 000	- -	- -	R31 500 -
5. Infrastructure development plans • Bracken office complex • Road upgrade and maintenance	Capital reserve fund	R250 000 (not yet approved) R250 000 (not yet approved)	R262 500	R275 625 R262 500	R289 406,25	
6. Human resources • Direct human resource costs	Operating	R770 472,62	R832 110,42	R898 679,25	R970 573,59	R1 048 219,4
7. General expenses • General operating costs	Operating	R1 706 679,87	R179 211,7	R1 881 724,6	R1 975 810,8	R2 074 601,3
8. Special projects • Proposed business plan (investigating the viability of operating a business in the reserve) • Signage and interpretation	Operating Capital expenditure	R300 000 (not yet approved) -		R5 250	R5 512	R5 788
Note: Human resource costs are escalated at 8% per annum. Operating expenditure is escalated at 5% per annum.						

PART 3

MONITORING & AUDITING

8. MONITORING & AUDITING

8.1 Annual audit procedure

8.1.1 Management Effectiveness Tracking Tool South Africa (METT-SA)

The METT-SA is a rapid, site-level assessment tool adapted from the World Bank and Worldwide Fund for Nature (WWF) system (second edition, 2007). The system is based on the idea that good protected-area management follows a process comprising six distinct stages or elements:

It begins with understanding the **context** of existing values and threats (where are we now?), then progress through **planning** (where do we want to be?), followed by allocation of resources (**inputs**) (what do we need?). As a result of management actions (**processes**) (how do we go about it?), it eventually produces products and services (**outputs**) (what were the results?), which result in impacts or **outcomes** (what did we achieve?).

This version has been compiled so that it can be applied to the full range of protected areas managed by all C.A.P.E partners. It also applies to protected areas in other regions, and, with minor adaptations, could be applied outside of South Africa as well. It may also be used for marine protected areas (MPAs) and islands, but, in the long run, it may become necessary to amend the system to be more specific to these areas. In addition, a system for off-reserve conservation areas, such as conservancies or stewardships, may need to be developed.

When applying METT-SA, it is important for the following to be kept in mind:

- The METT-SA is intended to report on the reserve's progress. Thus, the score is the baseline against which future assessments are made to see if there has been an improvement.
- It is site-specific and must therefore not be used to compare scores between different protected areas.
- It is a useful tool to give indications of management trends. In this version, the six elements of the management process, as defined in the original version, are scored as subsets of the total. This gives an indication of where management should strive for improvement.
- It is not intended to replace more detailed assessments as part of adaptive management systems.
- The METT-SA has limitations in the quantitative measurement of outcomes, and these should be measured by more objective and quantitative systems.
- This version adjusts the total score where questions are irrelevant.

- Often, low scores on some questions could be a reflection on the organisation as a whole, and do not necessarily point to issues over which the protected-area manager has control. **The performance of managers should therefore under no circumstances be measured against the METT-SA results.**

Tracking the trends of management effectiveness is a long-term process, and instant improvements are unlikely. Generally, the METT-SA is applied at three-year intervals, but an annual application is acceptable if it is understood that changes may only be slight. The METT-SA for Bracken Nature Reserve was undertaken in 2007, and the results are presented in appendix 14. The METT-SA will be repeated in approximately September 2011.

8.1.2 Protected-area review (PAR)

The PAR is an internal review conducted annually to assist managers in reviewing their sites, and to allow for adaptive management actions to be taken where required (and within managers' control).

8.2 Management plan review

Every five years, this IRMP should be reviewed, and adjusted where necessary. To achieve this, the following questions (and others as needed) should be addressed:

- Did this management plan make a meaningful contribution to the management of Bracken Nature Reserve?
- Were individual management 'prescripts' realistic and achievable? Were they written unambiguously or was there room for misunderstanding?
- Were budgets for each management activity realistic? Were the allocated budgets too much or too little?
- Were sufficient staff members of the right qualifications allocated to each management activity?

There will be some overlap between the review and the audit, and they should therefore be done on the same day, by the same team.

8.3 Biodiversity monitoring

The South African biodiversity database has been developed in order to assist managers in storing data in a central, secure location. This database is a useful indicator within the reserves in order to determine the status of floral, faunal as well as tracking infrastructure developments. The system can be interrogated by managers, and species lists can be obtained per site, if required.

All data collected, such as bird counts, night counts and plant monitoring, are added to the database and kept up to date.

Table 5: Biodiversity monitoring requirements

Action	Responsible party	Means of verification	Frequency
Vegetation monitoring Invasive alien vegetation Aspects to be monitored include the effectiveness of the operation, the effectiveness of the follow-up, methods used, compliance with the alien-clearing schedule, and environmental damage such as herbicide spillage	Nature reserve staff Nature reserve manager, students and Interns	Weekly inspections Final inspections Field verification sheets Biodiversity database	Weekly Once off – completion of contract Annually – to determine management unit clearing plan Once a week
Fire mapping All veld fires must be accurately mapped and recorded to build up a useful record that will assist with veld interpretation. These records will take the guesswork out of the effects of fire when it occurs on the property. A simple map indicating the extent and the date of the burn is the minimum requirement.	Nature reserve staff Nature reserve manager, students and interns	Veld age map, fire map	Post-fire
Post-fire recruitment	Nature reserve staff Nature reserve manager, students and interns	Stratified sampling plots	Post-fire Six months 12 months Annually for three years
Abundance, density and structure	Nature reserve staff Nature reserve manager, students and interns	Fixed-point photography Presence, abundance, density	Annually
Threatened species (fauna and flora)	Nature reserve staff Nature reserve manager, students and interns	Field observation sheet Biodiversity database	Seasonally

Water monitoring rainfall	Nature reserve staff Nature reserve manager, students, interns	Field collection equipment	Daily

PART 4

REFERENCES

9. REFERENCES

Anon 2003[1]. The Integrated Metropolitan Environmental Policy. Unpublished report, City of Cape Town.

Anon 2003[2]. The Biodiversity Strategy. Unpublished report, City of Cape Town.

Anon 2009[1]. Local Biodiversity Strategy and Action Plan 2009–2019. Unpublished report, City of Cape Town.

Anon 2009[2]. City of Cape Town Biodiversity Network – Analysis: 2009 Methods and Results. Unpublished report, City of Cape Town.

Anon 2010. City of Cape Town, Five-year Plan for Cape Town, Integrated Development Plan (IDP) 2007–2012, 2010–2011 Review. Unpublished report, City of Cape Town.

C.A.P.E Project Team 2000. Cape Action Plan for the Environment: Strategy. Unpublished report, WWF (South Africa).

Driver, A., Maze, K., Rouget, M., Lombard, A.T., Nel, J., Turpie, J.K., Cowling, R.M., Desmet, P., Goodman, P., Harris, J., Jonas, Z., Reyers, B., Sink, K. & Strauss, T. 2005. National Spatial Biodiversity Assessment 2004: Priorities for biodiversity conservation in South Africa. Strelitzia 17. SANBI, Pretoria.

Holness, 2005. Sensitivity Value Analysis Manual. A decision support tool, operating on the principles of systematic conservation planning, for integrating best available biodiversity knowledge into spatial planning within national parks. SANParks internal report.

Holness, S. & Skowno, A. 2008. Report on Sensitivity-Value Analysis and Zonation Process for the Boland Mountain Complex. CapeNature Conservation internal report.

Myers, N., Mittermeyer, R.A.C.G., Fonseca, G.A. & Kent, J. 2000. Biodiversity hotspots for conservation priorities. Nature 403:853–858.

Ninham Shand & MCA. 2002. Bracken Nature Nature Reserve Environmental Management Plan: Report No 338/9757

Rebelo, A.G., Boucher, C., Helme, N.A., Mucina L. & Rutherford, M.C. 2006. Fynbos biome. In: Mucina, L. & Rutherford, M.C. (eds). The Vegetation of South Africa, Lesotho and Swaziland: Strelitzia, 19, pp. 52–219.

SRK Consulting. 2008[1]. Final Conservation Development Framework for Settlers Park Nature Reserve. Nelson Mandela Bay Municipality. Internal report.

SRK Consulting. 2008[2]. Final Conservation Development Framework for Van Stadens Wildflower Nature Reserve. Nelson Mandela Bay Municipality. Internal report.

PART 5

10. APPENDICES

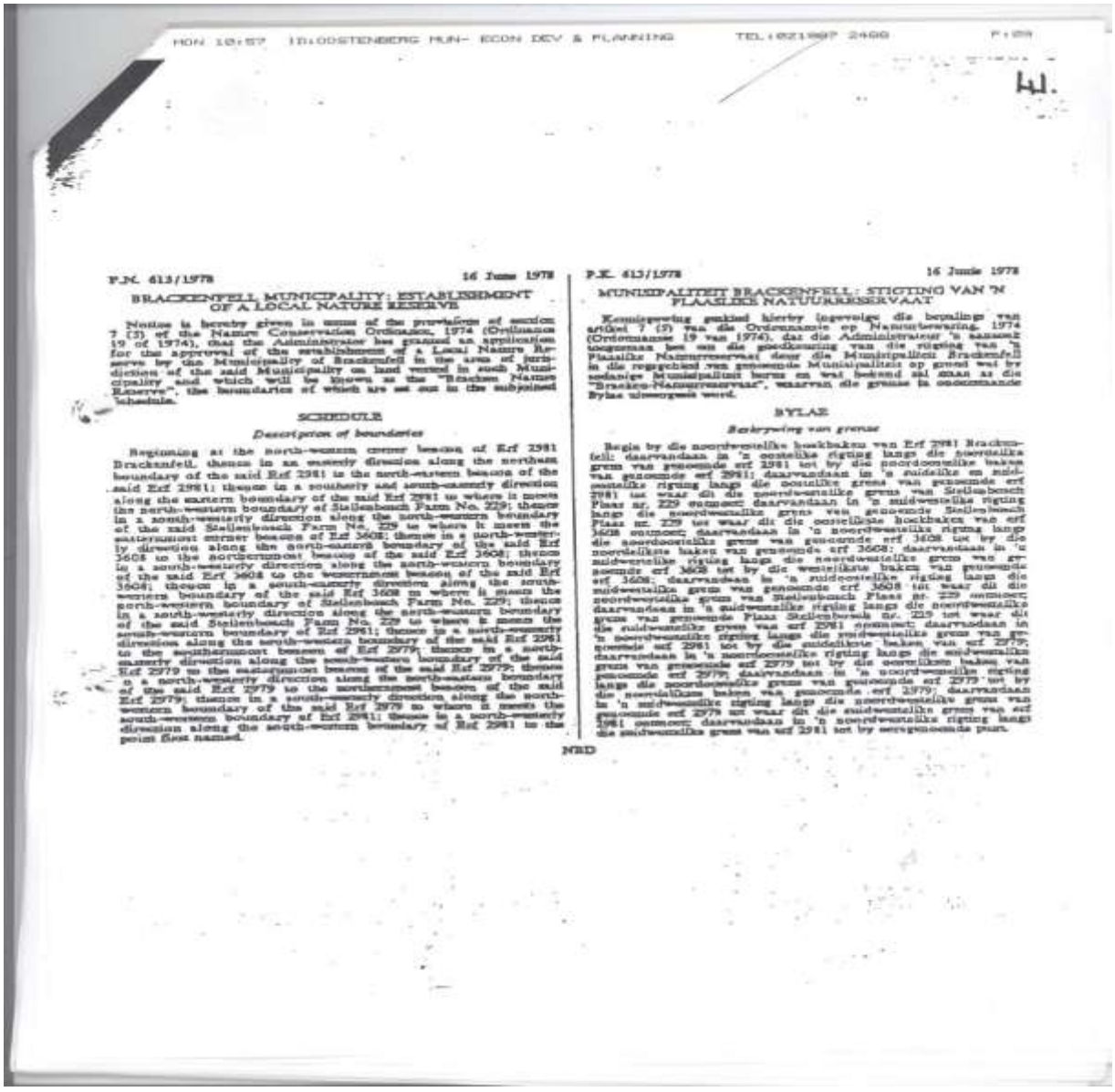
A. Charts and Tables

Appendix 1: Rainfall Table

RAINFALL-WELGEMOED	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Year	mm											
2005	32.4	5	11.6	98.7	43.8	130.6	64.6	108.1	52	20.9	14	0
2006	0	10.4	3.6	34.6	141.1	45.5	99.9	60	31.5	52	32.5	31.5
2007	6.5	46	31	89	144	158	145.5	142.5	44	42	52.5	32
2008	17	21	7	29.5	110	116	209	111	220	14	54.5	11
2009	1.5	15	4	37	129	164.5	96	112.5	107	57	128	4
2010	1.5	10.5	7.5	17	150	134	56	75	17	49.5	37	12

B. Legal Agreements

Appendix 3: Gazette for Nature Reserve Proclamation



MON 10:57 TIBOOSTENBERG MUN- ECON DEV & PLANNING TEL:(021)887 2468 P:09

4.

P.N. 613/1978 16 June 1978

BRACKENFELL MUNICIPALITY: ESTABLISHMENT OF A LOCAL NATURE RESERVE

Notice is hereby given in terms of the provisions of section 7 (3) of the Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974), that the Administrator has granted an application for the approval of the establishment of a Local Nature Reserve by the Municipality of Brackenfell in the area of jurisdiction of the said Municipality on land owned by such Municipality and which will be known as the "Brackenfell Nature Reserve", the boundaries of which are set out in the subjoined Schedule.

SCHEDULE

Description of boundaries

Beginning at the north-western corner beacon of Erf 2981 Brackenfell, thence in an easterly direction along the northern boundary of the said Erf 2981 to the north-western beacon of the said Erf 2981; thence in a southerly and south-easterly direction along the eastern boundary of the said Erf 2981 to where it meets the north-western boundary of Stellenbosch Farm No. 229; thence in a south-westerly direction along the south-western boundary of the said Stellenbosch Farm No. 229 to where it meets the eastermost corner beacon of Erf 3608; thence in a north-westerly direction along the north-eastern boundary of the said Erf 3608 to the northernmost beacon of the said Erf 3608; thence in a south-westerly direction along the north-western boundary of the said Erf 3608 to the westernmost beacon of the said Erf 3608; thence in a south-easterly direction along the south-western boundary of the said Erf 3608 to where it meets the north-western boundary of Stellenbosch Farm No. 229; thence in a south-westerly direction along the north-western boundary of the said Stellenbosch Farm No. 229 to where it meets the south-western boundary of Erf 2961; thence in a north-westerly direction along the south-western boundary of the said Erf 2961 to the southernmost beacon of Erf 2979; thence in a north-easterly direction along the south-eastern boundary of the said Erf 2979 to the eastermost beacon of the said Erf 2979; thence in a north-westerly direction along the north-eastern boundary of the said Erf 2979 to the northernmost beacon of the said Erf 2979; thence in a south-westerly direction along the north-western boundary of the said Erf 2979 to where it meets the south-western boundary of Erf 2981; thence in a north-westerly direction along the south-western boundary of Erf 2981 to the point first named.

P.K. 613/1978 16 Junie 1978

MUNISIPALITEIT BRACKENFELL: STIGTING VAN 'N PLAASLIKE NATUURRESERVAAT

Kennisgewing geskied hierby ingevolge die bepalings van artikel 7 (3) van die Ordonnansie op Natuurbewaring, 1974 (Ordonnansie 19 van 1974), dat die Administrateur 'n aansoek toegestaan het om die goedkeuring van die stigting van 'n Plaaslike Natuurreservaat deur die Munisipaliteit Brackenfell in die regsgebied van gemelde Munisipaliteit op grond wat by sodanige Munisipaliteit berus en wat bekend sal staan as die "Brakfell-Natuurreservaat", waarvan die grense in onderstaande Bylae uiteengesit word.

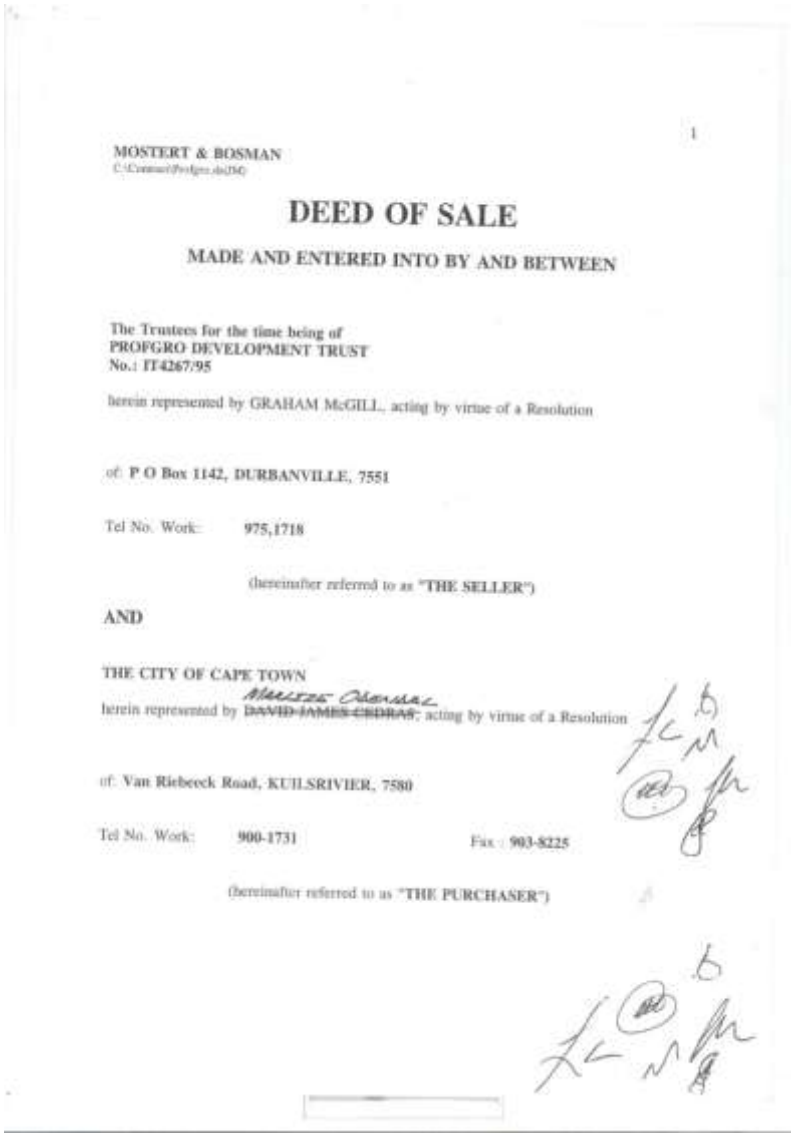
BYLAE

Beskrywing van grense

Begin by die noordwestelike hoekbaken van Erf 2981 Brackenfell; daarvandaan in 'n oostelike rigting langs die noordelike grens van gemelde erf 2981 tot by die noordoostelike baken van gemelde erf 2981; daarvandaan in 'n suidelike en suidoostelike rigting langs die oostelike grens van gemelde erf 2981 tot waar dit die noordwestelike grens van Stellenbosch Plaas nr. 229 ontmoet; daarvandaan in 'n suidwestelike rigting langs die noordwestelike grens van gemelde Stellenbosch Plaas nr. 229 tot waar dit die oostelikste hoekbaken van erf 3608 ontmoet; daarvandaan in 'n noordwestelike rigting langs die noordoostelike grens van gemelde erf 3608 tot by die noordelikste baken van gemelde erf 3608; daarvandaan in 'n suidwestelike rigting langs die noordwestelike grens van gemelde erf 3608 tot by die westelikste baken van gemelde erf 3608; daarvandaan in 'n suidoostelike rigting langs die suidwestelike grens van gemelde erf 3608 tot waar dit die noordwestelike grens van Stellenbosch Plaas nr. 229 ontmoet; daarvandaan in 'n suidwestelike rigting langs die noordwestelike grens van gemelde Plaas Stellenbosch nr. 229 tot waar dit die suidwestelike grens van erf 2961 ontmoet; daarvandaan in 'n noordwestelike rigting langs die suidwestelike grens van gemelde erf 2961 tot by die suidelikste baken van erf 2979; daarvandaan in 'n noordoostelike rigting langs die suidwestelike grens van gemelde erf 2979 tot by die oostelikste baken van gemelde erf 2979; daarvandaan in 'n noord-westelike rigting langs die noordoostelike grens van gemelde erf 2979 tot by die noordelikste baken van gemelde erf 2979; daarvandaan in 'n suidwestelike rigting langs die noordwestelike grens van gemelde erf 2979 tot waar dit die suidwestelike grens van erf 2981 ontmoet; daarvandaan in 'n noordwestelike rigting langs die suidwestelike grens van erf 2981 tot by eersgenoemde punt.

NBD

Appendix 4: Deed of Sale for the Purchase of Erf 11073 (Perdekop)



1

MOSTERT & BOSMAN
C:\Contract\Profgro.doc(JM)

DEED OF SALE

MADE AND ENTERED INTO BY AND BETWEEN

The Trustees for the time being of
PROFGRO DEVELOPMENT TRUST
No.: IT4267/95

herein represented by GRAHAM McGILL, acting by virtue of a Resolution

of: P O Box 1142, DURBANVILLE, 7551

Tel No. Work: 975,1718

(hereinafter referred to as "THE SELLER")

AND

THE CITY OF CAPE TOWN
herein represented by ~~DAVID JAMES CEDRAS~~, acting by virtue of a Resolution

of: Van Riebeeck Road, KUILSRIVIER, 7580

Tel No. Work: 900-1731 Fax : 903-8225

(hereinafter referred to as "THE PURCHASER")

WITNESSETH:

The Seller hereby sells to the Purchaser who purchases the following property, namely:

ERF 11073 BRACKENFELL, IN THE CITY OF CAPE TOWN, DIVISION STELLENBOSCH, WESTERN CAPE PROVINCE

IN EXTENT: 6341 (SIX THOUSAND THREE HUNDRED AND FORTY ONE) SQUARE METRES

HELD BY DEED OF TRANSFER NO. T23276/1996.

(hereinafter referred to as "**THE PROPERTY**")

on the following terms and conditions:

1. PURCHASE PRICE

The purchase price is the sum of **R290 700,00 (TWO HUNDRED AND NINETY THOUSAND SEVEN HUNDRED RAND) (VAT inclusive).**

(hereinafter referred to as the **PURCHASE PRICE**)

payable by the Purchaser to the Seller as follows:

1.1 The full purchase price shall be paid to the Seller's Conveyancers to be held in trust and invested in a financial institution's investment account for the benefit of the Purchaser, within 14 days after signature of this agreement by both parties.

1.2 The full purchase price shall be paid by the conveyancers to the Seller on date of registration of transfer.

2. COSTS OF TRANSFER

The Purchaser shall pay all transfer costs incurred in respect of the registration of transfer of the property, which amount shall be paid on demand.

Appendix 5: Surveyor General (SG) diagrams

C. Species Checklists

Appendix 6: Bracken Nature Reserve Plant Species

FAMILY	GENUS	SPECIES NAME	COMMON NAME
ALLIACEAE	Tulbaghia	*Tulbaghia capensis*	
AMARYLLIDACEAE	Amaryllis	*Amaryllis belladonna*	March Lily
AMARYLLIDACEAE	Gethyllis	*Gethyllis afra*	
AMARYLLIDACEAE	Gethyllis	*Gethyllis sp.1*	
AMARYLLIDACEAE	Haemanthus	*Haemanthus pubescens pubescens*	
ANACARDIACEAE	Rhus	*Searsia laevigata*	
ANACARDIACEAE	Rhus	*Searsia lucida~*	
ANACARDIACEAE	Rhus	*Searsia rosmarinifolia*	
ANACARDIACEAE	Rhus	*Searsia tomentosa*	
ANEMIACEAE	Mohria	*Mohria caffrorum*	
ANTHERICACEAE	Chlorophytum	*Chlorophytum triflorum*	
APIACEAE	Itasina	*Itasina filifolia*	
APOCYNACEAE	Orbea	*Orbea variegata*	
ARACEAE	Zantedeschia	*Zantedeschia aethiopica*	
ASPARAGACEAE	Asparagus	*Asparagus capensis*	
ASPARAGACEAE	Asparagus	*Asparagus kraussianus*	
ASPARAGACEAE	Asparagus	*Asparagus rubicundus*	
ASPARAGACEAE	Asparagus	*Asparagus undulatus*	
ASPHODELACEAE	Bulbine	*Bulbine favosa*	
ASPHODELACEAE	Bulbine	*Bulbine lagopus*	
ASPHODELACEAE	Bulbinella	*Bulbinella triquetra*	
ASPHODELACEAE	Trachyandra	*Trachyandra ciliata*	
ASPHODELACEAE	Trachyandra	*Trachyandra hirsuta*	

ASPHODELACEAE	Trachyandra	*Trachyandra muricata*	
ASTERACEAE	Athanasia	*Athanasia trifurcata*	
ASTERACEAE	Berkheya	*Berkheya sp.1*	
ASTERACEAE	Chrysocoma	*Chrysocoma ciliata*	
ASTERACEAE	Chrysocoma	*Chrysocoma coma-aurea*	
ASTERACEAE	Cineraria	*Cineraria geifolia*	
ASTERACEAE	Cotula	*Cotula turbinata*	
ASTERACEAE	Dimorphotheca	*Dimorphotheca pluvialis*	
ASTERACEAE	Eriocephalus	*Eriocephalus africanus~*	
ASTERACEAE	Felicia	*Felicia filifolia~*	
ASTERACEAE	Gazania	*Gazania krebsiana~*	
ASTERACEAE	Helichrysum	*Helichrysum dasyanthum*	
ASTERACEAE	Helichrysum	*Helichrysum revolutum*	
ASTERACEAE	Othonna	*Othonna filicaulis*	
ASTERACEAE	Othonna	*Othonna quinquedentata*	
ASTERACEAE	Senecio	*Senecio abruptus*	
ASTERACEAE	Senecio	*Senecio anthemifolius*	
ASTERACEAE	Senecio	*Senecio arenarius*	
ASTERACEAE	Senecio	*Senecio hastatus*	
ASTERACEAE	Seriphium	*Seriphium plumosum*	
BORAGINACEAE	Lobostemon	*Lobostemon sp.1*	
BRASSICACEAE	Heliophila	*Heliophila africana*	
CELASTRACEAE	Gymnosporia	*Gymnosporia buxifolia*	
COLCHICACEAE	Wurmbea	*Wurmbea hiemalis*	
CRASSULACEAE	Crassula	*Crassula capensis~*	
CRASSULACEAE	Crassula	*Crassula ciliata*	
CRASSULACEAE	Crassula	*Crassula fascicularis*	

CRASSULACEAE	Crassula	*Crassula saxifraga*	
CYPERACEAE	Ficinia	*Ficinia nigrescens*	
DROSERACEAE	Drosera	*Drosera cistiflora*	
DROSERACEAE	Drosera	*Drosera trinervia*	
ERICACEAE	Erica	*Erica cerinthoides~*	
ERIOSPERMACEAE	Eriospermum	*Eriospermum lanceifolium*	
ERIOSPERMACEAE	Eriospermum	*Eriospermum nanum*	
ERIOSPERMACEAE	Eriospermum	*Eriospermum sp.1*	
ERIOSPERMACEAE	Eriospermum	*Eriospermum sp.2*	
EUPHORBIACEAE	Euphorbia	*Euphorbia genistoides*	
EUPHORBIACEAE	Euphorbia	*Euphorbia sp.1*	
EUPHORBIACEAE	Euphorbia	*Euphorbia sp.2*	
EUPHORBIACEAE	Euphorbia	*Euphorbia tuberosa*	
FABACEAE	Aspalathus	*Aspalathus ciliaris*	
FABACEAE	Aspalathus	*Aspalathus cordata*	
FABACEAE	Aspalathus	*Aspalathus ericifolia~*	
FABACEAE	Aspalathus	*Aspalathus hispida~*	
FABACEAE	Dipogon	*Dipogon lignosus*	
FABACEAE	Indigofera	*Indigofera incana*	
FABACEAE	Lessertia	*Lessertia rigida*	
FABACEAE	Liparia	*Liparia splendens splendens*	
FABACEAE	Liparia	*Liparia splendens~*	
FABACEAE	Otholobium	*Otholobium hirtum*	
FABACEAE	Podalyria	*Podalyria sericea*	
FABACEAE	Rafnia	*Rafnia acuminata*	
FABACEAE	Sutherlandia	*Sutherlandia frutescens*	
FABACEAE	Xiphotheca	*Xiphotheca reflexa*	

GERANIACEAE	Pelargonium	*Pelargonium capitatum*	
GERANIACEAE	Pelargonium	*Pelargonium cucullatum~*	
GERANIACEAE	Pelargonium	*Pelargonium hirtum*	
GERANIACEAE	Pelargonium	*Pelargonium lobatum*	
GERANIACEAE	Pelargonium	*Pelargonium longicaule*	
GERANIACEAE	Pelargonium	*Pelargonium longicaule~*	
GERANIACEAE	Pelargonium	*Pelargonium longifolium*	
GERANIACEAE	Pelargonium	*Pelargonium pinnatum*	
GERANIACEAE	Pelargonium	*Pelargonium senecioides*	
GERANIACEAE	Pelargonium	*Pelargonium triste*	
HAEMODORACEAE	Wachendorfia	*Wachendorfia paniculata*	
HYACINTHACEAE	Albuca	*Ornithogalum flaccida*	Albuca flaccida
HYACINTHACEAE	Drimia	*Drimia exuviata*	
HYACINTHACEAE	Drimia	*Drimia filifolia*	
HYACINTHACEAE	Lachenalia	*Lachenalia aloides var. quadricolor*	
HYACINTHACEAE	Lachenalia	*Lachenalia aloides~*	
HYACINTHACEAE	Lachenalia	*Lachenalia bulbifera*	
HYACINTHACEAE	Lachenalia	*Lachenalia rubida*	
HYACINTHACEAE	Lachenalia	*Lachenalia sp.1*	
HYACINTHACEAE	Ornithogalum	*Ornithogalum suaveolens*	
HYPOXIDACEAE	Empodium	*Empodium plicatum*	
HYPOXIDACEAE	Pauridia	*Pauridia minuta*	
HYPOXIDACEAE	Spiloxene	*Spiloxene alba*	
IRIDACEAE	Aristea	*Aristea dichotoma*	
IRIDACEAE	Babiana	*Babiana ambigua*	
IRIDACEAE	Babiana	*Babiana nana~*	

IRIDACEAE	Babiana	*Babiana sp.1*	
IRIDACEAE	Babiana	*Babiana stricta*	
IRIDACEAE	Babiana	*Babiana villosula*	
IRIDACEAE	Chasmanthe	*Chasmanthe aethiopica*	Suurkanol
IRIDACEAE	Ferraria	*Ferraria crispa*	
IRIDACEAE	Ferraria	*Ferraria crispa~*	
IRIDACEAE	Ferraria	*Ferraria sp.1*	
IRIDACEAE	Geissorhiza	*Geissorhiza aspera*	
IRIDACEAE	Gladiolus	*Gladiolus alatus*	
IRIDACEAE	Gladiolus	*Gladiolus angustus*	
IRIDACEAE	Gladiolus	*Gladiolus carinatus*	Blou Afrikaner
IRIDACEAE	Gladiolus	*Gladiolus gracilis*	
IRIDACEAE	Gladiolus	*Gladiolus orchidiflorus*	
IRIDACEAE	Gladiolus	*Gladiolus priorii*	
IRIDACEAE	Gladiolus	*Gladiolus watsonius*	
IRIDACEAE	Melasphaerula	*Melasphaerula ramosa*	
IRIDACEAE	Micranthus	*Micranthus tubulosus*	
IRIDACEAE	Moraea	*Moraea bellendenii*	
IRIDACEAE	Moraea	*Moraea collina*	
IRIDACEAE	Moraea	*Moraea elsiae*	
IRIDACEAE	Moraea	*Moraea flaccida*	
IRIDACEAE	Moraea	*Moraea fugacissima*	
IRIDACEAE	Moraea	*Moraea miniata*	
IRIDACEAE	Moraea	*Moraea ochroleuca*	
IRIDACEAE	Romulea	*Romulea flava~*	
IRIDACEAE	Sparaxis	*Sparaxis auriculata*	
IRIDACEAE	Watsonia	*Watsonia coccinea*	

IRIDACEAE	Watsonia	*Watsonia marginata*	
IRIDACEAE	Watsonia	*Watsonia spectabilis*	
JUNCAGINACEAE	Triglochin	*Triglochin bulbosa*	
LAMIACEAE	Leonotis	*Leonotis leonurus*	
LAMIACEAE	Salvia	*Salvia africana-caerulea*	
LAMIACEAE	Salvia	*Salvia africana-lutea*	
LAMIACEAE	Salvia	*Salvia lanceolata*	
LOBELIACEAE	Cyphia	*Cyphia sp.1*	
MALVACEAE	Hermannia	*Hermannia althaeifolia*	
MALVACEAE	Hermannia	*Hermannia cuneifolia~*	
MALVACEAE	Hermannia	*Hermannia hyssopifolia*	
MALVACEAE	Hermannia	*Hermannia multiflora*	
MALVACEAE	Hermannia	*Hermannia pinnata*	
MALVACEAE	Hermannia	*Hermannia scabra*	
MENISPERMACEAE	Cissampelos	*Cissampelos capensis*	
MESEMBRYANTHEMACEAE	Antimima	*Antimima aristulata*	
MESEMBRYANTHEMACEAE	Carpobrotus	*Carpobrotus edulis*	
MESEMBRYANTHEMACEAE	Dorotheanthus	*Dorotheanthus bellidiformis~*	
MESEMBRYANTHEMACEAE	Lampranthus	*Lampranthus emarginatus*	
MESEMBRYANTHEMACEAE	Lampranthus	*Lampranthus explanatus*	
MESEMBRYANTHEMACEAE	Lampranthus	*Lampranthus glaucus*	
MESEMBRYANTHEMACEAE	Lampranthus	*Lampranthus spiniformis*	
MESEMBRYANTHEMACEAE	Ruschia	*Ruschia rigidicaulis*	
MESEMBRYANTHEMACEAE	Ruschia	*Ruschia sarmentosa*	
MESEMBRYANTHEMACEAE	Ruschia	*Ruschia schollii*	
MONTINIACEAE	Montinia	*Montinia caryophyllacea*	
MYRSINACEAE	Myrsine	*Myrsine africana*	

OLEACEAE	Olea	*Olea europaea africana*	
OLEACEAE	Olea	*Olea europaea~*	
ORCHIDACEAE	Disa	*Disa sp.1*	
ORCHIDACEAE	Disa	*Disa sp.2*	
ORCHIDACEAE	Holothrix	*Holothrix sp.1*	
ORCHIDACEAE	Satyrium	*Satyrium coriifolium*	
ORCHIDACEAE	Satyrium	*Satyrium odorum*	
OXALIDACEAE	Oxalis	*Oxalis flava*	
OXALIDACEAE	Oxalis	*Oxalis livida~*	
OXALIDACEAE	Oxalis	*Oxalis luteola*	
OXALIDACEAE	Oxalis	*Oxalis obtusa*	
OXALIDACEAE	Oxalis	*Oxalis pes-caprae~*	
OXALIDACEAE	Oxalis	*Oxalis purpurea*	
OXALIDACEAE	Oxalis	*Oxalis tenuifolia*	
OXALIDACEAE	Oxalis	*Oxalis versicolor~*	
POACEAE	Themeda	*Themeda triandra*	
POLYGALACEAE	Polygala	*Polygala sp.1*	
POLYGALACEAE	Polygala	*Polygala sp.2*	
POLYGALACEAE	Polygala	*Polygala sp.3*	
PROTEACEAE	Leucadendron	*Leucadendron lanigerum~*	
PROTEACEAE	Leucadendron	*Leucadendron salignum*	
PROTEACEAE	Protea	*Protea repens*	Sugarbush, Suikerbos
PROTEACEAE	Serruria	*Serruria stellata*	
RESTIONACEAE	Willdenowia	*Willdenowia incurvata*	
RHAMNACEAE	Phylica	*Phylica cephalantha*	
RHAMNACEAE	Phylica	*Phylica parviflora*	
RHAMNACEAE	Phylica	*Phylica plumosa~*	

RHAMNACEAE	Trichocephalus	*Trichocephalus stipularis*	
ROSACEAE	Cliffortia	*Cliffortia polygonifolia~*	
ROSACEAE	Cliffortia	*Cliffortia sp.1*	
RUBIACEAE	Anthospermum	*Anthospermum aethiopicum*	
RUTACEAE	Agathosma	*Agathosma sp.1*	
RUTACEAE	Diosma	*Diosma hirsuta*	
SANTALACEAE	Thesium	*Thesium funale*	
SANTALACEAE	Thesium	*Thesium sp.1*	
SANTALACEAE	Thesium	*Thesium sp.2*	
SANTALACEAE	Thesium	*Thesium strictum*	
SCROPHULARIACEAE	Diascia	*Diascia elongata*	
SCROPHULARIACEAE	Hebenstretia	*Hebenstretia ramosissima*	
SCROPHULARIACEAE	Manulea	*Manulea cheiranthus*	
SCROPHULARIACEAE	Nemesia	*Nemesia affinis*	
SCROPHULARIACEAE	Nemesia	*Nemesia barbata*	
SCROPHULARIACEAE	Oftia	*Oftia africana*	
THYMELAEACEAE	Passerina	*Passerina corymbosa*	
VISCACEAE	Viscum	*Viscum capense*	
ZYGOPHYLLACEAE	Zygophyllum	*Zygophyllum sessilifolium*	

Appendix 7: Bracken Nature Reserve Mammal Species List

GENUS AND SPECIES	COMMON NAME	THREATENED STATUS
Cryptomys hottentotus	Common Molerat	Least Concern (LC)
Georychus capensis	Cape Molerat	Least Concern (LC)
Raphicerus melanotis	Cape Grysbok	Least Concern (LC)
Galerella pulverulenta	Small Grey Mongoose	Least Concern (LC)
Hystrix africaeaustralis	Porcupine	Least Concern (LC)
Rhabdomys pumilio	Striped Mouse, Striped Field Mouse	Least Concern (LC)
Tatera afra	Cape Gerbil	Least Concern (LC)
Aethomys namaquensis	Namaqua Rock Mouse	
Lepus capensis	Cape Hare	

Appendix 8: Bracken Nature Reserve Birds Species List

FAMILY	GENUS	SPECIES NAME
ANATIDAE	*Alopochen*	*aegyptiacus*
ANATIDAE	*Anas*	*undulata*
FRINGILLIDAE	*Serinus*	*canicollis*
MONARCHIDAE	*Telophorus*	*zeylonus*
ACCIPITRIDAE	*Accipiter*	*melanoleucus*
ACCIPITRIDAE	*Accipiter*	*rufiventris*
ACCIPITRIDAE	*Buteo*	*rufofuscus*
ACCIPITRIDAE	*Buteo*	*vulpinus*
ACCIPITRIDAE	*Elanus*	*caeruleus*
ACCIPITRIDAE	*Polyboroides*	*typus*
ALAUDIDAE	*Calandreslla*	*cinerea*
APODIDAE	*Apus*	*barbatus*
APODIDAE	*Apus*	*caffer*
APODIDAE	*Tachymarptis*	*melba*
ARDEIDAE	*Ardea*	*cinerea*
ARDEIDAE	*Ardea*	*melanocephala*
ARDEIDAE	*Bubulcus*	*ibis*
CAPRIMULGIDAE	*Caprimulgus*	*pectoralis*
CAPRIMULGIDAE	*Caprimulgus*	*tristigma*
CHIONIDAE	*Burhinus*	*capensis*
CISTICOLIDAE	*Apalis*	*thoracica*
CISTICOLIDAE	*Cisticola*	*juncidis*
CISTICOLIDAE	*Cisticola*	*subruficapilla*
CISTICOLIDAE	*Cisticola*	*tinniens*

CISTICOLIDAE	*Prinia*	*maculosa*
COLIIDAE	*Colius*	*colius*
COLIIDAE	*Urocolius*	*indicus*
COLUMBIDAE	*Columba*	*guinea*
COLUMBIDAE	*Oena*	*capensis*
COLUMBIDAE	*Streptopelia*	*capicola*
COLUMBIDAE	*Streptopelia*	*semitorquata*
COLUMBIDAE	*Streptopelia*	*senegalensis*
CORVIDAE	*Corvus*	*albicollis*
CORVIDAE	*Corvus*	*albus*
CUCULIDAE	*Chrysococcyx*	*caprius*
CUCULIDAE	*Chrysococcyx*	*klaas*
DICRURIDAE	*Dicrurus*	*adsimilis*
ESTRILDIDAE	*Estrilda*	*astrild*
FALCONIDAE	*Falco*	*biarmicus*
FALCONIDAE	*Falco*	*naumanni*
FALCONIDAE	*Falco*	*eregrinus*
FALCONIDAE	*Falco*	*rupicolus*
HIRUNDINIDAE	*Hirundo*	*albigularis*
HIRUNDINIDAE	*Hirundo*	*cucullata*
More birds to look out for:		
SWALLOWS AND SWIFTS		
OLIVE THRUSH		
FERAL PIGEONS		
CROWNED PLOVERS		
BLACKSMITH PLOVERS		

Appendix 9: Bracken Nature Reserve Reptiles

FAMILY	GENUS	SPECIES
CHAMAELEONIDAE	*Bradypodion*	*pumilum*
COLUBRIDAE	*Duberria*	*lutrix lutrix*
COLUBRIDAE	*Lamprophis*	*aurora*
COLUBRIDAE	*Psammophis*	*leightoni*
COLUBRIDAE	*Psammophis*	*notostictus*
COLUBRIDAE	*Pseudaspis*	*cana*
ELAPIDAE	*Naja*	*nivea*
SCINCIDAE	*Trachylepis*	*capensis*
TESTUDINIDAE	*Chersina*	*angulata*
TESTUDINIDAE	*Homopus*	*areolatus*
	Scelotes	*bipes*

Appendix 10: Bracken Nature Reserve Amphibian List

FAMILY	GENUS	SPECIES NAME

BREVICEPTIDAE	*Breviceps*	*gibbosus*
BUFONIDAE	*Vandijkophrynus*	*angusticeps*
PYXICEPHALIDAE	*Strongylopus*	*grayii*
PYXICEPHALIDAE	*Strongylopus*	*grayii grayii*

Appendix 11: Bracken Nature Reserve Invertebrate List

Fig Tree Borer	*Phryneta spinator*
Milipede Assassin	*Ectrichodia crux*
Black-ringed Ladybird	*Oenopia cinctella*
Bark stink bugs	*Coenomorpha*
Spider-hunting wasp	*Tachypompilus ignites*

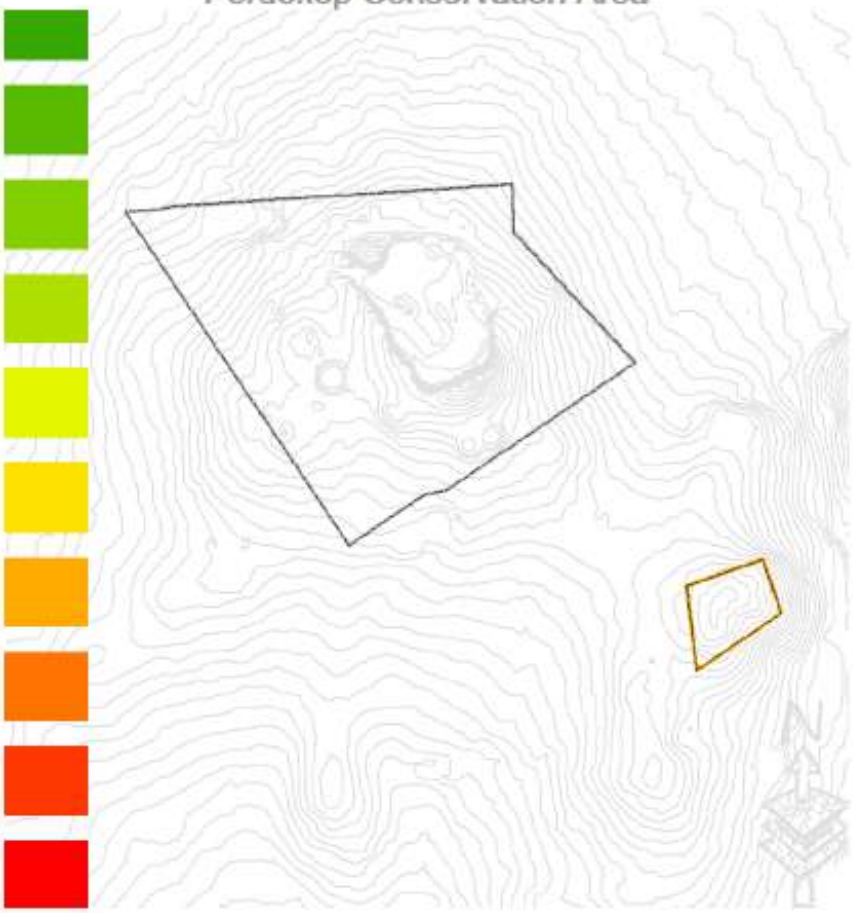
BRACKEN NATURE RESERVE ARACHNIDA LIST	
Theraphosidae Harpactirella	Small baboon spider
Stegodyphus	Community Nest Spiders
Thomisidae Thomisus sp	Small crab spider
Argiope trifasciata	Banded Garden Orb-web spider
Araneidae Neoscona blondeli	Orb web spider
Amaurobiidae	*Chresiona sp.*
Araneidae	*Pararaneus cyrtoscapus*
Linyphiidae	*Pelecopsis janus*
Lycosidae	*Lycosa sp.*
Oxyopidae	*Oxyopes russoi*
Phyxelididae	*Vidole capensis*
Salticidae	*Menemerus sp.*

Salticidae	*Thyenula ogdeni*
Theridiidae	*Enoplognatha molesta*
Theridiidae	*Latrodectus geometricus*
Theridiidae	*Steatoda capensis*
Thomisidae	*Synema imitator*
Anapidae	*Crozetulus sp.*
Araneidae	*Argiope trifasciata*
Araneidae	*Neoscona subfusca*
Oxyopidae	*Oxyopes* moontlik *russoi*

D. Other documents as required

Appendix 12: Sensitivity Value Analysis

SENSITIVITY- VALUE ANALYSIS AND ZONATION PROCESS:
BRACKEN NATURE RESERVE
&
Perdekop Conservation Area



Prepared for the Biodiversity Branch and Environmental Management Systems Branch

SEPTEMBER 2010

Arne Purves

Natural Resource Specialist

Arne.purves@capetown.gov.za

THIS CITY WORKS FOR YOU

Contents

1. Introduction and Scope of Report

Bracken Nature Reserve is a small reserve of approximately 37 ha. It is located in the Oostenberg Administrative Region of Cape Town in Brackenfell, and is surrounded by light industrial and residential areas.

The vegetation types consist of Swartland Granite Renosterveld (of which only 3% remains) and Cape Sand Plain Fynbos (of which 1% is conserved). Both these vegetation types are poorly conserved and highly threatened. 260 plant species have been recorded in the Reserve.

Perdekop Conservation Area is a small area of 2.2 hectares, well known among local botanists and conservationists for its richness and high levels of biodiversity and endemic species. The vegetation types found at Perdekop are highly threatened Swartland Granite Renosterveld and Cape Sand Plain Fynbos respectively.

These vegetation types are all listed as threatened ecosystems under National Environmental Management: Biodiversity Act (Act 10 of 2004), DEAT (in press).

1.1 History

In the 1700's the hill overlooking Brackenfell was known as Kanonkop, because there was a canon on the hill that signalled farmers when ships were in the harbour so they could sell their produce there. By 1950, a granite quarry was developed on the hill and closed in the early 1970's. By 1970, the quarry was turned into a landfill site. Later, sections of the quarry were established as a Nature Reserve. Bracken Nature Reserve was later earmarked as a core botanical site for its high botanical value. The reserve forms part of the City's Biodiversity Network and is listed as a protected area.

1.2 Context

The development of the Sensitivity and Zonation plan is one of the steps required in compiling a Conservation Development Framework (CDF) for the reserve. CDFs are tools to reconcile the various land-use needs and to delineate visitor user zones and the positioning and nature of new infrastructure, access points, roads and facilities.

The CDF process has grown in response to the requirements of the NEMBA (2004) and is a strategy to comply with the spatial planning requirements of these acts. The CDFs will ensure that best practice and sustainable development principles are integrated into spatial planning within protected areas.

The Sensitivity-Value analysis is the landscape analysis portion of the broader Conservation Development Framework. It is a multi-criteria decision-support tool for spatial planning that is designed to integrate the best available information into a format that allows for defensible and transparent decisions to be made. The Sensitivity-Value process is based on the principle that the acceptability of a development (or placement of a structure) at a site is based on the site's value (either from biodiversity, heritage, aesthetic or a combination of values) and its sensitivity or vulnerability to a variety of types of disturbance (Holness *et al*, 2005).

- The Sensitivity-Value analysis, the CDF and the associated zonation plan should form part of an adaptive management system. They will grow and change over time as the understanding of the landscapes and ecosystems improve; and
- It does not replace the need for detailed site and precinct planning and EIA compliance at site level.

2. Background and Brief

The Sensitivity-Value analysis was undertaken by the EMS Branch's natural resource specialist. The small size of the City's nature reserve also did not require an extensive analysis, with the subsequent zonation process being fairly straight forward. The methodology used for both the Sensitivity-Value analysis and the zonation process was adapted from Holness (2008) and SRK Consulting (2008).

All geographical information work was carried out in ESRI's ArcMap version 9.3.1 GIS (Geographical Information System) using the ArcInfo license level with Spatial Analyst and 3D Analyst extensions.

3. Sensitivity-Value Analysis

Sensitivity-Value Analysis and Zoning Process methodology

Stage 1: Data synthesis and compilation

Compilation of required data for the analysis

- Spatially define the planning domain or study area.
- Evaluate available and required datasets for the Sensitivity-Value model.
- Spatial data is collected or created for each element of the Sensitivity-Value model.

Stage 2: Layer interpretation

Layer interpretation is an important component of the Sensitivity-Value process that requires a combination of spatial data interpretation and expert knowledge.

- Using the assembled data, areas are assigned a score on a common scale for each element of the model; and
- The scores achieved for each element of the model are represented as separate input layers on a GIS.

Stage 3: Sensitivity-Value Analysis

The Sensitivity-Value analysis stage involves an iterative exploration of the input layers.

- The scores achieved for each element of the model are weighted and aggregated to obtain an overall Sensitivity-Value ranking.
- Different weightings and aggregation procedures and combinations of input layers can be explored; and
- The robustness of the Sensitivity-Value analysis is examined.

The resultant Sensitivity-Value output maps should provide an initial understanding of the spatial distribution of the important and sensitive biodiversity, landscape and heritage features.

Stage 4: Development of a draft zonation plan

The outputs of the Sensitivity-Value process are used as the foundation for the development of a draft zonation plan. The Sensitivity-Value outputs and draft zonation plan are workshopped with relevant stakeholders.

Stage 5: Refinement of the draft zonation and the identification of special management overlays

Special management areas/overlays are identified using the information derived from the Sensitivity-Value analysis. Recommendations are made regarding the management of the land-use zones and special management areas.

The draft is then presented for comment to the City and stakeholder groups to obtain broad public input into the plan prior to finalisation,

Stage 6: Final Zonation and Conservation Development Framework.

The comments and input from the public participation process are integrated into the final zonation plan. The plan is passed through Council for approval and adoption.

3.1 Input Layers

The study area for the CDF was defined as the current management boundary of the Bracken Nature Reserve and Perdekop Conservation Area. Where appropriate a 1km buffer around the management boundaries was used to ensure that the reserve sensitivities are considered within the context of the surrounding urban and rural landscape.

3.1.1 Biodiversity

3.1.1a Habitat Value

The habitat unit as defined by a particular vegetation community is used as the broad proxy for biodiversity. The vegetation communities are good surrogates for habitat value as it uses readily available information that clearly delineates the distribution of distinct subsets of biodiversity across the landscape.

The South African National Vegetation Map (Rebelo et al, 2006) was used to broadly define the habitat units. The NSBA (Driver *et al*, 2005) values were used to inform current ecosystem status and level of protection of vegetation types within the study area.

The following factors were also incorporated in the habitat value calculation

- The value assigned to a habitat unit should reflect the contribution that vegetation type makes to the local, provincial and national conservation estate.
- This value should reflect the rarity of the habitat, the level of transformation that occurred within the habitat type, species richness and diversity, habitat heterogeneity, and contribution to local conservation targets as identified in the City's Biodiversity Network (Benn, 2008).
- The habitat value also takes into account a gap analysis (how much is in reserves), whereby habitat types that exists largely outside of protected areas receive a higher value.

Broad habitat value is a poor indication of the value of a particular site if a reserve has a history of significant transformation or degradation. Where a reserve includes transformed and/or degraded areas these need to inform the adjustment of the broad habitat value to reflect:

- The level and type of transformation that has occurred at a particular site.
- The rehabilitation/restoration potential of a site. Areas that are likely to revert, with a minimum of management intervention, to a natural or near natural state should be allocated a higher value than areas where extensive management intervention is required.
- Degraded or developed areas were considered to have lower habitat values. The habitat values were adjusted downwards according to the level and type of degradation or habitat loss that has occurred.

Data Inputs (GIS methods and sources)

Base habitat map:

The Cape Town Vegetation remnant map was used to delineate habitat units according to their national vegetation type. The values used to adjust the base habitat scores are the listed in Table 2. This is necessary in order that critically endangered ecosystems are accurately reflected in the scoring in terms of protection status and, % transformation of the vegetation types.

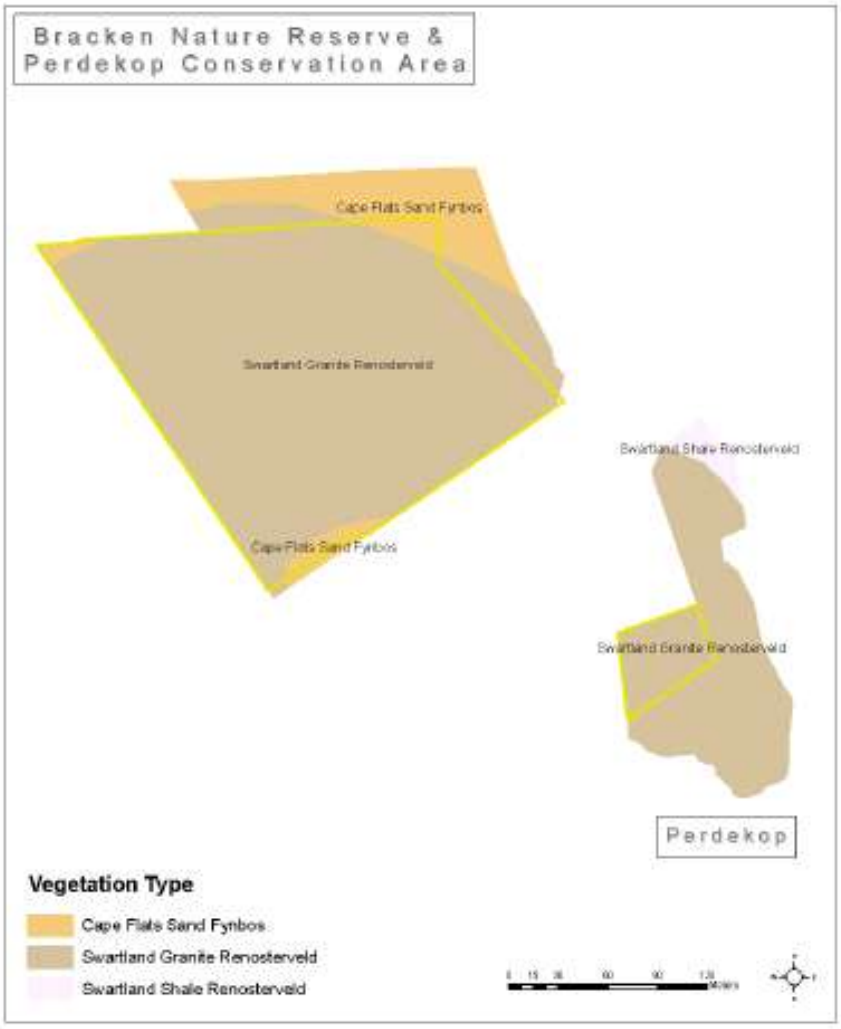


Figure 1: Bracken Nature Reserve National Vegetation Types

3.1.1b: Transformation # Degradation Map:

Habitat transformation and degradation was mapped from recent aerial photography (2005, 2007 and 2008). Habitat modifiers are listed in Table 1 and Figure 2 shows their types and spatial extent.

Table 1: Habitat Modifiers

Type	Category	Description
Transformed	Facilities	Facilities for use by public within the reserve (Ablutions, displays, benches etc.)
	Housing	Formal and informal housing
	Quarries	Open excavation or burrow pits.
	Road & paths	The road (management and access roads), trail and boardwalk network
	Dams	Artificial water impoundments and Bulk water infrastructure
	Recreational Open Space	Primarily areas where lawns are maintained for public recreation. Often associated with non-indigenous tree planting for shade etc.
Degraded Heavy, moderate or Low	Firebreaks/fencing	Strips of cleared land maintained for fire management. Including the boundary fencing which usually incorporates a firebreak.
	Invasive Alien vegetation	These areas include sites that have an Invasive Alien Plant infestation density of more than 75%. Sites need to be assessed in terms of their restoration potential. This would also include plantation (Forestry) sites.
	Disturbed	Areas where the natural habitat is not in a near-natural state, but is also not irreversibly transformed. These areas still perform important habitat and ecosystem functions. Old capped landfill sites

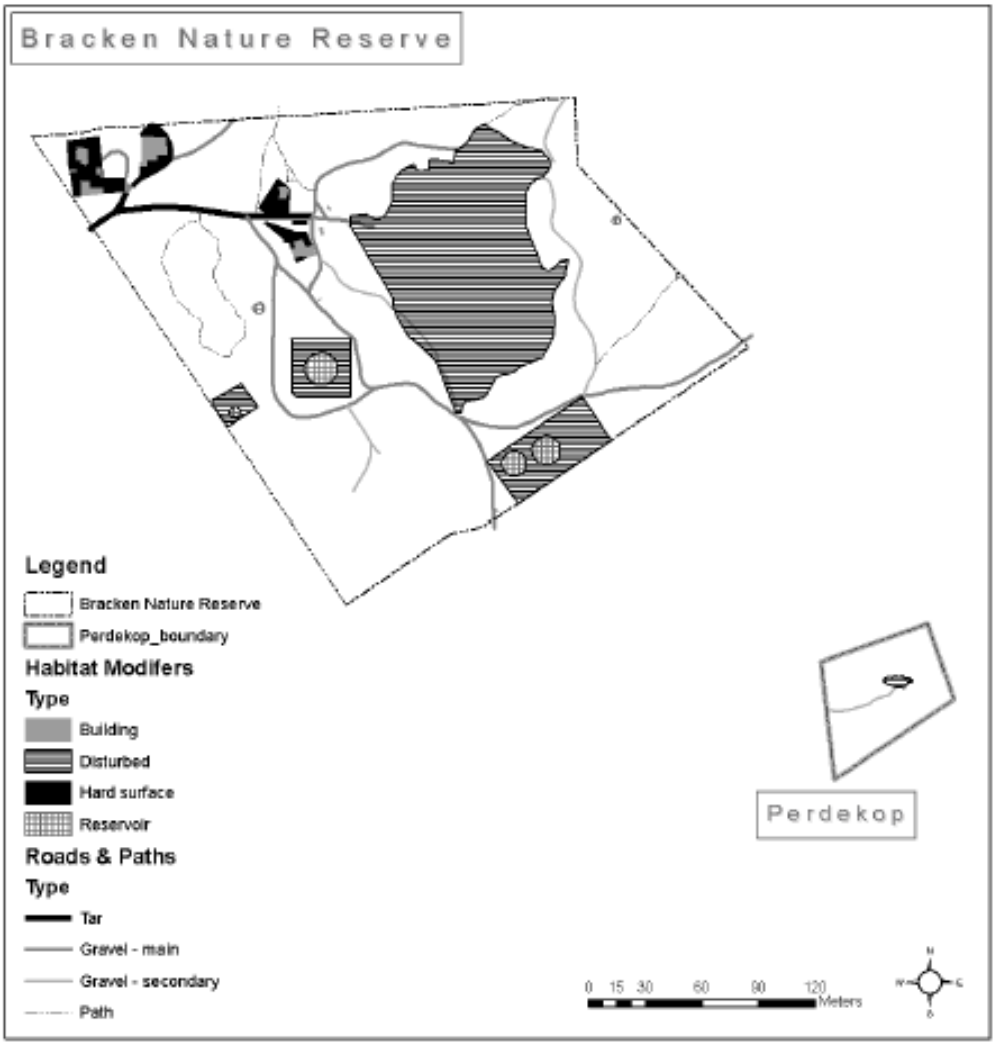


Figure 2: Habitat Modifiers

Scoring, Logic and rationale

The scoring method derived was as follows:

1. Base values were assigned to the study area according to the ecosystem status of the vegetation types (Table 2).

2. The Base values were adjusted on the basis of habitats that are likely to receive an adjusted conservation status under the "Criterion D" listing of threatened ecosystems in terms of NEMBA (2004). This reflects vegetation types with high numbers of rare and endangered plant species. This value replaced the NSBA Conservation Status where higher and was not used in addition to them (Table 2).
3. Base values were adjusted according to the protection status of the vegetation type (Gap Analysis) as determined in the fine scale conservation plan for the City (see Appendices, Table 9 and Table 10).
4. Base values were adjusted according to the % Transformation that has occurred within each vegetation type within the City. (See Appendices, Table 9 and Table 10).
5. The values of all degraded sites were reduced according to the type of habitat degradation (Table 3); and
6. The values of all transformed areas were reduced to zero
7. Once these values were determined, the values were converted to a 0-10 range using a linear conversion method in ArcGIS.

Table 2: Habitat Value summary for each vegetation type before local adjustment for transformation/degradation

Vegetation Type	NSBA Conservation Status Score	Criterion D Score*	SANBI Conservation Status	% Transformed Score	Unmodified Score
Atlantis Sand Fynbos	6	10	5	3	18
Boland Granite Fynbos	8	6	3	3	14
Cape Estuarine Salt Marshes	4	0	-1	3	6
Cape Flats Dune Strandveld: False bay	8	8	3	10	21
Cape Flats Dune Strandveld: West Coast	4	8	3	2	13
Cape Flats Sand Fynbos	10	10	4	10	24
Cape Lowland Freshwater Wetlands	4	0	-1	2	5
Cape Winelands Shale Fynbos	8	0	3	6	17
Elgin Shale Fynbos	10	0	4	6	20
Hangklip Sand Fynbos	6	6	-1	4	9
Kogelberg Sandstone Fynbos	4	10	2	0	12
Lourensford Alluvium Fynbos	10	10	3	10	23
North Peninsula Granite Fynbos	4	0	-1	2	5
Peninsula Sandstone Fynbos	4	8	-1	0	7
Peninsula Shale Fynbos	6	0	-1	4	9
Peninsula Shale Renosterveld	10	0	3	10	23
South Peninsula Granite Fynbos	8	0	2	6	16
Southern Afrotemperate Forest	4	0	-1	0	3
Swartland Alluvium Fynbos	10	0	5	10	25
Swartland Granite Renosterveld	10	10	4	10	24
Swartland Shale Renosterveld	10	10	4	10	24
Swartland Silcrete Renosterveld	10	0	-1	10	19
Western Shaleband Vegetation	4	0	3	0	7

This value only replaces NSBA Conservation Status Value when it's a higher value

Table 3: Habitat Value Summary table

Type	Source	Category	Value	Notes
Base Values	NSBA Conservation Status	Critically Endangered	10	
		Endangered	8	
		Vulnerable	6	
		Least Threatened	4	
	Criterion D Status	Critically Endangered	10	Criterion D Status overrides NSBA where the value is higher
		Endangered	8	
		Vulnerable	6	
		Least Threatened	4	
Broad adjustors	Vegetation remnants % Transformed	0-14%	0	This criterion highlights the critically endangered vegetation types within the City without considering protection status.
		15-29%	5	
		30-39%	6	
		40-49%	7	
		50-59%	8	
		60-69%	9	
		70-100%	10	
	Ecosystem protection Status (Gap Analysis)	Not Protected	5	Currently not represented in formal reserves
				>5% of target in reserves
		Hardly Protected	4	5->50% of target in reserves
		Poorly Protected	3	50->100% of target in reserves
		Moderately Protected	2	100% + of target conserved in formal protected areas
		Well Protected	-1	
Modifiers				
Local adjustors	Overriding values for transformed sites	Artificial water bodies	0	Value reduced to 0
		Quarries/roads	0	Value reduced to 0
		Developed	0	Value reduced to 0
		Recreational Open Space (ROS)	0	Value reduced to 0
	Adjusting values for degraded sites	Heavily degraded	-6	High density aliens – depleted seed bank with low restoration potential Previously ploughed old fields Old capped landfill sites
		Moderately degraded	-2	High density aliens – intact seed bank with high restoration potential Forestry (Pine, Gum) plantations
		Low degraded	-1	High density non-locally indigenous species Area is recovering from historic disturbance, to a near natural state. Cleared fire belt areas Modified wetlands with NB habitat value

GIS Procedure:

Habitat Value Unmodified Score

1. Export vegetation data to separate shapefile
2. Delete all fields except the "SANBI_VEG" field
3. Dissolve on field "SANBI_VEG"
4. Add fields, NSBA Conservation Status Score (NSBA_SCR), Criterion D Score (Crit_D), SANBI Conservation Status (SANBI_Cons), % Transformed (PERC_TRANS), Unmodified Score (UNMod_SCR). Use Short Integer field type.
5. Populate the attribute table with the relevant scores
6. Calculate the Unmodified Habitat Value Score. Note: The Criterion D score will override the NSBA score if the latter is a higher value.

Habitat Transformation

1. All roads, trails and boardwalks are buffered by 1 meter.
2. All transformation types were digitised from aerial photography at a scale of 1:700. Artificial water bodies were extracted from the wetlands layer.
3. All transformation layers were unioned.
4. Values were assigned as per the table. Type in field "TRANSCLASS" and the score in the field "VALUE"

Habitat Value Modified Score

1. Union the above two layers
2. Clip the union layer to the study area
3. Delete all unnecessary fields.
4. Add field "MOD_SCR"
5. Calculate the value for "MOD_SCR". Remember to reduce the over-riding transformation values to 0
6. Covert to a 1-10 range using equal intervals and label 1-10.
7. Export to shapefile and label Bracken_HabitatValue.shp
8. Create map for report and export

Outputs

See Figure 3

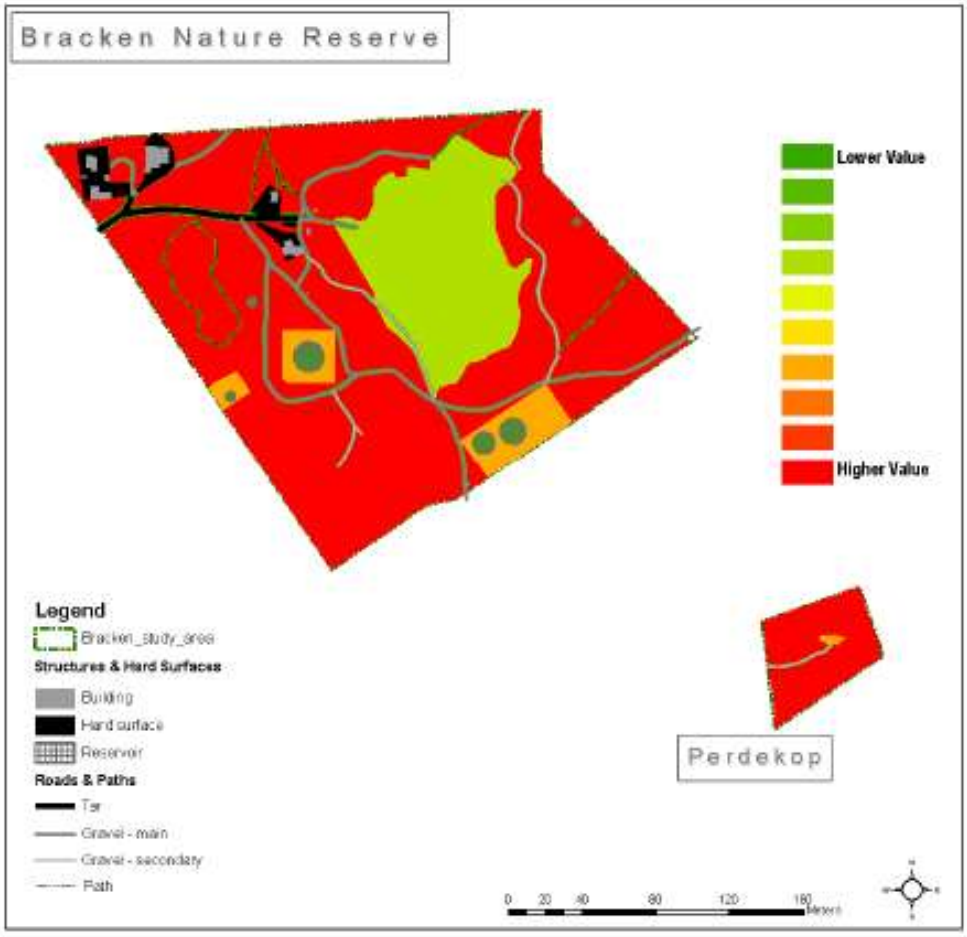


Figure 3: Bracken Habitat Value (Modified)

Interpretation in a local context

Critically endangered and endangered vegetation types occur in the reserve. These are the heavily transformed lowland vegetation types which include, Swartland Granite Renosterveld and Cape Flats Sand Fynbos.

Showstoppers#fatal flaws and special management area informants

Development of Greenfield sites within any critically endangered or endangered vegetation type or ecosystem should be approached with extreme caution, as by definition one cannot afford further biodiversity loss in these areas within the City.

Bracken Nature Reserve requires extensive restoration investment in order for the old landfill site to be rehabilitated to a semi natural state.

3.1.1c Special Habitat Value[1]

The value of some areas of a reserve to the biodiversity estate may not be fully reflected by the habitat proxy (vegetation units). It is critical that these areas are identified and included. However, care must be taken not to allow flawed data, selective data availability, perceptions and species/taxa bias to skew the biodiversity value of one site over another.

Key aspects that should be taken into account in this layer:

- Habitats important for supporting populations of special species.
    - Care must be taken to ensure that this input fairly reflects the distribution of special species across the reserve.
    - Where detailed and comprehensive data are available this can be based on actual distributions, but in all likelihood this will be based on expert assessment of likely habitat requirements for identified species.
- Areas containing significant biodiversity assets such as Leopard, Black eagles, Leopard toads etc. that are not specifically linked to entire habitats.
- Other habitats that have significant biodiversity value that have been omitted from the broad conservation value layer as a result of scale issues.

Data Inputs (GIS methods and sources)

Species data is available from SAS Flora (Coastec) and CREW datasets. There are many red data listed species occurring in both Bracken and Perdekop. The data for Bracken is all geocoded to the

[1] Not used in the Bracken Sensitivity-Value Analysis

reserve centroid so can't be used in the analysis. The data for Perdekop has localities, but the size of the reserve is too small and the entire area is considered critical.
The modified remnant vegetation layer (Habitat value map) is deemed adequate to serve as a habitat proxy for both fauna and flora.

3.1.2 Topographic Sensitivity

This layer is used to identify areas with steep slopes or with sensitive geological or geomorphologic features. Significant impacts (such as accelerated soil erosion or landslides) may occur during construction in, or with improper management.
Sensitivity to erosion was not considered in this report. The steepness and habitat values provide a good enough proxy for sensitivity to erosion.

Data Inputs (GIS methods and sources)

This layer is derived from a triangular irregular network (TIN) created in ArcView 9.3.1 using the 3D Analyst extension and ArcInfo licence level. The 2m Contour layer for the City was used to calculate the base heights for the TIN. Slope angles were calculated using the 3D Analyst extension.

Scoring, logic and rationale

Slope angles were split into categories that relate to potential impacts and the limits of construction without significant cut and fill.

Procedure:

- Buffer study area by 1000m
- Clip the 2m contour layer with the buffered boundary layer
- Calculate Slope angles
- Reclassify according to Table 4 using 3D Analyst - reclassify
- Convert raster layer to vector shapefile and clip to the reserve boundary
- Create new field "VALUE"

- Assign values according to attribute field "GRIDCODE" to shapefile field "VALUE"
- Create and export map
- Final Topographic Sensitivity layer: Bracken_topo_sensitivity.shp

Table 4: Topographic sensitivity

Source	Category	Value	Note
Slope angles calculated from 2m contour layer	45° - <90°	10	Very high potential for erosion and slope instability
	30° - <45°	9	Strong potential for erosion and slope instability
	15° - <30°	8	High risk of erosion following disturbance
	10° - <15°	6	Moderate risk of erosion following disturbance
	5° - <10°	2	Low sensitivity
	0° - <5°	0	No special topographical sensitivity

Outputs

See Figure 4

Figure 4: Bracken topographic sensitivity map

Interpretation in local context

Steeps slopes are not a major factor in the reserve. The excavation of the landfill site has created an artificial rim around the area requiring restoration.

Showstoppers/fatal flaws and Special Management Area Informants

The conversion of this hill into a landfill site has rendered the top relatively flat.

3.1.3 Hydrological Sensitivity

Bracken Nature Reserve and Perdekop conservation area have no significant rivers or wetlands. The information below is included as reference only.

Figure 5, shows the reserve in relation to the closest rivers and wetland systems.

The hydrological sensitivity layer has two purposes: to identify areas important for maintaining hydrological processes and to identify areas where infrastructure could be damaged by flooding.

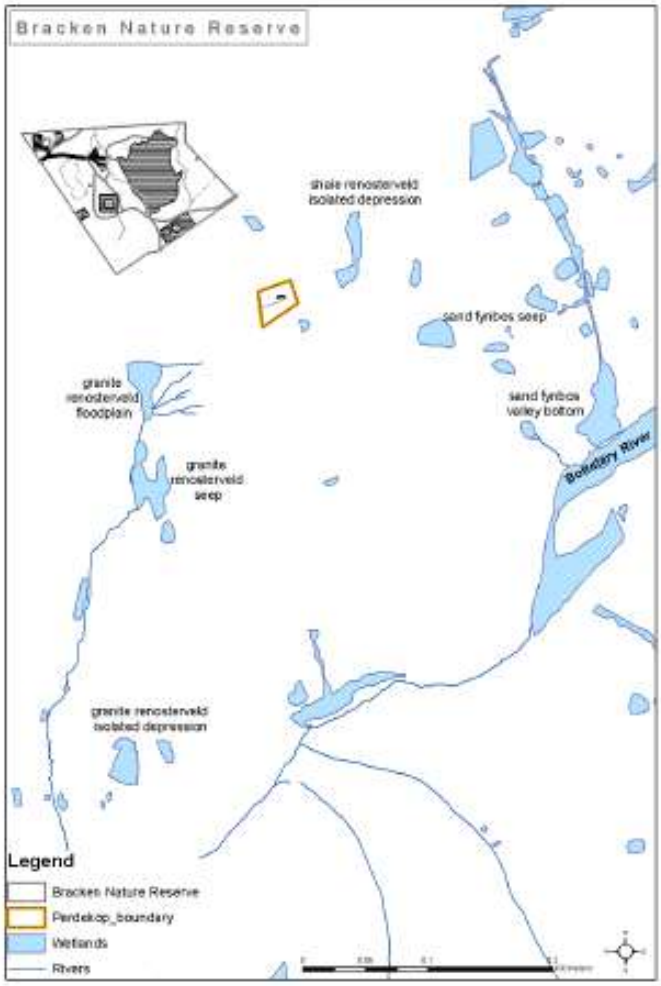


Figure 5: Bracken Nature Reserve and associated rivers and wetlands

Interpretation in local context

There are no rivers or wetlands in the reserve.

3.1.4 Visual Sensitivity

This layer examines the value of the study area from a visually aesthetic perspective. Visually intrusive development should not occur in areas with a high visual aesthetic value.
The visual sensitivity layer examines how visually intrusive a development will be in a landscape.

Data inputs (GIS methods and sources)

A viewshed analysis was run on the TIN created for the study area, using ArcMap 9.3.1 and the 3D Analyst extension.

Scoring, logic and rationale

The visual analysis examined how visually intrusive a development or structure would be at a particular point. Three separate variables were calculated (see Table 6).

- Slope steepness was calculated based on the TIN for the study area. Slope angles were divided into 10 equal width categories (the range was 0°-40°). These were scored in the range 1-10.
- An analysis of the visibility of each site from every other site in the reserve + a 1km buffer was undertaken. A 100m grid of points including the reserve and a 1000m buffer was used to define 810 viewpoints with a Z value of 1.8m (the grid was created using the "Special Raster Tools" in Hawth's Tools extension for ArcMap 9.3). The viewshed examines (on a proportional basis) which sites are most visible. Similar to slope steepness, these values were divided into 10 equal width categories and scored on a 0-10 basis.
- A viewshed analysis from all roads, paths and trails was undertaken. The analysis parameters used were the same as above except for the viewpoints used.
- These 3 values were added together and reclassified into the range 0-10 equal width categories to ensure compatibility with other layers.

Table 6: Visual Sensitivity Procedure

Source	Category	Value	Note
1. Slope Steepness			
❑ Slopes modeled in ArcGIS using Spatial Analyst		0-10	Slope angles calculated TIN created from 2m Contours
❑ Slopes reclassified	10 equal width categories Scored 1 to 10		Values converted into ten integer based classes, with the maximum value equivalent to slopes of over 45°
2. Grid visibility			
❑ 100m grid of reserve + 1km buffer area used as viewpoints 810 Viewpoints		0-10	Analysis based on the TIN
❑ Reclassified	10 equal width categories		Values converted into ten integer based classes, with the maximum value equivalent to visibility from 2.5% of park viewpoints.
3. Tourist viewpoint and public road visibility			
❑ All Roads, paths and trails used as viewpoints (100m interval; 62 points)		0-10	Analysis based on the TIN
❑ Reclassified	10 equal width categories		Values converted into ten integer based classes, with the maximum value equivalent to visibility from 5% of park viewpoints.

Procedure:

Visual Sensitivity

- ❑ Create a 100m point grid covering the buffered (1km buffer applied) reserve boundary layer. Hawth's tools have an easy tool for this.
- ❑ Create a point shapefile using the roads and paths shapefile. Hawth's tools have an easy tool for this
- ❑ Run the viewshed analysis using the two shapefiles above as the view points. Use a Z factor of 1.8m.
- ❑ Reclassify into 10 equal width categories and export the raster to feature class.
- ❑ Clip to the reserve boundary
- ❑ Intersect the 3 shapefiles and delete all unnecessary fields. Add field "VISUAL_VAL" .Add up the 3 "VALUE" fields using the field calculator and populate the "VISUAL_VAL" field
- ❑ Reclassify into 10 equal class categories
- ❑ Create and export map
- ❑ Final Visual Sensitivity layer: Bracken_visual_sensitivity.shp

Outputs See Figure 6

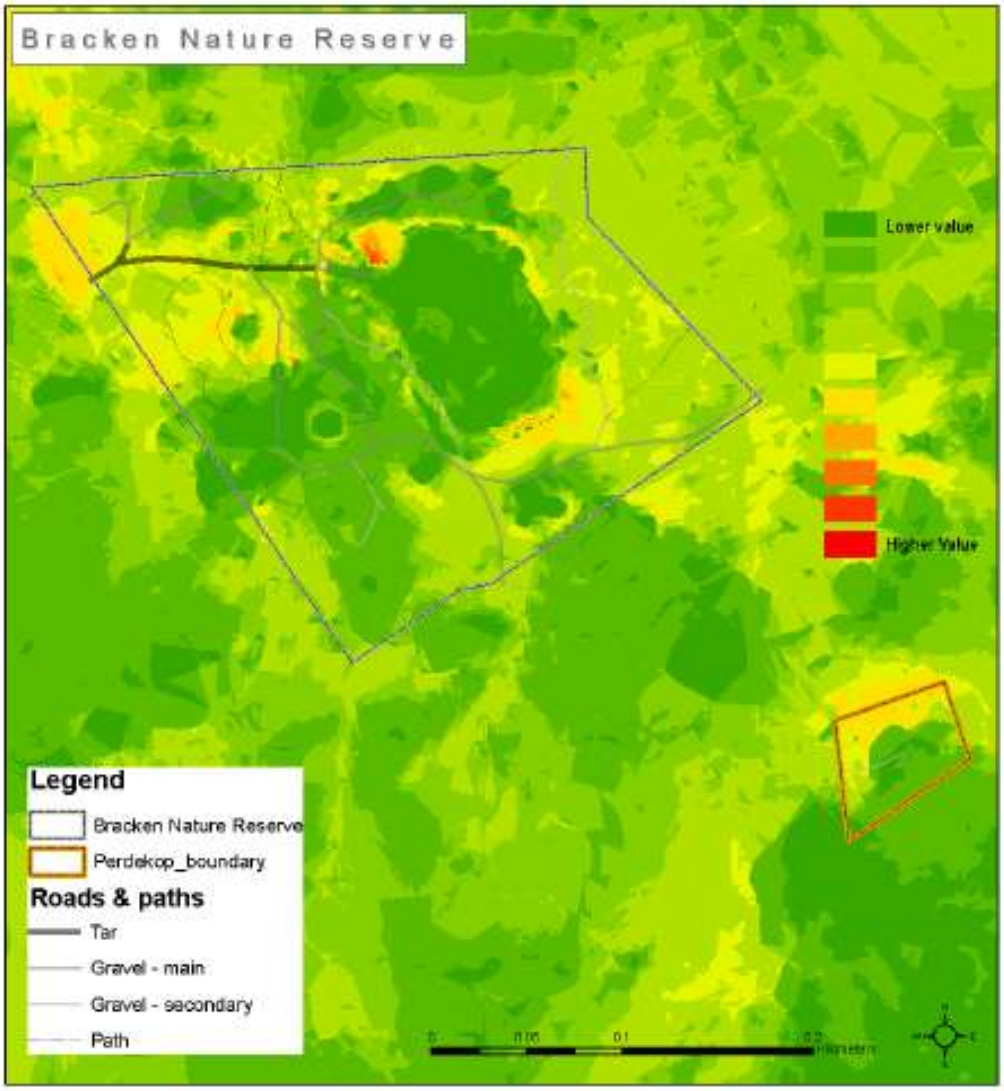


Figure 6: Bracken Nature Reserve visual sensitivity

Interpretation in local context

A 1km buffer was applied to the study area for the visual sensitivity analysis. The small size of the reserve means that visual impacts could occur both inside and outside of the reserve. Visually intrusive structures or developments should be avoided. Visually intrusive developments within the 1km buffer of the reserve could have a negative affect on the reserve.

Showstoppers/Fatal flaws and Special Management Area Informants

The viewshed analysis determines the visibility of areas from predefined observation points. However, the visibility of a development is only one of the components that determine its visual impact. Other factors, such as the development's design, construction and layout also contribute to the overall impact on the aesthetic character of its environment. Special consideration should be given to developments that are proposed in highly visible areas.

3.1.5 Heritage Sensitivity

This layer summarises the value or significance of a heritage site. The significance of a site will to a large extent determine the level of protection and management measures required for a site, and hence should be taken into account when undertaking spatial planning. The heritage value of this site is displayed as a special management overlay, as there is a significant historical context to this site. However, the spatial nature of the heritage value would more than likely cover the entire reserve. The individual heritage resources need to quantified and confirmed

4. Sensitivity-Value Analysis process (including weightings) and summary layers

The sensitivity-value analysis process has two key parts:

- The preparation of the input layers in a consistent and easy to analyze format (as outlined in the previous sections)
- The preparation of a summary layer which allows all the input layers to be easily accessed, interrogated, combined in a range of weightings (if necessary), and then used as a decision support tool in a workshop situation.

Data inputs (GIS methods and sources)

The GIS process is geared to keeping the dataset flexible enough for use in a workshop situation. All input and summary data need to be available within a single vector shapefile. The GIS method is as follows:

- Clip all input summary datasets to the spatial footprint of the smallest layer. This should correspond to the extent of the study area boundary. It is critical that all the clipped layers have the spatial extent, even though not all the area within the layer may be included within a polygon. Areas outside the polygons receive a 0 value in the union process so it is critical that these represent true 0 values and not gaps in the dataset.
- Union all datasets. This produces a composite vector shapefile containing all the data from the underlying summary layers.
- Delete all unnecessary attribute fields from the union shapefile.
- Summary information is calculated for each of the fragmented polygons using simple field calculations. A new attribute field is added for each summary weighting. Values are calculated using the field calculator. Complex calculations can be saved as expressions.
- Details of the summary calculations are given in Table 7.

Table 7: Sensitivity-Value Weightings*

Name	Field Name	Composition	Notes
Linear summary	LINEAR	Habitat Value + Special Habitat Value + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Value	Equal weighted summary of all layers
Biodiversity Value	BIODIV_VAL	Habitat Value + Special Habitat Value	Equal weighted summary of biodiversity value layers
Biodiversity sensitivity value	BIODIVSEN	2x(Habitat Value) + 2x(Special Habitat Value) + Hydrological Sensitivity + Visual sensitivity	Equal weighted summary of biodiversity value and sensitivity layers
Biodiversity Value driven summary	BIOVALHEAV	4x(Habitat Value) + 4x(Special Habitat Value) + Hydrological Sensitivity + Visual sensitivity + Heritage sensitivity	Layer which emphasizes the biodiversity value of a site, and hence is strongly influenced by the distribution of rare and threatened habitats and species, as well as by patterns of transformation across the landscape.
Balanced summary	BALANCED	2x(Habitat Value) + 2x(Special Habitat Value) + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	This is the favoured layer which emphasizes biodiversity value and aesthetic considerations, and de-emphasizes biodiversity sensitivities
Maximum	MAX_VAL	Habitat Value + Special Habitat Value + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	Select on all input layer fields to get max value for a polygon (not cumulative)

*Not all layers may be required as in the table

Outputs

See Figure 7

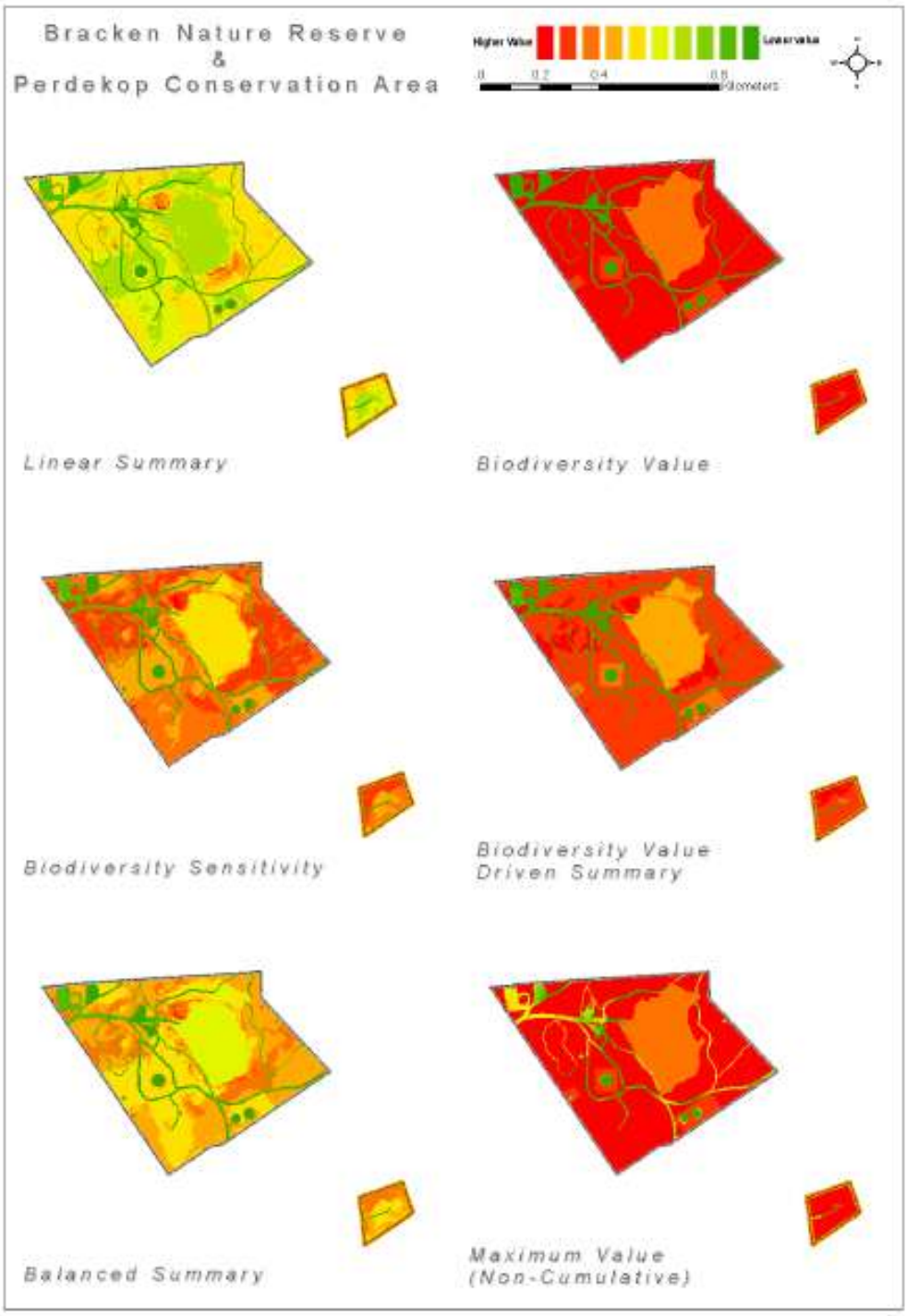


Figure 7: Examples from the outputs from the sensitivity –value analysis process using different weightings (See Table 6)

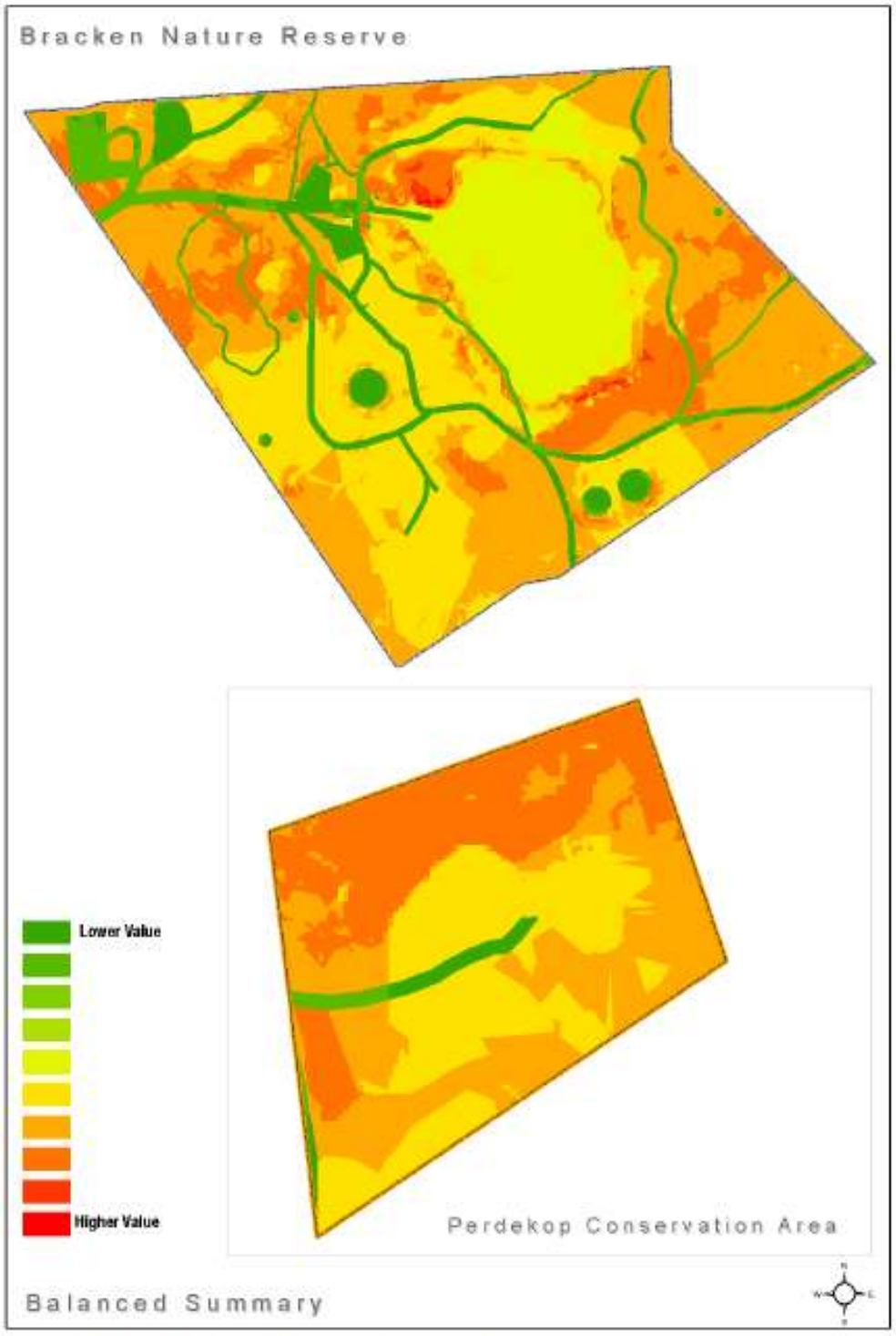


Figure 8: Balanced Summary weighting used in the Zonation Process

Interpretation in local context

The combined range of weightings presented in Table 6 and Figure 7 indicate no significant difference in outcome of the summary layers. The overriding importance of the habitat value is evident in the various weightings.

Showstoppers/fatal flaws and Special Management Area Informants

- No developments should be permitted outside of existing development footprints.
- The existing development footprint should be reduced to the absolute minimum and all sites not required must be rehabilitated and restored.
- Hard surfaces should be reduced in size (width) and replaced by permeable surfaces.

5. Zoning Process

5.1 Zoning Informants

This section briefly outlines the values underlying the identification of broad tourism use zones. It is important to remember that the landscape/biodiversity analysis is just one of the informants in the zonation process. Although the biodiversity analysis is intrinsically a relatively objective scientific process, other informants to the zoning process are not. Although every attempt is made to place high sensitivity-value sites into more protected zones where possible, the zoning process is in its essence a compromise between environment and development. In particular, often the identified high value sites are the key biodiversity assets that need to be made available in an appropriate manner to the ecotourism market. Direct links between the biodiversity layers and the spatial management of the reserve are made during the identification of special management areas (Where applicable). Even within broad high tourist use zones, there are likely to be areas subject to very tight conservation controls (potentially including complete exclusion of human impacts from an area).

Underlying decision making rules used in the zonation process:

- The zonation process is aimed a striking a *balance* between environmental protection and the development required to meet the broader economic and social objectives of the reserve.
- The zoning process takes into account existing development footprints and tourism access routes.
    - This is based on the underlying principle that all else being equal, an existing transformed site is preferable to a greenfields site from a biodiversity perspective.
    - Infrastructure costs are dramatically increased when developments take place away from existing infrastructure.
    - Existing tourism nodes and access routes are a reality of the economic landscape, and it is would not be possible to shut down existing tourism sites compromising the development objectives of the reserve.

- Where existing development nodes, tourist sites and access routes occur in areas with high sensitivity-value, then the broad use zoning aims to keep the development footprint as small as is realistically possible, preferably within the existing transformed site.
- Where possible, sites with high biodiversity sensitivity-value are put into stronger protection zones.
- Peripheral development is favoured and where possible should be located outside of the conservation area.

Two key points need to be emphasized:

- The designation of a broad use zone does not imply that all sites within that zone would be suitable for all the development types anticipated within that use zone. Detailed site level planning is still required, and many sites may prove to be unsuitable at a site/precinct/EIA level of planning.
- Special Management Areas/Overlays need to be formalized and the links made to the management plans.

(Adapted from Holness, 2008)

5.2 Draft Zoning Outputs

Figure 9 shows the draft Zonation for Bracken Nature Reserve and Table 8 shows the breakdown per zonation category. The balance between the use zones and conservation zones reflects the high conservation value of the site as well as the fact that the entire landfill site has been zoned for conservation.

Table 8: Breakdown (in HAs and % of Area) of the 5 Zonation Categories in the reserve

Zonation category	Area HA's	% of Area
Primary Conservation	2.2063	5.642884
Conservation	28.7066	73.42067
Low Intensity Use	5.5838	14.28126
High Intensity Use	0.7270	1.859392
Utility	1.8751	4.795799

The general consensus from the workshop was that the reserve facilities should be grouped around the existing development footprint (high intensity use area). All other structures and buildings that don't have significant heritage value should be phased out and removed. Access roads should be narrowed and hard surfacing should be removed and replaced with a permeable substrate. Restoration and conservation should be given the highest priority in the reserve. The old stone reservoir should be removed from the sensitive granite outcrop where it is located. If necessary a section of it could be maintained as a heritage resource, but preferable the entire structure should be removed. Its legacy can be retained in the documented history of the reserve. The current old buildings are mostly all dilapidated and in need of extensive renovations and investment to turn them into some thing that could be used. The cost of this would be better spent in a purpose built structure within the high intensity use zone. All non-essential buildings and structures should be removed and the sites rehabilitated.

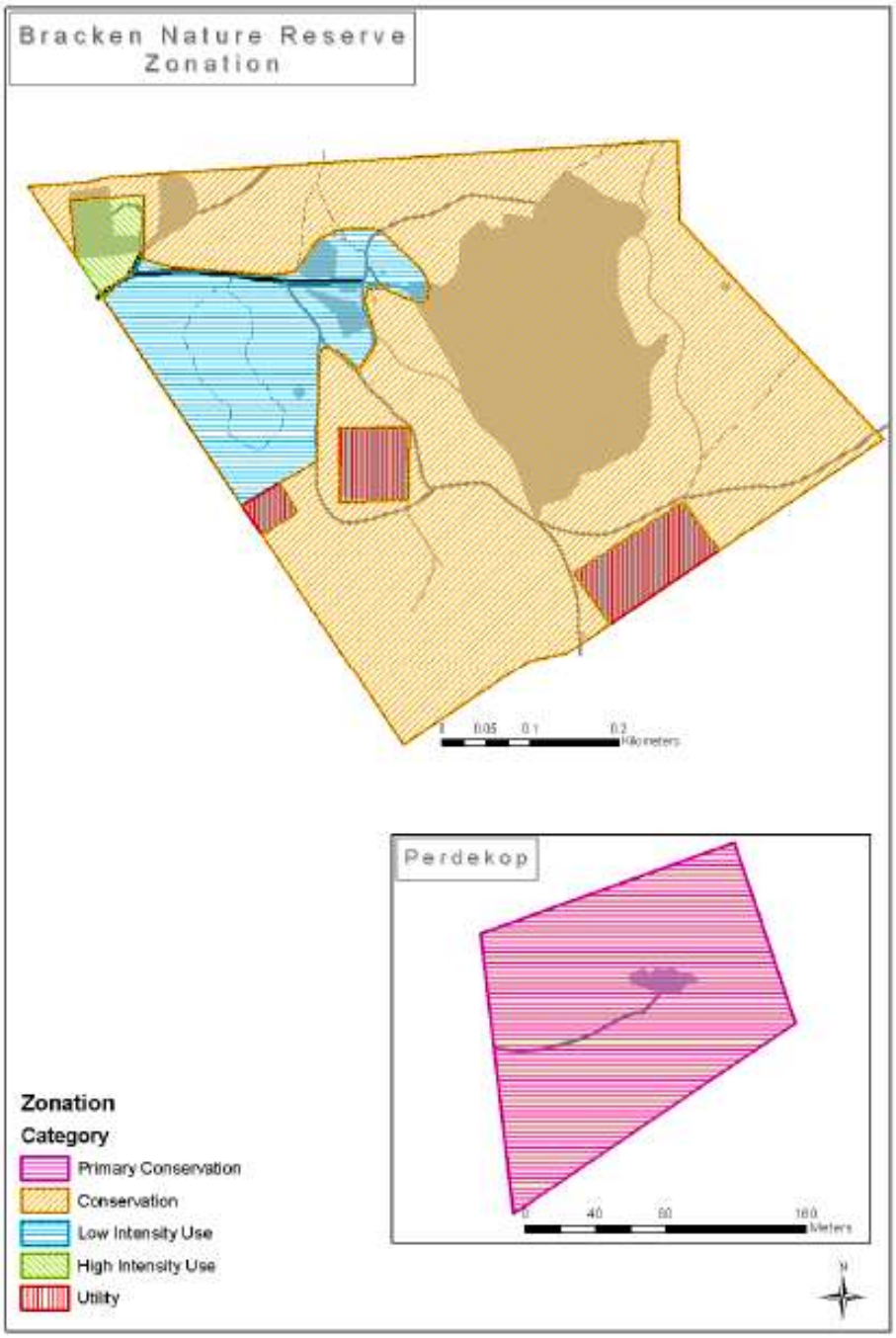


Figure 9: Draft Zonation for Bracken Nature Reserve and Perdekop Conservation Area.

5.3 Zoning Definitions and Descriptions

Table 11 (see Appendices) outlines the proposed zonation and zone descriptions. The link is still made to the Zonation used for the CapeNature Reserves (Holness, 2008) as there should be general alignment of the broader use zones for ease of comparison and integration if required in Provincial documents.

5.3.1 Special Management Overlays

Overlay zones are applied to different areas of the reserve requiring special management intervention. Overlay management zones are applied to areas of national, regional or reserve based importance for example: RAMSAR SITE or IBA (important Bird Areas), NB cultural sites or Natural resource consumptive use areas (Medicinal Plants).

The potential special management overlays are:

1. Heritage
2. Special Conservation
    a. This special management overlay defines areas around known locations of critically endangered species or species requiring specific management interventions.
3. Rehabilitation
    a. Areas identified for restoration and rehabilitation

Figure 10 shows the special management overlays as detailed below.

5.3.1.1 Heritage Special Management Overlay

The heritage SMO covers the heritage resources as identified in the report by Buchel (2010). It will be necessary to verify the heritage value of some of the buildings and determine which of the buildings can be removed and the sites rehabilitated.

5.3.1.2 Landfill Rehabilitation Special Management Overlay

This rehabilitation overlay covers the old landfill site. This area is subject to restricted access due to the high methane levels. The site should be prioritised for rehabilitation and its long term potential assessed and zoned accordingly.

5.3.1.3 Old Buildings Rehabilitation Special Management Overlay

The second rehabilitation site is around the old shed and hard surface area close to the offices. All the old dilapidated buildings should be removed and the site completely rehabilitated. Purpose build infrastructure should be sighted within the indicated High Intensity Use Zone. There are potential parking areas outside of the Protected Area that have been identified.

5.3.1.4 Old reservoir Rehabilitation Special Management Overlay

It is recommended that the old stone reservoir be removed and the site rehabilitated. These granite koppies are a conservation priority and the reservoir serves no function.

5.3.1.5 Special Conservation Special Management Overlay

This area is not part of the current protected area, however this area is noted as being extremely important as part of the Perdekop Core Flora Site. It should be prioritised for stewardship action and rehabilitation (Alien Vegetation removal).

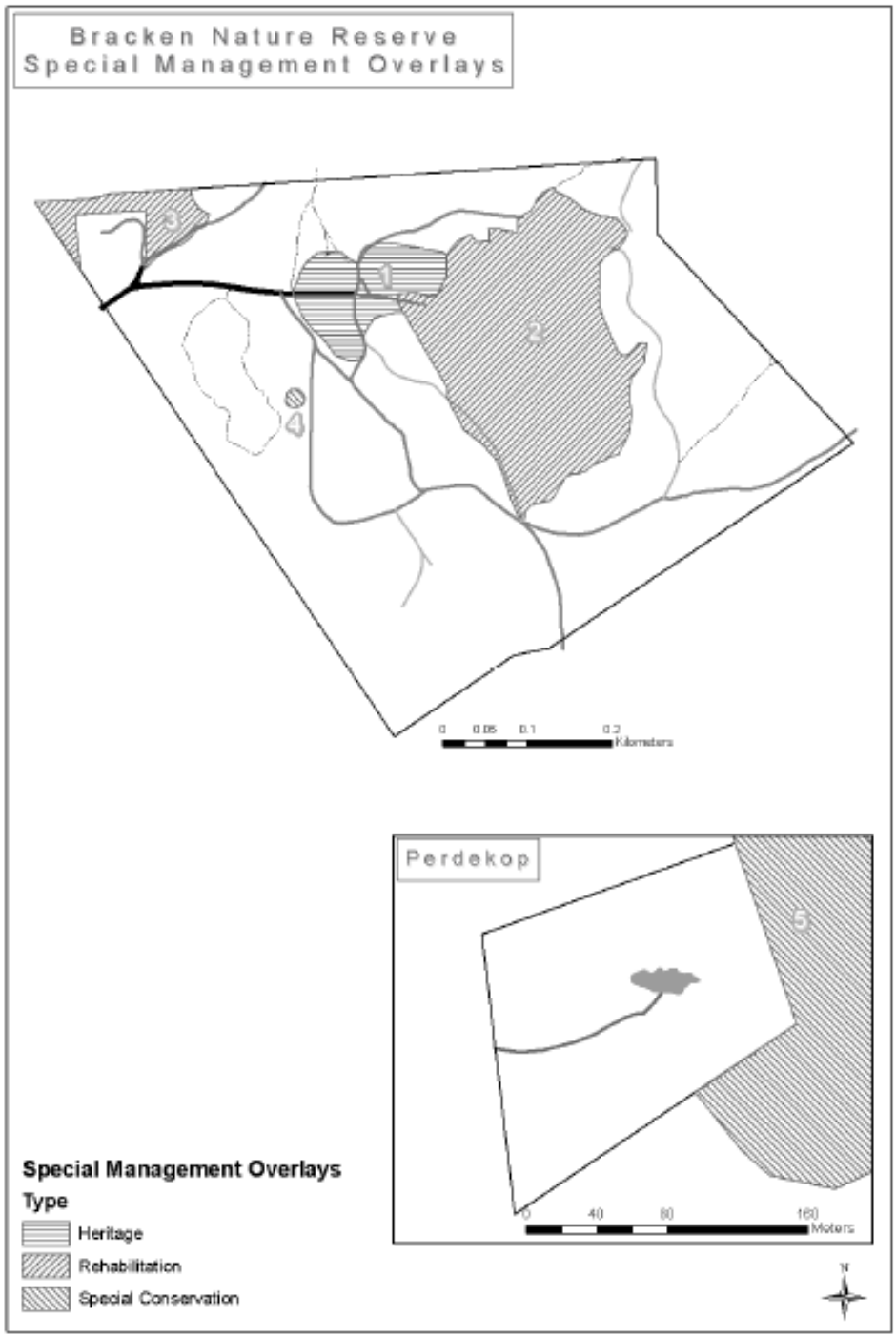


Figure 10: Special Management Overlays for Bracken Nature Reserve and Perdekop Conservation Area.

6. Conclusions and Recommendations

Bracken Nature Reserve is conserving some of the last few patches of CE Swartland Granite Renosterveld remaining in the City. It is thus essential that every last square meter of degraded vegetation is restored and rehabilitated. For these reasons the following recommendations are made;

- The value of the heritage resources be verified and were appropriate derelict buildings should be removed and the sites rehabilitated.
- All infrastructure should be contained within the High Intensity Use zone as outlined in the zonation map.
- Purpose Built facilities should be accommodated within the High Intensity Use Zone.
- Parking should be accommodated outside of the reserve in areas that have already been identified.
- The old stone reservoir should be removed and the site restored.
- The mowed areas around the water reservoirs should be reduced to an absolute minimum size where appropriate.
- The hard surface roads should be removed (or reduced in width) and replaced with a permeable surface.
- The remainder of the core flora site adjacent to Perdekop Conservation Area should be a priority for stewardship.

7. References

Benn, G. 2008. Terrestrial Systematic Conservation Plan re-Analysis: Methods and results. City of Cape Town Internal report.

Driver, A., Maze, K., Rouget, M., Lombard, A. T., Nel, J., Turpie, J. K., Cowling, R.M., Desmet, P., Goodman, P., Harris, J., Jonas, Z., Reyers, B., Sink, K. & Strauss, T. 2005. National Spatial Biodiversity Assessment 2004: Priorities for biodiversity conservation in South Africa. Strelitzia 17. SANBI, Pretoria.

Holness, 2005. Sensitivity Value Analysis Manual. A decision support tool, operating on the principles of systematic conservation planning, for integrating best available biodiversity knowledge into spatial planning within national parks. SANParks Internal Report.

Holness, S. Skowno, A. 2008. Report on Sensitivity-Value Analysis and Zonation Process for the Boland Mountain Complex. CapeNature Conservation Internal report.

National Environmental Management: Biodiversity Act (NEMBA). 2004 (Act No. 10 of 2004). Draft National List of Threatened Ecosystems.

Rebelo A. G., C. Boucher, N. Helme, L. Mucina, M.C. Rutherford *et al.* 2006. Fynbos Biome, in: L. Mucina & M.C. Rutherford (eds). The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19, pp 52-219.

SRK Consulting. 2008. Final Conservation Development Framework for Settlers Park Nature Reserve. Nelson Mandela Bay Municipality. Internal report.

SRK Consulting. 2008. Final Conservation Development Framework for Van Stadens Wildflower Nature Reserve. Nelson Mandela Bay Municipality. Internal report.

Snaddon, K. Day, L. Nel, J. Maherry, A. 2009. Prioritisation of City Wetlands. City of Cape Town Report.

Appendices

Table 9: Base values: Ecosystem Status of National vegetation types occurring in the City

Vegetation Type	NSBA Conservation Status	NSBA Conservation Status - Score	Criterion D Status	Criterion D score	SANBI Conservation Status (% target Conserved in City)	Conservation Status Score
Atlantis Sand Fynbos	Vulnerable	6	Critically endangered	10	Not Protected	5
Boland Granite Fynbos	Endangered	8	Vulnerable	6	Poorly Protected	3
Cape Estuarine Salt Marshes	Least threatened	4			Well Protected	-1
Cape Flats Dune Strandveld: False bay	Endangered	8	Endangered	8	Poorly Protected	3
Cape Flats Dune Strandveld: West Coast	Least threatened	4	Endangered	8	Poorly Protected	3
Cape Flats Sand Fynbos	Critically endangered	10	Critically endangered	10	Hardly Protected	4
Cape Lowland Freshwater Wetlands	Least threatened	4			Well Protected	-1
Cape Winelands Shale Fynbos	Endangered	8			Poorly Protected	3
Elgin Shale Fynbos	Critically endangered	10			Hardly Protected	4
Hangklip Sand Fynbos	Vulnerable	6	Vulnerable	6	Well Protected	-1
Kogelberg Sandstone Fynbos	Least threatened	4	Critically endangered	10	Moderately Protected	2
Lourensford Alluvium Fynbos	Critically endangered	10	Critically endangered	10	Poorly Protected	3
North Peninsula Granite Fynbos	Least threatened	4			Well Protected	-1
Peninsula Sandstone Fynbos	Least threatened	4	Endangered	8	Well Protected	-1
Peninsula Shale Fynbos	Vulnerable	6			Well Protected	-1
Peninsula Shale Renosterveld	Critically endangered	10			Poorly Protected	3
South Peninsula Granite Fynbos	Endangered	8			Moderately Protected	2
Southern Afrotemperate Forest	Least threatened	4			Well Protected	-1
Swartland Alluvium Fynbos	Critically endangered	10			Not Protected	5
Swartland Granite Renosterveld	Critically endangered	10	Critically endangered	10	Hardly Protected	4
Swartland Shale Renosterveld	Critically endangered	10	Critically endangered	10	Hardly Protected	4
Swartland Silcrete Renosterveld	Critically endangered	10			Not Protected	-1
Western Shaleband Vegetation	Least threatened	4			Poorly Protected	3

Table 10: National vegetation types for the City of Cape Town showing historic extent, remaining extent, targets and targets achieved inside and outside Protected Areas

National Vegetation Type	Historic extent (ha)	Current extent (ha)	Selected in Bionet (ha)	Target %	Target (ha)	Extent in proclaimed Protected Areas	Target met in selected Bionet	% Target conserved	% Target met in proclaimed Protected Areas	% Selected in Bionet from current extent	% Remaining from historic extent	15% of historic extent	% that is not selected in Bionet	Conservation Status	SANBI Conservation Status
Atlantis Sand Fynbos	25234.63	15711.95	12695.95	30	7570.39	0.00	Yes	168	0	81	62	3785.19	19	VU	Not Protected
Boland Granite Fynbos	9575.31	6064.19	4807.17	30	2872.59	354.52	Yes	167	12	79	63	1436.30	21	EN	Poorly Protected
Cape Estuarine Salt Marshes	39.86	25.79	25.64	24	9.57	25.64	Yes	268	268	99	65	5.98	1	LT	Well Protected
Cape Flats Dune Strandveld: False Bay	27260.11	8467.86	7272.84	24	6542.43	1855.58	Yes	111	28	86	31	4089.02	14	EN	Poorly Protected
Cape Flats Dune Strandveld: West Coast	12700.27	10603.88	6892.82	24	3048.07	964.79	Yes	226	32	65	83	1905.04	35	LT	Poorly Protected
Cape Flats Sand Fynbos	54410.34	8466.70	8464.75	30	16323.10	464.07	No	52	3	100	16	8161.55	0	CE	Hardly Protected
Cape Lowland Freshwater Wetlands	1463.98	1095.47	1068.83	24	351.36	786.66	Yes	304	224	98	75	219.60	2	LT	Well Protected
Cape Winelands Shale Fynbos	2666.97	1706.19	1388.97	30	800.09	217.89	Yes	174	27	81	64	400.05	19	EN	Poorly Protected
Elgin Shale Fynbos	841.18	321.14	282.77	30	252.35	4.58	Yes	112	2	88	38	126.18	12	CE	Hardly Protected
Hangklip Sand Fynbos	3301.60	1910.25	1489.88	30	990.48	1363.63	Yes	150	138	78	58	495.24	22	VU	Well Protected
Kogelberg Sandstone Fynbos	9499.63	9260.73	8814.04	30	2849.89	1944.47	Yes	309	68	95	97	1424.94	VU	LT	Moderately Protected
Lourensford Alluvium Fynbos	4819.25	409.97	409.97	30	1445.77	190.30	No	28	13	100	9	722.89	0	CE	Poorly Protected
North Peninsula Granite Fynbos	1997.35	1439.12	1343.54	30	599.21	986.44	Yes	224	165	93	72	299.60	7	LT	Well Protected
Peninsula Sandstone Fynbos	21896.12	21348.95	20761.60	30	6568.83	17306.57	Yes	316	263	97	98	3284.42	3	LT	Well Protected
Peninsula Shale Fynbos	1262.79	690.37	688.96	30	378.84	686.97	Yes	182	181	100	55	189.42	0	VU	Well Protected
Peninsula Shale Renosterveld	2374.81	316.89	316.89	26	617.45	261.67	No	51	42	100	13	356.22	0	CE	Poorly Protected
South Peninsula Granite Fynbos	7148.66	2481.74	2290.70	30	2144.60	1770.19	Yes	107	83	92	35	1072.30	8	EN	Moderately Protected
Southern Afrotemperate Forest	347.52	346.79	346.79	34	118.16	276.80	Yes	294	234	100	100	52.13	0	LT	Well Protected
Swartland Alluvium Fynbos	1742.41	75.91	75.91	30	522.72	0.00	No	15	0	100	4	261.36	0	CE	Not Protected
Swartland Granite Renosterveld	8059.16	1951.89	1951.89	26	2095.38	35.64	No	93	2	100	24	1208.87	0	CE	Hardly Protected
Swartland Shale Renosterveld	46712.40	4019.33	4018.76	26	12145.22	408.13	No	33	3	100	9	7006.86	0	CE	Hardly Protected
Swartland Silcrete Renosterveld	1066.65	188.43	188.43	26	277.33	0.00	No	68	0	100	18	160.00	0	CE	Not Protected
Western Shaleband Vegetation	328.59	328.57	328.57	30	98.58	31.11	Yes	333	32	100	100	49.29	0	LT	Poorly Protected
	244749.59	97232.12	85925.67		68622.40	29935.65						36712.44			

Table 11: City of Cape Town Nature Reserves and Conservation Areas: Visitor Use Zoning - Desired State* & Experiential Qualities

Experience	Zone	Desired State*	Conservation objectives	Secondary objective	Experiential Qualities	Activities	Interaction between users	Frequency of use	Group size	Sophistication and type of facilities	Primary user movement within the zone	Roads & footpaths	Equivalent Provincial zone
Close To Nature Activities tend to be at landscape level	Primary conservation	Natural or near-natural areas (or areas that can be rehabilitated to this state) that are managed primarily for biodiversity conservation. The experience is one of relative solitude and wildness. The nature of the experience is dependant on the quality of the natural environment. The main accent of management is biodiversity conservation and "Pack it in Pack it out" principles are applied to all activities including management. There may be some signs of infrastructure mainly of a heritage nature. In the longer term, unused utility infrastructure (e.g. reservoirs) should be phased out and the site rehabilitated.	Natural areas should be kept intact in order to protect habitat required to meet biodiversity targets for various vegetation types and to provide undisturbed habitat for a range of species. Where possible degraded areas should be rehabilitated.	Managed to provide visitor experiences in a way that does not impact on the biodiversity objective. Where appropriate heritage values are managed as required	Relative sense of isolation	Controlled access** Research and monitoring. Accompanied small groups. The size and frequency of groups to be specified for each reserve.	None or very low	None -Very low	Small	No new facilities. Existing structures should be phased out where appropriate. Heritage assets are managed where appropriate	Pedestrian access in accompanied small groups Motorised for essential management only.	Absolutely essential management tracks and footpaths in accordance with the foot path and road management plan Ongoing restoration of old paths/roads to be prioritized and monitored.	Quiet
	Conservation	Natural or near-natural areas (or areas that can be rehabilitated to this state) that are managed for biodiversity conservation. This zone provides experiences of a relative sense of relaxation in an environment that is openly exposed to the sights and sounds of the city. Although it is a place of quietness and naturalness, there will be more interaction between users than in the Primary Conservation Zone. The quality of the experience is less dependant on the quality of the natural environment.	Natural areas should be kept intact in order to protect habitat required to meet biodiversity targets for various vegetation types and to provide undisturbed habitat for a range of species. Where possible degraded areas should be rehabilitated.	Managed to provide visitor experiences in a way that does not impact on the biodiversity objective.	Relaxation	Self guided hiking, non-motorised access *** bird watching, etc. In reserves where access to water bodies is allowed, this area is limited to non-motorized vessels only in accordance with the Vlei By-Laws.	Moderate	Moderate	Small	Low impact, eco-friendly facilities that facilitate ecologically sustainable activities and visitor experiences may be permitted under certain circumstances. These are strictly for achieving the social and development objectives of the reserve where appropriate and are subject to a stringent internal approval process and must be inline with an approved reserve management plan.	Pedestrian Non motorised Motorised access for management only.	Management tracks/roads and footpaths. Minimal footpath construction to prevent ecological damage. Boardwalks may be permitted where appropriate to protect sensitive areas. The footpath system should be designed so as to control access into the Primary Conservation zone. Off road wheelchair access may be provided where appropriate.	
Outdoor Natural Experience Activities tend to be at precinct level	Low Intensity leisure	Natural, near-natural or managed landscapes which are primarily managed to promote recreational and educational objectives. The main accent is on recreational activities which are more reliant on the quality of the facilities provided than in a Conservation Zone. By their nature these zones are placed in more transformed landscapes. Interaction and socialisation are an integral part of the experience.	Although some areas will be impacted by a range of activities and limited infrastructure, most areas should be kept largely intact and ecological processes should remain functioning. Where possible degraded areas should be rehabilitated.	Recreation and education Managed to provide a largely natural outdoor area to support the recreational and education objectives of the reserve.	Socialisation	Walking, non-motorised access, bird watching. In reserves where access to water bodies is allowed, motorized vessels are only allowed under strict control (e.g. no waterskiing, low speed limits and wake-free zones) in accordance with the Vlei By-Laws.	Frequent	Moderate -high	Small-moderate	Low-Medium impact, eco-friendly facilities that facilitate ecologically sustainable activities and visitor experiences. E.g. Benches, bird hides, informative signage, lookouts. Parking for access to this and other zones.	Pedestrian Non motorised Motorised access for management only	Appropriate foot paths with directional signage Boardwalks should facilitate access and protect sensitive areas. Normal wheelchair access where appropriate Parking with no facilities for access to this and other zones	Low intensity leisure
	High Intensity Use	High use landscapes, which are often largely transformed, which are managed largely to support visitor activities more dependent on facilities, education and administrative functions of reserves. High intensity visitor facilities with modern commercialised amenities with very concentrated, activities. The quality of the visitor experience is heavily dependant of the quality of the facilities which enable the visitor to experience the environment with a minimum of effort. Due to the high impacts these are concentrated at specific nodes. These nodes are generally situated at existing facilities including historic buildings and precincts. The main focus of management is to ensure a high quality visitor experience whilst ensuring that the activities have a minimal impact on the surrounding environment and that heritage resources are respected and celebrated.	The activities and infrastructure in these areas should be managed to minimize impacts on biodiversity and visitor experience in other zones. Where feasible, non-crucial infrastructure should over time be removed from the reserve and the sites rehabilitated.	Facilities are managed to facilitate and promote appropriate visitor activities and educational use of the reserve. Administration; provides appropriate management infrastructure to facilitate other objectives of the reserve.	Entertainment	Events, self guided walks, wheelchair accessible trails, parking, picnicking. In reserves where access to water bodies is allowed, this area is appropriate for high intensity uses such as power boating and waterskiing in accordance with the Vlei By-Laws.	Very frequent	Very high	Small - Large	Picnic areas, parking areas, restaurants, information centers, ablutions, environmental education facilities, nurseries etc. Provides parking from which pedestrian access is gained to other zones.	Motorised Access People movers & Pedestrian access	Access roads and associated parking. Footpaths constructed to a higher standard for the comfort of the user. Design standards to be set in the footpath and road management plan Wheelchair access encouraged in this zone.	High Intensity Leisure
Site Specific Level	Utility zone	Area used for utility functions such as bulk water provision, landfill sites within the protected /conservation areas etc.	The activities and infrastructure in these areas should be managed to minimize impacts on biodiversity and visitor experience in other zones. Where feasible, non-crucial infrastructure should over time be removed from the reserve and the sites rehabilitated.	Administration Conservation where appropriate	Utility	Determined at site	Determined at site	Determined at site	Determined at site	Determined at site	Determined at site level	Access roads and associated parking as required by the Utility Function	

* Note. The "Desired State" is the long term objective of the zone and these desired conditions may not actually exist at the time of zoning. Achieving the" Desired State" will be informed by many factors and may only be reached after many years.
** Accompanied access refers to controlled access. The level and type of control is determined at reserve level.
*** Non-motorised access refers to mountain bikes, horses, paragliding etc. These activities are reserve specific and reference must be made to the reserve management plan for a list of acceptable activities per reserve.

Appendix 13: Security Audit

CITY OF CAPE TOWN

BIODIVERSITY MANAGEMENT BRANCH

Executive Brief

Comprehensive Security Audit of the Biodiversity Management Branch of the City of Cape Town

MARCH 2010

THORN-EX

Project Order No.: **4501377564**

Project Manager:

Bongani Mnisi
Biodiversity Management Branch
Area Manager: Northern District
Tel: 021 – 5144164
Fax: 021 – 5111951
Cell: 0835917791
E-mail: bongani.mnisi@capetown.gov.za

Lead Consultant:

Jan Phelan
Plan-It
Tel: 033 - 3302948
Fax: 033 - 3302948
Cell: 082 - 8760003
E-Mail: mwplanit@mweb.co.za

Conservation Management Consultant:

Harold Thornhill
Thorn-Ex
Tel: 033 - 3431814
Fax: 088 - 0333431819
Cell: 0824618043
E-mail: thornhillh@thorn-ex.co.za

Technology Consultant:

Jens von Fintel
Titan Security
Tel: 033 - 3943776
Cell: 5762406
E-mail: jens@titantech.co.za

TABLE OF CONTENTS

INTRODUCTION

The City of Cape Town' Biodiversity Management Branch, in wishing to ensure the safety of visitors and staff, requested assistance on conducting a security audit of all (25) its managed (and envisaged) Nature Reserves.

The need was based on the following assumptions:

- That the areas are poorly managed
- Security Agencies are inefficient in their operations
- The lack of tools to measure management effectiveness
- Safety and security of visitors as well as that of personnel are threatened.

Plan-It, in collaboration with Thorn-Ex and Titan Security, agreed to undertake the project. Owing to the budgetary constraints, it was agreed that the audit would encompass 12 priority Reserves, as selected by the Biodiversity Management Branch.

The following outcomes were proposed and accepted:

- A desktop exercise to evaluate existing information and identify gaps
- A physical Audit of the listed facilities
- Consultation with public user groups
- Recommendations in respect of security technology and infrastructure
- A comprehensive report on all findings
- A basic entry level conservation security training session for staff

The project was to be completed by the end of April 2010.

APPROACH

The focus was to be on the safety and security of staff working in the different reserves, of visitors to these reserves and of the biodiversity within the reserves.
The audit was to involve the reserve managers, site managers and any other staff the Biodiversity Management Branch deemed necessary to provide information for the audit.

The Project commenced with the Branch being approached to supply maps of each reserve with as much information as possible on all types of infrastructure, bio-physiographic information etc e.g. boundaries of reserves and kind of fence along these, access points, roads, tracks, paths, power lines, telephone lines, buildings, cell phone towers, masts, aerials, bridges, streams, rivers, contours, vegetation, adjacent land use, habitation or settlements in close proximity.

Questionnaires were then drawn up and sent to all the Reserve Managers as well as separate questionnaires which were sent to the various public interest groups, via the Reserve Managers.
Upon receipt of the above the project team drafted a preliminary working document to guide and focus the audit.
The audit commenced on the 15th of February 2010 with a workshop with the various Managers and a presentation of the findings from the questionnaires to the Biodiversity Branch.

The audits commenced on the 16th of February 2010 with a visit to each Reserve..

During each audit the manager and staff were interviewed and a physical inspection of infrastructure was conducted. The audits focused on existing security systems, security infrastructure, activities, incidents, job descriptions, training and manpower

In addition to the audits workshops were scheduled, via the Reserve Manager with relevant external safety and security institutions and public interest groups. The workshops were then held with various District and Reserve-specific public interest groups.

On conclusion of the audit phase, the security technology specialist visited the Reserves to inspect the systems and infrastructure in place at each reserve. Based on and with reference to the initial draft Audit Report, the specialist undertook an assessment of technology short-comings in order to arrive at feasible recommendations for practicable improvements.

The completed report was then circulated to all the Reserve Managers as a Draft Report for comment, prior to the Final Comprehensive Report incorporating such comment being presented to the Branch.

The Project was then concluded with a basic entry level security training session for nominated staff covering aspects such as:

- Information gathering and reporting
- Patrol structuring, planing and safety
- Preparedness and response
- Handling of transgressors (armed or un-armed)
- Incident handling
- Charge office procedures
- Evidence and Statements
- Record keeping and dossier development

EXECUTIVE SUMMARY

A safety and security audit was carried out on twelve Reserves under the jurisdiction of the Biodiversity Branch of the Directorate Environmental Resource Management.

The Audit was aimed at doing a rapid and verifiable analysis of the current security situation, security services, infrastructure, staffing, and social contexts. The information allowed for a “threat” level to be determined for each reserve.

Information acquired through a questionnaire survey with the Reserve Mangers, and information provided by the Branch was used as a baseline to guide and provide focus for the individual Reserve audits.

The Audits very quickly revealed that the location of the various reserves with their own unique social contexts primarily dictated the level of threat of each Reserve.
Some Reserves perceived as being “dangerous” were found to be “safe” with very low key incidents actually occurring. Although social ills do tend to spill over into Reserves the occurrence thereof is very localised and relate to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

General security observations revealed that any metal infrastructure or equipment and solar panels are at greatest risk and are stolen on a regular basis. Trespassing, vagrants traversing the reserves and the harvesting of plants for the commercial flower industry and commercially driven herbal medicine /"muthi" industry are linked to an associated threat to staff and visitors. However incidents of visitors and staff being accosted by vagrants are rare.

Security activities were generally viewed as an add-on function when incidents are reported, with some Reserve Managers and Field staff trying to fit security patrols and activities into their management work schedule. The Visitor Controller Officers, on the other hand are essentially Access Control Officers who may be called on to perform some Law Enforcement function if their training enables them to do so. However staff does carry out combined operations with Law Enforcement bodies like Marine and Coastal Management, SAPS or City Law Enforcement when activities in the vicinity of the reserves warrant this in the interests of conservation.
One of the most evident security shortcomings found was that Reserves were "abandoned", for all practical purposes, after hours, on weekends and on public holidays.
The investigation also found that very few Reserves actively patrol the Reserve and fences on a regular basis.

The Findings of each audit, including the responses received form the public interest groups were used to determine the threat level of each Reserve. The threat levels are based on a combination of factors which may affect security to the reserve, its staff and visitors as well as these threats in relation to other reserves.
The threat levels low, medium, and high reflects the safety threat to visitors, staff, and infrastructure. Further to which the threat level provides an indication in respect of intervention priority (staffing, infrastructure, equipment).

The results were as follow:

Reserve	Threat Level	Threat	Primary Cause
Witzands ACA	Medium	Illegal Access / Trespassing	Lack of fencing
Blaauwberg CA	Medium	Illegal Access / Trespassing	Lack of coverage
Rietvlei WR	Low	Illegal Access / Trespassing	Lack of coverage
Durbanville NR	Low	Theft	Lack of presence
Bracken NR	Low	Trespassing	Lack of coverage
Tygerberg NR	High	Trespassing / poaching	Lack coverage
Zandvlei NR	Low	Illegal Access / Trespassing	State of infrastructure
Falls Bay EP	High	Violent crime	Lack of fencing /coverage
Edith Stephens WP	Low	Theft	Lack of fencing
Wolfgat & Macassar NR	Severe	Violent crime	Location & Social
Kogelberg NR	Medium	Illegal Access / Trespassing	Extent / coverage
Helderberg NR	Low	Illegal Access / Trespassing	Lack coverage

Understaffing and poor or non-existent boundaries were found to be the primary cause of compromised Reserve security. The provision of “feet on the ground” or a management presence is therefore viewed as the first step towards improving the current situation.

The Investigation did conclude that technology solution options entailed fairly low key equipment such as Day-Night or Peak Inversion monitoring cameras, basic building alarm systems, external building detection beams, lighting, etc.
Infrastructure requirements were predominantly in respect of fencing.
Fencing is not always the preferred solution for safeguarding and demarcating an urban Reserve. However, it is suggested that failure to demarcate the boundaries of a Reserve compromises the authority’s ability to manage a designated area and severely limits the authority’s ability to prosecute transgressors. Simple in-expensive measures such as signage and markers will greatly aid in addressing these matters.

The relative “newness” of the Branch was found create various generic management challenges which negatively affect the efficiency and effective of Reserve management.

The aforesaid institutional matters included:
Lack in consistency of staff designations
Lack of consistency in functional content (job descriptions)
Lack of career pathing and skills development program
Lack of measurable performance standards
Lack of training and capacity building
Lack of uniform operational procedures and protocols
Un-clear performance objectives of Advisory Boards
Jurisdictional uncertainties in respect of cooperation with other environmental law enforcement agencies
Lack of memorandums of Understanding with Utility Service Branches active in Reserves

The apparent absence of a clear and definitive Branch Policy on Reserve Safety and Security was viewed as a contributing shortcoming. Further to which, no consistency was found in respect of operational procedures or protocols. Some stations had a Management Plan whilst others were still going to develop such plans. Some stations had developed their own safety procedures.

In respect of Procedures and Protocols it is suggested that the Biodiversity branch consider the developing the following procedures and protocols;
Incident response (poaching, trespassing, theft, fire, attack, medical emergency, land invasion, pollution, un-wanted pets)
Reserve patrols
Fence and gate security
Visitor control
It is suggested that the above procedures and protocols be developed in conjunction with an auditable reserve management system which is linked to the personnel and finance performance requirements. It is also recommended that the Branch conduct an Institutional “Governance Audit” to guide the above protocols, relationships with other government institutions and law enforcement bodies as well as the Branch’s legal obligations.

Consultation with public interest groups and reserve managers highlighted the benefits of “friend” groups. Some stations financial ability and conservation maintenance activities were greatly enhanced by such “friends” groups. Further to which, the social role that urban reserves play as “safe areas” for

people to walk their pets, have picnics or conduct social functions was highlighted at several public meetings. It was also mentioned that in some areas where “gang turf” issues were dominant the reserves were viewed as “neutral” territories.

Advisory Boards are a requirement in terms of reserves proclaimed under the Protected Areas Act although no clarity could be defined with respect to the extent, role and responsibilities of the various Reserves Advisory Boards. Some Reserves indicated that they played an active role whilst others were not aware of their existence. The development of clear responsibilities and objectives for each Board is viewed as imperative to contributing to the achievement of the Reserve objectives whilst providing a formal link to neighbouring communities and local government.

Most Reserves have other City Utility Departments executing functions within the Reserve, share boundaries with them, or manage large tracts of land under their jurisdiction. None of the Reserves were aware of any Memorandums of Understanding which clarify joint management matters. This was viewed as institutional shortcoming requiring attention at higher level.

A variety of Security Service providers render various levels of security to Reserves. These services vary from private security firms providing uniformed guards to provide a static or gate control service to services where such guards are used as Bushrangers. It was the investigation’s conclusion that each District or Reserve negotiates their own contract conditions with such service providers, a situation which does not contribute to clear and measurable security service provisioning.
The City Law Enforcement Services and structures were generally viewed as not being able to respond to conservation related incidents. Only a few Reserves reported adequate responses to call-outs or incidents with most Reserves saying they rely on the local SAPS for assistance.
Reserves which have installed alarm systems linked to the City Law Enforcement Control Rooms, reported that in the event of alarm activation the Reserve manager is phoned to investigate. No direct service benefit could be found in respect City Law Enforcement.

What was most evident during the investigation was the risk posed by staff acting outside their areas of jurisdiction. These transgressions are not through ill intent and staff is not necessarily aware that they are exceeding their authority. Urgent attention should be paid to the authority necessary for the role staff plays in enforcing provincial conservation laws, fisheries laws, and National laws. This should be done in cognisance of the criminal Procedures Act. It is further suggested that cooperation agreements and execution delegations be formalised with other environmental and conservation agencies.

Due to several reserves having a coastal boundary and the ever present activities of highly organised and dangerous Abalone poaching gangs the involvement of staff in curbing these activities need to clearly defined and coordinated. It is suggested that this should be the preserve of a highly trained and well equipped District based Law Enforcement Component conducting their duties in collaboration with other authorities and with the necessary jurisdiction.
It is the opinion of this investigation team that the establishment of a District based Law Enforcement Component will greatly contribute in addressing some of the security shortcomings highlighted. In addition, such a component will also alleviate some of the external enforcement requirements placed on Reserve staff thus allowing them to focus on reserve management and security.

CONCLUSION AND GENERIC RECOMENDATIONS

The audit results correlated closely with the location and management capacity of each Reserve. High concentrations of un-employed people living in dense informal settlements adjacent to reserves do pose a greater risk to the Reserves. Staff was found to be more exposed to violent crimes in such circumstances than those located in rural or medium to high income areas.

Although social ills do tend to spill over into Reserves the occurrence thereof is very localised and relates to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

The Findings of each audit, including the responses received form the public interest groups were used to determine the threat level of each Reserve.

The threat levels low, medium, and high reflects the safety threat to visitors, staff, and infrastructure. Further to which the threat level provides an indication in respect intervention priority (staffing, infrastructure, equipment).

The results were as follow:

Reserve	Threat Level	Threat	Primary Cause
Witzands ACA	Medium	Illegal Access / Trespassing	Lack of fencing
Blaauwberg CA	Medium	Illegal Access / Trespassing	Lack of coverage
Rietvlei WR	Low	Illegal Access / Trespassing	Lack of coverage
Durbanville NR	Low	Theft	Lack of presence
Bracken NR	Low	Trespassing	Lack of coverage
Tygerberg NR	High	Trespassing / poaching	Lack coverage
Zandvlei NR	Low	Illegal Access / Trespassing	State of infrastructure
Falls Bay EP	High	Violent crime	Lack of fencing /coverage
Edith Stephens WP	Low	Theft	Lack of fencing
Wolfgat & Macassar NR	Severe	Violent crime	Location & Social
Kogelberg NR	Medium	Illegal Access / Trespassing	Extent
Helderberg NR	Low	Illegal Access / Trespassing	Lack coverage

Understaffing and poor or non-existent boundaries were found to be the primary cause of compromised Reserve security. The provision of “feet on the ground” or a management presence is therefore viewed as the first step towards improving the current situation.

The Investigation did conclude that technology solutions entail fairly low key equipment such as Day-Night or Peak Inversion monitoring cameras, basic building alarm systems, external building detection beams, lighting, etc.
Infrastructure requirements were predominantly in respect of fencing.
Fencing is not always the preferred solution for safeguarding and demarcating an urban Reserve. However, it is suggested that failure to demarcate the boundaries of a Reserve compromises the authority’s ability to manage a designated area and severely limits the authority’s ability to prosecute transgressors. Simple in-expensive measures such as signage and markers will greatly aid in addressing these matters.

In areas where fencing is vandalised on a regular basis the use of electric fencing (long distances, or Diamond Razor Mesh (short distances) is recommended. However it is recommended that spring-steel barb wire be used in all other instances.

The relative “newness” of the Branch was found to create various generic management challenges which negatively affect the efficiency and effective of Reserve management.

The apparent absence of a clear and definitive Branch Policy on Reserve Safety and Security was viewed as a contributing shortcoming.

A great inconsistency was found in staff designations, with some staff fulfilling similar conservation functions being called Conservation Officers whilst other were called Site Managers or Assistant Managers. The same problem was evident within the junior staff ranks. On some stations “labourers” conducted similar duties to those of Bushrangers.

The appointment and use of Contract staff was found to be a management challenge to most Reserves. Contract staff are generally employed by an external service provider whilst The Branch is responsible for the day to day management of said staff including the provision of uniforms and training. The opinion is held that the cost of these services could very well be such that the Branch could employ these contract staff directly to a greater benefit.

Several instances were found of junior staff being employed for several years as “Small Plant operators” or “Foreman” and having developed a keen interest and expertise in various conservation matters. The provision of career pathing opportunities to staff will not only contribute to the goals of the Branch but also provide an incentive to junior staff.

No evidence was found of a clear skills development program for officers and the impression was created that each officer arranges and sees to his or her own training. This was especially evident with some officers having been trained as Peace officers and appointed whilst others had been trained but not appointed and some still needed to be trained. Some Officers were also expressing the need to be appointed as Fisheries Officers whilst other believed they should be trained and appointed as Environmental Inspectors.

Most reserves had Conservation Students and Interns fulfilling a variety of roles and responsibilities, in some instances un-paid. The rotation of Students and interns was thought to be a good means of exposing them to various experiences and opportunities.

The investigation also found that most staff lacked basic equipment such as binoculars, handcuffs, batons or mace thereby limiting their ability to execute their duties.
The apparent lack of a dress code was viewed as a factor which contributed to the public's sense of security or respect when coming into contact with officers. The wearing of T-shirts, overalls, or golf shirts should not be promoted whilst on duty in the public eye.

No consistency was found in respect of operational procedures or protocols. Some stations had a Management Plan whilst others were still going to develop such plans. Some stations had developed their own safety procedures.

One of the most evident security shortcomings found was that Reserves were "abandoned", for all practical purposes, after hours, on weekends and on public holidays. It is understood that staff work standard working hours. However, the provision of accommodation, which most Reserves have, to either Site managers or Bushrangers are seen as a simple cost effective measure. Where there are operational staff resident on the Reserves (mostly students) it acts as a definite deterrent to illegal activities. Staff stationed on Reserves can then work on a "conservation standard" shift schedule of 20 days on 5 days off.

The investigation also found that very few Reserves actively patrol the Reserve and fences on a regular basis. Although staff shortage is a contributing factor, careful planning and allocation of available resources will ensure that Reserves are patrolled on a regular basis. It is further suggested that the sharing of resources between Reserves will allow for more frequent patrols.

With regard to Procedures and Protocols it is suggested that the Biodiversity branch consider developing the following;
Incident response (poaching, trespassing, theft, fire, attack, medical emergency, land invasion, pollution, un-wanted pets)
Reserve patrols
Fence and gate security
Visitor control

It is suggested that the above procedures and protocols be developed in conjunction with an auditable Reserve management system which includes a personnel and finance performance aspect.

Consultation with public interest groups and reserve managers highlighted the benefits of "friend" groups. Some stations' financial ability and conservation maintenance activities were greatly enhanced by such "friends" groups. It is accepted that not all Reserves have the opportunity to have well capacitated "friends". However, the neighbouring community's sense of ownership was found to be a primary contributor to a Reserves state of security.
Further to which the social role that urban reserves play as "safe areas" for people to walk their pets, have picnics or conduct social functions was highlighted at several public meetings. It was also mentioned that in some areas where "gang turf" issues was dominant the reserves were viewed as "neutral" territories.

Advisory Boards are a requirement in terms of reserves proclaimed under the Protected Areas Act. The aim of which is to allow participation by interested parties and to ensure their continual engagement. With regard to reserves not yet proclaimed under the Protected Areas Act but which have Advisory Boards their role is much the same with the possible addition of raising and allocation of funds. This investigation could not clearly define the extent, role and responsibilities of the various Reserves Advisory Boards. Some Reserves indicated that they played an active role whilst others were not aware of their existence. The development of a clear responsibilities and objectives for each Board is viewed as imperative to contributing to the achievement of the Reserve objectives whilst providing a formal link to neighbouring communities and local government.

The removal of Spare tyres from Reserve vehicles by the Transport Sections should be halted as it poses a significant risk to staff operating in remote areas or providing law enforcement services.

Most Reserves have other City Utility Departments executing functions within the Reserve, share boundaries with them, or manage large tracts of land under their jurisdiction. None of the Reserves were aware of any Memorandums of Understanding which clarify joint management matters. This was viewed as institutional shortcoming requiring attention at higher level.

A variety of Security Service providers render various levels of security to Reserves. These services vary from private security firms providing uniformed guards to providing a static or gate control service to services where such guards are used as Bushrangers. It was the investigations conclusion that each District or Reserve negotiates their own contract conditions with such service providers, a situation which does not contribute to clear and measurable security service provisioning.

The City Law Enforcement Services and structures were generally viewed as not being able to respond to conservation related incidents. Only a few Reserves reported adequate responses to call-outs or incidents with moth Reserves saying they rely on the local SAPS for assistance.

Reserves which have installed alarm systems linked to the City Law Enforcement Control Rooms, reported that in the event of an alarm activation, the Reserve manager is phoned to investigate. No direct service benefit could be found in respect of City Law Enforcement.

What was most evident during the investigation was the risk posed by staff acting outside their areas of jurisdiction. These transgressions are not through ill intent and staff are not necessarily aware that they are exceeding their authority. Urgent attention should be paid to necessary authority and the role staff play in enforcing provincial conservation laws, fisheries laws, and National laws. This should be done in cognisance of the criminal Procedures Act. It is further suggested that cooperation agreements and execution delegations be formalised with other environmental and conservation agencies.

Due to several reserves having a coastal boundary and the ever present activities of highly organised and dangerous Abalone poaching gangs, the involvement of staff in curbing these activities need to be clearly defined and coordinated. It is the opinion of this team that this should be the preserve of a highly trained and well equipped District based Law Enforcement Component conducting their duties in collaboration with other authorities and with the necessary jurisdiction.
It is the opinion of this investigation team that the establishment of a District based Law Enforcement Component will greatly contribute in addressing some of the security shortcomings highlighted. In addition, such a component will also alleviate some of the external enforcement requirements placed on Reserve staff thus allowing them to focus on reserve management and security. The current practice of

Law enforcement staff working a daily night shift is questioned as no evidence could be found on its effectiveness. It is suggested that through information gathering, coordination with other authorities and planning, such nightly activities could take place on a sporadic basis with much greater successes.

The investigation team was also of opinion that the management requirements of the various Reserves need to be included in the Municipal Spatial Development Framework so as to ensure that the Reserve - Neighbourhood interface receive adequate attention.

SUMMARY OF RECOMMENDATIONS

INSTITUTIONAL		
Aspect	**Issue**	**Recommendation**
Governance	Relationship with other National & Provincial Conservation/Environmental institutions Relationship with other City Institutions Obligations in respect of By-laws, Municipal Systems Act (2000) and the Municipal Finance Management Act (2003) Working agreements with other Utility Services	Conduct Institutional Governance Audit Draft MOU's
Policy & Procedures	Management Policies, Goals, Objectives Operational Procedures &Protocols	Develop management Policies Goals & Objectives Develop Procedures and Protocols
Management	Consistency in personnel designations Consistency in personnel functional content Career pathing Skills development Reserve Management Standards	Develop consistent Job Descriptions Develop Skills Development and career pathing Protocol Develop Auditable Reserve Management System linked to Personnel & Financial Performance Management System

Reserve	Additional Staffing	Security and Equipment	Infrastructure
NORTH			
Witzands	1. 3x Bushrangers 2. Small labor team 3. Staff must be trained in 4 wheel driving 4. Officers appointed as Peace Officers	1. Establish a MOU with Bulk Water 2. Replace damaged fences 3. Monitor Wood cutter activities 4. Permits must contain more information 5. Reserve map required 6. Curb illegal access 7. Regular perimeter patrols.	1. 4x4 vehicle in good condition 2. Office Trellidor and burglar bars 3. Demarcation of boundaries 4. Erect signage 5. Electric fence along north and north-eastern boundary 6. Basic staff equipment
Blaauwberg	6x Bushrangers (2 x3-member teams) 2 x Permanent Visitor Controller Off's Officers appointed as Peace Officers Station District Law Enforcement Component	Staff be appointed as Peace Officers Law Enforcement Component duties expanded to cover "hot spots" in district. Daily night shifts limited to conduct patrols across district and do ad hoc night time	1. Link present alarm system to security service provider. 2. Mount Day-Night camera to cover main resort area. 3. Active Monitor to monitor activities during peak periods. 4. Erect signage 5. Basic staff equipment
Rietvlei	2 x Bushrangers Officers appointed as Peace Officers	Regular perimeter patrols Co-ordinate with MCM	Fence along R27 road. Alarm systems at new facilities Peak Inversion camera with recording facility for main gate Fence open residential property boundaries 5. Patrol boat 6. Basic staff equipment
CENTRAL			
Bracken	1. 1x EE Officer/Community Officer. 2. 1x Labourer	1. Visible patrols 2. Liaison with Everite Hostel.	1. Ablutions at gate 2. Day-night camera for main access area. 3. Removal of derelict buildings 4. Guard monitoring 5. Clear alien vegetation along fences 6. Basic staff equipment
Durbanville	2x Visitor Controller Officers Officers appointed as Peace Officers	Boundary fence cleared of vegetation Erect signage iro handling of unwanted pets	Steel gate at offices to be kept locked, and fitted with buzzer and solenoid access control Video monitor for door Service counter inside front door Alarm system to include response

			Long-range mobile panic buttons Lighting at offices and main gate Peak Inversion camera for main gate Guard Monitoring system Basic staff equipment
Tygerberg	Employ current 3 Contract Bushrangers 2x Bushrangers 1x Site Manager 1x Foreman 5x Llabourers 1x Additional EE Officer/Community Liaison 2x Visitor Controller Officers Officers appointed as Peace Officers Station District Law Enforcement Component	Attend Community Police Forum and Crime Watch meetings. Bushrangers obtain drivers licenses Staff presence over week-ends and after hours All gate remotes currently issued be recovered immediately and re-issued under a new access signal code Keys handed out should be retrieved and locks changed. Kanonberg be afforded controlled access in the event of a fire.	Replace existing camera at main entrance gate with a Peak Inversion camera with recording facility Present cameras be replaced with Day-Night cameras. Plattekloof and Quarry area be re-fenced with electric fence Perimeter road should be constructed where feasible Flatrap razer coils installed on top of all fences and along bottom of select fences Accommodation for Bushranger teams Installation of trigger operated floodlight in darker area of parking Additional mountain bike Basic staff equipment
SOUTH			
Zandvlei	3x Visitor Controller Officers 3x Bushrangers 4x Labourers Officers appointed as Peace Officers	Cease involvement in public amenity facilities on eastern side Formal gate control required during open hours Formalise relationship with Mountain Men Security Services Evening security at offices by private security service provider Introduce ad hoc evening patrols Formalise co-operation with Marine and Coastal Management regarding control at the estuary.	Northern access well designated and controlled access point Signage at the entrance, parking areas & along the water Re-fence office area with Diamond Razor Mesh Provide appropriate security lighting Replaced northern and western fence with Diamond Razor Mesh fence New offices need to be completed & fitted with monitored alarm system and BX Outdoor Beams Guard Monitoring system Motorized boat Basic staff equipment
False Bay	9x Bushrangers 4x Static Guards Officers appointed as Peace Officers Station District Law Enforcement Component	Regular patrols supported Bushrangers and Visitor Control officers should be circulated & deployed to cover peak periods of public use within the Park. Change permanent night shift to a planned basis during periods of specific risk or in response to specific incidents Co-ordinate night activities with other law	Establish two or three Bushranger bases Re-fence southern and eastern boundary electric fence Motorised patrol 2x Quad Install Guard Patrol Monitoring system Fence Rondevlei offices and EE Centre with Diamond Razor Mesh Install additional trigger Install flood lights at all facilities

		enforcement bodies Visitor Controller Officers patrol Zeekoevlei picnic area during peak periods.	Day-Night camera to Rondevlei Viewing Tower for office and entrance area Upgrade all existing cameras to Day-Night cameras with recording Additional cameras for Zeekoevlei entrance gate and new office complex Buildings should be alarmed with a siren and linked to a security service provider Buildings which do not have security staff at night should be fitted with BX80 Erect signage Basic staff equipment
Edith Stephens	Replace "small plant operator" with a fence maintenance post.	The reserve fence needs to be patrolled daily or at least twice a week Walk-in access should be controlled and documented at the gate Office gate should remain locked	Northern and southern fences must be replaced with Razor Diamond Mesh be considered or electric fence using spring steel wire Management track should be created along the fence Basic staff equipment
EAST			
Wolfgat & Macassar	8 x Bushrangers. 3x District Law Enforcement Officers 2 x Community Liaison Officers Officers appointed as Peace Officers Station District Law Enforcement Component	Weltevreeden office security system should include a response system City employed private security with mobile support to patrol coastal road esp. parking areas Investigate sand mining permits	Demarcate reserve using cement poles Erect signage Move Macassar Gate Basic staff equipment
Kogelberg	1x Visitor Controller Officer 3x Bushrangers Officers appointed as Peace Officers	Improve communication services	Construct Bushranger camp Erect signage Fence Erf 19 and north-west boundary using electric fence Install alarm at all buildings Install trigger lighting Install depot fence at rear Install Reed Switches for solar panels Peak Inversion Camera for entrance gate to depot Basic staff equipment
Helderberg	6 existing Labourers trained to level of Bushrangers Officers appointed as Peace Officers	Develop system for evening monies Regular perimeter patrols	Erect signage Electric fence be retained Peak Inversion camera at main gate Day –Night camera to cover parking area Basic staff equipment

COSTING

The equipment costing listed below are based on actual quotes provided.

Fencing:

Diamond Razor mesh fencing installed per 100m	R 440,00/meter
1,8m, 12 strand electric fencing installed at 100m (Au Alloy wire)	R 55,00/meter
12 Joule Nemtek energizer with built in fence monitor	R 3400,00 excl

Alarm Equipment:

To supply and install an 8-zone alarm Paradox alarm system complete with battery back-up, keypad, 15 watt siren, four internal infra-red passives, two fixed panic buttons and two reed switches. Alarm system can be zone doubled to a 16 zone system.

R 3600,00 excl.

To supply and install one outdoor BX80 beam R 1500,00 excl.

GSM 4 channel radio, programmed to four cellular phone numbers and linked to fence energizers, Alarm systems, Solar panels and standalone panic systems R 1800,00 excl

Long Range remote panic – one long range remote	R 250,00 excl.
Long Range receiver – installed	R 1100,00 excl.

Cameras:

To supply and install one gate camera – Peak inversion camera, auto-iris lens, 40m co-axial cable, power supply, 4-channel embedded digital recorder (250 G) hard drive and one 17 inch monitor. Price includes camera housing and installation R 11 900,00 excl.

To supply and install one day/night camera – Day/Night camera, auto-iris lens, 40m co-axial cable, power supply, 4-channel embedded digital recorder (250 G) hard drive and one 17 inch colour monitor. Price includes housing and installation R 12 900,00 excl

Appendix 14: Bracken Nature Reserve- METT-SA

REPORTING PROGRESS IN URBAN PROTECTED AREAS

A Site-level rapid assessment tool based on the World Bank & WWF's "Management Effectiveness Tracking Tool"

.

City of CapeTown

by

Howard Langley & Paul Britton

22 May 2007

Bracken Nature Reserve

REPORTING PROGRESS AT PROTECTED AREA SITES: DATA SHEET

Name of protected area	Bracken Nature Reserve		
Location of protected area (country and if possible, map reference)	S.A Western Cape		
Date of establishment (distinguish between agreed and gazetted	*Agreed*	*Gazetted*	
Ownership details (i.e. owner, tenure rights etc.)	City of Cape Town		
Management Authority	City of Cape Town		
Protected area size (ha)	35,6ha		
Staff numbers	*Permanent* 3	*Temporary*	
Budget	No dedicated reserve budget. A budget at district level is shared between three protected areas.		
Designation (ICUN category), World Heritage, RAMSAR etc	Local Authority Nature Reserve		
Reason for designation	Contains valuable remnants of the threatened vegetation types Renosterveld and Sand Plain Fynbos.		
Brief detail of World Bank funded project or projects in PA			
Brief detail of WWF funded project or projects in PA			
Brief detail of other relevant projects in PA	Rehabilitation of the landfill site into a natural ecosystem, development of infrastructure		
List two of the primary protected area objectives			
Objective 1	Biodiversity Conservation		

Objective 2	Provide economical , Environmental Education and recreational value to the surrounding communities
List the top two most important threat to the PA (and indicate reasons why they are selected)	
Threat 1	Impacts from the adjoining urban area, particularly the urban edge effects
Threat 2	Lack of Resources (staff and insufficient budget) and levels of high disturbance
List top two critical management activities	
Activity 1	Rehabilitation (transformation of landfill site into part of Greater Bracken)
Activity 2	Development of infrastructure

Date assessment carried out:	**22nd June 2007**
Name of assessor:	**Tshepo Mamabolo**

1: Context : Where are we now?	Criteria	Value	Score	Comments	Next steps
1.1 Legal status **Does the PA have secure permanent conservation legal status?**	The PA's permanent legal conservation status is not secured by its current legal status eg Public Open Space.			Although declared as Nature Reserve there only small areas of relatively undisturbed natural vegetation. The greater area is disturbed and a large area is a heavily transformed landfill site which is currently undergoing rehabilitation.	The reserve management main objective is to restore the natural ecosystem of the area, to function as a proper nature reserve, that can provide economical , EE and recreational value to the surrounding communities
	There is a formal agreement that the PA should be afforded the highest possible legal protection, but the process has not yet begun.	1			
	The PA is in the process of being afforded the highest possible legal protection.	2			
	The PA has Local Authority Nature Reserve status, or a higher level of legal protection.	3	3		
1.2. Protected Area regulations	There are no legal mechanisms for controlling inappropriate land use and activities in the PA	0		The reserve has limited manpower on the ground to control some of the illegal activities that occur. Other legal mechanisms include City by-laws, NEMA regulations etc. Reserve manager and assitant reserve manager completed a peace officers course and qualified as a peace officer - still awaiting apointment card.	The reserve management has to encourage good working relationship with local law enforcement and SAPS to assist with law enforcement. Encourage and train local community members to assist with after hours law enforcement e.g.(security watch)
	Legal mechanisms for controlling inappropriate land use activities in the PA exist but are not being implemented.	1			
	Legal mechanisms for controlling inappropriate land use and activities in the PA exist but there are some problems in effectively implementing them	2	2		
	Legal mechanisms for controlling inappropriate land use & activities in the PA exist and are being effectively implemented	3			
1.3. Law enforcement PA has capacity/resources to enforce regulations & bylaws well enough?	PA has no capacity/resources/support to enforce regulations & bylaws	0		The PA staff have been on the Peace officers course and have not been issued with appointment cards , therefore we can't implement regulations or bylaws i.e. issue fines or notices	Once appointed the PA staff will be able to implement by- laws and control some of the illegal activities in the reserve
	There are major deficiencies in capacity/resources to enforce regulations & bylaws (e.g. lack of skills, no patrol budget)	1	1		
	PA has acceptable capacity/resources/support to enforce regulations & bylaws but some deficiencies remain	2			

	PA has excellent capacity/resources/support to enforce regulations & bylaws	3			
1.4. Protected Area boundary demarcation **Is the boundary known and demarcated?**	The boundary of the PA is not known by the management authority or local residents/neighbouring land users	0		Fencing still needs to be erected in order to formalise boundaries and for other parties to be aware and informed of the PA 's boundaries	Erecting fence and informative signboards, regular patrols to be conducted.
	The boundary of the PA is known by the management authority but is not known by local residents/neighbouring land users	1	1		
	The boundary of the PA is known by both the management authority and local residents but is not appropriately demarcated	2			
	The boundary of the PA is known by the management authority and local residents and is appropriately demarcated	3			
1.5. Resource inventory Do you have enough information to manage the area?	There is little or no information available on critical habitats, species and cultural values of the PA	0		As the PA has just recently been placed under the management of the branch, there is insufficient information available	Compile information base to enable effective management of PA. Students are utilized to collect info/ conduct research as part of the projects/ thesis
	Information on critical habitats, species and cultural values is not sufficient to support planning and decision making	1	1		
	Information on critical habitats, species & cultural values is sufficient for planning/decision making but the necessary survey work is not being maintained	2			
	Information concerning critical habitats, species and cultural values of the PA is sufficient to support planning and decision making and is being maintained	3			
Subtotal: Context		**15**	**8**		

2: Planning: Where do we want to be?	**Criteria**	**Value**	**Score**	**Comments**	**Next steps**

2.1. Protected area design Does the protected area need enlarging, corridors etc to meet its objectives?	Inadequacies in design mean achieving major management objectives is impossible	0		The PA was previously designed for various functions not compatible with conservation and as a result, there are high levels of degradation constraining the achievement of biodiversity management objectives. The area is isolate and links and corridors do not exist.	Rehabilitate disturbed areas into conservation areas (e.g. the landfill site being rehabilitated to be incorporated into the natural area of conservation value). Incorporate the Perdekop area into the Nature Reserve and investigate potential links and corridors.
	Inadequacies in design mean that achievement of major objectives are constrained to some extent	1	1		
	Design is not significantly constraining achievement of major objectives, but could be improved	2			
	Reserve design features are particularly aiding achievement of major objectives of the PA	3			
2.2 Management plan Is there a management plan (compliant with Protected Areas Act) and is it being implemented?	There is no standard Management Plan for the PA	0		The management plan is 5 years old and needs to be reviewed and improved and should consist of clear and practical objectives , management practices. Etc Bracken has a management plan which was approved and only now needs to be revised and will be made compliant to the new Protected Areas Act	New approved management plan need to be prepared and implemented
	A standard Management Plan is being prepared or has been prepared, but is not yet approved.	1	1		
	An approved Management Plan exists and is being implemented, but has not been updated/reviewed during the past five years.	2			
	An approved Management Plan exists, is being implemented and has been updated/reviewed during the past three years	3			
2.3. Conservation Development Framework (CDF) Is there a visitor use zoning system indicating position and nature of operation & visitor infrastructure?	There is no CDF for the PA	0	0	CDF is not indicated in the management plan, the new management plan has to contain plans and implementation guidelines	CDF needs to be incorporated into the new management plan. This must include a review of all existing structures with the aim of removing all superfluous buildings.
	A CDF is being prepared or has been prepared but is not being implemented	1			
	An approved CDF exists but it is only being partially implemented because of funding constraints or other problems	2			
	An approved CDF exists and is being implemented	3			
Supplementary items	The planning process allows adequate opportunity for key stakeholders to influence the management plan	1	1	Advisory Board and Friends of Bracken continiously informed of projects and have some	

	There is an established schedule and process for periodic review and updating of the management plan	1		input.	
	The results of monitoring, research and evaluation are routinely incorporated into planning	1			
Subtotal Score: Planning		**12**	**3**		

3: Inputs: What do we need?	**Criteria**	**Value**	**Score**	**Comments**	**Next steps**
3.1. Research Is there a programme of management-orientated research work?	Research needs have not been identified nor is any research work taking place in the PA	0		Research in the PA is encouraged but so far only minimal research has been conducted .	Research on the *desired state* and best methods of revegetating to achieve this on the transformed landfill site must be done.
	Research needs have been identified, but other than for ad hoc research, no management orientated research is being done.	1	1		
	There is considerable research work but only limited "management" orientated research is being done.	2			

3.2. Human Resource capacity Does the PA have sufficient HR capacity to manage the protected area?	There is considerable research work being undertaken, which is relevant to management needs	3		The PA staff component needs to be improved, as there is currently only one staff member who has some qualification.	Staff training in conservation and management needs to be encouraged/ implemented
	The PA has no HR capacity	0			
	HR capacity is inadequate for critical management activities	1	1		
	HR capacity is sufficient, but there are deficiencies in necessary skills for critical management activities	2			
	HR capacity and expertise is adequate for management needs	3			
3.3. Current budget Is the current budget sufficient?	There is no dedicated budget for the PA	0		The PA shares/competes for a "pool" budget with other PA's, this results in some of the critical projects being suspended/delayed/ not carried out due to insufficient funds	The PA need a sufficient dedicated budget
	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1	1		
	The available budget is acceptable, but could be further improved to fully achieve effective management	2			
	The available budget is sufficient and meets the full management needs of the PA	3			
Bonus points	The budget is secure/guaranteed for the PA on an annual cycle	1	1	PA recieves a share of the distict annual budget	The PA need a sufficient dedicated budget
	The budget is secure/guaranteed on a three year cycle	2			
	The PA is not reliant on external funding	2			
Subtotal		**14**	**4**		

4: Process : How do we go about it?	Criteria	Value	Score	Comments	Next steps
4.1. Annual Plan of Operation (APO) Is there an annual work plan/APO that is approved by the organisation?	No approved/standardised APO exists	0		Some of the targets are not met due to constraints in resources (budget and man power)	The APO has to be linked to the approved annual budget in future, in order to meet our targets
	An approved APO exists but activities are not monitored against the plan's targets	1			
	An approved APO exists and actions are monitored against the plan's targets, but many activities are not completed	2	2		
	Actions are monitored against the approved APO's targets and most or all prescribed activities are completed	3			

4.2. Resource management Is the protected area adequately managed (e.g. for fire, invasive species, poaching)?	Requirements for active management of critical ecosystems, species and cultural values have not been assessed	0		The PA has been neglected and only recently (since 2004) been placed under the management of the branch. As such management needs still need ascertained. This should be advised by the revised management plan.	Long term planning and data capturing by management need to be addressed in order to manage the PA effectively
	Requirements for active management of critical ecosystems, species and cultural values are known but are not being addressed	1	1		
	Requirements for active management of critical ecosystems, species and cultural values are only being partially addressed	2			
	Requirements for active management of critical ecosystems, species and cultural values are substantially or fully addressed.	3			
4.3. Staff training Is there enough training for staff?	Staff are untrained	0		There is room for improvement, especially to the new staff member that was previously an abattoir employee, whom is passionate about Nature Conservation	Staff training needs to be encouraged as it will benefit the PA in long term
	Staff training and skills are low relative to the needs of the PA	1			
	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2	2		
	Staff training and skills are in tune with the management needs of the PA, and with anticipated future needs	3			
4.4. Budget management Is the budget managed to meet critical management needs?	Budget management is poor and significantly undermines effectiveness	0		There is room for improvement through training, evaluation etc Budget need to be allocated per protected area	Staff training in financial management need to be encouraged as it will benefit the PA in long term
	Budget management is poor and constrains effectiveness	1	1		
	Budget management is adequate but could be improved	2			
	Budget management is excellent and aids effectiveness	3			
4.5. Operational equipment & infrastructure (as required for	There is little or no operational equipment & infrastructure	0		Being a new established reserve, there are still major gaps. With limited budget it will take some time to reach	Budget for equipment and infrastructure needs to be increased
	There is some equipment & infrastructure but these are wholly inadequate	1	1		

operational management purposes, but excluding tourism/visitor facilities)	There is equipment and infrastructure, but still some major gaps that constrain management	2		targets/ objectives	
	There is adequate operational equipment and infrastructure	3			
4.6 Maintenance of equipment & infrastructure Is equipment & infrastructure (including tourism/visitor facilities) adequately maintained?	There is no approved Maintenance Plan and no maintenance is taking place	0		PA has limited maintenance budget , which is utilized for high priority maintenance of infrastructure, equipments etc	Budget for maintenance needs to be increased
	There is no Maintenance Plan and maintenance is taking place to an unsatisfactory standard.	1	1		
	There is no Maintenance Plan, but maintenance is taking place to a satisfactory standard.	2			
	There is an approved Maintenance Plan that is being fully implemented to a high standard.	3			
4.7. Education and awareness programme Is there a planned education programme?	There is no education and awareness programme	0		The PA has no dedicated EE officer as the result the manager conducts ad hoc programmes	A full time EE officer needs to be appointed to improve on service delivery and planning of EE awareness
	There is a limited and *ad hoc* education and awareness programme, but no overall planning for this	1	1		
	There is a planned education and awareness programme but there are still serious gaps	2			
	There is a planned & effective education & awareness programme fully linked to the objectives and needs of the PA	3			
4.8. Government & commercial neighbours Is there co-operation with adjacent land users?	There is no contact between managers and neighbouring official or corporate land users	0		Networking and communication with other department is still limited but it is encouraged by PA management	Communication improvement with other departments can be improved and encouraged as it will be a long term benefit to PA
	There is limited contact between managers and neighbouring official or corporate land users	1			
	There is regular contact between managers and neighbouring official or corporate land users, but only limited co-operation	2	2		

	There is regular contact between managers and neighbouring official or corporate land users, & substantial co-operative management	3			
4.9. Advisory committee/forum An Advisory Committee of local representatives and specialists advises on PA management & development issues.	There is no Advisory Committee/forum	0		The advisory board exists but can do better	The Advisory Board needs to be beneficial to the PA i.e. backing up management with resources (budgets and politicians)
	An Advisory Committee/forum is in the process of being established communities	1			
	An Advisory Committee/forum exists, but does not contribute significantly to the management/development of the PA.	2	2		
	A well represented and formalised Advisory Committee/forum contributes significantly to the proper management/development of the PA.	3			
4.10. Community partners Do community partners have input to management decisions via the Advisory Committee?	Community partners have no input into decisions relating to the management of the PA	0		The Friends of Bracken members sit on the Advisory Board meetings and have an input on some on the operational activities	
	Community partners have limited input into the PA's management decisions via local governance structures	1			
	Community partners contribute to some decisions relating to management via the PA's Advisory Committee	2	2		
	Community partners are fully representative on the PA's Advisory Committee and directly participate decisions making.	3			
4.11. Commercial tourism Do commercial tour operators contribute to protected area management?	There is little or no contact between managers and tourism operators using the PA	0	0	PA is not a tourism destination/ hot spot as yet.	The reserve infrastructure needs to be developed and improved to encourage tourism
	There is contact between managers and tourism operators but this is largely confined to administrative or regulatory matters	1			
	There is limited co-operation between managers and tourism operators to enhance visitor experiences and maintain conservation values	2			

	There is excellent co-operation between managers and tourism operators to enhance visitor experiences, protect values and resolve conflicts	3			
4.12. Monitoring & evaluation	There is no monitoring and evaluation in the PA	0		Being a new established reserve, there are still major gaps. The reserve management is working towards closing the gaps	Regular monitoring and evaluation will be some of the management priorities
	There is some *ad hoc* monitoring & evaluation, but no overall strategy and/ or no regular collection of results	1	1		
	There is an agreed and implemented monitoring & evaluation system but results are not systematically used for management	2			
	A good monitoring & evaluation system exists, is well implemented and used in adaptive management	3			
Supplementary item	There is open communication and trust between local stakeholders and PA managers	1			
Subtotal		**37**	**16**		

5: Outputs/Outcomes: What were the results/achievements?	Criteria	Value	Score	Comments	Next steps
5.1. Visitor facilities Are visitor/tourism facilities good enough and sufficient to prevent damage to the PA?	There are no visitor facilities and services	0		The reserve is still in a development phase stage and is working towards improving current infrastructure	There is scope for a wide range of facilities. The new management plan must provide guidelines as to the nature, size and position of facilities.
	Visitor facilities and services are inappropriate for current levels of visitation or are under construction	1			
	Visitor facilities and services are adequate for current levels of visitation but could be improved	2	2		
	Visitor facilities and services are excellent for current levels of visitation or the nature (sensitivity) of the PA prohibits the development of any visitor services.	3			
Supplementary item	There are active programmes for restoration of degraded areas in the PA and/or associated buffer zone, resultant from visitor use.	1	1	Disturbed areas are being restored with propagated indigenous plants, the landfill site is being rehabilitated in order to be incorporated in the PA, intact areas (Perdekop) are being used as seed banks for the degraded areas at BNR.	Undertake research to determine the most appropriate desired state of disturbed and transformed area and the most suitable methods to follow.
5.2. Ecological & Cultural condition	Important biodiversity, ecological and cultural values are being severely degraded in the PA	0		The reserve has extensive areas of degraded vegetation.	Management is actively working towards

assessment Is the protected area being managed consistent to its objectives?	Some biodiversity, ecological and cultural values are being severely degraded	1	1	Restoration is a high priority because of the high botanical value of the original vegetation which are currently only small remnants in the reserve.	restoration and controlling/ stopping degradation, where possible.
	Some biodiversity, ecological and cultural values are being partially degraded but the most important values have not been significantly impacted	2			
	Biodiversity, ecological and cultural values are predominantly intact	3			
5.3. Access assessment Are the available management mechanisms working to control access or use?	Protection systems (patrols, permits etc) are ineffective in controlling access or use of the PA in accordance with designated objectives	0		Due to lack of fencing access controls lacking. This needs to be improved to encourage effective utilization of the PA	Budget has been allocated to to erect fencing and that will assist in illegal access control.
	Protection systems are only partially effective in controlling access or use of the PA in accordance with designated objectives	1	1		
	Protection systems are moderately effective in controlling access or use of the PA in accordance with designated objectives	2			
	Protection systems are largely or wholly effective in controlling access or use of the PA in accordance with designated objectives	3			
5.4. Economic benefit assessment Is the Protected Area providing economic benefits to local communities?	The existence of the PA has reduced the options for economic development of the local communities	0		The existence of PA has increased property values of houses adjacent to the reserve.	In the long term the PA will be of high value to the surrounding community as it is the only reserve in Brackenfell.
	The existence of the PA has neither damaged nor benefited the economy of the local economy	1			
	There is some flow of economic benefits to local communities from the existence of the PA but this is of minor significance to the regional economy	2	2		
	There is a significant or major flow of economic benefits to local communities from activities in and around the PA (e.g. employment of locals, locally operated commercial tours etc)	3			
5.5. Community benefit assessment	The existence of the PA has not delivered any direct or indirect community benefits	0		The PA has provided training and employment to the local	The PA will strive to provide long term

(other than economic) e.g. recreation & education facilities, community hall, sport facilities etc.	The existence of the PA has delivered some minor short term community benefits	1	1	disadvantaged community.e.g.local communities are employed on contract basis for alien clearing, footpath construction, tree felling , rehabilitation of the lanfillsite	employment to local community members
	The PA delivers some quantifiable long term community benefits that make a difference to the lives of local communities	2			
	The PA delivers considerable quantifiable long term community benefits that make a real difference to the lives of local communities	3			
Subtotal Score: Outcomes		**16**	**8**		

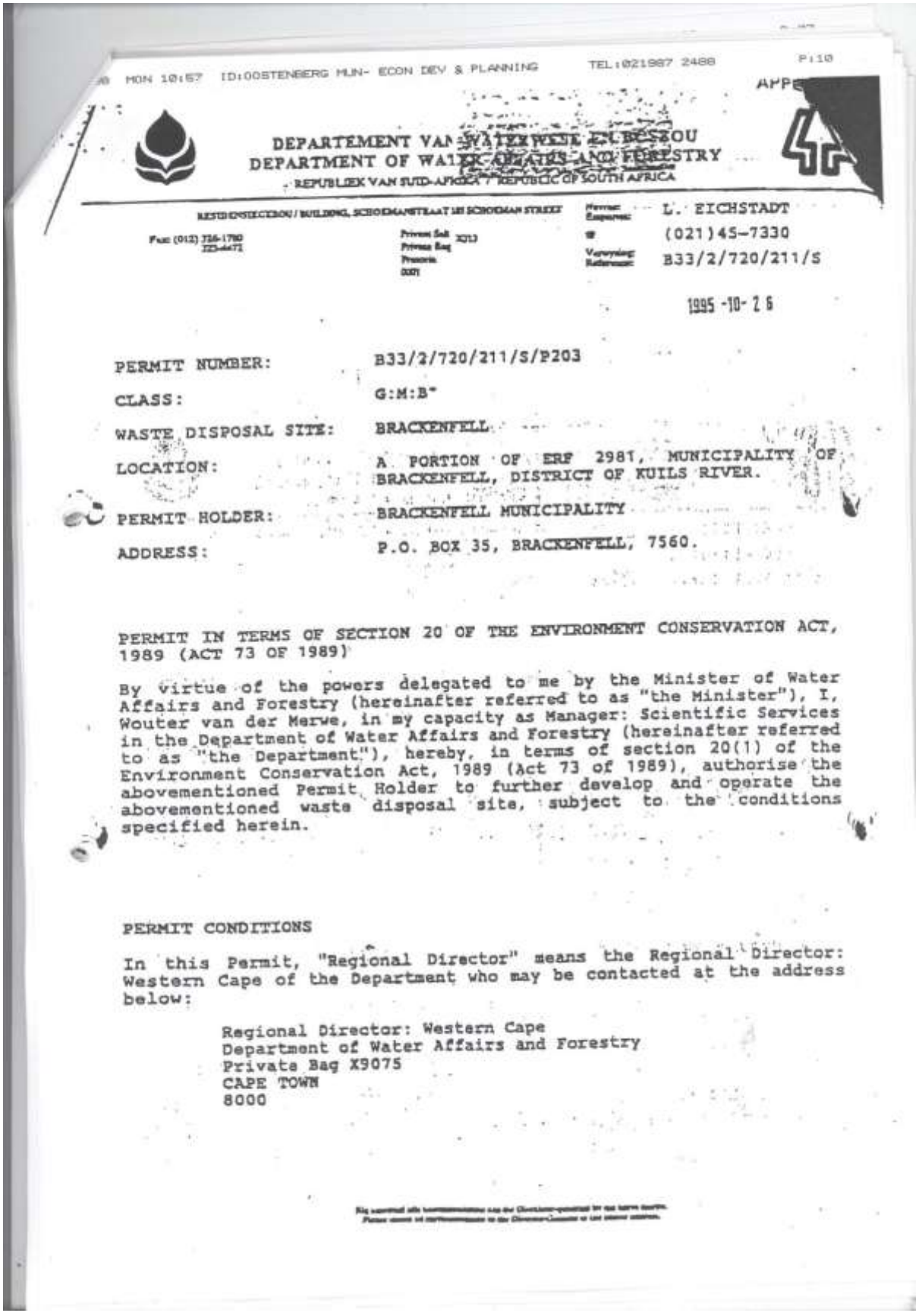
1: CONTEXT	**VALUE**	**SCORE**
1.1. Legal status	3	3

1.2. Protected Area regulations	3	2
1.3. Law enforcement	3	1
1.4. Protected area demarcation	3	1
1.5. Resource Inventory	3	1
Subtotal	**15**	**8**
2: PLANNING		
2.1. Protected area design	3	1
2.2. Management plan	3	1
2.3. Conservation Development Framework	3	0
Supplementary items	3	1
Subtotal	**12**	**3**
3: INPUTS		
3.1. Research	3	1
3.2. Staff numbers	3	1
3.3. Current budget	3	1
Supplementary items	1	1
Subtotal	**14**	**4**
4: PROCESS		
4.1. Annual Plan of Operation	3	2
4.2. Resource management	3	1
4.3. Staff training	3	2
4.4. Budget management	3	1
4.5. Operational equipment & infrastructure	3	1
4.6. Maintenance of equipment & infrastructure	3	1
4.7. Education & awareness	3	1
4.8. Government & commercial neighbours	3	2
4.9. Advisory committee	3	2
4.10. Community partners	3	2
4.11. Commercial Tourism	3	0
4.12. Monitoring & Evaluation	3	1
Supplementary items	1	0
Subtotal	**37**	**16**
5: OUTPUTS/OUTCOMES		

5.1. Visitor facilities	3	2	
5.2. Condition assessment	3	1	
5.3. Access assessment	3	1	
5.4. Economic benefit assessment	3	2	
5.5. Community benefit assessment	3	1	
Supplementary items	1	1	
Subtotal	**16**	**8**	
TOTAL	**94**	**39**	**41%**

Summary and comment on score. This Nature Reserve contains remnants of very threatened vegetation types. Unfortunately these only form a small portion of the reserve. The remainder of the area presents major challenges as the vegetation is severely degraded. A major portion of the reserve is covered by a landfill site which has transformed the landscape. The maintenance of the remnants and the rehabilitation and restoration of the disturbed and transformed area present major challenges and a well researched rehabilitation/restoration plan is required.
The score is indicative of the above and the fact that the area has only recently been placed under the management of the Biodiversity Branch of the City of Cape Town.

Appendix 15: Brackenfell Municipality Waste Disposal Permit



MON 10:57 ID:OOSTENBERG MUN- ECON DEV & PLANNING TEL:021987 2488 P:10

APPE 42

DEPARTEMENT VAN WATERWESE EN BOSSOU
DEPARTMENT OF WATER AFFAIRS AND FORESTRY
REPUBLIEK VAN SUID-AFRIKA / REPUBLIC OF SOUTH AFRICA

L. EICHSTADT
(021)45-7330
B33/2/720/211/S

1995 -10- 26

PERMIT NUMBER: B33/2/720/211/S/P203

CLASS: G:M:B"

WASTE DISPOSAL SITE: BRACKENFELL

LOCATION: A PORTION OF ERF 2981, MUNICIPALITY OF BRACKENFELL, DISTRICT OF KUILS RIVER.

PERMIT HOLDER: BRACKENFELL MUNICIPALITY

ADDRESS: P.O. BOX 35, BRACKENFELL, 7560.

PERMIT IN TERMS OF SECTION 20 OF THE ENVIRONMENT CONSERVATION ACT, 1989 (ACT 73 OF 1989)

By virtue of the powers delegated to me by the Minister of Water Affairs and Forestry (hereinafter referred to as "the Minister"), I, Wouter van der Merwe, in my capacity as Manager: Scientific Services in the Department of Water Affairs and Forestry (hereinafter referred to as "the Department"), hereby, in terms of section 20(1) of the Environment Conservation Act, 1989 (Act 73 of 1989), authorise the abovementioned Permit Holder to further develop and operate the abovementioned waste disposal site, subject to the conditions specified herein.

PERMIT CONDITIONS

In this Permit, "Regional Director" means the Regional Director: Western Cape of the Department who may be contacted at the address below:

Regional Director: Western Cape
Department of Water Affairs and Forestry
Private Bag X9075
CAPE TOWN
8000