

# **ECO-ROUTE**

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# **BIODIVERSITY ANALYSIS OF PORTION 7 OF THE FARM BRAKKLOOF No 443**

## **EXECUTIVE SUMMARY**

### **I. Terms of Reference:**

ECO-ROUTE Environmental Consultancy was approached by COLOUR BLUE Project Managers to conduct a Biodiversity Analysis on the site of the proposed Development. The Terms of Reference guides the scope of work for the specific specialist study.

“Investigate and report on the existing ecological status and possible ecological corridors present on the property. Significant ecological processes must be identified.

### **II. Methodology:**

A desktop study was done, taking into account all of the available Specialists Scientific Reports. A literature study was undertaken using the relevant literature as sited. Site visits and *in situ* surveys and evaluations were carried out.

### **III. Key Issues Identified:**

#### **Riverine Conservation:**

Rivers and their associated riparian habitats are central to human welfare, the quality and quantity of fresh water in a predominantly semi-arid country is of the utmost importance. Therefore any impact on the ecological fitness of river systems must be evaluated and controlled.

#### **Alien Plant Infestation:**

All landowners are under legal obligation to eradicate mature alien plants and control re-growth of alien plants on their properties.

Invasive alien species have a significant negative impact on the receiving environment causing direct habitat destruction, increasing risk of “wildfires” and substantially reducing the surface and sub-surface water availability in any ecosystem but especially so in wetlands and riverine habitats.

#### **Ecological Corridors and Habitat Fragmentation**

When continuous areas of habitat are broken up into fragments with little or no contingency (as a result of human impact such as farming and urbanization) ecological processes that ensure the functioning of these systems are disrupted and the flow of ecological information comes under severe stress.

Therefore corridors of natural habitat of significant size are needed to link the habitat fragments in order to facilitate species movement and the continuation of ecological processes to ensure both species and habitat fitness.

### **Restoration and Rehabilitation**

Rehabilitation efforts are valuable in restoring the habitats that previously have been disturbed or has been disturbed as a result of development construction activities.

The restoration and rehabilitation process and procedures go way beyond the mere beautification of the development project and are best left in the hands of Rehabilitation Specialists.

### **IV. Recommendations**

Where possible, buffer zones and ecological corridors must be introduced to protect the valuable remainder of the natural vegetation and along the riverine system.

The ecological corridor will link the ridge line to the artificial small dams on the property and further link-up with the riverine system, thereby ensuring a flow of important ecological processes that is necessary for conserving the integrity of the habitats and systems on site.

### **V. Conclusions**

Therefore every effort should be made to ensure that the identified ecological corridor is kept open and functional.

# BIODIVERSITY ANALYSIS

## 1. Methodology

A desktop study was done taken into account all of the available Specialists Scientific Reports. A literature study was undertaken using the relevant literature as indicate by Cape Nature and the Department of Environmental Affairs and Development Planning as well as other applicable documentation. Site visits and evaluations were carried out.

## 2. Ecological Status of the Property:

### 2.1 The Current Ecological Status:

The Biodiversity Index of the Site is “Medium-Low” it was determined taking the following ecological parameters into account:

- Vegetation Analysis – the arable portion of the site is disturbed and transformed. The presence of the Eucalyptus trees in the riverine habitat has an extremely negative impact on the soil fertility and renders the soil virtually sterile.
- Some species of importance occur on site and could be maintained in the eco corridor as identified.
- Localized remnants of Fynbos occur along the ridge line and in areas with rocky outcrops. These communities are semi-isolated and can only be linked to other Fynbos communities on the adjacent land through the ecological corridor that has been identified and will be adopted in the proposed development.
- The indication of any faunal activities were low this can directly be linked to the fact that the natural habitat is largely destroyed and or isolated.

### 2.2 The Ecological Status of the Property during Construction:

- The impact on the ridge line and riverine areas of property should be avoided.
- All alien vegetation should be cleared prior to any construction activities. No heavy machines can be used for this purpose.
- A plant rescue operation should form part of the rehabilitation operation and must take place before the commencement of any construction activities.
- All rescued plants must be kept in an on-site nursery.
- These matters will be addressed in the Construction Environmental Management Plan.

### 2.3 The Ecological Status of the Property after Rehabilitation:

- The overall ecological status of the property must benefit from the proposed development.

- A detailed Rehabilitation Plan with clearly indicated goals and time frames should be adopted in order to achieve habitat restoration of especially the wetland system.
- It is envisaged that the identified ecological corridor could play a significant role in the conservation of ecological processes along the gradient from “ridge to river” and onto adjacent properties thereby forming important linkages in the local environment.

### **3. The Following Key Issues Were Identified During The Biodiversity Analysis:**

#### **3.1 Riverine Conservation**

##### **3.1.1 Conservation Principles:**

- Rivers and their associated riparian habitats are central to human welfare, the quality and quantity of fresh water in a predominantly semi-arid country is of the utmost importance.
- Therefore any impact on the ecological fitness of river systems must be evaluated and controlled.
- The National Water Act (Act No. 36 of 1998) regulates water use and the conservation of water resources.

##### **3.1.2 Management Guidelines:**

- All alien vegetation along river banks and in riparian habitats must be removed as these plants impact on the stability of river banks and seriously reduce water flow in the river system.
- Riparian zones must be kept intact or rehabilitated if necessary. The ecological fitness of the river system depends on the ecological status of the adjacent natural vegetation of the riparian zone.
- The riparian vegetation stabilizes the river and stream embankments, act as a filtration system, regulate water temperature, contribute organic matter that supports aquatic life and acts as a buffer zone to adjacent land uses.
- The ideal riparian buffer zone should be 30 to 40 meters wide.

#### **3.2 Alien Plant Management**

##### **3.2.1 Legislation:**

- The Conservation of Agricultural Resources Act (Act No. 43 of 1983) CARA lists all declared weeds and invader plants. Alien plants are divided into three categories based on their potential risk factors as alien invaders.
- All landowners are under legal obligation to eradicate mature alien plants and control re-growth of alien plants on their properties.
- Invasive alien species have a significant negative impact on the receiving environment causing direct habitat destruction, increasing risk of “wildfires”

and substantially reducing the surface and sub-surface water availability in any ecosystem but especially so in wetlands and riverine habitats.

### **3.2.2 Clearing Principles and Methods:**

- Alien plant eradication is a long term management project and a proper rehabilitation plan is essential.
- Alien plant infestation should be mapped and the responsible species identified.
- Lighter infested areas should be cleared first to prevent young immature plants to come in to seed and as a result add to the built up of the alien seed bank.
- Start clearing upstream and move downstream in order to eliminate possible re-establishment of seedlings.
- Special care must be taken when removing mature stands of alien plants from river banks and wetlands as the soil stability can easily be affected. Hand and manual clearance is the only option, heavy machinery should never be used.
- Biological control of invader plants is cost effective but is more of a supportive follow-up option than a tool for principle eradication of alien plants.
- Fire as a control method is useful but must be followed up with hand clearing as the seeds of most alien plant species are stimulated to germinate by the smoke treatment associated with fire.

## **3.3 Corridors and Habitat Fragmentation**

### **3.3.1 Conservation Principles:**

- When continuous areas of habitat are broken up into fragments with little or no continuity (as a result of human impact such as farming and urbanization) ecological systems that ensure the functioning of these systems are disrupted and the flow of ecological information comes under severe stress.
- As a result habitats are altered with regard to size and the number of possible niches resulting in species loss from the affected ecosystem that could ultimately lead to species extinction.
- Therefore corridors of natural habitat of significant size is needed to link the habitat fragments (that inevitably arise from human activities and needs) in order to facilitate species movement and the continuation of ecological processes such as dispersal, pollination and other interrelated activities necessary to ensure both species and habitat fitness.

### **3.3.2 Management Guidelines:**

- There is no prescribed width or length for the ideal corridor, this will largely be determined by the species diversity and the habitat size needed to support the species diversity, along with the minimum needs for ecological drivers (such as pollinators) to keep the habitats connected and operational.
- Ecological corridors need to be identified at the design phase of proposed developments and ground-truthed by adequately qualified specialists in order to ensure the viable connectivity between habitat fragments.
- Corridors can be incorporated along wide road verges, river and stream embankments, ridges, natural drainage systems and interlinked wetland systems.
- Corridors linking individual ecosystems through well established ecotones are the ultimate answer – the scale involved are often outside that in which the urban developer operates and should be addressed on a regional level.

## **3.4 Restoration and Rehabilitation**

### **3.4.1 Principles:**

- Rehabilitation efforts are valuable in restoring the habitats that previously have been disturbed or has been disturbed as a result of development construction activities.
- The restoration and rehabilitation process and procedures go way beyond the mere beautification of the development project and are best left in the hands of Rehabilitation Specialists.
- The soil erosion prevention and sedimentation often form the starting point of restoration programs. The correct methodology must be adopted to suit the *in situ* conditions and take into consideration the prevailing local climatic situation.

### **3.4.2 Rehabilitation Plan:**

- A detailed Restoration and Rehabilitation Plan must form part of the Environmental Management Plan for the proposed development.
- The Rehabilitation Plan must be compiled by a specialist in the field of rehabilitation.
- A suitably qualified specialist must be employed to oversee the implementation of the Rehabilitation Plan.
- Adequate financial resources must be allocated for the rehabilitation phase at the off set of the development and indicated in the relevant documentation.
- Monitoring of the rehabilitation process should be carried out on a regular basis and environmental auditing should be done on at least an annual basis.



## **4. Opportunities and Constraints**

### **4.1 The following Opportunities have been identified:**

#### **4.1.1 Restoration of the impacted riverine system:**

- It will be financially and ecologically possible to restore a large part of the riverine system at the lowest part of the property and abutting onto the property.
- Re-introduction of some of the original vegetation is possible.

#### **4.1.2 Restoration of a portion of the remnant Fynbos:**

- Conservation and restoration of the remnant Fynbos on the site will be made possible by the implementation of the identified ecological corridor.

### **4.2 The following Constraints apply:**

#### **4.2.1 Soil Conditions:**

- It may well prove problematic to re-introduce some species if the structure of the soil as well as the micro invertebrate population of the soil had been compromised by the age of the Blue Gum plantation.
- The re-colonisation of the newly created habitat may not happen if the adjacent remnant habitats do not contain the required species, or if the required corridors are not functional.

#### **4.2.2 Reduction of Ecosystem components:**

- The speed of recovery of the restored system will depend on the availability of the component species from adjacent systems. It must be pointed out that the surrounding area is already impacted to a large degree.

## **5. Recommendations:**

### **5.1 Creation of appropriate buffers and corridors**

- Where possible, buffer zones will be introduced to protect the valuable remainder of the natural vegetation.
- This corridor will link the ridge line to the artificial small dams on the property and further link-up with the riverine system.
- It is proposed that all the individual erven remain unfenced and that bridges are constructed over the corridor area in order to obtain maximum ecological integrity.

## **5.2 Reduction of fragmentation at local and regional scale**

- It is not within the power of the developer to prevent landscape or regional scale fragmentation, but the conservation and restoration as envisaged will aid greatly in the further protection of the sensitive vegetation in the area.

## **5.3 Fire dependency, maintenance of natural fire regime**

- The Grassy Fynbos remnants on the property will require fire management.
- Due to the proximity to proposed buildings, these patches will have to be managed in a different way from natural Fynbos areas.
- It is envisaged that reasonable functionality can be maintained through adapted burning methods such as mosaic burns.
- The positive issue is therefore that despite the difference between a natural fire regime and the managed situation, the vegetation diversity along the ecological corridor could be maintained to a large degree, the possibility of improvement with the applicable management procedures exist.

## **5.4 Water Management**

- Water saving measures and devices will be required for any buildings on site.
- It is furthermore proposed that large capacity rain storage tanks should be installed at buildings where it is at all possible.

## **6. Conclusions:**

- The developers are pro-active in as they have called for comprehensive studies with regard to Vegetation and Biodiversity of the site.
- This approach lends credibility to the commitment of the developers in addressing the Restoration and Rehabilitation Phase of the proposed Development.
- Every effort should be made to restore and conserve the habitat along the ecological corridor this will greatly enhance both the receiving environment and the proposed development.

## 7. Literature

### Relevant Acts and Policies

Brownlie,S. 2005. *Guideline for involving biodiversity specialists in EIA processes*: Edition 1. CSIR Report No ENV-S-C 2005 053 C. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

Department of Environmental Affairs and Development Planning. 2006. *Provincial Guideline on Biodiversity Offsets*. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

Fynbos Forum, 2006. *Ecosystems Guidelines For Environmental Assessment In The Western Cape*. South African National Biodiversity Institute.

Lombard A.T., et. al. 2004. *A Rapid Biodiversity Conservation Assessment and Framework for a Conservation Plan for the Plettenberg Bay Municipality, Cape Floristic Region, South Africa*. Biodiversity Conservation Unit. WESSA.

The Biodiversity and Wine Initiative Manual, [www.bwi.co.za](http://www.bwi.co.za)

## BIODIVERSITY ASSESSMENT

### BACKGROUND INFORMATION ON BIODIVERSITY DATA SETS USED

#### I Introduction:

A number of different Biodiversity Conservation Plans are available for the Western Cape Region. Notably CAPE (Cape Action Plan for the Environment), STEP (Sub-Tropical Thicket Ecosystem Plan) and more aimed at the region in question “A Rapid Conservation Assessment and Framework for a Conservation Plan for the Plettenberg Bay Municipality” (Bitou Municipality) and “A Rapid Conservation Assessment and Corridor Design for the Knysna Municipality”. The latter two publications integrate the outcomes of the former two publications.

#### II Mapping Scale:

The CAPE Conservation Plan is mapped at a 1:250000 scale and allows for an on site deviation of 250 meters, the STEP Conservation Plan is mapped at a 1: 250000 and the vegetation maps at a 1:100000 scale and allows for an on site deviation of 250 - 100 meters. The finer mapped Conservation Plans for the Knysna and Bitou Municipalities allow for a deviation of 25 meters on site as they are mapped at a 1:25000 scale.

Ideally Conservation plans for specific regions should be mapped at 1:10000 allowing for a deviation of 10 meters on site. As most developments take place on areas smaller than 20ha (200000m<sup>2</sup>) *the on site application of these conservation plans are problematic as the deviations that has to be allowed for are at times larger than the proposed development property (1ha = 10000 m<sup>2</sup> thus an area of 100m x 100m).*

Therefore to allow for even a 25 m deviation means that any survey point could be placed outside of a possible vegetation boundary 25% of the time, this is an unacceptable high probability and could lead to grossly inaccurate reporting.

As a result these conservation plans can at most only be used as indicative tools of the possible conservation status and associated vegetation type of any given property. The use of a common mapping tool such as “Google Earth” and aerial photographs often give a far better insight into the specific situation on a property in question if used as a starting point for ground-truthing surveys.

An alternative vegetation mapping tool in the form of multispectral satellite imagery can be used to enhance the interpretation of vegetation occurring on a finer scale. Modern satellites such as QuickBird provide multispectral data with a pixel size down to 2.4m<sup>2</sup>. This allows one to classify vegetation down to individual tree level and distinguish between alien and indigenous tree canopy. A pilot study was carried out on a farm in the Sedgefield area consisting of Coastal Dune Thicket, Grassy Fynbos, Wet Fynbos and a mosaic of the above as well as extensive areas of alien invasives. Initial spectral processing of the purchased image clearly indicated the presence of several distinctive

vegetation types which were then characterized by ground truthing. The end product is a cost effective detailed vegetation map.

A pro-active approach to development planning should be based on site visits and on *in situ* scientific surveys in order to facilitate pre-application biodiversity screening. “Without ground-truthing and accurate reporting, biodiversity screening that relies solely on reference to biodiversity maps and plans must be viewed as incomplete and therefore inadequate for the purposes of informed decision-making.” (*Ecosystem Guidelines for Environmental Assessment in the Western Cape*)

The methodology cited in the Knysna and Bitou Municipality Conservation Plans (Lombard, *et al.* 2004) make no reference to any ground-truthing. The STEP data set was used to generate a new land-use information layer at a finer scale of 1:25000 using ArcGIS 8.0. This implies that the accuracy of any given point on the map (information layer) is a function of the previous dataset and the utilized software.

However the afore mentioned conservation plans are valuable in determining the overall conservation status of larger regions and as such should be used to determine possible ecological corridors and placing the smaller scale proposed development area into the larger scale conservation picture.

### **III The Local and Regional Environment:**

One of the biggest challenges faced by an Environmental Assessment Practitioner is the fragmentation of the receiving environment at the level that most developments take place. It is therefore imperative that possible ecological corridors and habitat contingencies on the immediate adjacent properties and the larger regional area be taken into consideration when evaluating and assessing the layout, size and general character of the proposed development on site.

It is the task of the EIA Specialist to identify potentially significant environmental impacts, thereby avoiding negative impacts on the receiving environment and assuring the effective management of potential impacts. The identification of opportunities to enhance the immediate environment through restoration and rehabilitation must also be addressed.

The prediction of potentially significant impacts on the receiving environment through practical *in situ* assessment and evaluation form a base line data set that should be taken into consideration during the planning process of the proposed development.

### **IV Biodiversity Assessment Procedures:**

The goal of any Biodiversity Assessment is to inform the EIA Process in order to achieve viable and scientifically based decisions with regard to the proposed development and the associated impacts, mitigations, recommendations and conditions pertaining to the development in question.

The limitations of the applicable data sets and the resulting confidence level of the specialist input with regard to the possible risks, uncertainties and information gaps must be taken into consideration when recommendations is made in the Assessment Report (*Guideline for involving Biodiversity Specialists in the EIA Process*) addressing the planning, construction and operational phases of the proposed development.

#### V Applicable Legislation, Policies and Guidelines pertaining to Biodiversity:

LEGISLATION	ADMINISTERING AUTHORITY
GOVERNMENT REGULATION NO'S R385 AND R386 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)	DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING WESTERN CAPE
CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)	DEPARTMENT OF AGRICULTURE WESTERN CAPE
NATIONAL WATER ACT (ACT 36 OF 1998)	DEPARTMENT OF WATER AFFAIRS AND FORESTRY RSA
NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004)	DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING WESTERN CAPE
WESTERN CAPE NATURE CONSERVATION LAWS AMENDMENT ACT (ACT 3 OF 2000)	DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING WESTERN CAPE

  

POLICY / GUIDELINES	ADMINISTERING AUTHORITY
MANUAL ON THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS (WORKSHOP MANUAL) NOVEMBER 2006	WESTERN CAPE DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING
ECOSYSTEM GUIDELINES FOR ENVIRONMENTAL ASSESSMENT IN THE WESTERN CAPE	FYNBOS FORUM, BOTANICAL SOCIETY OF SOUTH AFRICA
GUIDELINE FOR INVOLVING BIODIVERSITY SPECIALISTS IN EIA PROCESSES JUNE 2005	WESTERN CAPE DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING
DRAFT PROVINCIAL GUIDELINE ON BIODIVERSITY OFFSETS MAY 2006	WESTERN CAPE DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING
A RAPID CONSERVATION ASSESSMENT AND FRAMEWORK FOR A CONSERVATION PLAN FOR THE PLETTENBERG BAY MUNICIPALITY / KNYSNA MUNICIPALITY	WESSA BIODIVERSITY CONSERVATION UNIT JANUARY 2004
THE BIODIVERSITY AND WINE INITIATIVE (BWI) MANUAL ON BIODIVERSITY	CAPE NATURE AND WINE INDUSTRY