Appendix 8. Cultural Resources Survey of the proposed Golf Estate

GOLF ESTATE DEVELOPMENT ON ELANDSFONTEIN 440 KR

CULTURAL RESOURCES SURVEY

AFRICAN HERITAGE CONSULTANTS CC

2001/077745/23

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Appendix 6. Stimulation of the Local and Regional Economy

Estimated socio-economic impact on region during pre-construction & construction phase												
	people on site[1]				time on site[2]		local spending[3]		local labour[4]			contract values[5]
Sector	managers	labour	local labour	residents / visitors	days/ year	man-days	R/day/ person	total/year	R/day// labourer	total/ year		average/ year
Professionals & Consultants	15	5	5		100	2000	R 50	R 100,000	80	R 40,000		R 1,500,000
Contractors & Sub-contractors	10	60	50		300	21000	R 20	R 420,000	80	R 1,200,000		R 15,000,000
Service providers (I.e local authorities, Telkom, Eskom etc)	5	15	10		100	2000	R 30	R 60,000	80	R 80,000		R 3,000,000
Residents / Visitors	5	10	10	40	100	5500	R 50	R 200,000	80	R 80,000		
Total	35	90	75	40		**30500**		**R 780,000**		**R 1,400,000**		**R 19,500,000**
										Phase duration	years	**5**
										Total amount of man-days spend on-site	man-days	**152500**
										Total amount of local spending	R	**3,900,000**
										Total amount spend on local labour	R	**7,000,000**
										Total value of contracts	R	**97,500,000**
										Total monetary value injected into regional economy	R	**108,400,000**

1 The average amount of people on site during the estimated number of days per year spent on site
2 Man-days = Number of people x average number of days in the year spend on site
3 Expected expenditure by the sectors in the region
4 Predicted wages paid to local labour
5 Estimated total value of pre-construction and construction contracts

Sub-surface irrigation areas have been sited with great care and contingency measures undertaken to reduce any danger of spillage, by Biolytix in conjunction with PAWC engineers, DWAF and WCNCB personnel.

PERFORMANCE: Each system will provide a high quality filtrate with an average Chemical Oxygen Demand (COD) of less than 40 mg/l and Total Suspended Solids (TSS) of less than 30 mg/l.

OTHER COMPLETED PROJECTS

Longridge Winery
Lamberts Bay Bird Island
Institute for Culinary Arts
De Rus homestead
Spier Packshed
Spier Organic Farm
Spier North Bank
Various houses within the Winelands district
Drie Gewels phase 1
Spier Tennis Club
Kouga Cultural Centre
Eagle Crag Lodge – Shamwari
Yellowwoods lodge

PROJECTS UNDER CONSTRUCTION

Bayeti Lodge
Shamwari – various facilities

ADDITIONAL PROJECTS IN DESIGN STAGE

Institute for Culinary Arts upgrade
Wedderwill Estate
De Zalze phase 2,3 &4
Pezula Estate
Kommetjie Ecocentre
Jonkershoek
Sossusvlei Lodge
Gonube Green phase 2
Kwandwe Lodge
Katumba
Lynedoch Hamlet
Hollandsebos Lodge

PURPOSE: The facility was originally served by a septic tank and soakaway that blocked and emitted objectionable odours. A Biolytix system was installed at the facility to replace the failing system. Biolytix SA was awarded the contract after a public tender by the Provincial Administration of the Western Cape.

CAPACITY: The system has a treatment capacity of 2000 litres per day

SYSTEM DESCRIPTION:

- All of the wastewater and sewage gravitates down to a single Biolytix filter situated right next to an entertainment deck (The previous septic tank gave off bad odours that resulted in complaints from guests. This system has now functioned for over two years without a single complaint.)
- Filtrate is flushed to a subsurface irrigation system by a Biolytix flush valve.
- The irrigation lines are located in undisturbed veld. After a year of continuous operation vegetation around the irrigation line have shown increased growth without evidence of any die-off of sensitive plant species.

PERFORMANCE: The system will provide a high quality filtrate that compiles to the DWAF irrigation standard and is suitable for sub-surface irrigation. The client is satisfied that the effect on the environment is localized and acceptable.

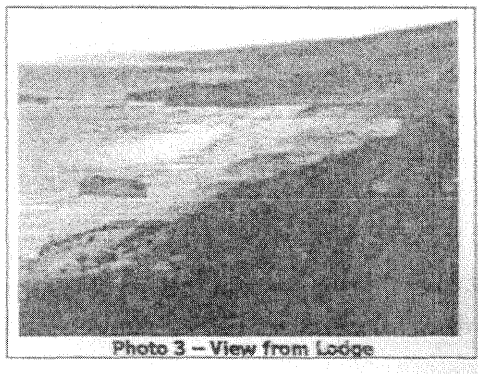


Photo 3 – View from Lodge

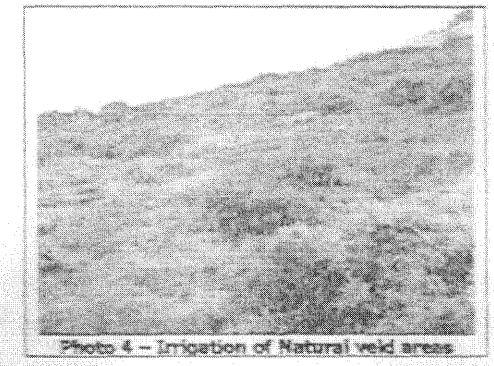


Photo 4 – Irrigation of Natural veld areas

PROJECT NAME: *CEDARBERG ALGERIA CAMP SITE*

LOCATION: The Algeria Campsite is a long established camp site located on a river in the Cedarberg range, some 30 kilometres from Clanwilliam.

PURPOSE: Sewage from the campsite was treated by septic tanks and soakaways, that resulted in observed environmental pollution. This resulted in threats of closure of the campsite by the Department of Water Affairs. The contract to replace the existing waste treatment system was awarded to Biolytic SA after a public tender by the Provincial Administration of the Western Cape.

CAPACITY: The system has a capacity of 26 kilolitres per day

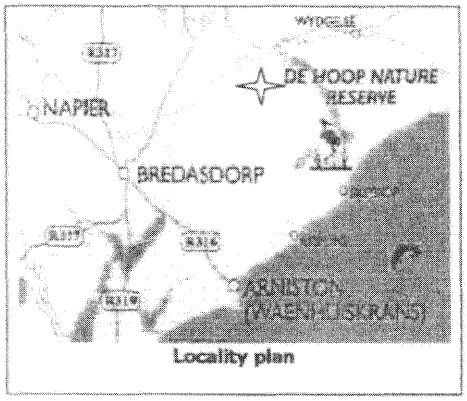
SYSTEM DESCRIPTION:

The campsite has a large and a small ablution block, serving 48 campsites.

PROJECT NAME: *DE HOOP NATURE RESERVE – MAIN COMPLEX*

Note that Biolytix systems are also installed at the De Hoop Whale trail.

LOCATION: The De Hoop Nature Reserve is located on the south coast of the Western Cape Province.



Locality plan

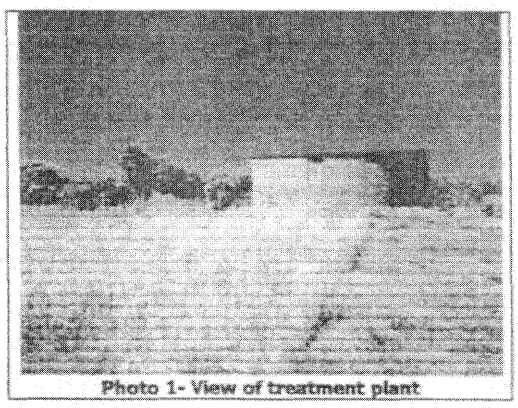


Photo 1- View of treatment plant

PURPOSE: The Biolytix system at the main complex replaces settlement ponds and septic tanks. The former were not sealed and effluent percolated through the limestone and polluted groundwater. The Biolytix system treats effluent from the main complex houses, chalets, administration block and workers houses. Biolytix SA was awarded a joint tendered contract with a civil contractor.

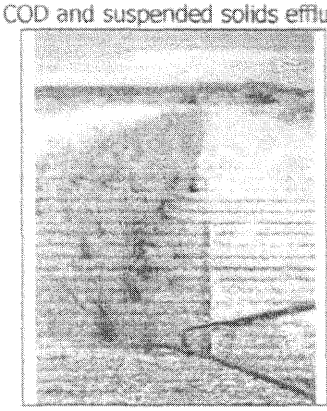
CAPACITY: 37 kilolitres per day

SYSTEM DESCRIPTION:

- Two pumps stations pump macerated sewage to the Biolytix filter
- The filter is an above ground structure that resembles a reservoir
- Distribution to the filter is by means of a rotating arm
- Filtrate collects at the base of the filter chamber and is distributed to a constructed wetland system which removes nutrients
- Polished treated filtrate is released into a low-lying section of veld

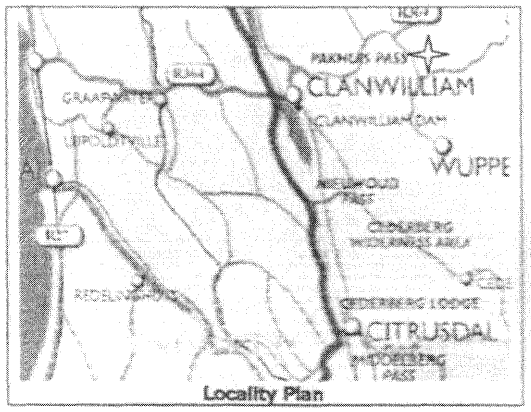
PERFORMANCE: The final polished filtrate has a low COD and suspended solids effluent.


Photo 2 & 3– Wetland system



Note that two separate systems have been installed in this nature reserve

LOCATION: The Bushmanskloof nature reserve is located in the Cedarberg, east of Citrusdal.



Locality Plan

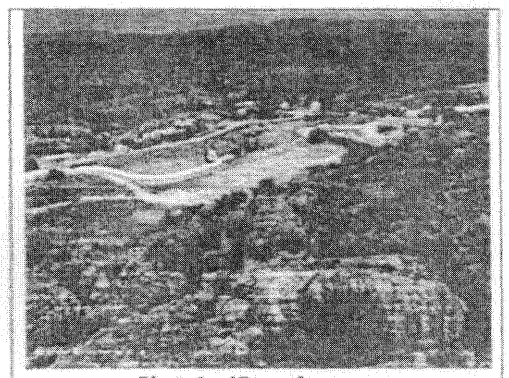


Photo1 – View of reserve

PURPOSE: The system treats all effluent from the Reserve Lodge.

CAPACITY: 22 kilolitres per day

SYSTEM DESCRIPTION:

- A large septic tank has been converted into a pump station into which all sewage gravitates.
- Macerated sewage is then pumped to an above-ground Biolytix filter. This is housed in a chamber that is designed to resemble a farm reservoir.
- Treated effluent is stored in another retrofitted septic tank, from which it is pumped to underground irrigation lines serving lawns at the entrance to the lodge.

PERFORMANCE: This is a low maintenance and cost-effective system providing treated effluent well within the DWAF irrigation standard, suitable for sub-surface irrigation


Photo 2 – View of pump station

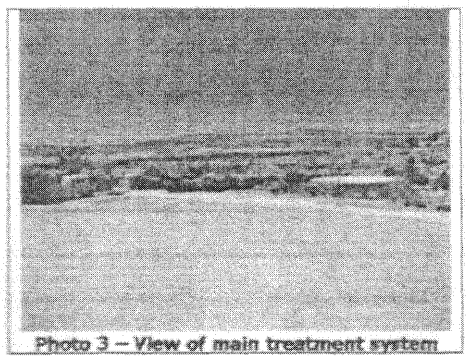


Photo 3 – View of main treatment system

- Final collection is usually in a pump station from which macerated sewage is transferred to the Biolytix treatment plant by a small bore pipe.
- The treatment plant is fully scaleable and has a small footprint.
- Treatment chambers can be buried for minimal visual intrusion.
- Full treatment takes place in the plant, namely primary, secondary and tertiary treatment.
- The treated effluent is recycled for beneficia l re-use within the development.

The Biowater System

This system is engineered for small to medium sized communities (in the region of 25 to 2 500 homes). This is a more cost-effective and environmentally sound alternative to bulk sewage infrastructure for small communities where a managed and controlled wastewater treatment system is required.

The main features of a Biowater system are:

- Biolytix pre-treated chambers are installed at each household. This is either a new installation or a refitted septic.
- A low pressure collection system using a small diameter pipe may be used to collect the treated effluent. The collection system is designed for average flows as the on-site Biolytix filter provides buffer storage.
- Further treatment at a central plant is subject to site specific and Local Authority requirements using a combination of Biolytix and third party technologies.
- Beneficial re-use of treated effluent where possible and desirable, simultaneously providing for nutrient re-use.

larger decomposer organisms, their predators and prey. Together, these organisms form a biologically complex and robust ecosystem.

Decomposing solid organic matter, together with fully broken down matter, combine to create a physical and biological filter medium. Solids are continuously digested and re-digest ed, and eroded by the action of flowing wastewater. The result is a continuous reduction in particle size until a stable humus matrix is formed.
The effectiveness of the aerobic system is due to the vast internal surface area of the humus matrix.

The Frenchman Duclaux observed that,
"Wherever there is decomposition of organic matter, whether it be the case of a weed or an oak, of a worm or a whale, the work is exclusively performed by infinitely small organisms. They are the important, almost the only, agent of universal hygiene; they clear away, more quickly than the dogs of Constantinople, or the wild beasts of the desert, the remains of all that has had life."

"BIO-MIMICRY" - IMITATING A RAIN FOREST

The inspiration of the Biolytix Filter came from the floor of the Rain Forest, where a multiplicity of organisms work to consume the enormous loading of putrefying organic matter on the forest floor.

The Biolytix Filter essentially re-creates this forest floor. Organic solid waste and wastewater are digested and treated by being gradually filtered through a matrix of highly biologically active aerated spaces. The filter is akin to a large organic sponge that absorbs and retains the water in its many pores, allowing it to gradually seep through. The water travels in a thin film over the immense humus surface area, encountering a multitude of organisms that play different roles in cleansing the water. These creatures are responsible for the speed of the system and the

Appendix 4. Biolytix Waste Water Treatment systems plus list of Projects

PASSIONATE ABOUT THE ENVIRONMENT

The Biolytix technology was developed in Australia during an applied research programme extending from 1990 to 1994. This led to the generation of the highest quality ecological wastewater recycling systems available today, with international patent protection.

During 1999, the Spier Wine Estate near Stellenbosch built and commissioned two pilot Biolytix systems. The success of these pilots was confirmed by independent tests carried out by the CSIR. The Spier Holdings subsidiary, Biolytix Southern Africa, has subsequently obtained a licence to utilise the technology throughout Southern Africa.

At Biolytix Southern Africa, we are passionate about the environmental and economic benefits of our technology and the importance of an ecological approach to wastewater treatment and re-use.

Our mission is to become the leading provider of on-site wastewater treatment systems, using ecological technologies.

IN PARTNERSHIP WITH OUR CLIENTS

At Biolytix we strive to provide a total wastewater treatment service, customised to our clients' needs. This one-stop service includes:

- Collaborating with the client on a feasibility, needs and environmental assessment to determine the most ecologically sustainable and sensitive approach for water conservation, the treatment of wastewater and the use

Spotted Dikkop

Spotted Eagle Owl

Steppe Buzzard

Swainson's Francolin

Wahlberg's Eagle

Whitebellied Sunbird

Yellowbilled Hornbill

Arrowmarked Babler

Barn Owl

Blackcollard Barbet

Blackeyed Bulbul

Blackheaded Oriole

Blackshouldered Kite

Blacksmith Plover

Blue Waxbill

Brownhooded Kingfisher

Burchell's Coucal

Cape Glossy Starling

Cape Turtle Dove

Chinspot Batis

Common Waxbill

Crested Barbet

Crested Francolin

Crowned Plover

Diederik Cuckoo

Emeraldspotted Dove

European Bee-eater

Familiar Chat

Fantailed Cisticola

Forktailed Drongo

Gabar Goshawk

Goldenbreasted Bunting

Grass Owl

S. pyramidalis	Catstail Dropseed
Themeda triandra	Rooigras
Trachypogon spicatus	Giant Spear Grass
Tragus berteronianus	Common Carrot-seed Grass
Trichoneura grandiglumis	Small Rolling Grass
Tristachya leucothrix	Hairy Trident Grass
Urelyterum agropyroides	Quinine Grass
Urochloa mosambicensis	Bushveld Signal Grass

Thunbergia atriplicifolia

Triumfetta sonderi

Vernonia oligocephala

Zinnia peruviana

GRASSES

Aristida adscensionis	Annual Three-awn
A. barbicollis	Spreading Three-awn
A. congesta	Tassel Three-awn
A. junciformis	Ngongoni Three-awn
A. meridionalis	Giant Three-awn
A. scabrivalvis	Purple Three-awn
A. stipitata	Long-awned Three-awn
Andropogon chinensis	Hairy Blue Grass
A. eucomus	Snowflake Grass
A. schirensis	Stab Grass
Bothriochloa insculpta	Pinhole Grass
Brachiaria serrata	Velvet Signal Grass
Chloris virgata	Feathered Chloris
Cymbopogon excavatus	Broad-leaved Turpentine Grass
C. plurinodis	Narrow-leaved Turpentine Grass
Cynodon dactylon	Couch Grass
Digitaria eriantha	Finger Grass

Schotia brachypetala	Weeping Boer-bean
Strychnos cocculoides	Corky Monkey-orange
S.madagascariensis	Black Monkey-orange
S. pungens	Spine-leaved Monkey-orange
Tarconanthus camphoratus	Camphor-bush
Terminalia sericea	Silver Cluster-leaf
Tricalysia lanceolata	Jackal-coffee
Vangueria infausta	Velvet Wild-medlar
V. parvifolia	Mountain Wild-medlar
Vitex rehmannii	Pipe-stem Fingerleaf
Ximenia Americana	Blue Sourplum
X. caffra	Sourplum
Ziziphus mucronata	Buffalo-thorn
Z. zeyheriana	Dwarf Buffalo-thorn

FORBS

Scientific Name	**Common Name**
Acrotome hispida	
Aponogeton junceus	
Babiana hypogea	
Barleria pretoriensis	
Becium obovatum	
Bidens pilosa	Blackjack
Boophane disticha	Poison bulb
Callilepis leptophylla	

C. zeyheri	Large-fruit Bushwillow
Commiphora mollis	Velvet-leaved Corkwood
C. pyracanthoides	Firethorn Corkwood
C. schimperi	Glossy-leaved Corkwood
Croton gratissimus	Lavender Croton
Cussonia paniculata	Mountain Cabbage-tree
Dichrostachys cinerea	Sickle-bush
Diospyros lycioides	Bluebush Star-apple
Diplorrhychus condylocarpon	Horn-pod Tree
Dombeya rotindifolia	Wild-pear
Ehretia rigida	Puzzle-bush
Elaeodendron transvaalense	Bushveld Saffron
Elephantorrhiza burkei	Elephant-root
Englerophytum magalismontanum	Stamvrug
Erythrina lysistemon	Sacred Coral-tree
Euclea crispa	Blue Guarri
Euclea natalensis	Hairy Guarri
Euphorbia ingens	Naboom
Faurea saligna	African Beechwood
Ficus burkei	Common Wild Fig
Flueggea virosa	*Whiteberry-bush*
Gardenia volkensii	Bushveld Gardenia
Grewia bicolor	White-leaved Raisin
G. flavescens	Sandpaper Raisin
G. monticola	Grey Raisin
Gymnosporia buxifolia	Common Spike-thorn

from Serapa Lodge and it was established that Mr. Irons is not a direct neighbour of Mr. Clifford (Appendix 10).

All the concerns that Mr. Irons had was already addressed in the Scoping Report, except the entrance gate because it is unclear what the concern is about the entrance gate.

included into the development plan of the proposed Golf Estate (Appendix 8).

Mitigation

Cultural resources in the form of archaeological and historic sites are none renewable resources. Proper conservation measures will have to be implemented and abided by. The owners of Mahlapholane Game Lodge should adhere to the recommendations laid down in the report of the cultural resources survey (Appendix 8).

Significance

The benefit will be highly significant because the resources can be utilized for educational and tourism purposes if accessibility is controlled and the risk of destruction is properly managed.

5.7 Provision of Employment Opportunities

The Project will provide work for about 175 permanent staff. Unskilled people are most likely to benefit from opportunities during the construction phase, although the contractors may have to bring in some of their own skilled labour (Appendixes 6 & 7).

Significance

All sectors of the community, particularly those in the Bela Bela area should benefit – some directly others indirectly.

6. IDENTIFIED ALTERNATIVES

All alternatives were looked at but none was found to build the Golf Estate. This area is geographically the only suitable area that naturally provides all the criteria to build the Golf Estate. The slopes the areas for the residential houses and the valley form a natural area to build the golf course. The golf course would not be

Mitigation

The owners of Mahlapholane Game Lodge should develop a plan that details the type and position of all the houses to be build on the golf estate.

5.3 Noise Levels

Construction phase noise impacts are likely to be significant for short periods especially during the construction of the golf course and building of the residential houses.

Mitigation

Based upon the SABS 01031983 code for suburban residential districts with little road traffic, 40 dBa at night is an acceptable background noise level. Once the construction of the golf course and building of the residential houses is commenced, an assessment of expected construction noise should be undertaken.

Significance

Noise impact is of low significance.

5.4 Increased Competition for Resources

Any large development tends to attract a secondary population (i.e. those not directly employed by the project) into the region where the project will be taken place. The influx of people can put considerable strain on local resources. If provision is not made for them, informal settlements increase, local communities can feel threatened by competition for jobs by outsiders, existing accommodation can become increasingly overcrowded and there is increased competition for resources such as building materials, water supply, etc. All these factors can lead to increased social tension.

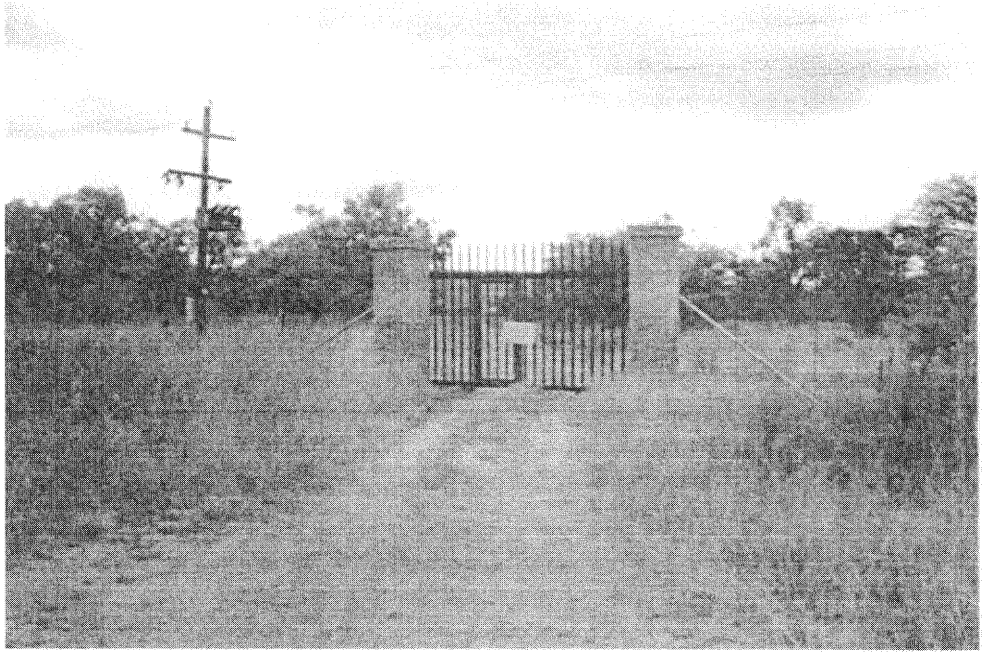


Figure 8. Proposed entrance gate to Golf Estate

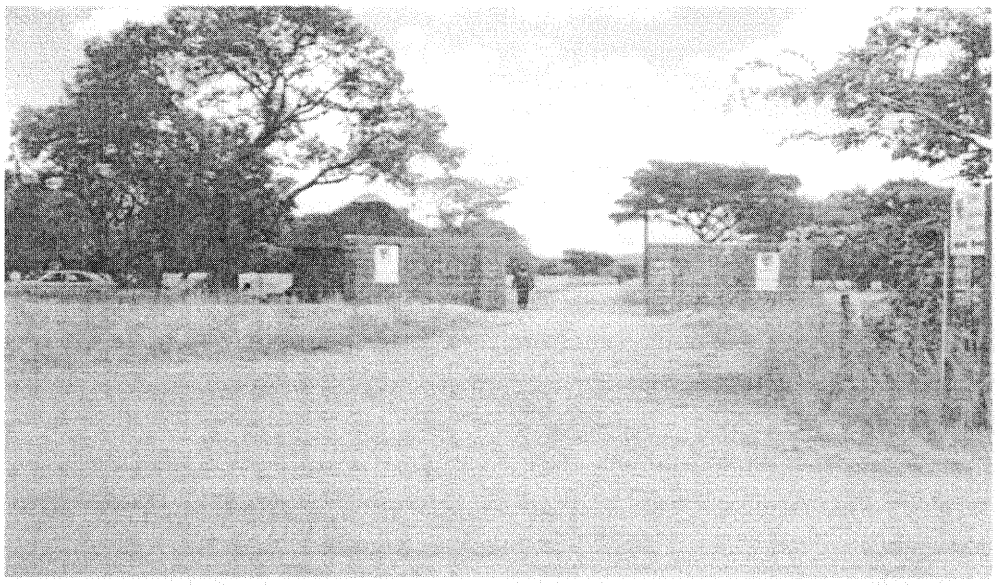


Figure 9. Mabilingwe Gate opposite entrance to proposed Golf Estate

According to the proposed layout of the residential houses, the visual impact will be low because of its low position in the landscape. The views

Mitigation

The number of species must be kept to a minimum to prevent over utilization of the vegetation and a field assessment should be done to determine the numbers of species to be kept on this area.

5. SOCIO-ECONOMIC IMPACTS

5.1 Introduction

The potential impacts discussed in this section include:

- Visual impacts;
- Noise levels
- Increased competition for resources from induced migration of work-seekers into the area;
- Stimulation of the local and regional economy;
- Provision of employment opportunities;

5.2 Visual Impact

The residential houses would significantly alter the visual character of the landscape and the significance of the visual effect of the golf course will be low. The significance of the visual effect of the residential houses will be affected by the following:

- The topographical characteristics of the site (Figures 6 to 10);
- Surrounding land uses;
- The affected parties (i.e. communities/individuals who will be able to see residential houses from different vantage points (Figures 6 to 10);
- The opportunity for mitigation of visual impact.

Significance

The potential impact arising from the dust would be of medium significance, but will be low if the sealing of the gravel road could be done.

4.7 Impacts on the Fauna and Flora

4.5.1 Vegetation Loss On-site

According to the vegetation survey done on the proposed golf course site and residential houses no red data, endangered or vulnerable plant species were collected (Appendix 1).

The loss of vegetation will be kept to the minimum. Almost all the trees and shrubs will form part of the proposed golf course and the stands of the residential houses will placed in such a way that trees would not be unnecessary taken out. The tall grass species and forbs on the fairways will be replaced with lawn, but the rough would consist of natural grass, but will be mowed. The rest of the site will be left in its natural state.

The vegetation in the dam will consist of vegetation occurring natural in this area. The vegetation impact of constructing a golf course on this site will be of low significance

Mitigation

The owners of the proposed development must draw up a contract for the developer to stipulate that if trees should be taken out it must be discussed with the owners and if possible look for alternatives. It must also be stipulated in the selling of the residential stands that no exotic or alien plants to this region should be planted on the estate and that include the water features on the golf course as well.

- The owners are going to implement a sewage system that will breakdown the raw sewage and recycle the water to be used for the maintenance of the golf course (Appendix 4).

Significance

Potential impacts arising from domestic waste will be of low significance. The storm water run-off will not be significantly impacted, as water quality will be controlled on site. The significance rating for this impact is therefore low.

4.5 Impacts on the Ground Water Resources

To establish an 18 hole golf course it needs ± 1 500 000 liters of water per day. The amount of water tested for the four boreholes were 35 000 gallons (157 500 liters) per hour and the test was done with half capacity because the person who tested the boreholes did not had larger pipes and he said that it should be more in the line of 70 000 gallons (315 000 liters) per hour. The water utilized for the Golf Estate is four existing boreholes and the existing dam on the property.

The quality of the four bore holes were tested by the Water Navorsings Laboratorium Dienste SA in Heidelberg, Gauteng. The remarks on the quality of the water were: "besondere goeie water" (Appendix 5).

Mitigation

The owners of the Golf Estate are going to build a sewage system where the raw sewage will be processed that the end result would be where they can re-use the recycled water for the maintenance of the golf course. This will cut down on the use-age of borehole water with ± 80 % (Appendix 4).

4.3 Solid Waste Treatment and Disposal

During the building phase and operational phase of the golf course and residential houses solid waste will be produced which could potentially have an environmental impact if not managed safely. The main source of solid waste includes excess building material such as concrete and domestic waste from the contractors and later from the residential houses and clubhouse.

Mitigation

A written agreement was reached with the municipality of Bela Bela that all solid waste would be taken away and disposed at the registered landfill site in Bela Bela on a regular basis (Appendix 3).

Significance

On the basis of the effective disposal of waste, the potential impact from pollution is considered to be low.

4.4 Liquid Effluent Disposal and Treatment

Liquid effluent will be generated from domestic wastes and storm water run-off into the surrounding drainage system and groundwater system.

- Domestic liquid wastes are generated within the office, clubhouse and residential houses. The volumes of domestic waste will be small and the domestic wastewater will be disposed via the Biowater System (Appendix 4). The Biolytex filter is a naturally aerated, non-mechanical system that uses no chemicals. Since anaerobic bacteria cannot survive in this oxygenated environment, the system does not produce an objectionable odour. This system

Medium significance: The impact will have a greater effect and mitigatory actions become more important. The effects will be felt at a local and sub-regional scale in both the short- and long-term future. Secondary or cumulative impacts may arise from the primary impact.

High significance: The impact is very important. Effects may be felt throughout the sub-region and nation. Resources for impact mitigation will be substantial and may be required throughout the life of the project. Cumulative and secondary effects would be significant.

The impacts of this project have been identified and described through determining the effects of the various outputs (solid - and liquid waste, chemical (fertilizers) contamination of ground water, extraction of ground water for the building and maintenance of the golf course, water usage from the residential houses, air pollution and visual impact of the residential houses and clubhouse on the surrounding area) from building the golf course and residential houses on the biophysical environment.

3.8 The Proposed Site

The site can be seen in the aerial photograph in Figure 3. This is the only site where the Golf Course and residential houses could be built on that specific farm. The site is in a shallow valley where the golf course would be build and the gentle slopes would serve as the sites for the residential houses

The vegetation on the site includes slope communities, drainage line (spruit) community and a dam community (Figure 4) (Appendix 1). The vegetation offers a wide diversity of habitats for local bird and animal populations.

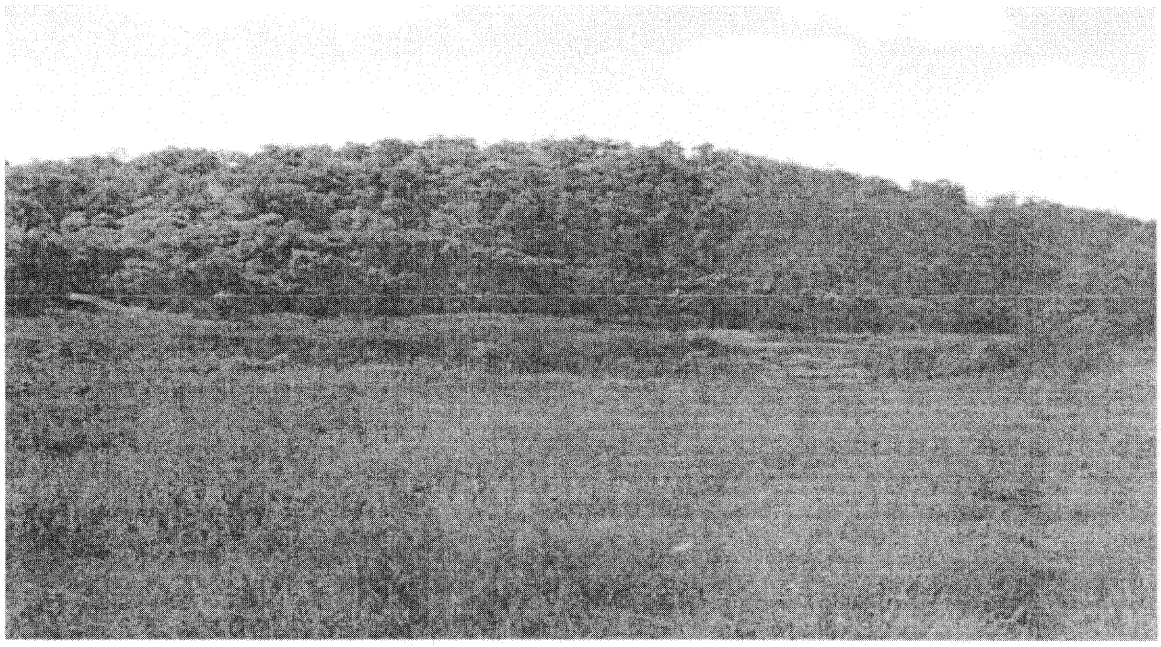


Figure 4. Section of the slope community and dam community.

3. AFFECTED ENVIRONMENT

3.1 Location

Mahlapholane Game Lodge is situated 18 km northwest of the town Bela Bela in the Waterberg Mountain Range on the Alma/Cyferfontein gravel road in the Limpopo Province of South Africa.

3.2 Climate

The climate of Mahlapholane Game Lodge is defined as a summer rainfall area. The average rainfall is 650 mm per annum. The average temperature for January (the hottest month) is 29,8 °C and the average temperature for July (the coldest month) 1,8 °C. Frost does occur in the low-lying areas.

3.3 Topography

Mahlapholane lies in the rugged and rocky Waterberg Mountains with the altitude that ranges from 1 200 to 1 500m. The substrate is characterized by an acidic sandy, loamy to gravelly soil derived from sandstone, quartzite or shale.

3.4 Drainage

A small annual stream in the planned development area is a tributary of the Buffelspruit that flows past the town of Bela Bela.

3.5 Vegetation

Acocks (1985) describes the vegetation of the Waterberg area as an open savanna of tall straight African Beechwood *Faurea saligna* trees in a tall, tufted, wiry, sour grassveld in the less rocky parts, a dense, mixed bushveld in the rugged parts (Figure 3). Fire and grazing are important parameters and aspect plays an important role in the distribution of the

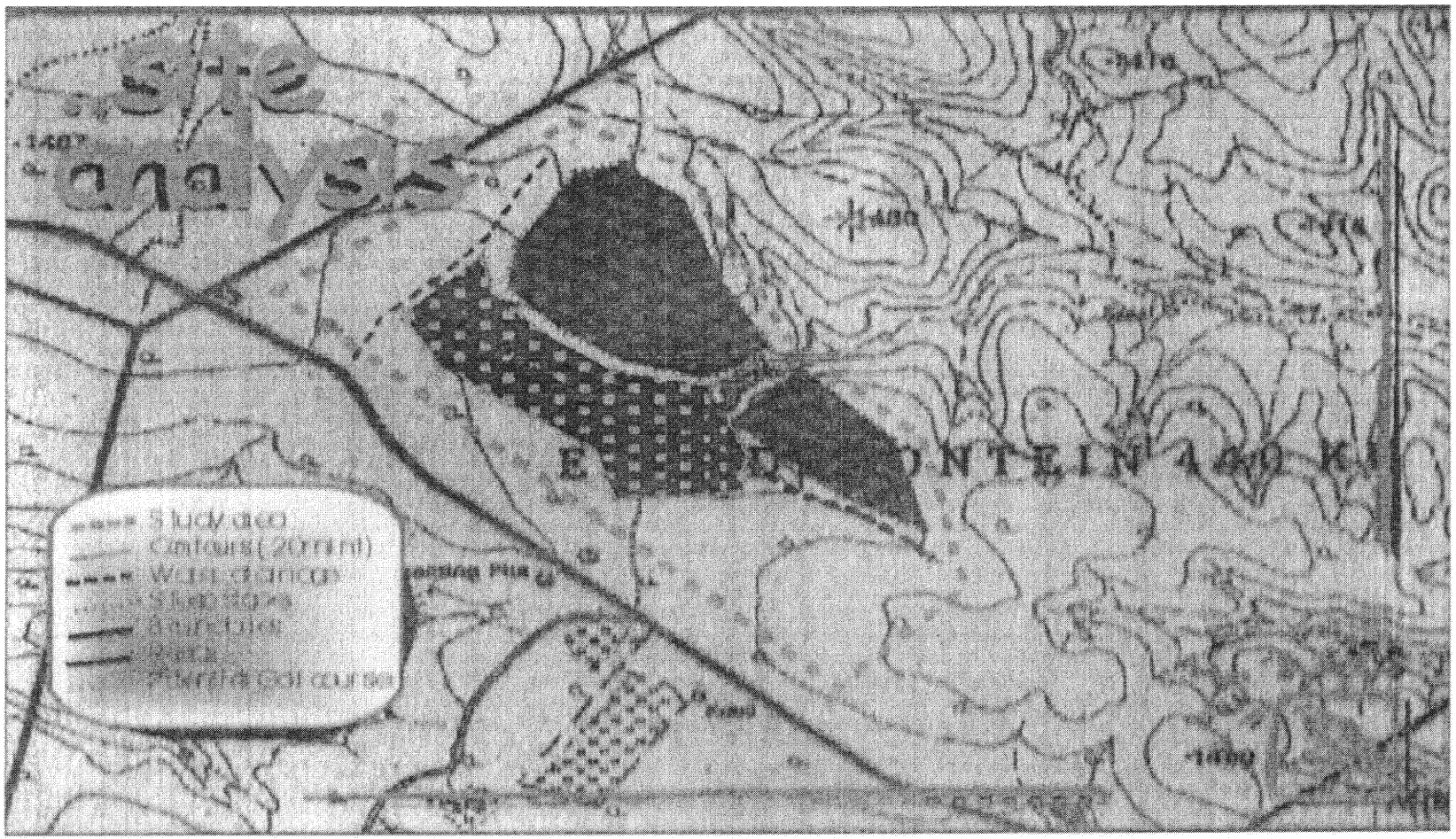


Figure 1. Scanned portion of the Map 2428 CC showing the farm Elandsfontein 440 KR on which the proposed Golf Course and 300 residential houses is to be built.

The Scoping Report will be available for public comment at the following place: Bela Bela Municipal Library. Copies have also been sent to all relevant authorities.

All interested and affected parties are kindly requested to ensure that their comments regarding the Scoping reach PVS: Ecological & Environmental Consultants by 30 June 2003. Written comment should be addressed directly to

PVS: Ecological & Environmental Consultants

P.O. Box 927

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Tel: (014) 772-2774

If you require clarification on any technical issue, please contact PVS: Ecological & Environmental Consultants on (014) 772- 2774 or 082 926 5554.