

Hartbeespoortdam Butterfly Conservancy

Appendices

PART 6



Use Ratio			
Rentable Area : Construction Area	3064.86m2:	3714.54m2	
The Rentable Area is 82% of the construction area.			
SENSITIVITY ANALYSIS			
TOTAL CAPITAL OUTLAY			
Land Costs			
Market Value (15.2ha)			2,500,000.00
Construction Costs 1 July 2004			
	AREA (m ²)	RATE (R/m ²)	TOTAL COST (R.)
Restaurant and Kitchen	223.09	3000	669,270.00
Shop	179.57	3000	538,710.00
Gallery and arts and crafts	257.11	2800	719,908.00
Offices	118.84	2800	332,752.00
Ablutions	179.57	2700	484,839.00
Activity zone, Laboratory, Interactive Displays and Museum	384.54	3000	1,153,620.00
Climatic Zones: Tropical (central plant)	798.89	2280	1,821,469.20
Mediterranean (central plant)	1005.59	2030	2,041,347.70
Highveld (central plant)	707.81	2280	1,613,806.80
Parking	5250	170	892,500.00
Landscaping	6000	100	600,000.00
			10,868,222.70
VAT (14%)			1,521,551.18
Total			12,389,773.88
<i>Escalation Adjustments 1 July 2004 - 31 May 2006</i>			
Pre-Tender Escalation: Sn2004 6 months [K(1+0.005) ⁶]			12,766,144.35
Pre-Tender Escalation: Sn2005 0 months [K(1+0.0066) ⁰]			0.00
Escalation 1 July 2004 - 28 February 2005			376,370.47
			12,766,144.35
Pre-Tender Escalation Haylett 0.85			10,851,222.70
1 month [K(1+0.005) ¹]			10,905,478.81
			54,256.11
Escalation 1 March 2005 - 31 March 2005			12,820,400.46
Haylett and Cash Flow Factor 0.85 * 0.6			6,538,404.24
Escalation during construction: 9 months 0.005			300,181.93
Escalation during construction: 5 months 0.006			198,520.12
Escalation during construction: 1 April 2005 - 31 May 2006			498,702.04
Total Construction Cost			13,319,102.51
Professional Fees 9%			
			1,198,719.23
			14,517,821.73
Finance Costs			
			350,000.00
Less: Interim Income (Sale of Nursery plants)			5,000,000.00
Total Capital Outlay			12,367,821.73
NET OPERATING INCOME			
	AREA (m ²)	RATE (R/m ²)	TOTAL INCOME (R.)
Restaurant and Kitchen	213.64	58	12,391.12
Shop	170.11	60	10,206.60
Gallery and arts and crafts	224.73	65	14,607.45
Offices	111.33	55	6,123.15
Ablutions	0	0	0.00
Activity zone, Laboratory, Interactive Displays and Museum	296.26	45	13,331.70
Climatic Zones: Tropical	642.17	60	38,530.20
Mediterranean	973.79	60	58,427.40
Highveld	432.83	60	25,969.80
Parking	5250	20	105,000.00
Landscaping (Nursery)	6000	50	300,000.00
			584,587.42
Less: Allowances for vacancies and Bad Debt 1.2%			7,015.05
			577,572.37
Less: Non-recoverable operating costs 9%			51,981.51
Net Income			525,590.86



PROFESSIONAL FEES Building Cost excluding VAT			
Architect (Stages 1-5)		12,367,821.73	
Cost Bracket 7: R81,450.00			81,450.00
Plus: TCO @6.50%			803908.4126
Plus: Disbursements (printing, travelling etc) @1.00%			123678.2173
Architects Fees for project			1,009,036.63
QS			
Building Cost excluding VAT		12,367,821.73	
Less: Electrical Engineer 10%			1,236,782.17
Less: Mechanical Engineer 8.5%			1,051,264.85
			10,743,039.56
Primary Charge			388,000.00
Plus: 4.15%			113,836.14
Plus: Disbursements (printing, travelling etc) @0.50%			53,715.20
QS Fees for project			555,551.34
Structural Engineer			
16% of total Cost excluding VAT		1,978,851.48	
For the first 860,000.00 (12.5%)			107,500.00
For the next 3,440,000.00 (10%) 1,601,720.71			160,172.07
Plus: Disbursements (printing, travelling etc) @0.25%			494,712.87
Structural Engineer Fees for project			762,384.94
Electrical Engineer			
Electrical Engineer 10% Building Cost excluding VAT		1,236,782.17	
For the first 540,000.00 (15%)			81,000.00
For the next 3,760,000.00 (12.5%) 998,575.45			124,821.93
Plus: Disbursements (printing, travelling etc) @0.15%			1,855.17
Electrical Engineer Fees for project			207,677.10
Mechanical Engineer			
Mechanical Engineer 8.5% Building Cost excluding VAT		1,051,264.85	
For the first 750,000.00 (15%)			112,500.00
For the next 4,620,000.00 (12.5%) 557,789.13			69,723.64
Plus: Disbursements (printing, travelling etc) @0.15%			1,576.90
Mechanical Engineer Fees for project			183,800.54
Total Professional Fees			2,718,450.55
			21.98%

The 15.2ha site was donated to the present owner and developer 15 years ago. Today's market value for the site is R2,500,000.00.

The development has three different climatic zones that are passively regulated but may require mechanical systems to maintain, regulate and measure the climatic conditions. Thus over and above the R1750.00/m² there is an additional R530m² for mechanical systems.

The Coastal Bushveld and Grassland Biome has a lower construction rate /m² as the material used for the construction is cheaper R1500/m² + R530m²

The site presently incorporates a wholesale nursery that will remain during the construction phase and be incorporated into the new development. The developments landscaping will incorporate plants that will form part of the nursery (a removable asset). Thus the rate per m² for landscaping is relatively low.

There are also a large percentage of plants, which will be sold to make way for the development (seen in the TCO as a interim income). This also has an effect on the net operating income, as there will be monetary profit drawn from the landscape.

The per m² rate for operating income of the three climatic zones is relatively high. This is due to the multi functionality that this area offers. (The systems within the design and construction process also increased the construction cost that in turn increases the operating cost). This area will be used to breed and house butterflies, and grow and germinate plants specific to that climatic area.

The initial return on investment is relatively low thus by doing a sensitivity analysis an attempt will be made to cut in certain areas so as to increase the return on investment.



Sensitivity analysis: Adjustments to TCO

Rates of the restaurant are to be decreased. The design will be altered to provide for cheaper finishes.

Parking: compacter crusher stone will replace the original finishes. This will be positive to help reduce the total construction cost as well as act towards sustainability.

Reducing the pre tender escalation period by 2 months will save R143,933.96

Financial costs could probably be halved; this due to the fact that the developer has a considerable amount of cash which he will invest, thus not needing big loans. The function as a butterfly conservancy will also attract sponsorship from private enterprises as well as nature conservation.

By making these few adjustments R2,860,901.84 will be removed from the TCO, which will in turn increase the return on investment.

Sensitivity analysis: Adjustments to Operating Income

The reductions in finishes of the restaurant have resulted in a reduced rent factor.

There are no classy galleries in the area, and considering that the area attracts many visitors that will be interested in art the possibility of increasing the rental rates is positive. The shops rates will also increase in this case.

The developer has family, which are interested in renting the restaurant, the development is relatively small, this will contribute to a reduced vacancy and bad debt factor.

The final return on investment is 0.61% higher than previously calculated. It is still not a marvellous return but considering that it is the first year of operation and that the area is showing great growth and development opportunities it should increase in the future.

The detailed professional fees calculation produced a total percentage on construction cost which is far above the initial 9% which was calculated in the TCO. All the professionals will have to reduce their fees to make the project feasible.



6.04 ACCOMMODATION

University of Pretoria etd - Pettey, R P (2005)

ACCOMMODATION SCHEDULE								
Space	Activity Functions	Size	Equipment	Services	illumination	Finishes	Operational Components - Space description	
1 GALLERY	space defining entrance	198m ²	display screens display platforms	directional lighting plugs internet facilities	70 lux	concrete brick plaster epoxy floor	Exterior/ Interior landscape Inquisitive Expectation Entrance Display Area Visual Communications Administration point	
2 SHOP	information and orientation	164m ²	display shelves	directional lighting general lighting intranet connections plugs	70 lux	concrete brick plaster epoxy floor	Reception Information Kiosk Connections to other activity functions	
3 RESTAURANT	sustenance areas	221m ²	tables & chairs serving counters preparation counters fridges etc.	down lighters intranet connections plugs w ater connections extractor fans	60 - 70 lux	concrete epoxy floor tiles	Seating/ relaxation area Preparation area, including store (20% of total area, 44.5m ²) Exterior entrance Administration point	
4 REFUSE DISPOSAL	refuse recycling zones		recycle bins				Recycling zones throughout	
5 LABORATORY AND INCUBATION CENTRE	laboratory and incubation	19.5m ²	incubators emergence cages work surface	w ater plugs lighting	150 lux	concrete brick epoxy floor tiles	Work stations Store Breeding, incubation and emergence area	
6 OFFICE	administration offices	12m ²	desk and chair computer	lighting plugs internet	70 lux	concrete epoxy floor	Work stations Internet/ Intranet	
7 LECTURE THEATRE	auditorium	39m ²	20 seats projector screen	lighting plugs internet communication systems	70 lux	concrete industrial carpet	Presentations Seating Internet/ Intranet Video conferencing	
8 UNISEX TOILET CLUSTER	public toilets	34m ²	5 WC 1 Urinal 1 Physically challenged WC 8 internal HMB 4 external HMB	lighting w ater w aste soil w ater disposal	100 lux	concrete brick tiles	W.C, HMB, Urinals W.C. for the physically challenged	
9 ACTIVITY ZONE	audio visual communications interactive displays	278m ²	display counters display tanks computers plasma screens	lighting plugs internet communication systems sound devices	70 - 100 lux	concrete brick epoxy floor	Presentations Seating Circulation Connection to other activity functions Work stations Display Area Storage Robust Adaptability	
10 MIXED BUSHVELD BIOME	climatic zones	625m ²						
COSTAL BUSHVELD GRASSLAND BIOME		839m ²		passive climate control devices		EITFE fabric	Entrance	
MOUNTAIN FYNBOS BIOME		758m ²		w ater mechanical systems evaporative cooling heat blowers		indigenous plants concrete	Climate controlled environments Circulation Release zones Food and water sources Circulation	
11 PARKING AREA	vehicle parking	132 bays						
	physically challenged buses	4 bays 4 bays	two booms and ticket system	w ater lighting		cobble pavers crushed stone indigenous plants	Connection to entrance and nursery Not central focal point Easily accessible to physically challenged	
12 EXISTING NURSERY	nursery						Green houses Shade structures Circulation	

Appendix B. ACCOMMODATION SCHEDULE

060



Figure 001: Parides iphidamas by Ryan Pettey

BY DAVID PINCUS

More and more people living in Johannesburg and Pretoria, as well as in other parts of Gauteng, are in the enviable position of not only being able to afford to buy weekend and holiday homes near water, but to also choose between two very large inland dams, the Vaal Dam and the Hartbeespoort Dam, both of which are within easy driving distance.

There is, as one would expect, serious competition between the agents who sell in those areas, and we like that, because competition fuels the free market system.

Chas Everitt International area agent Iris Venter says Hartbeespoort

has become Gauteng's "own Riviera", and where, she claims, demand hopelessly outstrips supply.

"We often hear references to property prices rising by 20% in a year, but in this area 40% is common and both residents and investors have been quick to recognise the potential," she says.

The area, which started as a weekend getaway venue for Pretoria and Johannesburg residents has become what she terms "a home-from-home" retreat, with much of its

impetus due to the establishment of Pecanwood Estate, which was rapidly followed by several other up-market developments. Peter Weaver, who represents Grosvenor Property Marketing, which is developing the Xanadu Manor Retirement Village on the shore of the dam, says he has been told there are more than 50 developments near the dam.

Among the most popular, says Venter, is the Westlake Country and Safari Estate, launched in 1998, where banks are so confident of

value that buyers are granted 100% bonds to buy land.

"There is no building time limit in this development and vacant stands have changed hands up to four times already, as investors take advantage of easy finance and escalating values. Prices now vary between R450 000 and R1.5-million for those on the waterfront, which were originally sold by the developer for between R65 000 and R250 000.

"House prices in the estate have also soared, and now range from

R1.8-million to R10 million."

Westlake covers more than 130ha, with building restricted to a strip along the water, leaving two-thirds of the estate undeveloped. The common area is maintained as a nature reserve where zebra, wildebeest and various buck species roam freely.

And, Venter says, the houses cannot be seen from the main road. Weaver says the first phase of the retirement village, which is a sectional title development on Route 511, near Afifa, will be the only one in the

area. The first phase, which will consist of the frail-care centre, the clubhouse and 120 units that will sell for between R375 000 and R870 000, and which will be transferred in about a year, is being sold now.

He, and the developers, Grosvenor Property Marketing, are surprised by the number of relatively young people and recently-retired 60-year-olds that have bought free-standing houses in the scheme.

When completed the retirement village, which is part of the 250ha

Xanadu Eco Park, of which 100ha will not be developed and will be stocked with small game, will consist of 250 units, ranging from one bathroom one bedroom units to three bedroom, two bathroom units, and it will also have several one-bedroom assisted-living cottages adjacent to the frail-care centre, which will offer nursing service. A general practitioner will be on call, but serious cases will be taken to hospital in Brits or Pretoria.

The houses have garages attached to them, but there won't be accommodation for domestics in the complex. However, people living in the area can be hired as domestics on a daily basis.

Values rocket on Hartbeespoort Dam 'Riviera'

A paradise lost - or gained?

'It's not the place of my youth,' says a son of the dam's first developer

BY KASHIEFA AJAM

Nestled in the Magaliesberg mountains, Hartbeespoort dam was once only enjoyed by day-trippers and on weekends. But today it has become a hub of activity with dozens of high-priced developments which is set to turn a small community into a high-class town.

With its spectacular scenery and close proximity to both Johannesburg and Pretoria, the Dam now has a permanent residency of about 30% and this figure is set to increase rapidly as more and more people crave a piece of paradise.

But not everyone is satisfied with a property boom in Hartbeespoort. Jolstoel Schoeman's father John Schoeman, originally owned all the land around the dam.

Then, the area was an undeveloped mass of nature.

"My father built a township and sold the properties for R100 and R200 back then. He named it Schoemansville. He dreamt that one day people would make their homes around the dam.

"But this big boom, is not quite what he had in mind."

Schoeman said he would never move back to the area as he felt all the developments had "spoil its magic".

"It is still a beautiful place. But it is not the same. It is not the place I knew in my youth. There is rubbish all over the place and the water is filthy."

"They have developed it right up to the banks of the dam and that was never the idea," said Schoeman.

Meanwhile many other long-time residences thought Hartbeespoort should "move with the times".

Jack Seale of the Animal and Snake Park said the area was "destined for what it has now become."

"It has been proven that it is possible to develop inside a reserve. We realise that it has to be done responsibly. As far as we know all the developers have done the necessary Environmental Impact Assessments.

"But all these houses and estates will not change the place because Hartbeespoort is still unique."

Seale said in the past when people spent the day at the Dam, there were no facilities. There was only one

hotel, one bottle store and one pub.

"We now have nearly 200 pubs, several B&Bs, toilets and other facilities for day campers. Hartbeespoort is now or near with other popular tourist destinations.

"When overseas tourists come here, they say it looks like Switzerland and the north of Scotland. It is conveniently situated and it also has a very mild climate in winter as well as in summer. People come to the dam for a day and are so captivated by it that they decide to make it their homes."

Seale said, however, that the influx of people moving into the area could create a problem if it was not controlled.

"We will have problems, there is no doubt about that. The only thing that is worrying is that there could be a population explosion. But already we are discussing the re-employment of traffic officers to handle the huge amounts of cars that pass through the area on weekends," said Seale.

But spokesperson for the Madi-beng municipality, Kenneth Ngubegusha has assured *Saturday Star*



It's still unique ... plans are in place to prevent development from spoiling Hartbeespoort Dam's atmosphere.

PHOTO BY ANTON HAMMERL

that it had a firm grip on developments at the Dam.

"There was a time when we realised that Hartbeespoort could be overdeveloped if it was not controlled.

"We have put in place short-term

and long-term plans to control the development of the area.

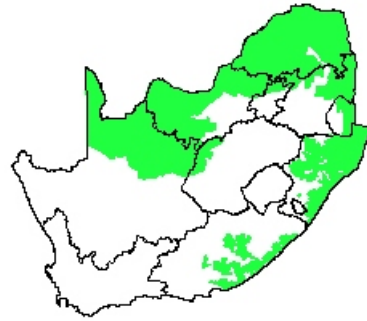
"The procedure now is that developers must apply with the municipality first. Thereafter we wait 90 days for any comments or objections by locals about the proposed devel-

opments. Then it is up to the mayoral committee to approve it."

Ngubegusha said after developers get the thumbs up they will only be allowed to construct the buildings and facilities that were in their initial proposals.

"Obviously there are very strict conditions and all of this will be monitored regularly.

"Also the developer has to contribute half to the installations of sewerage, water and electricity facilities," said Ngubegusha.



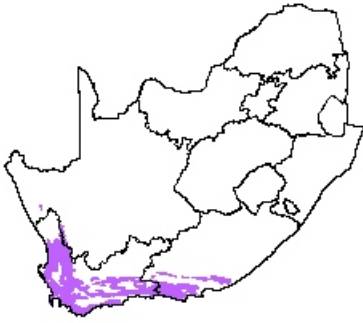
SAVANNA BIOME

The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the Lowveld and Kalahari region of South Africa and is also the dominant vegetation in Botswana, Namibia and Zimbabwe.

It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.

The environmental factors delimiting the biome are complex: altitude ranges from sea level to 2 000 m; rainfall varies from 235 to 1 000 mm per year; frost may occur from 0 to 120 days per year; and almost every major geological and soil type occurs within the biome. A major factor delimiting the biome is the lack of sufficient rainfall which prevents the upper layer from dominating, coupled with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for the grass dominance, which, with its fine material, fuels near-annual fires. The shrub-tree layer may vary from 1 to 20 m in height, but in Bushveld typically varies from 3 to 7m.²

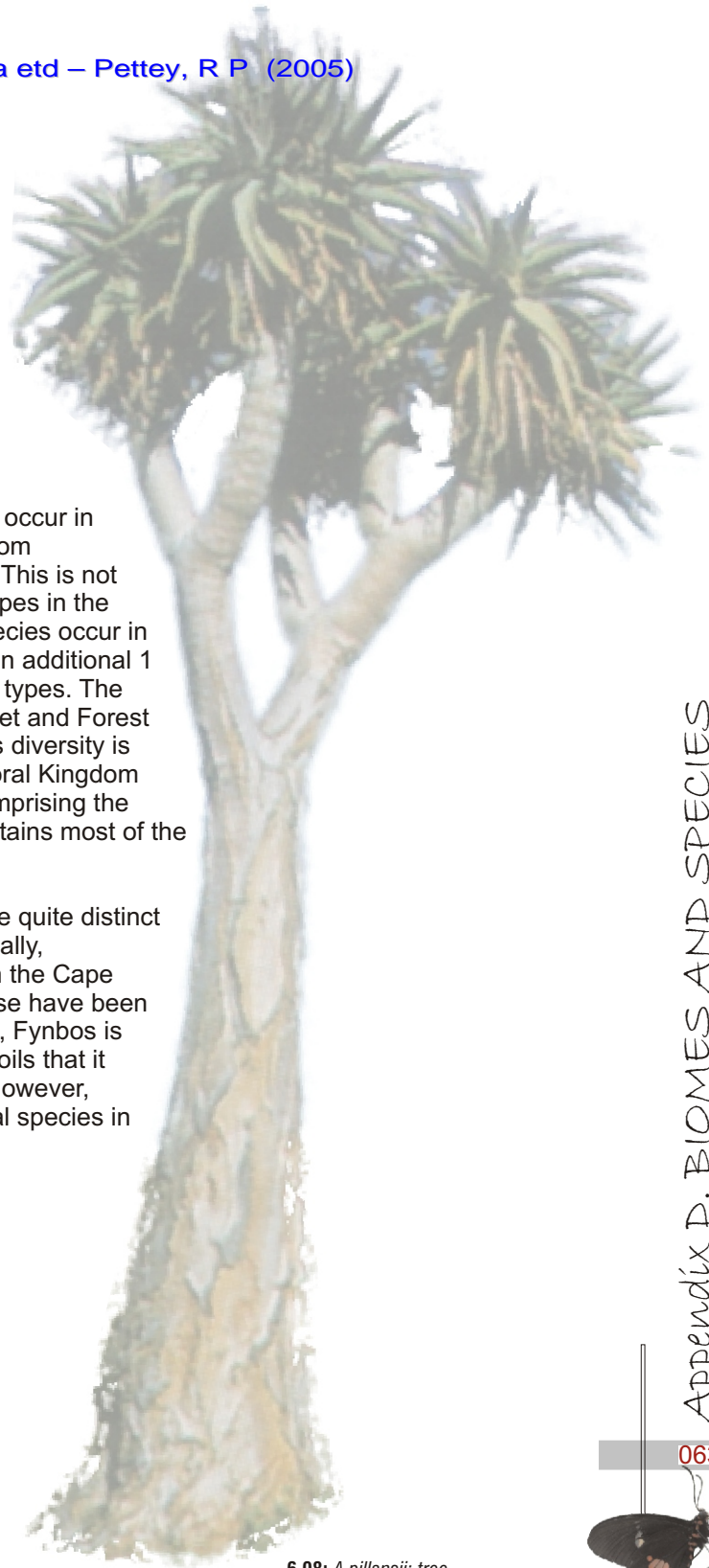




FYNBOS BIOME

In South Africa, over one third of all plant species occur in the Cape Floral Kingdom, even though the Kingdom occupies less than 6% of the area of the country. This is not primarily due to the large number of vegetation types in the Cape Floral Kingdom. Over 7 000 of the plant species occur in only five Fynbos vegetation types, with perhaps an additional 1 000 species in the three Renosterveld vegetation types. The contribution of Succulent and Nama Karoo, Thicket and Forest vegetation types in the region to the plant species diversity is thus relatively small. Thus, although the Cape Floral Kingdom contains five biomes, only the Fynbos Biome, comprising the Fynbos and Renosterveld vegetation groups, contains most of the floral diversity.

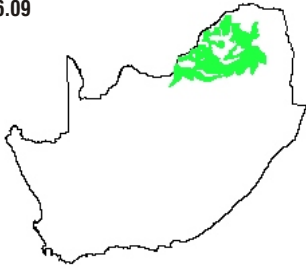
The two major vegetation groupings in Fynbos are quite distinct and have contrasting ecological systems. Essentially, Renosterveld used to contain the large animals in the Cape Floristic Kingdom, but these are now extinct or else have been reintroduced into conservation areas. By contrast, Fynbos is much richer in plant species, but has such poor soils that it cannot support even low densities of big game. However, most of the endemic amphibian, bird and mammal species in the region, occur in Fynbos vegetation types.³



6.08: A pillansii: tree



6.09



University of Pretoria etd – Pettey, R P (2005)
MIXED BUSHVELD (Savanna Biome)

Statistics:

66 647 km²; ± 60% transformed; 3.05% conserved.

Locality & Physical Geography:

This bushveld represents a great variety of plant communities, with many variations and transitions. The vegetation varies from a dense, short bushveld to a rather open tree savanna, covering the greater part of Northern Province and the northern parts of North-West Province. The area comprises mostly undulating to flat plains at an altitude of 700 to 1100m.

Climate:

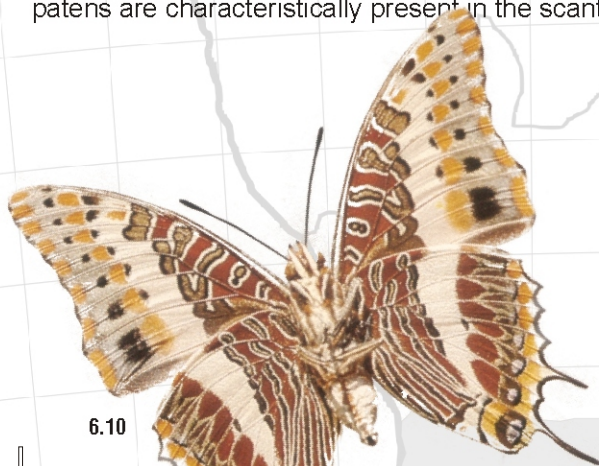
The rainfall varies between 350 to 650 mm, occurring in summer. Temperatures range from -8C to 40C, with an average of 21C. Average humidity 54%.⁴

Geology & Soil:

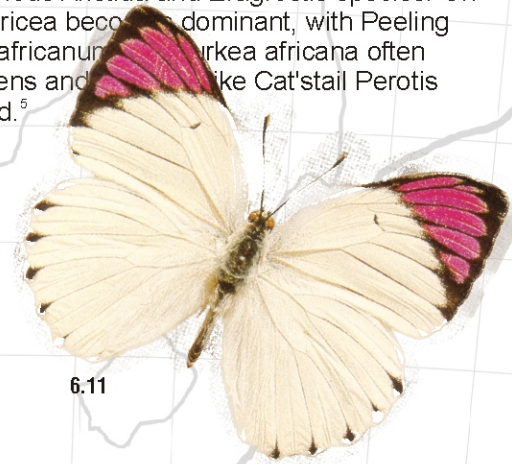
The soil is mostly coarse, sandy and shallow, overlying granite, quartzite, sandstone or shale.

Vegetation:

The vegetation varies from a dense, short bushveld to a rather open tree savanna. On shallow soils Red Bushwillow *Combretum apiculatum* dominates the vegetation. Other trees and shrubs include Common Hook-thorn *Acacia caffra*, Sicklebush *Dichrostachys cinerea*, Live-long, *Lannea discolor*, *Sclerocarya birrea* and various *Grewia* species. Here the grazing is sweet, and the herbaceous layer is dominated by grasses such as Fingergrass *Digitaria eriantha*, Kalahari Sand Quick *Schmidtia pappophoroides*, Wool Grass *Antheophora pubescens*, *Stipagrostis uniplumis*, and various *Aristida* and *Eragrostis* species. On deeper and more sandy soils, Silver Clusterleaf *Terminalia sericea* becomes dominant, with Peeling Plane *Ochna pulchra*, Wild Raisin *Grewia flava* *Peltophorum africanum*, *Surkea africana* often prominent woody species, while Broom Grass *Eragrostis pallens* and *Stipagrostis patens* are characteristically present in the scanty grass sward.⁵



6.10



6.11

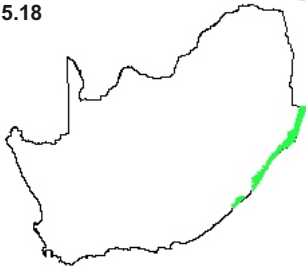


6.12 - 6.17

064

COASTAL BUSHVELD-GRASSLAND (Savanna Biome)

5.18



Statistics:

11 881 km²; area transformed unknown but high; 14.03% conserved.

Locality & Physical Geography:

This mosaic of vegetation types occurs from just above sea level to about 300 m altitude. The terrain is more or less flat to gently undulating, but rises overall quite steeply towards the interior. The area is deeply dissected by the many rivers which drain eastwards across KwaZulu-Natal.

Climate:

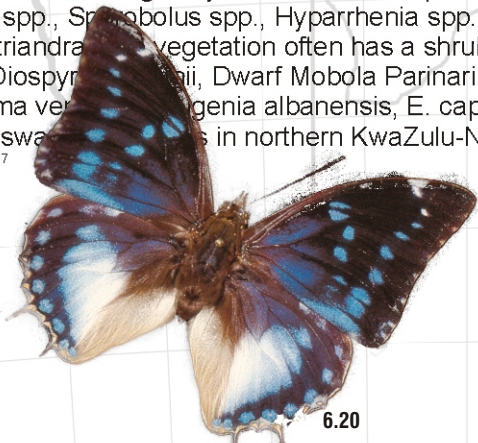
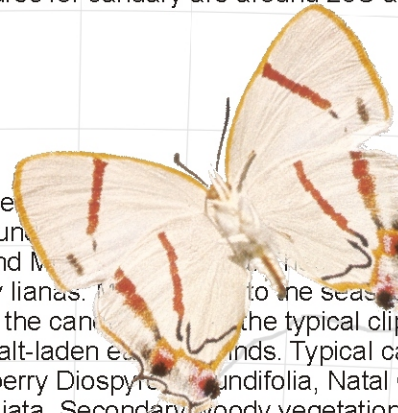
The climate is humid 72%⁶ with only one or two months experiencing very little or no rain. The rainfall exceeds 1 000 mm per year. Mean annual temperatures for January are around 25C and those in July around 17C.

Geology & Soil:

Sandy soils of Quaternary aeolian and marine origin.

Vegetation:

Remaining forest patches are characterised by species such as *Parides gerrardii*, *Parides emetica*, *Umzimbeet Millettia grandis*, White Ironwood *Vepris unguiculata*, *Brachylaena* spp., *Celtis* spp., *Chaetacme aristata* and *Mimosa* spp. Forest patches are also characterised by a large number of species of woody lianas. *Mimosa* spp. thickets are also characterised by a large number of species of woody lianas. *Mimosa* spp. thickets are also characterised by a large number of species of woody lianas. *Mimosa* spp. thickets are also characterised by a large number of species of woody lianas. On the seaward side the canopy has the typical clipped appearance of wind-pruning as a result of constant exposure to salt-laden easterly winds. Typical canopy species are: Coast Red Milkwood *Mimusops caffra*, Dune Jackalberry *Diospyros undifolia*, Natal Guarri *Euclea natalensis*, *Brachylaena discolor* and *Apodytes dimidiata*. Secondary woody vegetation is patchy and often characterised by Sweet Thorn *Acacia karroo* together with Scattered Thorn *A. nilotica* and Splendid Thorn *A. robusta*. The grassy matrix includes species such as Ngongoni Bristlegrass *Aristida junciformis*, *Eragrostis* spp., *Stenobolus* spp., *Hyparrhenia* spp., *Digitaria* spp., *Setaria* spp. and occasionally *Themeda triandra*. *Themeda* spp. vegetation often has a shrubby appearance, due to many dwarf geophytes, including *Diospyros gerrardii*, Dwarf Mobola *Parinari capensis* subsp. *incohata*, Veined Medlar *Pachystigma venosum*, *Engenia albanensis*, *E. capensis*, *Ancylobotrys petersiana* and *Salacia kraussii*. Locally, at swamps in northern KwaZulu-Natal, the Illala Palm *Hyphaene coriacea*, is very prominent.⁷

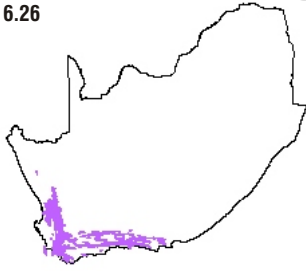


Appendix D. BIOMES AND SPECIES



Figure 001: *Parides iphidamas* by Ryan Pettey

6.26



University of Pretoria etd – Pettey, R P (2005)
MOUNTAIN FYNBOS (Fynbos Biome)

Statistics:

27 462 km²; ± 11% transformed; 26.14% conserved.

Locality & Physical Geography.

The most widespread vegetation type in the Fynbos Biome, occurring mainly along the Cape Fold Belt from north of Nieuwoudtville to Cape Town and Cape Agulhas and to near Port Elizabeth, with outliers in the Kamiesberg in the north. Altitude ranges from sea level to 2 200 m. The distinction between Mountain and "Lowland" Fynbos types is considered by some to be artificial as the centres of endemism and structural types within Mountain Fynbos are as distinct as the differences between Mountain, Grassy and the "Lowland" vegetation types.

Climate:

Rainfall varies from 200 to over 2 000 mm per year, occurring mainly in the winter months. Average humidity is 71%⁸.

Geology & Soil:

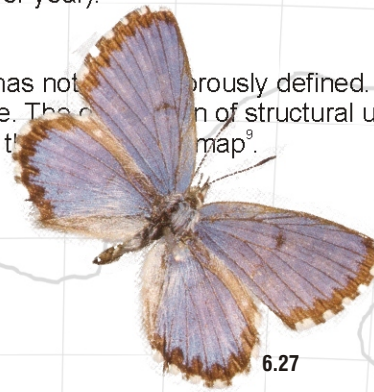
Largely confined to soils derived from sandstones of the Cape Supergroup, except where the rainfall is sufficiently high, when it occurs on leached soils derived from granites (greater than 300 to 400 mm per year) and even shales (greater than 600 to 800 mm per year).

Vegetation:

In terms of floristics and structure, Mountain Fynbos has not been rigorously defined. Mountain Fynbos is merely Fynbos on the mountains of the Fynbos Biome. The composition of structural units within this type is complex and fragmentary and, cannot be shown at this scale on a map⁹.



6.28



6.27



6.29 - 6.37

066



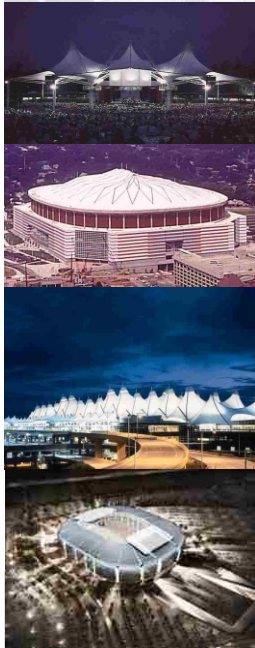
Sheerfill Architectural Membrane

I could not find the actual composition of this material but I have a suspicion that it is also ethylene tetrafluoroethylene - ETFE. I included it here as another fine example of the products capabilities.

“Sheerfill Architectural Membrane enables the construction of buildings with a stunning architectural profile, but the true beauty lies in its superior ability to transmit light. Sheerfill brings the open, airy feeling of colour light indoors, filling even large sports complexes and industrial facilities with

diffuse, natural daylight. Sheerfill’s backlit luminosity at night creates a unique and dramatic architectural signature on the skyline. In contrast to traditional roofing materials that would require replacement, tests prove that Sheerfill tensile structures provide up to 25 years or more of reliable service. There is no relaxation of the membrane from its original shape, even after years of withstanding high live loads, such as heavy snows and high winds.

The translucent characteristics and visual appeal are unaffected by age, climate, pollutants or discolouration.”¹⁰



6.38 - 6.41



References

University of Pretoria etd – Pettey, R P (2005)

BARKER, B J. 1991. *Southern Africa from the Highway: A motorists route guide to 2000 stop-off-and-see sights and destinations along our major roads*. AA the motorists Publications, Cape Town.

CARRUTHERS, V. 1990. *The Magaliesberg*. Southern. Johannesburg.

de JAGER, R. et al. 2003. Apartheid Museum Johannesburg. *Digest of South African Architecture*. 2002/2003, vol 7, p24-25

GILBERT, J. 2003. *Sustainable Building Assessment Tool*. Class Notes. University of Pretoria.

HARRIS, J B. et al. 1996. *Mastered Structures in Architecture*. Bath Press. Avon

HOLLEIN, H. 2002. Vulcania, European Volcano Park. *GA Document 71*. 2002

HOLM, D & VILJOEN, R. 1996. *Primer for Energy Conscious Design*. Energy for Development of the Department Minerals and Energy. Pretoria.

LIEF. s.a. *Planting for Butterflies*. Lievenke Noyons, Randburg.

METZ, T. 2000. Behnisch, Behnisch and Partner let the environmentalists at the IBN-DLO institute in Holland practice what they preach. *Architectural Record*. January 2000, vol 188, p97-103

MIGDOLL, I. 1987. *Field Guide to the Butterflies of Southern Africa*. C Struik, Cape Town.

PINCUS, D. 2004. Values rocket on Hartbeespoort Dam 'Riviera'. *Saturday Star*, 11 September 2004.

SCRIVENS, S. 1980. *Interior planting in large buildings: a handbook for architects, interior designers and horticulturists*. Architectural Press. London

S.n. 2001. *Earth Sciences 320: Electricity. Wind power*. Class Notes. University of Pretoria.

STAIRS, D. 1997. Biophilia and Technophilia: Examining the Nature/ Culture Split in Design Theory. *Design Issues*. Autumn 1997, vol.13, no.3, p.37-44.

STONE, A R. 1995. *The War of Desire and Technology at the Close of the Mechanical Age*. Cambridge: MIT Press.

VAN OUDTSHOORN, F. 1994. *Gids tot Grasse van Suid-Afrika*. BRIZA Publikasies Bk: Arcadia.

VAN RENSBURG, R.J. 2001. *Gebouklima 322: Department of Architecture and Landscape Architecture*. Class notes. University of Pretoria.

VAN WYK, B & VAN WYK, P. 1997. *Field Guide To Trees Of Southern Africa*. Struik: Cape Town.
Southern Africa from the Highway

VAN ZYL, B G. Sa. *Acoustics for Architectural Students. Department of Architecture*. University of Pretoria.

VON ZABELTITZ, C. 1999. *Ecosystems of the world, Greenhouse Ecosystems, volume 20*. Elsevier. Amsterdam.

Internet Source:

American Vegetable Grower (1 June 2004)
[Http://www.ebuild.com](http://www.ebuild.com) (18 September 2004)

Asahi Glass Co, Ltd
www.agc.co.jp (18 September 2004)

Butterfly Pavillion
<http://www.butterflies.org> (22 January 2004)

Department of Environmental Affairs and Tourism (South African Government)
<http://www.environment.gov.za> (Monday, 9 August 2004)

Institute of Local Self Reliance - Healthy Building Network (2003)
[Http://www.healthybuilding.net](http://www.healthybuilding.net) (18 September 2004)

National Botanical Institute SA
[Http://www.nbi.ac.za](http://www.nbi.ac.za) (23 April 2004)

Provinces of the Republic of South Africa
[Www.nationonline.org](http://www.nationonline.org)

Research Machines plc (2003)
[Http://www.bbc.co.uk](http://www.bbc.co.uk) (18 September 2004)

Sant - Gobain Performance Plastics
<http://www.chemfab.com> (18 September 2004)

The Heart of Africa is closer than you think. *Hartbeespoortdam in South Africa North West Province* (2004)
<http://www.hartbeespoortdam.com> (6 October 2004)

U.S Department of the interior & National Park Services (1994)
<http://www.nps.gov/dsc/dsgncnstr/gpsd/toc.html> (17 may 2004)

Interviews

CARRUTHERS, V. 30 November 2004. Pecanwood Estates. Hartbeespoort

GCABASHE, C. 20 February 2004. *Butterfly Conservationist at Butterflies for Africa*, Pietermaritzburg.

HOLM, D. 2002. *Open Day at the Autonomous House*, Hartbeespoort, 19 October 2002

PRETORIUS, E. 30 August 2004. *Build Architects*, Brooklyn. Pretoria

