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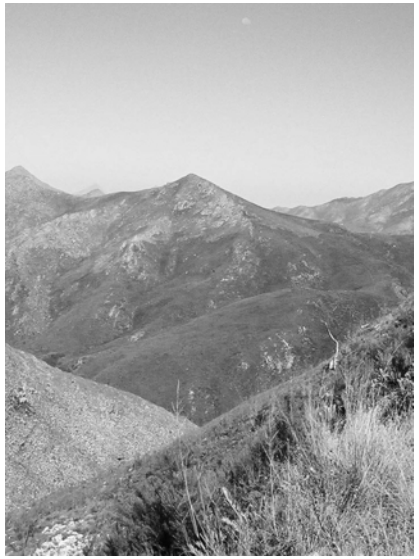

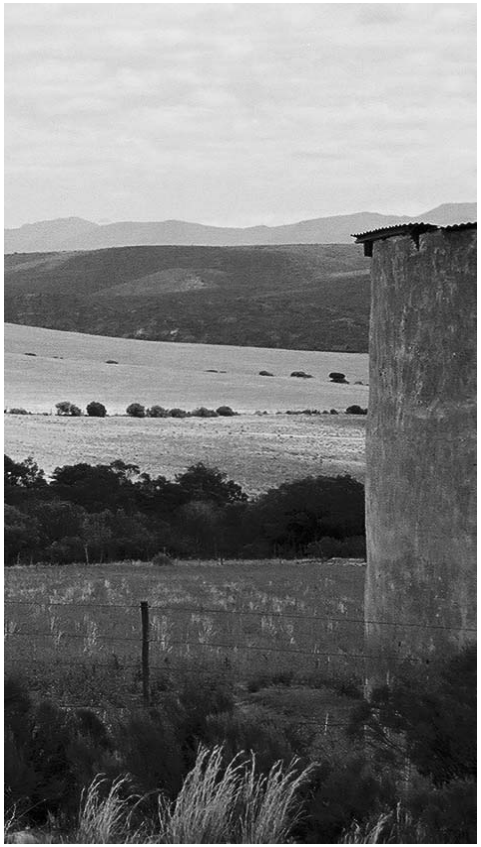

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DEVELOPMENT AND MANAGEMENT FRAMEWORK FOR THE GOURITS RIVER CATCHMENT

Submitted by: GERHARD GRIESEL
Student number: 2134097
Mentor: DR. GWEN BREEDLOVE
Study leader: DR. GWEN BREEDLOVE
UNIVERSITY OF PRETORIA
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Submitted as part of the requirements for the degree of
Magister in Landscape Architecture (Professional), ML (Prof),
in the Faculty of Engineering, Built Environment and Information Technology

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to GOD all the honour

estie griesel
my parents
dr gwen breedlove
the studio gang

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SECTION A: GENERAL BACKGROUND

SECTION SYNOPSIS

This section provides a brief introduction and description of the following:

a) Definition and purpose of the development and management framework
b) Structure of, and readers manual for the development and management framework
c) Interested and affected parties

1 INTRODUCTION

This project forms part of a thesis for a Masters Degree in Landscape Architecture at the Department of Architecture, University of Pretoria. Not only is macro-scale or regional design a very important part of Landscape Architecture but a very interesting field that I wanted to explore through this project.

Extensive studies have been made by the Cape Action Plan for the Environment (CAPE) on the biodiversity conservation for the Cape Floral Kingdom. A Biodiversity Strategy and Action Plan for the Cape Floral Kingdom was developed.

It is my intention to understand the Gourits River Catchment Area (further referred to as GRCA) as an interacting process, to interpret this as a value system and to designate appropriate land uses.

1.1 DEFINITION AND PURPOSE OF THE DEVELOPMENT AND MANAGEMENT FRAMEWORK

The Gouritz River Catchment Area Development Framework has the following two-fold purpose, namely:

a) To describe the following:
   (i) What will happen in the GRCA
   (ii) Where the proposed projects will be located within the GRCA
b) To provide the relevant authorities, interested and affected parties with comprehensive background information regarding the proposed developments for sustainable socio-economic development.

The development and management framework is, thus, firstly a process that describes and contextualises the GRCA and then to interpret this as a value system and to designate appropriate land uses.

1.2 DOCUMENT STRUCTURE AND MANUAL

In addition to this inductory section (Section A), this development and management framework currently, comprises 5 further sections listed in Table 1 below. It illustrates how this document aims to achieve its objectives and how it should be read.

Table 1: Structure of the development and management framework

SECTION	CONTENTS
Section A	General Background
Section B	Vision, goals and fundamental values.
Section C	Site description and purpose of the Development and Management Framework
Section D	Guidelines and principles for planning, design and management
Section E	Environment Composite
Section F	Sustainable Development Baseline
Section G	Design Guidelines
Section H	Design Philosophy
Section I	Plans
Section J	Addendums
Section K	Referred works

1.3 CLIENT PROFILE

Gourits River Catchment Area will be a co-operative venture between three major stakeholders, namely the private sector, the Western Cape Nature Conservation Board and the community.

Cape Nature Conservation (CNC) is concerned with the conservation of the natural environment within the western Cape, which includes the fynbos biome - one of the six plant kingdoms of the world. Western Cape Nature Conservation attempts to conserve these areas by careful management of nature reserves and wilderness areas in the Western Cape (http://www.capenature.org.za : 06 Feb 2003)

The community participates through project-specific "interact groups" that will be set up.

1.4 INTERESTED AND AFFECTED PARTIES:

1.4.1 The Community

The communities that falls into the GRCA and those on the edges of the Area

1.4.2 The Municipalities

a) The Municipalities of Baviaans, Beaufort West, Kannaland, Lainsburg, Langeberg, Mosselbaai, Oudshoorn, Prince Albert, Swelllendam, ECDMA 10, WCDMA 02, WCDMA 05.

1.4.3 Listed Organisations

a) CAPE ACTION PLAN
The objective of C.A.P.E. is to secure the conservation of the biodiversity of the Cape Floral Kingdom and through this to deliver sustainable economic benefits to the people of the region.

b) DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM
The vision of the DEAT is to lead environmental management and tourism in the interests of sustainable development and to contribute to the improvement of the quality of life of all South Africans(www.environment.gov.za : 06 Feb 2003).

c) DEPARTMENT OF AGRICULTURE
The Department of Agriculture strives to lead agricultural development for economic growth in South Africa and play a constructive role in agricultural development in Africa (www.nda.agric.za :06 Feb 2003).

d) DEPARTMENT OF WATER AFFAIRS AND FORESTRY
DWAF is the custodian of South Africa's water and forestry resources responsible for the formulation and implementation of policy governing these two sectors. While striving to ensure that all South Africans gain access to clean water and safe sanitation, the water sector also promotes effective and efficient water resources management to ensure sustainable economic and social development. The forestry programme promotes the sustainable management of the country's natural forestry resources and commercial forestry for the lasting benefit of the nation (http://www.dwaf.gov.za/06 Feb 2003).

e) THE WESTERN CAPE DEPARTMENT OF PLANNING, LOCAL GOVERNMENT AND HOUSING
(http://www.westerncape.gov.za/:06 Feb 2003).

f) THE WESTERN CAPE DEPARTMENT OF ECONOMIC AFFAIRS, AGRICULTURE AND TOURISM (http://www.westerncape.gov.za/ : 06 Feb 2003).

g) THE EASTERN CAPE DEPARTMENT OF ECONOMIC AFFAIRS, AGRICULTURE AND TOURISM (http://www.westerncape.gov.za/ : 06 Feb 2003).

i) NATIONAL BOTANICAL INSTITUTE

The NBI is an autonomous, statutory specialising formed by the amalgamation of the National Botanic Gardens and the Botanical Research Institute in 1989. With its head office at Kirstenbosch in Cape Town, the Institute has gardens and research centres throughout South Africa. It runs environmental education programmes and maintains databases and libraries specialising in information on the plant life of southern Africa (www.nbi.ac.za/homepage.htm : 06 Feb 2003)

i) BOTANICAL SOCIETY OF SOUTH AFRICA

The Botanical Society of South Africa is committed to supporting the National Botanical Gardens of South Africa and promoting the conservation of our rich floral heritage.

The Botanical Society presently has over 15 000 members resident in 45 countries around the world. There are thirteen branches in South Africa. Active conservation, education and publication programmes are also run under the auspices of the Society (www.botanicalsociety.org.za/06 Feb 2003).

k) SOUTH AFRICAN NATIONAL PARKS

South African National Parks (SANParks) manages a system of parks, which represents the indigenous fauna, flora, landscapes and associated cultural heritage of the country. It manages 20 national parks with an unrivalled variety of accommodation in arid, coastal, mountain and bushveld habitats (www.parks-sa.co.za/:06 Feb 2003).

l) WORLD WIDE FUND FOR NATURE – SOUTH AFRICA

Since it was founded in 1961, WWF has become one of the world's largest and most effective independent organisations dedicated to the conservation of nature. WWF now operates in around 100 countries, supported by nearly five million people worldwide. Today, the organisation tackles the many forms of pollution that are harming the soil, atmosphere, freshwater and oceans, which ultimately sustain life and looks for new and sustainable ways of using the planet's natural resources (www.panda.org.za/: 06 Feb 2003).

m) FAUNA AND FLORA INTERNATIONAL (FFI)

Founded in 1903, Fauna and Flora International is the world's longest established international conservation organisation. FFI is a non-profit organisation supporting over 200 projects in more than 60 countries. FFI acts to conserve threatened species and ecosystems worldwide, with sustainable solutions based on sound science and taking human needs into account (www.fauna-flora.org/ : 06 Feb 2003).

n) CONSERVATION INTERNATIONAL

CI applies innovations in science, economics, policy and community participation to protect the Earth's richest regions of plant and animal diversity in the hotspots, major tropical wilderness areas and key marine ecosystems. With headquarters in Washington, D.C., CI works in more than 30 countries on four continents (www.conservation.org :)

o) THE WILDERNESS FOUNDATION – SA (WF)

Founded by Dr Ian Player in 1972, WWF is a not-for-profit, non-governmental organization (NGO) working in Southern Africa to protect and sustain wilderness, wildlife and wildlands; to provide environmental education, experience and training to all contemporary and indigenous communities; and to further human understanding and cooperation for the conservation of wild habitats. The Wilderness Foundation accomplishes its mission through implementing public awareness programmes and campaigns; promoting wilderness as a resource for all South Africans; monitoring and assisting with the management of existing and potential wilderness areas under both private and public ownership; and advocating for enlightened policy and research that sustains wilderness and wildlands (www.wild.org/southern_africa/wf.html : 06 Feb 2003)

SECTION B: VISION, GOALS AND VALUES

SECTION SYNOPSIS

This section provides a description of the following aspects of GRCA:

a) Vision.
b) Goals.
c) Fundamental values.
d) Promoting the goals of Agenda 21.
e) Promoting the ideals of NEPAD.
f) Criteria for monitoring compliance.

2 VISION AND GOAL STATEMENTS AND FUNDAMENTAL VALUES

2.1 VISION

The vision for Gaurits River Catchment Area is as follows:

TO CREATE IN THE CAPE FLORAL KINGDOM A FRAMEWORK OF REGIONAL LAND USE PLANNING FOR SUSTAINABLE SOCIO-ECONOMIC DEVELOPMENT….

based upon tourism, economic empowerment, community co-operation, integration, social equity and conservation of the natural and cultural environment.

2.2 OVER-ARCHING GOALS

The above vision is supported by a "triple bottom line" approach, which refers to the interrelated goals of economic development, social equity and environmental integrity. This approach is internationally recognized as the standard against which planning and development actions of government, business and society at large are to be measured in order to achieve sustainable development (Swarbrooke 2002:160). In accordance with the "triple bottom line" approach, the over-arching goals for GRCA are the following:

a) Economic development

This goal refers to the efficient utilisation of the available community assets, the enhancement of the existing economic sectors, and the establishment of new enterprises that will ensure sustainable socio-economic development.

b) Social equity

This goal refers to the implementation of a number of strategies to achieve real social equity and promote the well-being of all the people in the area. These strategies include, sustainable community empowerment, land reform, integration, provision of housing, and providing the previously disadvantaged with access to, and participation in the mainstream economy.

c) Environmental integrity

This goal refers to the implementation of the integrated strategies aimed at restoring and conserving both the natural and cultural environment and within and beyond the boundaries of the area. The proposed developments will reflect a strong sense of appreciation for the cultural heritage of the area, whilst the conservation of biodiversity would be reflected in, amongst others:

- the management and use of natural recourses
- custodianship of the land as it is developed
- the re-use of waste that demonstrates practical ways of reconciling human needs with the requirements of other organisms and the carrying capacity of the environment.

2.3 FUNDAMENTAL VALUES

a) Custodianship

This generation is here only for a short time in the life of the Gouritz River Catchment Area and therefore is it our duty to foster a sense of history and to act as custodians of the present natural, cultivated and built environment for the benefit of this and future generations.

b) Fostering hope

Due to the profound sense that there are limits to our natural, cultural and economic resource base, we try to practice sustainable ways of living and doing business.

c) Community-building, trust and respect

By facilitating connections across historic divides in the community, the aim is to promote sustainable community co-operation, integration, social equity and a sense of place that embodies lifestyles appropriate for sustainable South African future.

2.4 INTERNATIONAL AGREEMENTS ON SUSTAINABLE DEVELOPMENT

The Gourits River Catchment Area Management and Development Framework are in compliance with and strongly promote the following international agreements on sustainable development.

2.4.1 AGENDA 21

GRCA must give practical effect to Agenda 21[1] (the United Nations Action Plan on sustainable development for the 21st century), and specifically, the Local Agenda 21[2].

Agenda 21 carries a strong moral obligation to ensure the full implementation of various international agreements pertaining to environmental sustainability, economic efficiency and human development and well-being.

These are the following themes of the Local Agenda 21:

a) Resources are used efficiently and waste minimised.
b) Pollution is limited
c) The diversity of nature is valued and protected
d) Local needs are met locally
e) People are given the opportunity to undertake satisfying work in a diverse economy
f) People's general well-being is promoted by creating safe, clean, pleasant living and working environments.
g) People are given access to the skills, knowledge and information needed to enable them to play a meaningful part in society.
h) Opportunities for culture, leisure and recreation are readily available to all.
i) Places, spaces and objectives combine meaning and beauty with utility.
j) Human settlements have appropriate scale and form
k) Links are developed with other parts of the world.

---

1 Agenda 21 is a action plan and blueprint for sustainable development adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. South Africa is one of the global partners to Agenda 21, which calls on governments to adopt national strategies for sustainable development.

2 Local Agenda 21 is essentially about "quality of life" and is defined as a local-government-lead, community wide and participatory effort to establish a comprehensive action strategy for environmental protection, economic prosperity and community well-being in the local jurisdiction or area. This requires the integration of planning and action across economic, social and environmental spheres. Key elements are community participation, assessment of current conditions, target setting for achieving goals, monitoring and reporting (Department of Environmental Affairs and Tourism, ISBN 0-621-27991-9, 1998)

2.4.2 NEW PARTNERSHIP FOR AFRICA'S DEVELOPMENT (NEPAD)

GRCA must promote and give practical effect to NEPAD[3], which centers around African re-birth through self-generated new endeavors that are culturally, socially and environmentally sensitive and responsible. In order to achieve the objectives of NEPAD, African leaders will take joint responsibility for the following:

a) Strengthening mechanisms for conflict prevention, management and resolution at the regional and continental levels and to ensure that these mechanisms are used to store and maintain peace.
b) Promoting and protecting democracy and human rights in their respective countries and regions, by developing clear standards of accountability, transparency and participatory governance at the national and sub-national levels
c) Restoring and maintaining macroeconomic stability, especially by developing appropriate standards and targets for fiscal and monetary policies, and introduce appropriate institutional frameworks to achieve these standards
d) Instituting transparent legal and regulatory frameworks for financial markets and auditing of private companies and the public sector
e) Revitalising and extend the provision of education, technical training and health services, with high priority given to tackling HIV/AIDS and other communicable diseases
f) Promoting the role of women in social and economic development.
g) Building the capacity of the states in Africa to set and enforce the legal framework as well as maintaining law and order
h) Promoting the development of infrastructure, agriculture and its diversification into agro-industries and manufacturing to serve both domestic and export markets.

---

[3] NEPAD is a pledge by African leaders, based on a common vision and a firm and shared conviction, that they have a pressing duty to eradicate poverty and to place their countries, both individually and collectively, on a path of sustainable growth and development, and at the time to participate actively in the worlds economy and body politic.
Through this program, African leaders are setting an agenda for the renewal of the continent. The agenda is based on national and regional priorities and development plans that must be prepared through participatory processes involving the people, it is their role to articulate these plans as well as lead the processes of implementation on behalf of their people.
The program is a new framework of interaction with the rest of the world, including the industrialised countries and multilateral organisations. It is based on the agenda set by African peoples through their own initiatives and of their own volition, to shape their own destiny

SECTION C: SITE DESCRIPTION AND CONTEXT

SECTION SYNOPSIS

This section provides a description of the following:

a) Key characteristics and location of the area
b) Global, regional and local context
c) Legislation context

3 DESCRIPTION AND CONTEXT

3.1 THE GOURITS RIVER CATCHMENT AREA

The area referred to as the Gourits River Catchment Area (GRCA) consists of the following (refer to Figure 1):

a) The Gourits River Catchment
b) The tributaries that feed into the Gourits River and their catchments.
c) The municipal areas of: Baviaans, Beaufort West, Kannaland, Lainsburg, Langeberg, Mosselbay, Oudshoorn, Prince Albert, Swelllendam, ECDMA 10, WCDMA 02 and WCDMA 05.

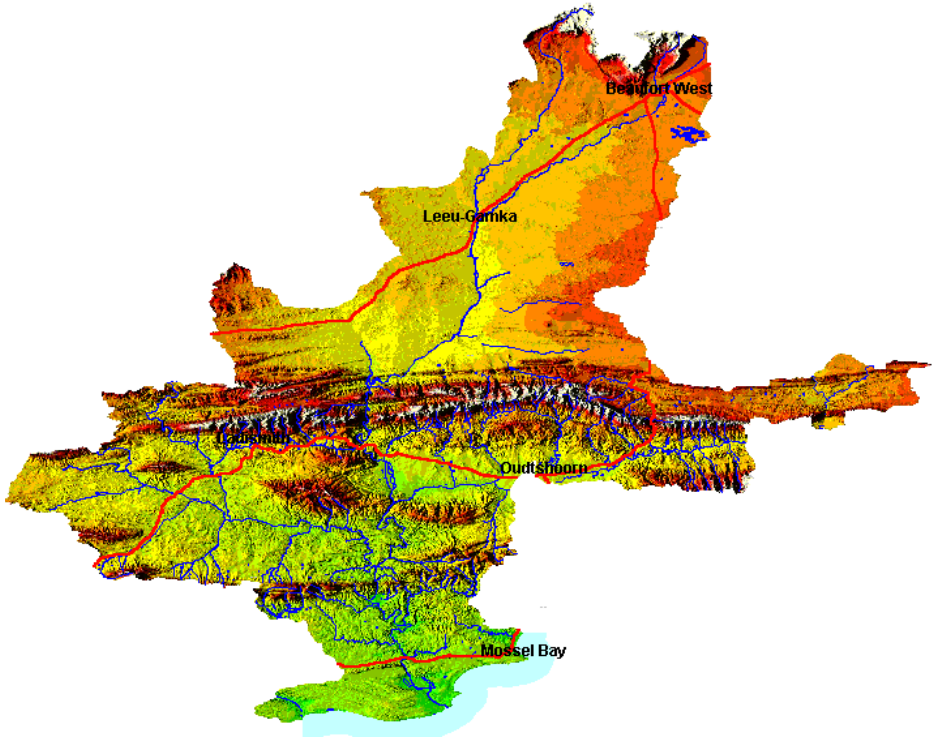


Figure 1: The Gourits River Catchment Area (DEAT 2002/3)

3.2 REGIONAL CONTEXT

The Gourits River Catchment Area is situated along the southern coast of South Africa and extends inland across the Little Karoo. The area has two primary climatic regions that display distinctly different characteristics; the large arid inland Karoo area drained by the Gourits River and the smaller humid strip of land along the coastal belt with several small rivers. Economic activity in the arid areas is centred around sheep and ostrich farming, with extensive irrigation: lucerne, grapes and deciduous fruit, and forestry, tourism and petrochemical industries in the coastal region. Indigenous forests, wetlands and estuaries of high conservation status are found in the humid areas.

The Gourits River Catchment area is part of three other areas i.e. Cederberg and Baviaans (refer to Figure 2)

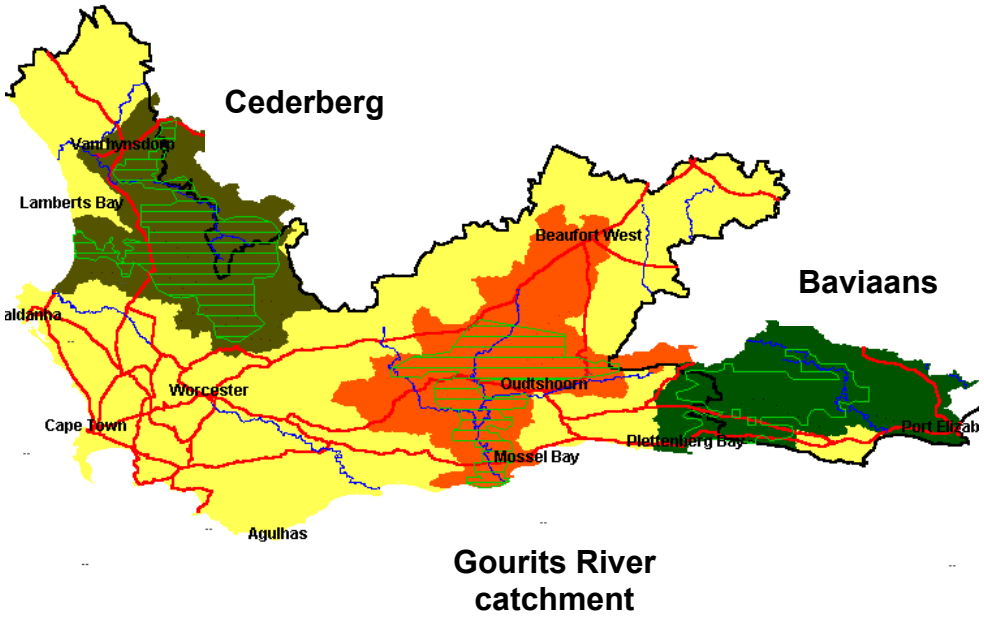


Figure 2: Cape Floral Kingdom (DEAT 2002/3)

3.3 ENVIRONMENTAL CONTEXT

In this chapter, the primary environmental context of the study area is described. Table 2 below summarises the primary environmental aspects and their relevance to the area.

Table 2: Primary environmental aspects.

ASPECT	RELEVANCE AND IMPLICATIONS
Cape Floral Kingdom	Presenting the opportunity to contribute to the conservation of one of the six Floral Kingdoms of the world (e.g. via the promotion of the ideals of the CAPE project
CAPE Project	Presenting the opportunity to give effect to the strategies put forward by CAPE for conservation of Fynbos
Catchment Area	Presenting the opportunity to contribute towards conserving the catchment area and its vital community supporting functions.
Gourits Mega Reserve	Info not available yet

3.3.1 CAPE FLORAL KINGDOM

The Gourits River Catchment Area falls within the Cape Floral Kingdom, which is internationally recognized as one of the six Floral Kingdoms of the world. This unique Cape Floral Kingdom is the smallest, covering a mere 0.06% of the earths surface, and is the only Floral Kingdom contained in its entirely within a single country (refer to Figure 3).

Figure 3: Floristic kingdoms and regions of the world (Van Wyk & Smith 2001:9)

The Cape Floral Kingdom is of immense scientific importance. It covers only 4% of South Africa, but contains 45% of all species occurring in the country. Some 75% of all plants in the South African Red Data Book occur in the Cape Floral Kingdom (Low & Rebelo 1996:49). It is characterised by an exceptional richness in plant species and high endemicity. More than 8700 species are known to occur, with more that 68% being endemic[4] (Van Wyk & Smith 2001:19). It thus compares with some of the richest floras worldwide, surpassing many tropical forest regions in floral diversity.

The Cape Floral Kingdom comprises various biomes, namely Fynbos, Nama Karoo, Succulent Karoo and Thicket (refer to Figure 4). However, Low and Rebelo (1996:45) state that the contribution of Fynbos in terms of species richness, endemicity and fame, is so overwhelming, that the Cape Floral Kingdom is considered to be "essentially Fynbos[5]"

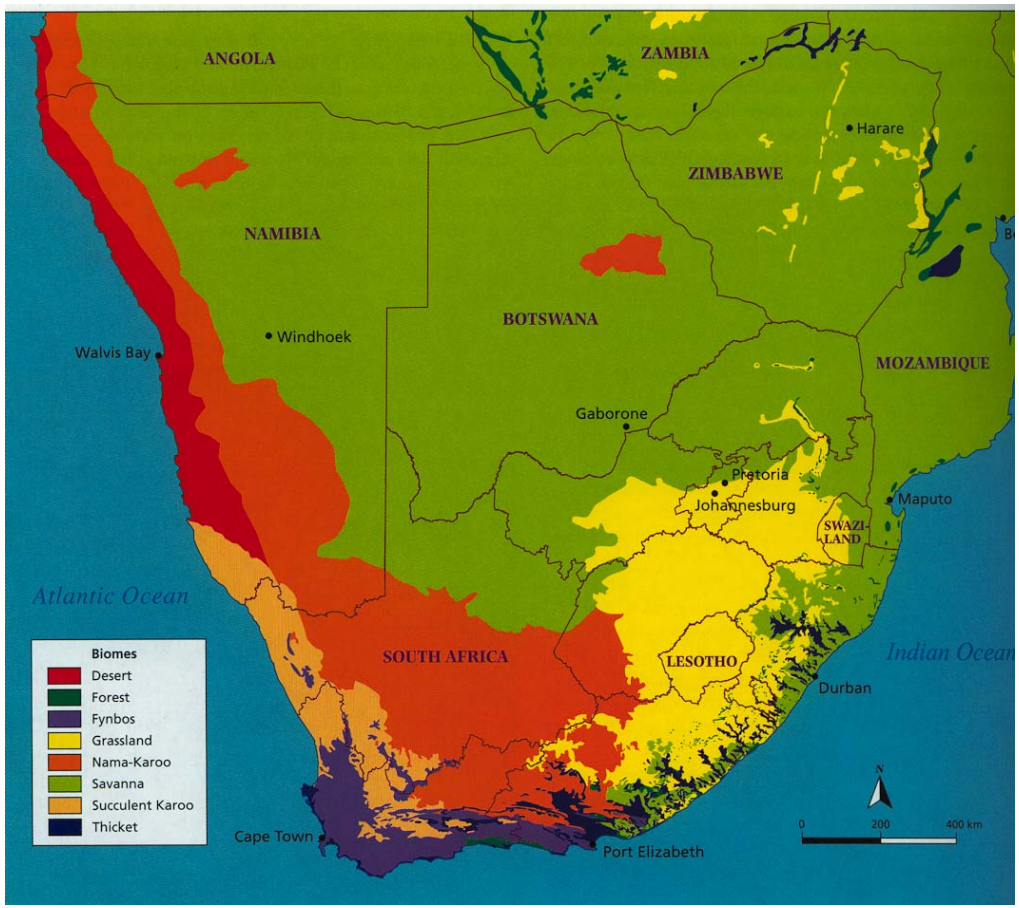


Figure 4: Biomes of southern Africa (Van Wyk & Smith 2001:8)

[4] Confined to, or exclusive to a particular, specified area

[5] Fynbos is the noun describing the unique flora that occurs exclusively in the South-Western Cape in a narrow band following the Cape Fold Mountains from north of Niewoudtville to near Port Elisabeth (Low & Rebelo 1996:45)

3.3.2 REGIONS AND CENTRES OF PLANT ENDEMISM

Three regions and 18 centres of endemism have been identified in South Africa according to van Wyk & Smith (2001:17). The GRCA falls into two of these regions, that is, the Cape Floristic Region (CFR) and the Succulent Karoo Region (SKR), more specifically the Little Karoo Centre (LKC) in this region (refer to Figure 5).

3.3.3 THE CAPE PROJECT

The CAPE Action Plan for the Environment (CAPE) is a project developed by the South African government in partnership with the Global Environment Facility (GEF) to secure the future of the Cape Floral Kingdom. The Cape project was made possible by a grant from the GEF.

The Cape project was established to develop a long-term strategy to conserve biodiversity in the terrestrial, marine and freshwater ecosystems of the Cape Floral Kingdom. It has produced a Strategy and Action Plan. Specific objectives of the Strategy, as stated in the Cape Action Plan For The Environment, include the following:

a) Establishing an effective reserve network, enhancing off-reserve conservation and supporting bioregional planning.
b) Developing methods to ensure sustainable yields, promoting compliance with laws, integrating biodiversity concerns into catchment management, and promoting nature-based tourism.
c) Strengthening institutions, policies and laws, enhancing co-operative governance and community participation and support continued research.

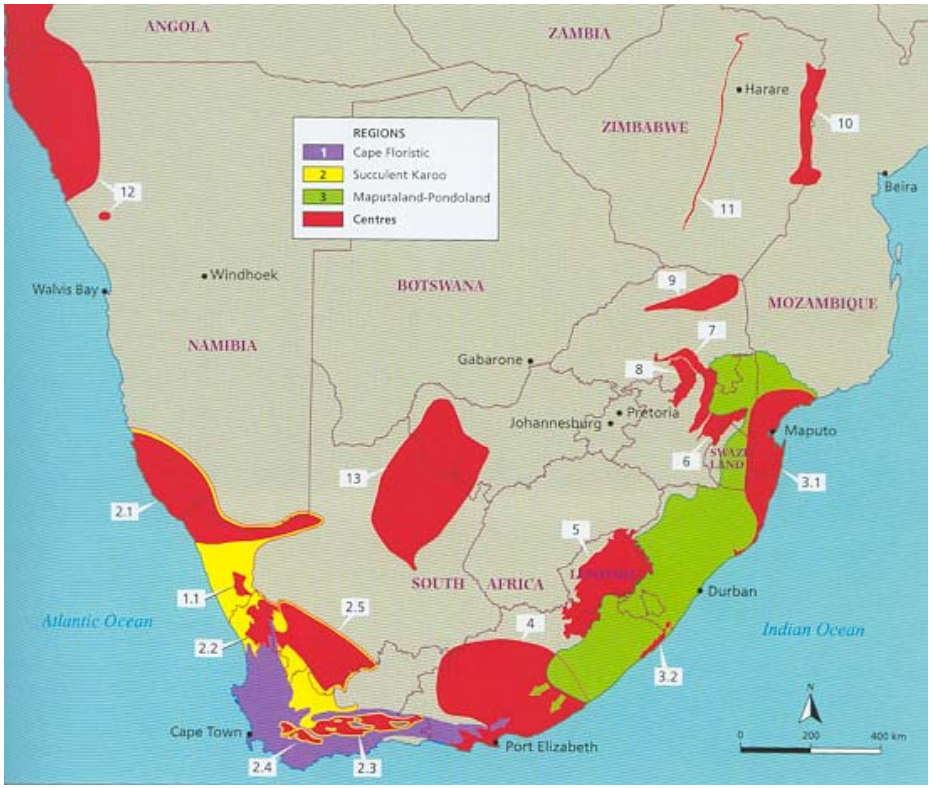


Figure 5: Principal regions and centres in southern Africa (Van Wyk & Smith 2001:17)

3.3.4 CATCHMENT AREA

The Gourits River Catchment Area is the Water Management Area 16: Gourits.

In accordance with the Bioregional Planning Framework for the Western Cape it is of fundamental importance to promote the maintenance of hydrological processes and catchment dynamics when planning and managing areas that form part of a catchment.

Government policy, which forms the basis of the National Water Act, 1998 (Act 36 of 1998), states in the article "since many land uses have a significant effect on the water cycle, the regulation of land use should, where appropriate, be used as an instrument to manage water resources".

It is therefore imperative that the rivers that flow into the Gourits River can have an effect on the water cycle and can be managed in a manner that ensures their long-term sustainability.

3.4 BIOPHYSICAL CHARACTERISTICS

The first considerations are historical geology and climate, which, in conjunction, have interacted upon the river basin, for they have created the basic form. When this is understood, the various topographic regions become clearly evident. The current climate and hydrology can be use to explain the pattern of rivers and streams, the distribution of groundwater, relative quantities and physical properties. The pursuit of this information on the movements of sediments, some fluvial processes, other from deposition, will reveal the pattern, distribution and properties of soils. When climate, topography, hydrology and soils are known, the incidence of plants becomes clearer. As animals are all either directly or indirectly plant-related, whether in terrestrial or aquatic environments, knowledge of the plant communities will tend to explain the distribution of animals.

3.4.1 GEOLOGY

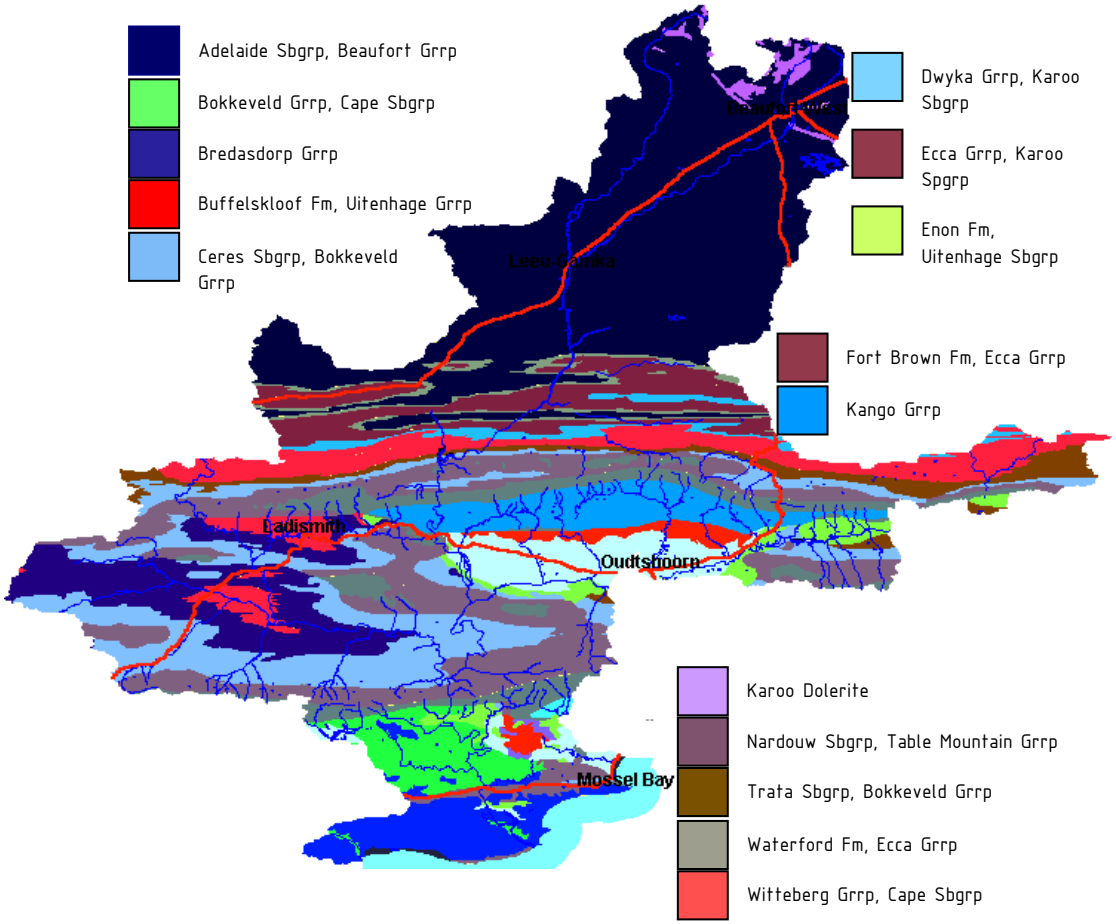


Figure 6: The stratigraphic geology of the GRCA (DEAT 2002/3)

a) Cape Floristic Region

The Cape Floristic Region is geologically dominated by rocks of the Cape Super group that consists of Table Mountain, Bokkeveld and Witteberg Groups (Van Wyk & Smith 2001:21). The Witteberg Group consists mostly of siltstones imbedded with thin beds of sandstone, capped by conspicuous white Quartzite (Van Wyk & Smith 2001:21). Shale's of the Bokkeveld and Malmesbury Groups mainly underlie valleys and the lower slopes of the mountains. Tertiary of younger sands, conglomorate and other types of sediment cover much of the coastal plains.

b) Little Karoo Centre

According to van Wyk and Smith (2001:59). The low-lying regions of the LKG are underlain by mosaic of various rock strata, including sediments of the:

- Kango Group (conglomerate, shale, limestone)
- Bokkeveld Group (shale, siltstone, sandstone)
- Witteberg Group (quartzite, shale)
- Uitenhage Group (conglomerate, siltstone, mudstone, calcrete)

Higher reaches of the Mountains consist of the Table Mountain Group. Scree and alluvium respectively border the mountain chains and major river channels (Van Wyk & Smith 2001:59)

3.4.2 CLIMATE

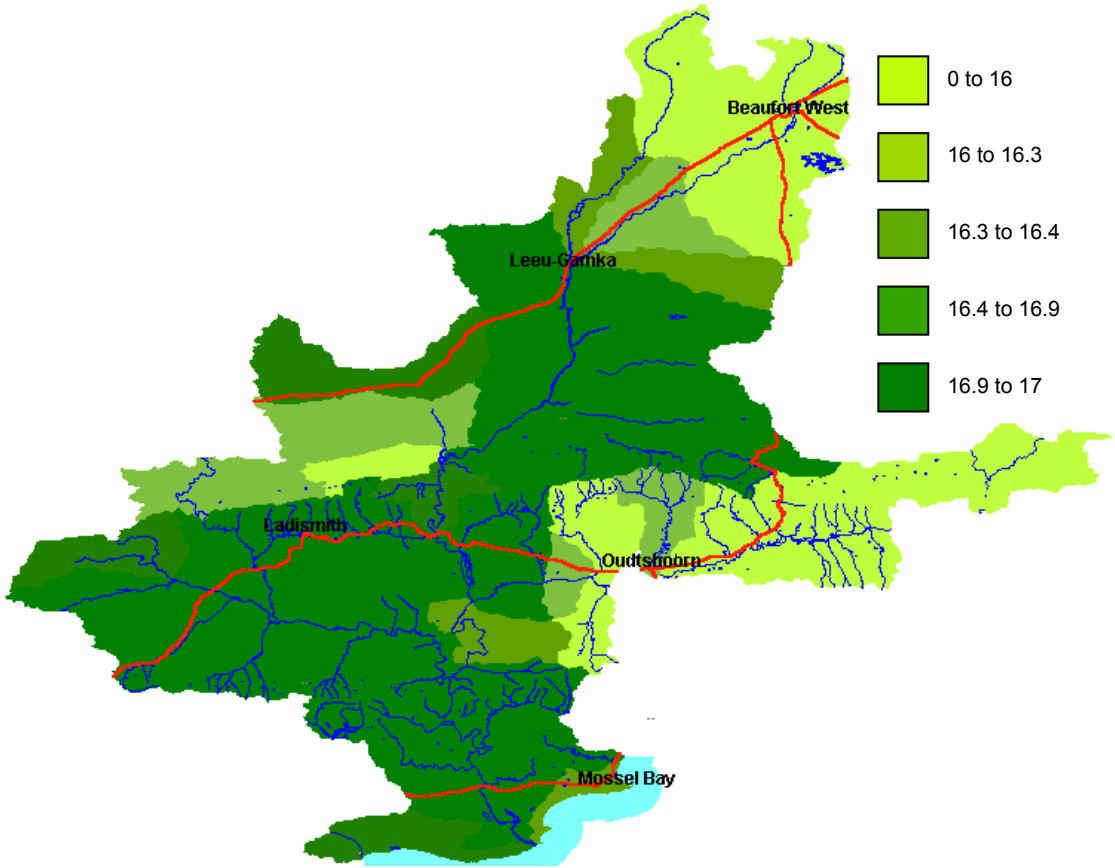


Figure 7: Mean Annual Temperature (DEAT 2002/3)

a) Cape Floristic Region

The rainfall in the eastern part of the CFR is evenly distributed throughout the year but in the western part receives most of its rainfall in the winter. Rainfall towards the west is mainly cyclonic. Towards the far eastern parts occasional convectional thunderstorms are not uncommon in the warmer months (Van Wyk & Smith 2001:20). Throughout the region there are a marked rainfall gradients corresponding to altitudinal gradients. According to van Wyk & Smith (2001:20), the average annual rainfall is mostly between 300 and 2 000mm, but it is estimated to be as high as 5 000mm on some mountain peaks.

Mean annual temperatures vary from 15–16°C at the coast to 17–18°C further inland, but are lower than 13°C at high altitudes. Winds may blow throughout the year, northwesterly gales associated with cyclones in winter, and southeasterly winds in the summer (Van Wyk & Smith 2001:20).

b) Little Karoo Centre

Climatically the Little Karoo is much drier than the higher reaches of its associated mountains. According to van Wyk and Smith (2001:59), arid conditions are caused mainly by rain-shadow affect of the Langeberg in the south. Annual rainfall varies from 125–300 mm, but can be as high as 400 mm locally due to orographic effects.

The western proportion of the LKC receives predominantly cyclonic winter rain (May-September), whereas the eastern proportion receives most of its rain early November and very late summer (Van Wyk & Smith 2001:59).

Very large temperature fluctuations are an outstanding feature of the climate in LKC. Contrasts of 28°C between day and night are not unusual in low-lying regions (Van Wyk & Smith 2001:59). The mean daily maximum temperature is about 26°C, mean daily minimum about 10°C and mean annual temperature about 18°C (Van Wyk & Smith 2001:59). It can be exceedingly hot in the valley, with the average extreme maximum about 44°C. Winter temperatures may drop to an extreme average of -3°C.

3.4.3 TOPOGRAPHY

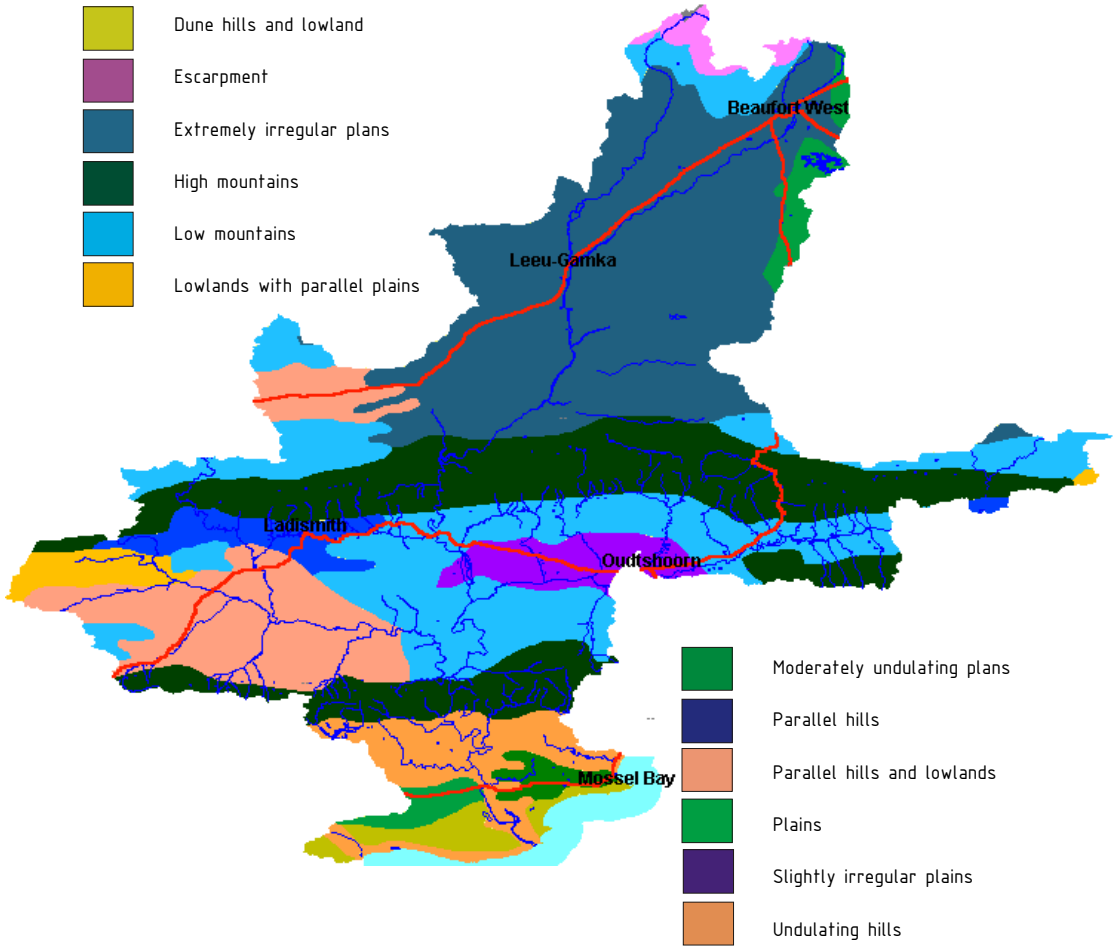


Figure 8: The Broad Terrain Topography (DEAT 2002/3)

a) Cape Floristic Region:

The landscape, according to Van Wyk and Smith (2001:20), of the Cape Floristic Region (CFR) is dominated by the subparrallel ranges of the Cape Fold Belt mountains and their undulating intermontane valleys. The eastern part of the CFR, the mountains trend is east-west but towards the west the orientation is northerly. The average altitude of the mountains ranges from 1000 – 1500m with individual peaks exceeding 2000m. Low-lying coastal plains covered by deposits of marine origin along the coast, especially south of the Langeberg range (Van Wyk & Smith 2001:20)

b) Little Karoo Centre

The Little Karoo Centre (LKC) consists of level plains and gently rolling hills, rugged rocky ridges and arid mountain foothills and slopes (Van Wyk & Smith 2001:59). Over most of the valley floor, according to Van Wyk and Smith 2001:59), the altitude varies from 200 – 400 m. Between Calitzdorp and Van Wyksdorp the Rooiberg Range (1490 m) cuts across the valley and divides the LKC into a western (Ladismith Karoo) and eastern portion. East of
Oudshoorn towards Uniondale the very rugged Kammanasie Mountains rise to 1955 m.

3.4.4 HYDROLOGY

The Gourits River Catchment Area consists of six Secondary catchments, refer to Figure 9.

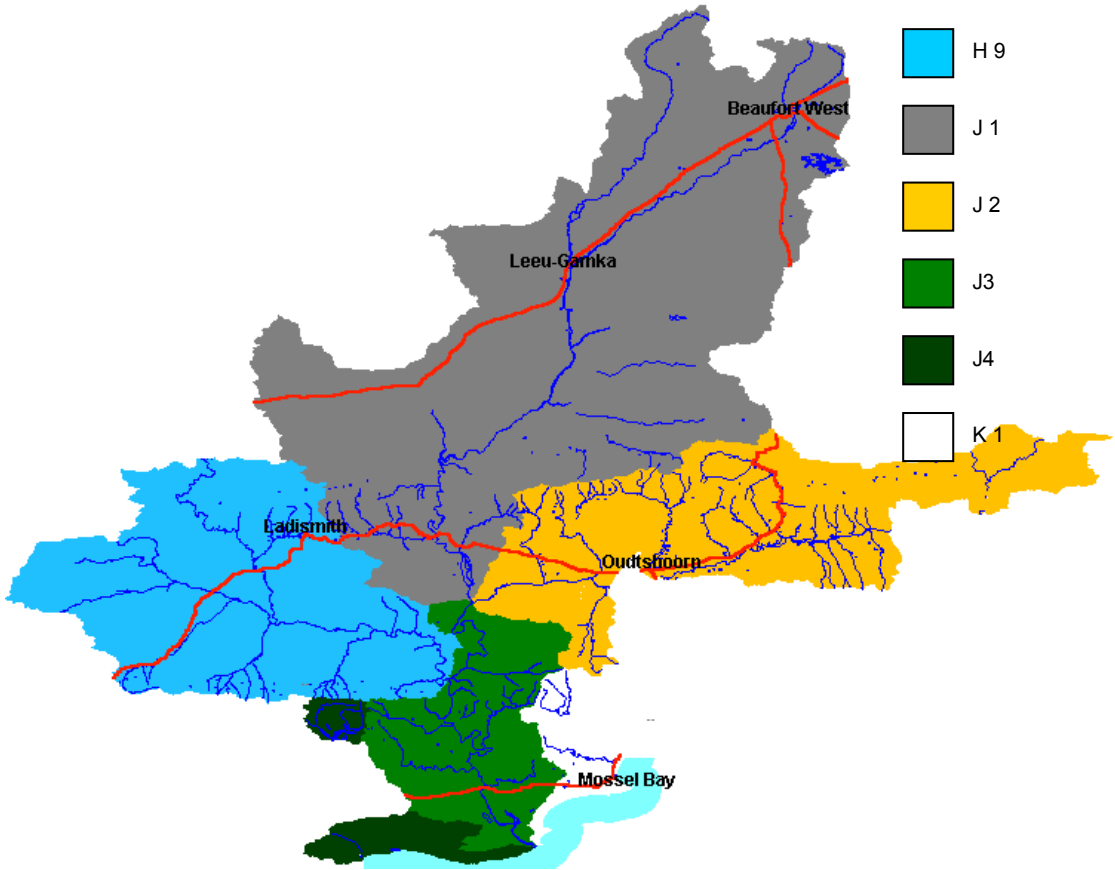


Figure 9: The Secondary Catchments Codes (DEAT 2002/3)

The Mean Annual Runoff for these Secondary catchments, varies from 47.9 cubic meters to 228.9 cubic meters, refer to Figure 10.

Several dams control the Gourits River and its tributaries. Dams have also been constructed on some of the coastal rivers, where potential for further regulation remains. A substantial proportion of the yield is from groundwater, with strong interdependence between surface water and groundwater.

At current levels of development, deficits occur in all the sub-areas, with the exception of the lower Gourits River. These are mainly as a result of irrigation requirements, which are in excess of the water available, but where farming practices have been adopted accordingly. The deficit reflected for the coastal region is mostly attributable to the provision made for implementation of the Reserve. At present day conditions all urban/industrial uses can be fully supplied. However, the total irrigation requirements cannot always be supplied from run-of-river.

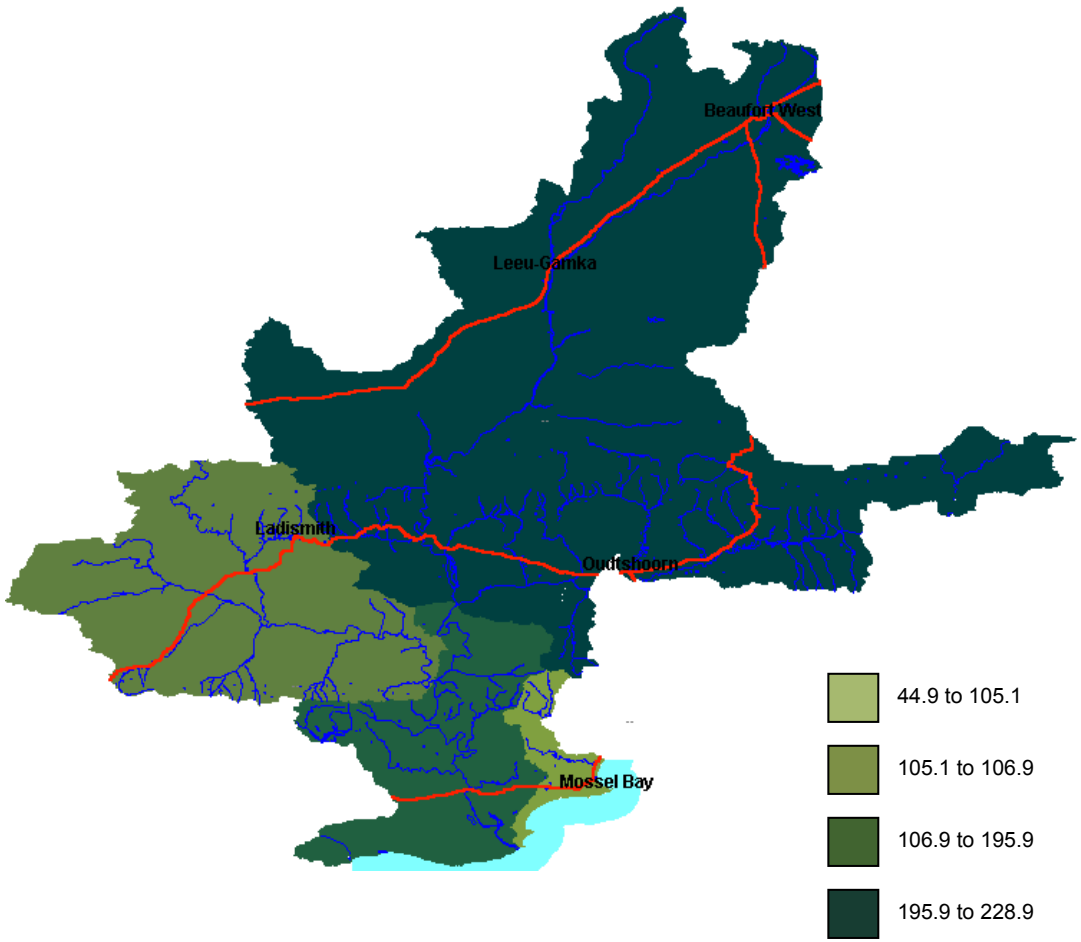


Figure 10: The Secondary Mean Annual Runoff (DEAT 2002/3)

There are 29 classified wetland systems and four estuaries in the GRCA. These estuaries are:

- Blinde River
- Gourits River
- Hartenbosch
- Kafferkuils (Stilbaai)

3.4.5 SOILS

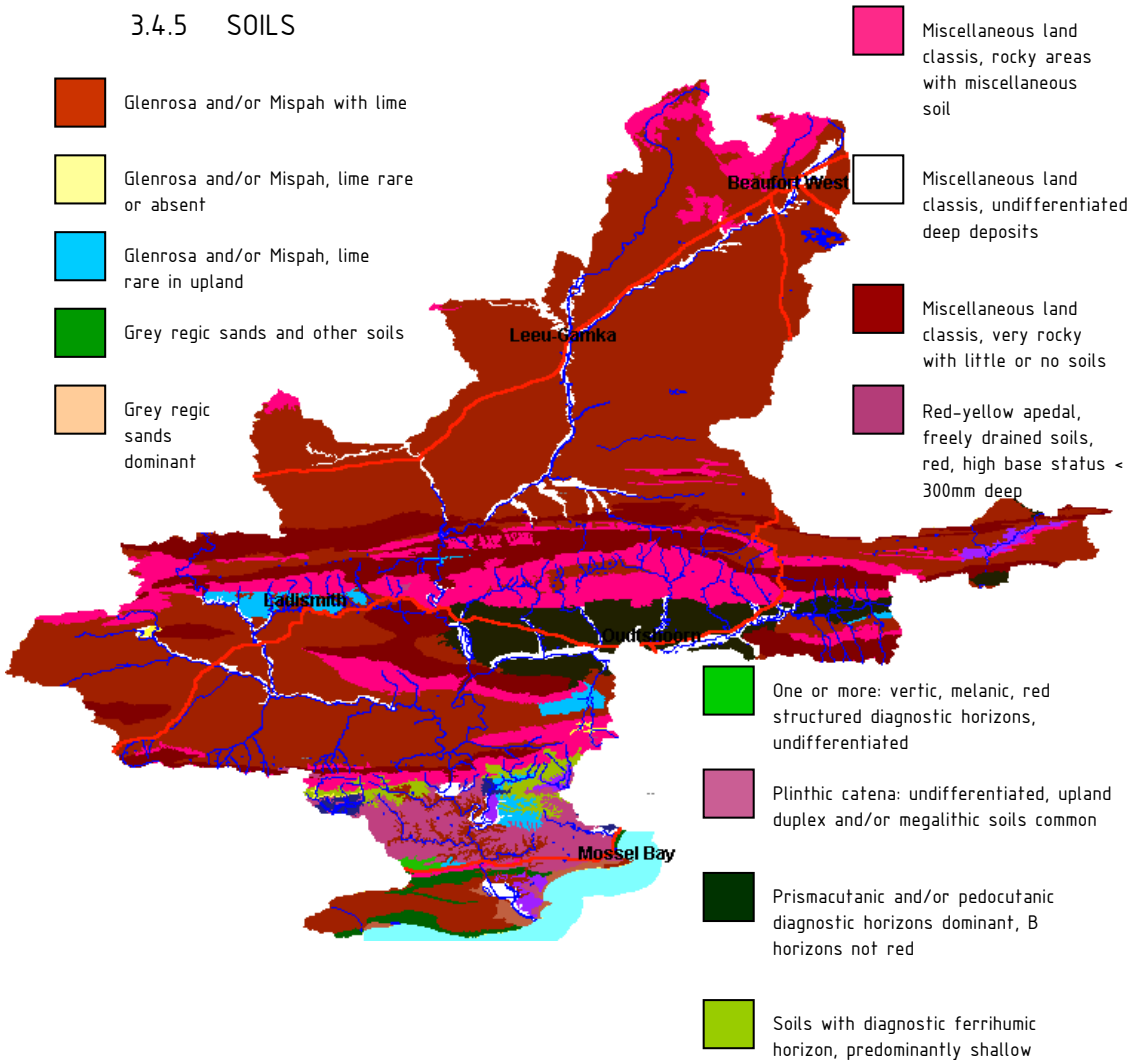


Figure 11: Soil Descriptions (DEAT 2002/3)

These soil descriptions are very specific and describe only the type of soils but to understand the potential for development Figure 12 combined these specific types into Soil Potential Classes.

a) Cape Floristic Region

The quartzites of the Cape Supergroup generally give rise to soils that are acidic, nutrient-poor, coarse-grained, rocky and shallow. This is the dominant soil type on the Cape Mountains. Clay-rich and more fertile soils are limited and have developed from the shale's of the Bokkeveld and Malmesbury Groups as well as from the Cape granites (Van Wyk & Smith 2001:21). Shallow, gravelly soils develop from patches of silcrete and ferricrete, which cap much of the Bokkeveld shale's in parts of the southern Overberg.

b) Little Karoo Centre

Soils in the valleys are predominantly shallow and stony, derived mainly from shale's and conglomerates. They are clayey, fertile and alkaline (Van Wyk & Smith 2001:59). In parts (mainly in the triangle formed by Barrydale, Ladismith and Van Wyksdorp) the weathering of quartz veins creates local fields of white quartz pebbles (Van Wyk & Smith 2001:59).

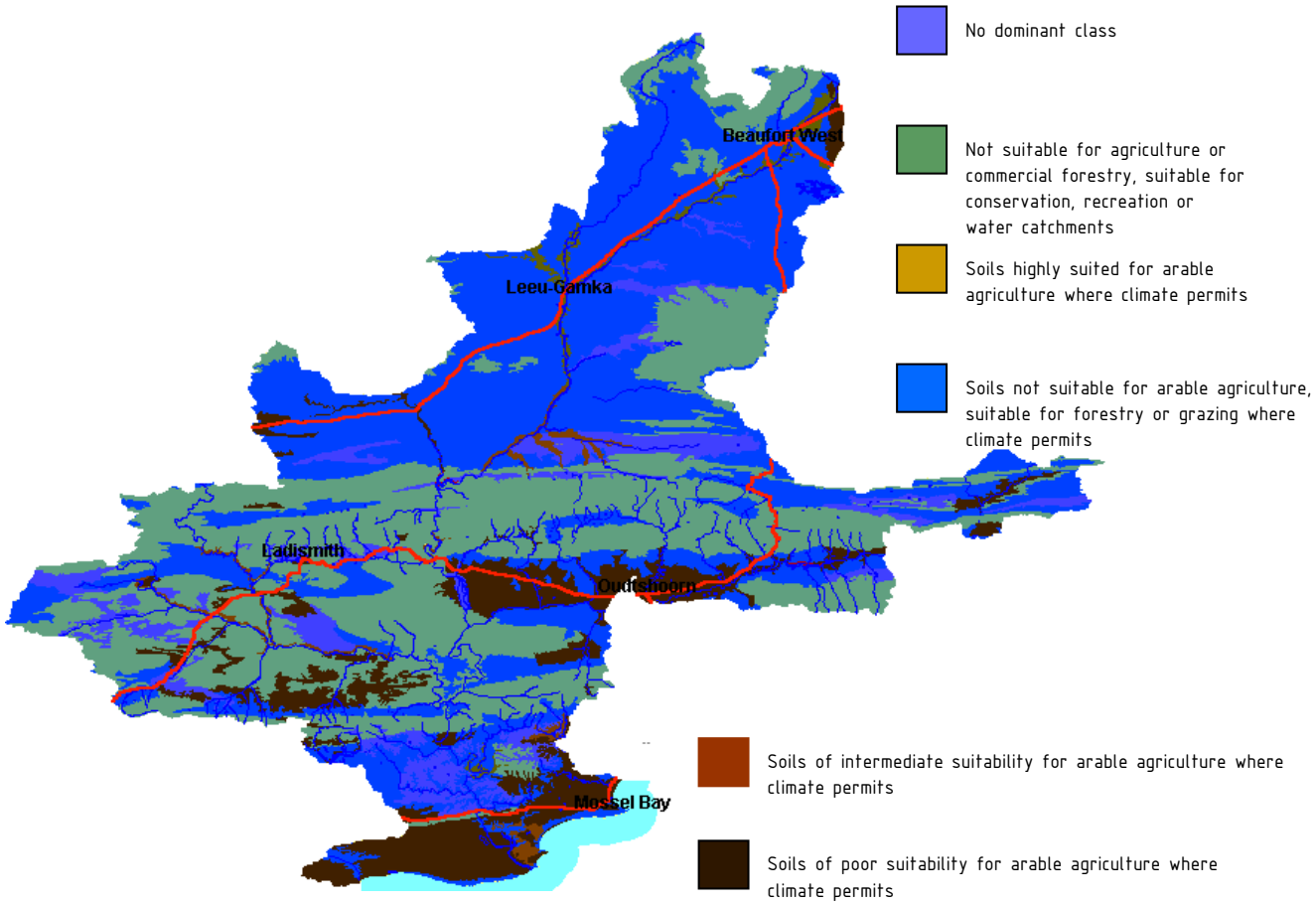


Figure 12: Soil Potential Classes (DEAT 2002/3)

3.4.6 VEGETATION

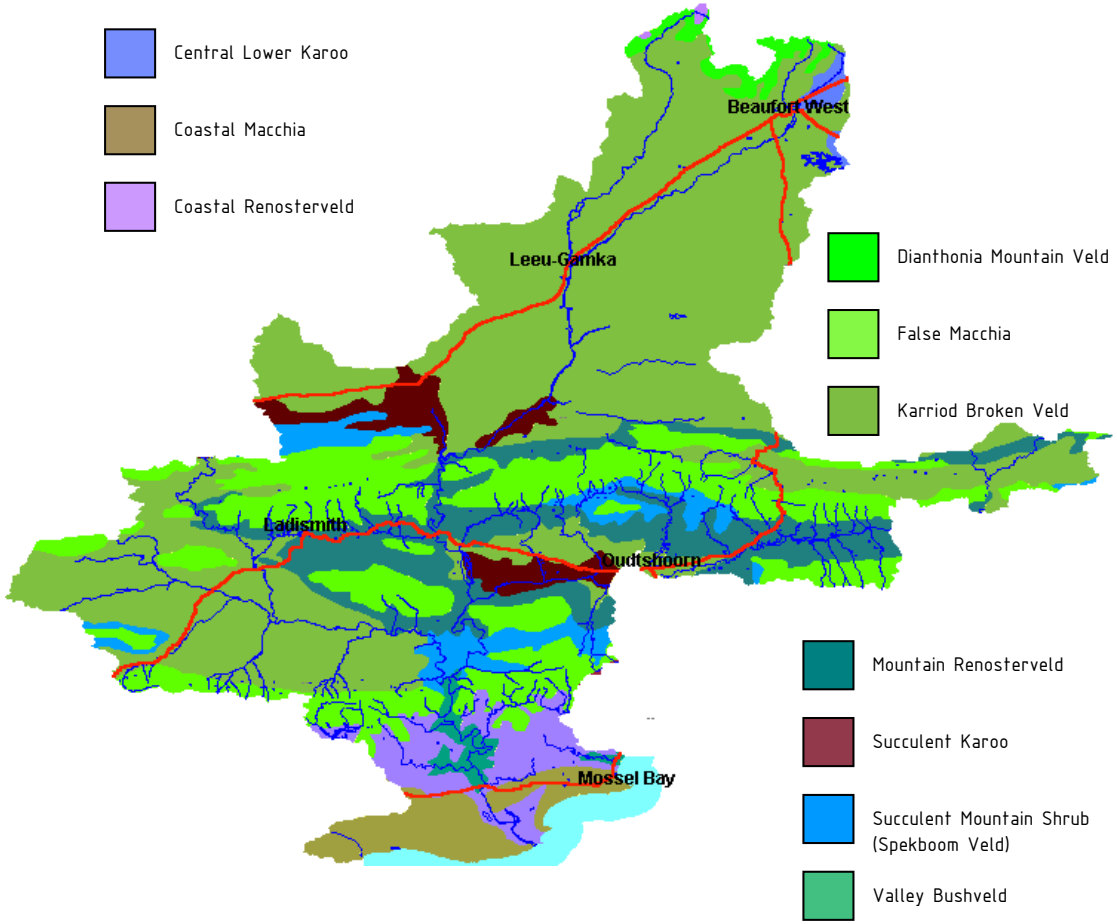


Figure 13: Acocks veld types (DEAT 2002/3)

a) Cape Floristic Region

Five broad vegetation types have been recognised in the CFR according to van Wyk and Smith (2001:21):

- Fynbos
- Renosterveld
- Succulent Karoo
- Subtropical Thicket
- Afromontane Forrest

Fynbos and Renosterveld are the main vegetation types in the CFR. Both are fire-climax shrublands, with burning intervals of 4-60 years for Fynbos and 2-15 years for Renosterveld. Fynbos is the prevalent vegetation type of the CFR and is mainly associated with the nutrient-poor soils of the Cape Fold Belt Mountains (Van Wyk & Smith 2001:21). Many different types of Fynbos vegetation are recognized, e.g., proteoid, ericaceous, dry and grassy Fynbos.

Renosterveld resembles Fynbos in being dominated by ericoid shrubs, but is quite different floristically, with very few members of Restionaceae, Ericaceae and Proteaceae.

b) Little Karoo Centre

The predominant vegetation type of the LKC is broadly classified as Little Succulent Karoo, with Spekboomveld (Spekboom Succulent Thicket) mainly on the north-facing aspect of hills, notably between Calitzdorp and Oudtshoorn (Van Wyk & Smith 2001:60). Dense stands of Acacia karoo grow along some of the riverbanks.

Central Mountain Renosterveld is found mainly in the western Little Karoo and occurs on soils derived from rocks of the Bokkeveld and Witteberg Group and rarely on Karoo Supergroup shale's (Van Wyk & Smith 2001:59). South and Southwest Coast Renosterveld. Which is characterised by a high proportion of grasses, occurs in the eastern Little Karoo, mainly on clays and slits derived from Bokkeveld and Kango Group shale's and Uitenhage Group conglomerates (Van Wyk & Smith 2001:59). Enclaves of Renosterveld and Fynbos cap nearly all higher koppies and mountains.

3.4.7 HABITAT

a) Birds

There are four sensitivity zones of all the bird species in this area. Within the zones are there different bird classification zones where the specific birds are grouped.

There are a full Bio Atlas Species Report of these groups of birds in Addendum A

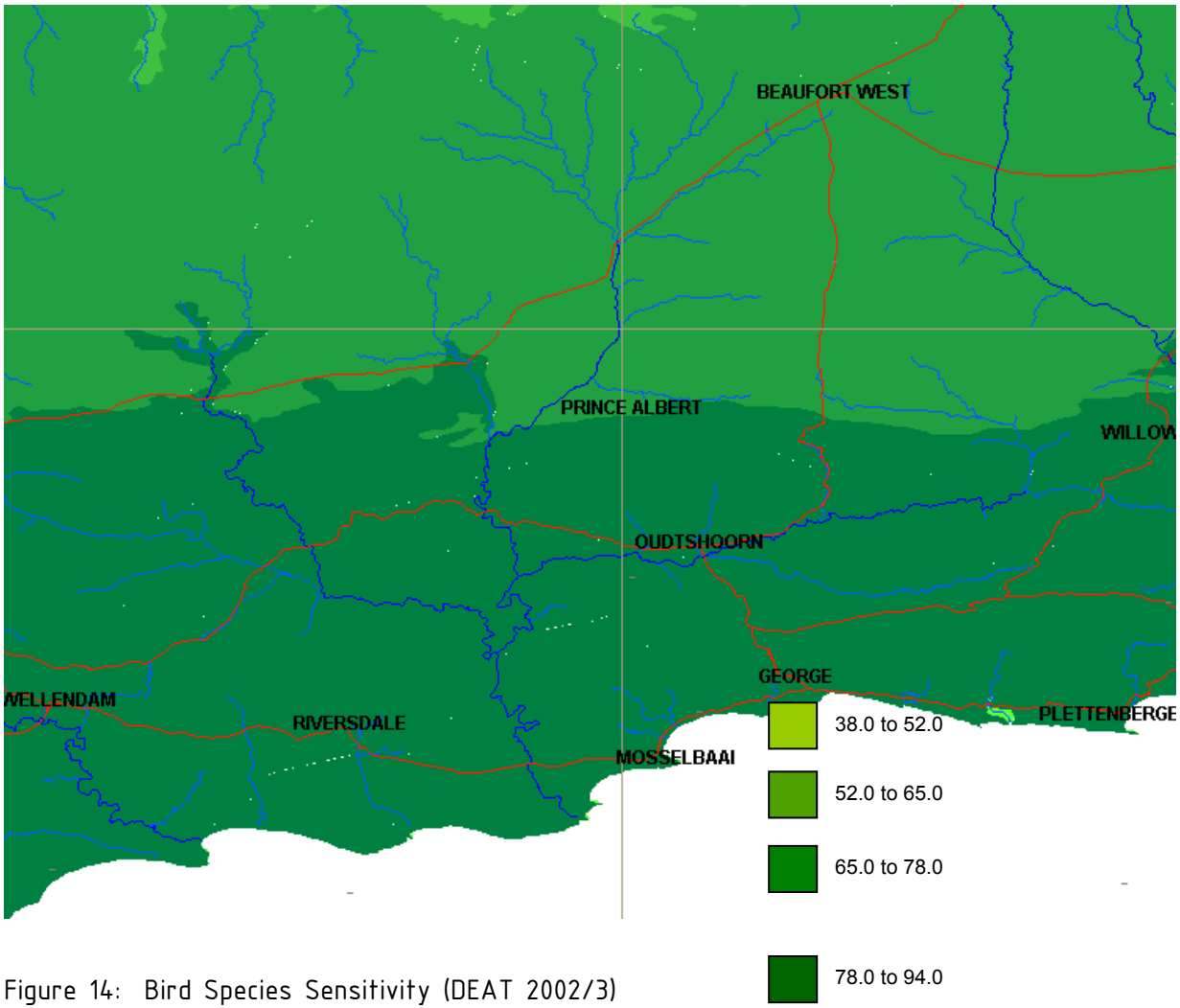
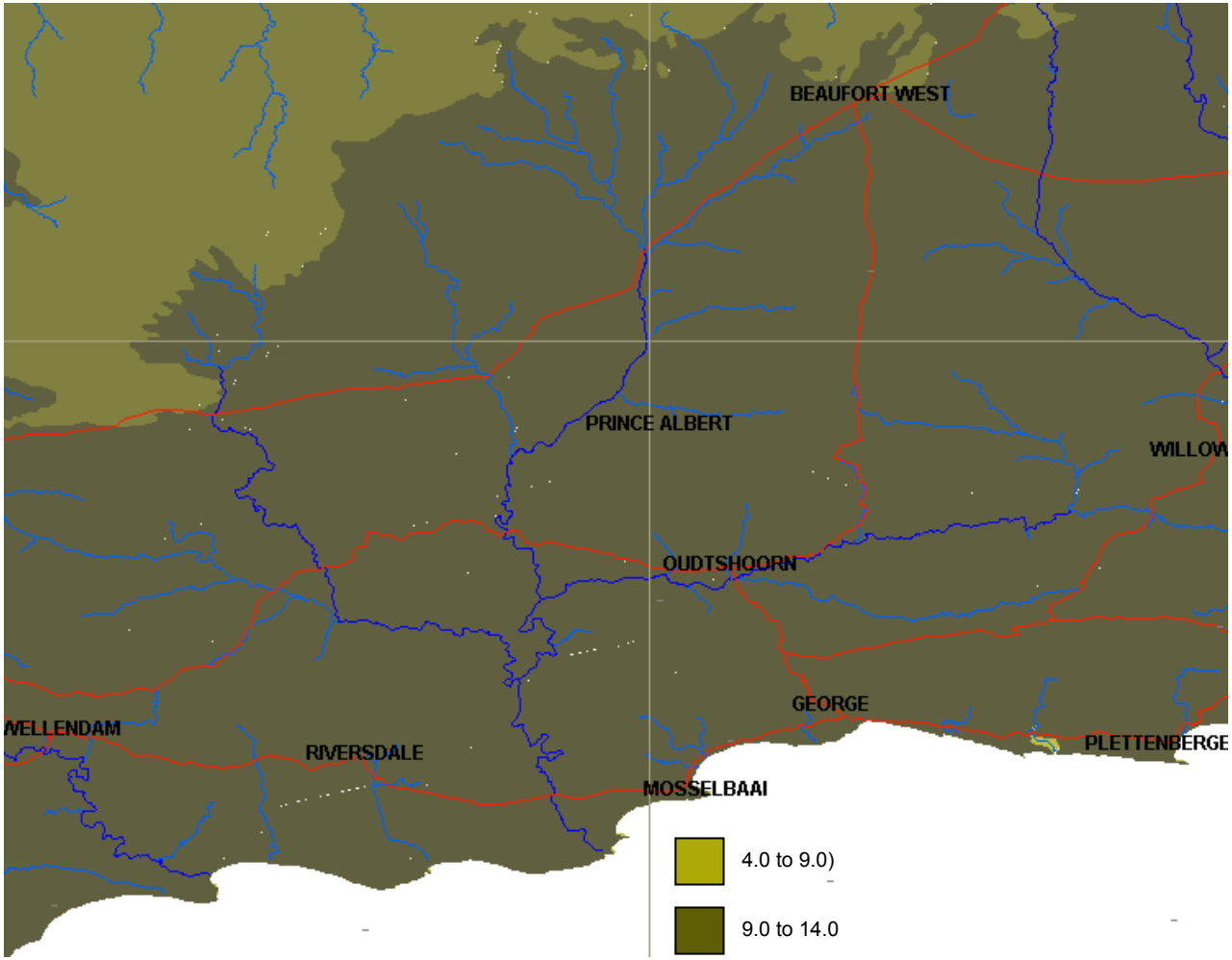


Figure 14: Bird Species Sensitivity (DEAT 2002/3)

b) Mammals



The area is part of two mammal species sensitivity areas. Within this areas are zones of different groups that consist of specific animals

There are a full Bio Species Atlas report of these groups of animals in Addendum A

Figure 15: Mammal Species Sensitivity (DEAT 2002/3)

c) Reptiles

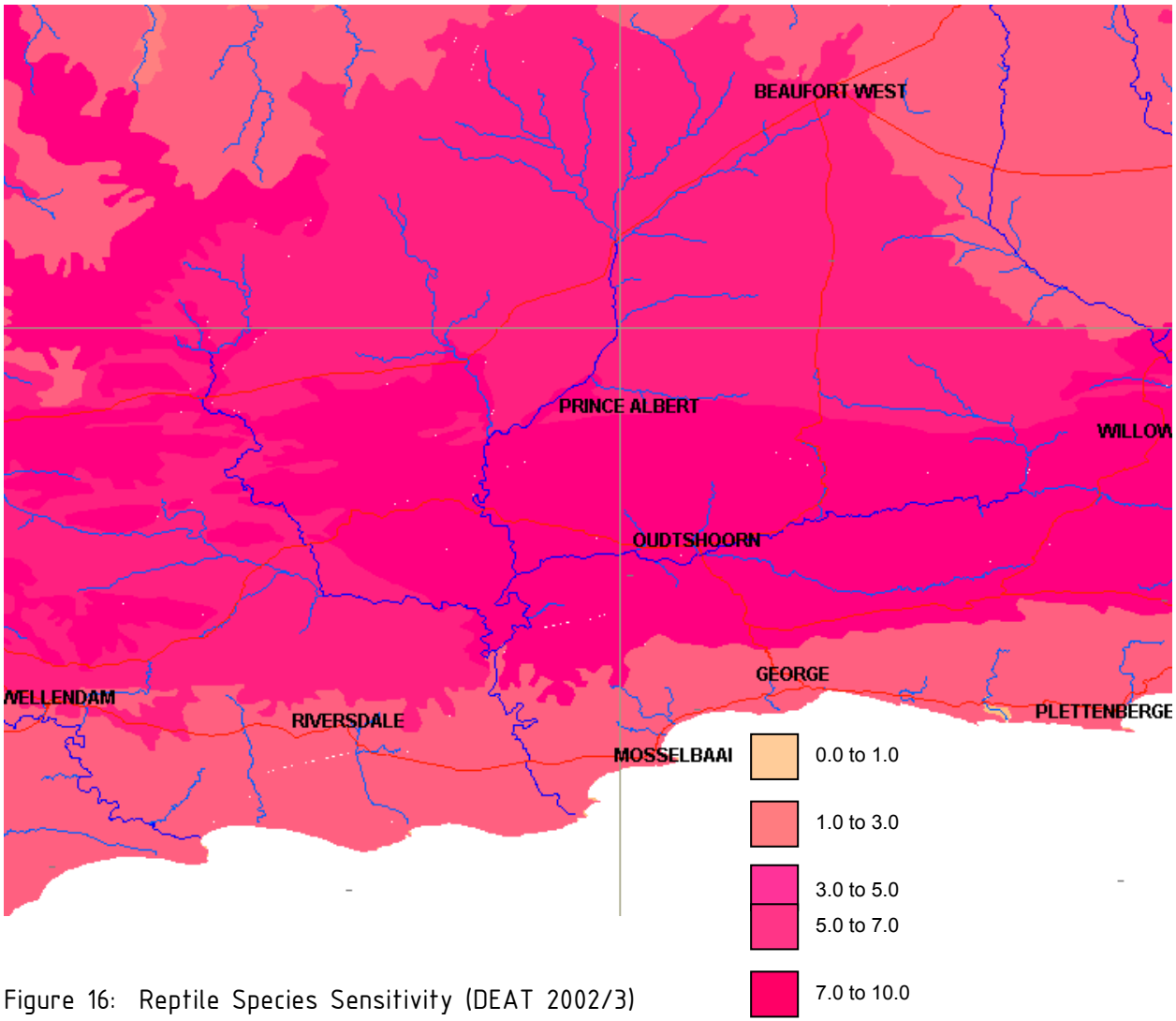


Figure 16: Reptile Species Sensitivity (DEAT 2002/3)

The area is part of five reptile species sensitivity areas. Within this areas are zones of different groups that consist of specific reptiles

There are a full Bio Species Atlas report of these groups of reptiles in Addendum A

d) Scarabs

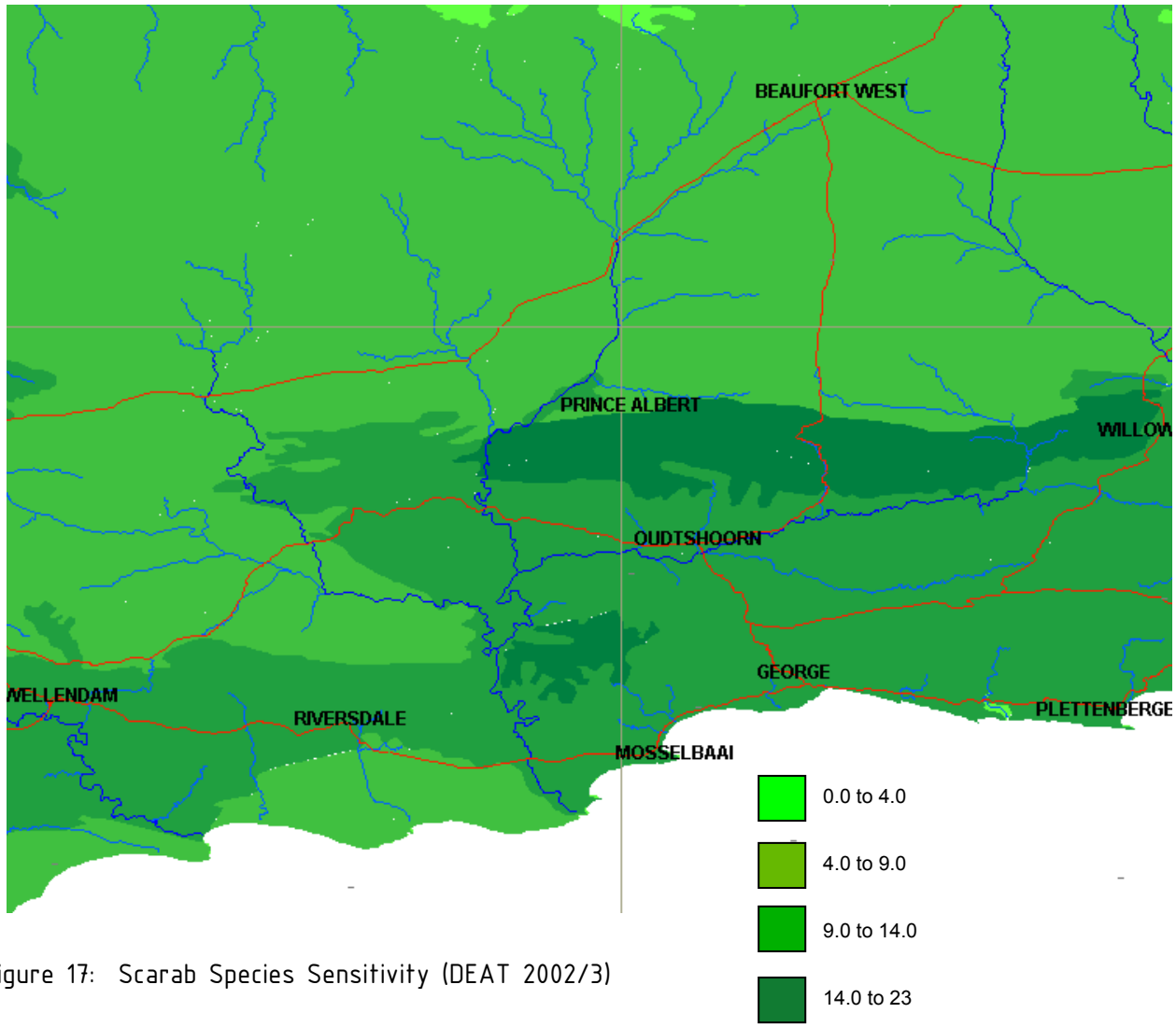


Figure 17: Scarab Species Sensitivity (DEAT 2002/3)

The area is part of four reptile species sensitivity areas. Within this areas are zones of different groups that consist of specific reptiles

There are a full Bio Species Atlas report of these groups of reptiles in Addendum A

3.5 SOCIO-ECONOMIC CONTEXT

a) Social Considerations

Studies of economic growth worldwide have focused on a series of key indicators. These include per capita income, life expectancy and education levels. South Africa is in the medium category of the Human Development Index and was ranked 89th out of 174 countries in 1998.

The population of South Africa is growing at a rate of 2 – 3% per annum and is expected to double during the next 30 – 40 years (DEAT 1999[i]). Wealth and quality of life indicators show great variation across and within provinces, mostly on the basis of population group.

The Western Cape and Eastern Cape provinces are very different. The Western Cape could be described as wealthy, urban, educated and with a relatively low population growth rate, while the Eastern Cape is poor, rural, poorly educated and with a relatively high population growth rate (Idasa 1999). Obviously, these are generalisations. Table 3 shows the key population statistics of South Africa and compares it with the Western Cape and Eastern Cape.

Table 3. Key population statistics (SSA: 1998).

INDICATOR	SOUTH AFRICA	WESTERN CAPE	EASTERN CAPE
Area	1 219 090 km2 122 million ha	129 386 km2 (10,6%)	169 580 (13,9%)
Population (1995 survey)	42 million	3,7 million (SSA) 4,4 million (Wesgro)	6,6 million
% of total population		10%	16%
Population Growth Rate (average 1980 – 1995)	2,4%	1,7%	2,6%
Human	0.677	0.826	0.507

Development Index (1991)			
Adult literacy	82%? (old stat excl TBVC?)	95 %	61 %
Population under 17 years	43%	36%	50%
Life expectancy at birth (1991)	64	68	61
HIV/Aids (antenatal) 1997	17%	6%	13%
Infant mortality per 1000	56	25	57
Poverty Rate		18 %	62 %
Unemployment rate	29%	18 - 19 %	42 %

Per capita income	R5 886 (1994) R2 206 (1995)	R9 104 (1994) R14 000 (1995)	R2 626 (1994)
GDP	R400 billion	14,1 % of national	7,6 % of national
Rural population	19 million	0,5 million	4 million
Urbanisation rate	54%	85 - 90 %	37%

b) Economic considerations

By African standards, South Africa is a wealthy country. Although South Africa covers only 3% of the surface area of Africa, it accounts for approximately 40% of all industrial output and 25% of gross domestic product (GDP). However, this wealth is highly concentrated geographically and in terms of population groups, with rural incomes generally being 50% lower than urban incomes.
The most affluent 20% of households receive 65% of total income (DEAT 1999).

In terms of average provincial and national economic and social indicators, the Western Cape is one of the wealthiest provinces, while the Eastern Cape is one of the poorest. However, the south-western district of the Eastern Cape is in reality very similar to the Western Cape, environmentally, socially, politically and economically. These averages mask large inequalities within the provinces, particularly between rural and urban areas, and within metropolitan areas. Immigration into the Western Cape, especially the Cape Metropolitan Area, is driven partly by the poor social and economic conditions in the hinterland of the Eastern Cape and partly by the high quality of life and opportunities offered to skilled workers, which attracts relatively wealthy people from Europe and Gauteng. Manufacturing, trade, community services, finance, transport and agriculture are the most important economic sectors and are assisted to a significant extent by government policy.

3.6 CURRENT LAND USE CONTEXT

3.6.1 Land Ownership

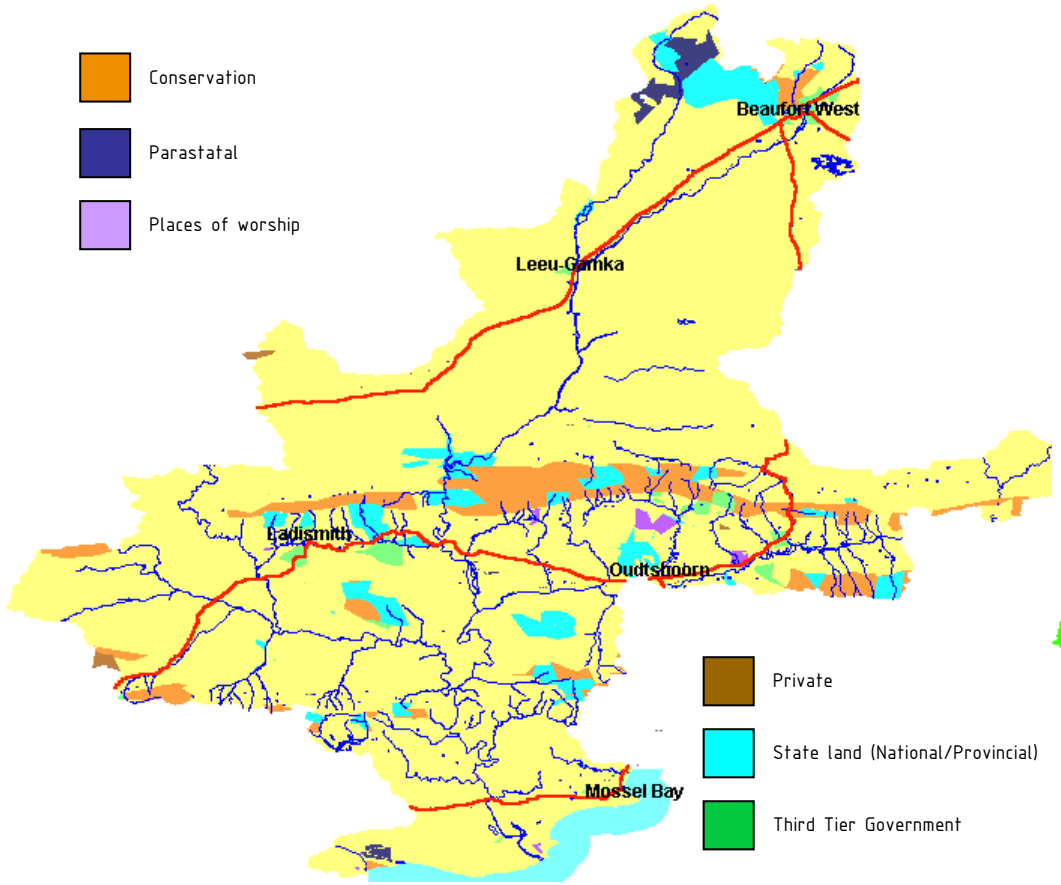


Figure 18: Land Ownership (DEAT 2002/3)

3.6.2 Land Use

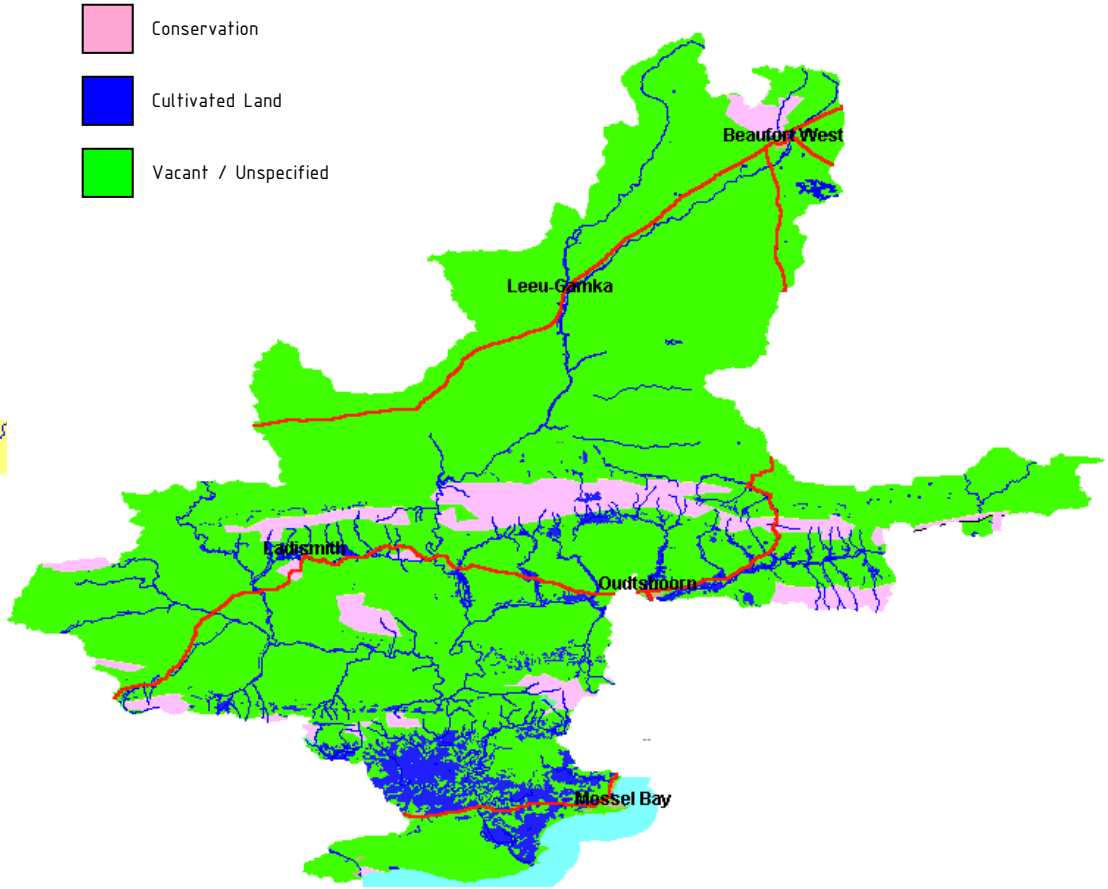


Figure 19: Land Use (DEAT 2002/3)

3.7 LEGISLATIVE CONTEXT

Central to the objectives of the enabling legislation is the promotion of sustainable development, which enquires that, the three imperatives for achieving sustainable development, namely, social, economic and environmental, be promoted in a balanced manner.

A decisively important principle, which underlines economic development, is the broadening of economic base of a region (which is a fundamental government policy). Optimum development, furthermore, originates in sound and sustainable economic performance (economic efficiency), which requires the optimal utilization of the cooperative economic advantages of a region.

Sustainable development requires specific institutional capacity, and for the development process to be successful, communities must be empowered to create, manage and maintain their own development programmes. This capacity must be structured and channelled into the community institutions (through for example IDPs of local authorities).

A number of statues make provision for the above requirements, the primary of which are listed below. Table 6 summarises the statues that are of direct relevance to the planning and development of the area.

Table 4: Relevant legislation

ACT	RELEVANCE AND IMPLICATIONS
South African Constitution, 1996 (Act 108 of 1996)	Promoting sustainable development by compelling government to pass legislation to promote sustainable social and economic development.
Development Facilitation Act, 1995 (Act 67 of 1995)	Making provision for the general principles relating to land development and land development objectives. Ensuring that integrated land development is promoted, while taking into account social, economic, institutional and physical aspects of land development, and ensuring that environmentally non-sustainable land development practices are discouraged.
Local Government Municipal Structures Act, 1998 (Act 117 of 1998)	Providing a framework within which the private sector and municipalities can work together to promote common interests. Of particular interest is the provision made for development orientated planning and the need for development action to be aligned with integrated development plans.
Local Government Municipal Systems Act, 2000 (Act 32 of 2000)	Giving effect to the country's vision of developing local government, building on the constitutional provisions for basic development rights. The act elaborates on the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of communities within the municipal area, working in partnership with the municipality's political and administrative structures.
Western Cape Planning and Development Act, 1999 (Act 7 of 1999)	Providing principles for sustainable development and environmental conservation.
Environment Conservation Act, 1989 (Act 73 of 1989)	Requirements to manage the biophysical economic and social resource of the country. Regulates the activity and the permitting process regarding: ❑ The protection of ecological processes, biophysical beauty as well as the protection of the biophysical environment. ❑ The promotion of sustained utilisation of species and ecosystems and the effective application and reuse of biophysical resources. ❑ The establishment, maintenance and improvements of environments, which contribute to a generally acceptable quality of life.
Development Facilitation Act, 1995 (Act 67 of 1995)	Measures to facilitate and speed up the implementation of reconstruction and development programmes and projects in relation to land.

ACT	RELEVANCE AND IMPLICATIONS
National Water Act, 1998 (Act 36 of 1998)	To facilitate social and economic development Providing for growing demand of water use Protection of aquatic and associated ecosystems Reducing and preventing pollution and degradation of water resources. Managing floods and droughts. To achieve this, to establish suitable institutions and to ensure that they have appropriate community, racial and gender representation.
Water Services Act, 1997 (Act 108 of 1997)	Provision of the right of access to basic water supply and sanitation. Provision of a regulatory framework for water services institutions. Provision for the establishment and disestablishment of water boards. Provision of financial assistance to water services institutions. Acknowledging that there is a duty on all spheres of Government to ensure that water supply services and sanitation services are provided in an efficient, equitable and sustainable manner.
National Conservation Management Act, 1998 (Act 107 of 1998)	Serve as the general framework within which environmental management and implementation plans must be formulated. Ensures that environmental management must place people and their needs at the forefront of its concern and serve their – physical, psychological, development, cultural, social, interests equitably
National Heritage Resources Act, 1999 (Act 25 of 1999)	Introduce an integrated and interactive system for the management of the National Heritage Resources. Promoting the nurturing and conservation of local heritage resources. Introduction of an integrated system for the identification, assessment and management of National Heritage Resources.
Adult Basic Education and Training Act, 2000 (Act 52 of 2000)	Providing an institutional framework to devise and implement national, sector and work place strategies to develop and improve the skills of the work force.

ACT	RELEVANCE AND IMPLICATIONS
Conservation of Agricultural Resources Act 1983 (Act 43 of 1983)	Purpose of the act is to empower the Minister of Agriculture to take wide-ranging steps to protect the natural agricultural resource base of the country. In particular, it aims to combat and prevent soil erosion, protect water sources and combat invader plants and weeds
Tourism Act, 1993 (Act 72 of 1993)	It ensures the prevision for the promotion of tourism. Measures are aimed at the maintenance and enhancement of standards of facilities and services hired out or made available to tourists.
National Roads Act, 1971 (Act 54 of 1971)	Provide for road traffic matters, which shall apply uniformly throughout South Africa.
National Forest Act	Purpose of the act is aimed at promoting: ❑ Sustainable management and development of forests. ❑ The restructuring of forestry in state forests. ❑ The sustainable use of forests. ❑ Community forestry ❑ Increased participation in forestry. ❑ Increased participation in forestry by disadvantaged persons.
Provision of Land and Assistance Act, 1993 (Act 126 of 1993)	Purpose of the act is to make available, privately or state-owned land to poor people who do not have land or secure tenure on land so that they can use the land for residential, agricultural or small business development purposes
Using Water for Recreational Purposes Policy, 2002	Defining government's overall and DWAF's particular responsibility regarding this water use and establishing the basic principles, aims and policy for regulating the use of water for recreational purposes.
National Environmental Management, 2002 (Act 56 of 2002)	Prevention and regulation of environmental damage
Health Act, 1977 (Act 63 of 1977)	Prevention of pollution of water for human consumption, regulations regarding communicable disease and relating to rubbish, nightsoil, nuisances, offences and penalties
White paper on Spatial Planning and Land use Management	The broad objective is to facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources.

ACT	RELEVANCE AND IMPLICATIONS
Health Act, 1977 (Act 63 of 1977)	Prevention of pollution of water for human consumption, regulations regarding communicable disease and relating to rubbish, nightsoil, nuisances, offences and penalties

SECTION D: GUIDELINES AND PRINCIPLES FOR PLANNING, DESIGN AND MANAGEMENT

SECTION SYNOPSIS

This section provides a theoretical background to:
a) Suitability Analysis
b) Regional Tourism Design
c) Ecological Landscape Design

4 PLANNING, DESIGN AND MANAGEMENT PRINCIPLES

4.1 SUITABILITY ANALYSIS

Once an ecological inventory of a place has been conducted, and some understanding of the interrelationships between people and nature achieved, it is then necessary to make detailed studies of these interactions to present options for feature use. One such type of detailed study is suitability analysis.

There are different approaches to suitability analysis. A closer view is given to the following (Steiner 1991:132):

- Soil Conservation Service Systems
- McHarg suitability analysis method

4.1.1 APPROACHES TO SUITABILITY ANALYSIS

a) Soil Conservation Service Systems

Capability classes are based on soil types that are mapped and interpreted. They were developed to assist farmers with agricultural management practices. Groupings are made according to the limitations of the soils when it is used for field crops, the risk of damage when it is used and the manner in which it responds to management.

This classification does not take into account the other biophysical characteristics of the area and it will not be used for this study purpose.

b) The McHarg, or University of Pennsylvania, Suitability Analysis Method

In Design with Nature, McHarg explained suitability analysis in the following manner:

> "In essence, the method consists of identifying the area of concern as consisting of certain processes, in land, water, and air – which represent values. These can be ranked – the most valuable land and the last, the most valuable water resources and the last, the most and least productive agricultural land, the richest wildlife habitats and those with no value, the areas of great or little scenic beauty, historic buildings and their absence, an so on." (McHarg 1999:34)

Lewis Hopkins has explained this method in the following manner:

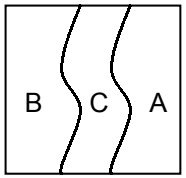
> "The output of land suitability analysis is a set of maps, one of each land use, showing which level of suitability characterises each parcel of land. This output requirement leads directly to two necessary components of any method: (1) a procedure for identifying parcels of land that are homogeneous and (2) a procedure for rating these parcels with respect to suitability for each land use," (Hopkins 1977:386)

A simplified illustration of how the suitability analysis procedure works is provided in Figure 20 (Steiner 1991:132).

STEP 1

MAP DATA FACTORS BY TYPE

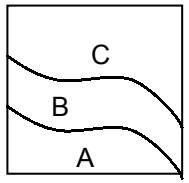
Example 1



A: 0 – 10%
B: 10 – 20%
C: 20 – 40%

SLOPE MAP

Example 2



A: SLIGHTLY ERODED
B: SLIGHT TO MODERATE
C: MODERATE

EROSION MAP

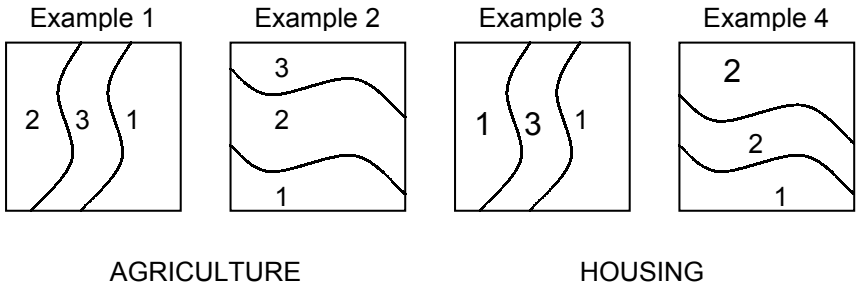
STEP 2

RATE EACH TYPE OF EACH FACTOR FOR EACH LAND USE

Factor types		Agriculture	Housing
Example 1			
	A	1	1
	B	2	2
	C	3	3
Example 2			
	A	1	1
	B	2	2
	C	3	3

STEP 3

MAP RATINGS FOR EACH AND USE ONE SET OF MAPS FOR EACH LAND USE



STEP 4

OVERLAY SINGLE FACTOR SUITABILITY MAP TO OBTAIN COMPOSITES. ONE MAP FOR EACH LAND USE

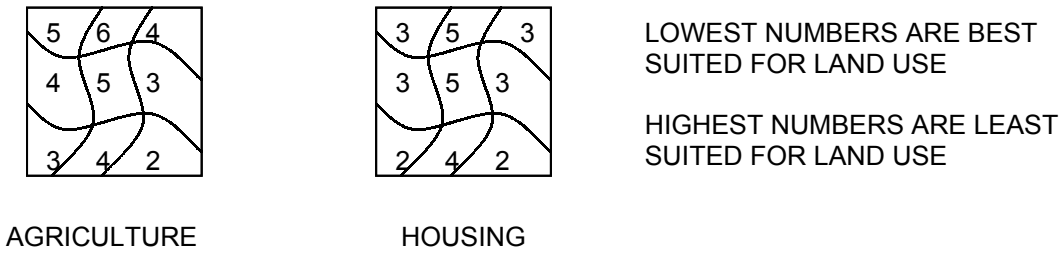


Figure 20: Suitability analysis procedure (Steiner 1991:132)

The most attractive feature of this method is that it can be used for both conservation and development of resources and this is the reason why this procedure will be followed in this study.

4.2 TOURISM

Quietly, unobtrusively, but pervasively, tourism has risen to great socio-economic heights in South Africa. Hundreds of thousands of workers depend on it for their livelihood. The government rely on its tax revenues, which help support worthwhile services, such as education and welfare. Most of all, millions of travellers gain personal enrichment through travel.

The very foundation upon which tourism rests is the land: soils, hills, valleys, ridges, mountains, streams, lakes, seas and waterfronts. It is the difference between the lands and home and those destinations that stimulates travel. Without attractions in destinations there would be no travel either for business or personal objectives (Gunn 1990:1)

Because tourists are flowing through an area, attractions require resources, design and operations for successive groups of tourists that visit throughout a single day. According to Gunn (1991:42) Travellers will visit more than one location in the period between leaving home and returning. Categories of typical activities are listed in Table 4 (Gunn 1991:42).

Table 5. Classification of travel activities according to Gunn (1991:42)

Touring Circuit Activities Categories

- Driving for pleasure, sightseeing
- Visiting outstanding natural areas: parks, forests, scenery
- Travel Camping: tent, trailer, RV
- Water touring: boating, rafting
- Visiting friends/relatives, including duty travel
- Visiting universities, factories, processing plants, science facilities
- Visiting national, state shrines, pilgrimages, gardens
- Visiting places noted for food, entertainment
- Visiting historic, archeological sites, building, museums
- Visiting places important for ethnic foods, costumes, arts, drama
- Visiting art, craft, gift, legendary places

Extended stay Activities Categories

- Vacationing at resorts: food, lodging, fitness, recreation
- Vacationing at camp sites: parks, forest areas
- Vacationing at hunting, fishing, other sports destinations
- Participating in programs at organisation camps
- Participating in festivals, events, pilgrimages
- Participating in conferences, conventions, professional business
- Vacationing at gaming centres: gambling, racing entertainment
- Visiting major sports arenas: domes, coliseums
- Vacationing at theme parks

Table 5 relates these categories of activities in terms of kinds of attraction places needed to support them. This list shows the difference between attraction objectives for the two classes of markets.

Table 6: Classification of attractions (Gunn 1991:42)

Touring Circuit Attractions	Longer-stay Attractions
Roadside scenic areas	Resorts
Outstanding natural areas	Camping areas
Camping areas	Hunting/water sports areas
Homes: friends and relatives	Organisation camp sites
Unusual institutions	Vacation home complexes
Shrines, cultural places	Festival, event places
Food, entertainment places	Convention, meeting places
Historic buildings, sites	Gaming centres
Ethnic areas	Sports arenas, complexes
Shopping areas	Trade centres
Crafts, lore places	Science/technology centres

The greater the aggregation of both touring circuit and longer-stay attractions, the better. Groupings provide business support for the services designed by travellers, such as hotels, food and entertainment. The list in Table 5 will be used and extended in to the framework for Management and Development for the Gourits River Catchment Area.

4.2.1 DESTINATION CHARACTERISTICS

The design and development of tourist destinations could be facilitated greatly by knowing in advance the characteristics that will influence the impact of development. The key characteristics to be analysed according to Gunn (1991:55):

- Natural environmental features and processes. These include topography, mountains, lakes, rivers and sea, soil, vegetation, flora and fauna, sunshine, temperature, precipitation, erosion and environmental processes.
- Economic structure and economic development. This include the level economic development, diversity of economic base, spatial characteristics of development and patterns of investment
- Social structure and organisation. These include the demographic profile of the host population, strength of local culture, patterns of social organisation, religious affiliation, levels of health and safety, language and traditions.
- Level of tourist development. The degree of local involvement in tourist industry, rate of development, nature and diversity of attractions, types and quality of accommodation.

For the purpose of this study the key characteristics used for analysing the impact of development is:

- Biophysical aspects
- Human Needs

4.2.2 DESTINATION CONCEPT

Design considerations must be considered as a whole, that is, grouping the attraction units described earlier, together. This procedure allows a broader perspective and stimulates greater design integration. Figure 15 (Gunn (1991:57) shows the need for integrated planning and design of destinations.

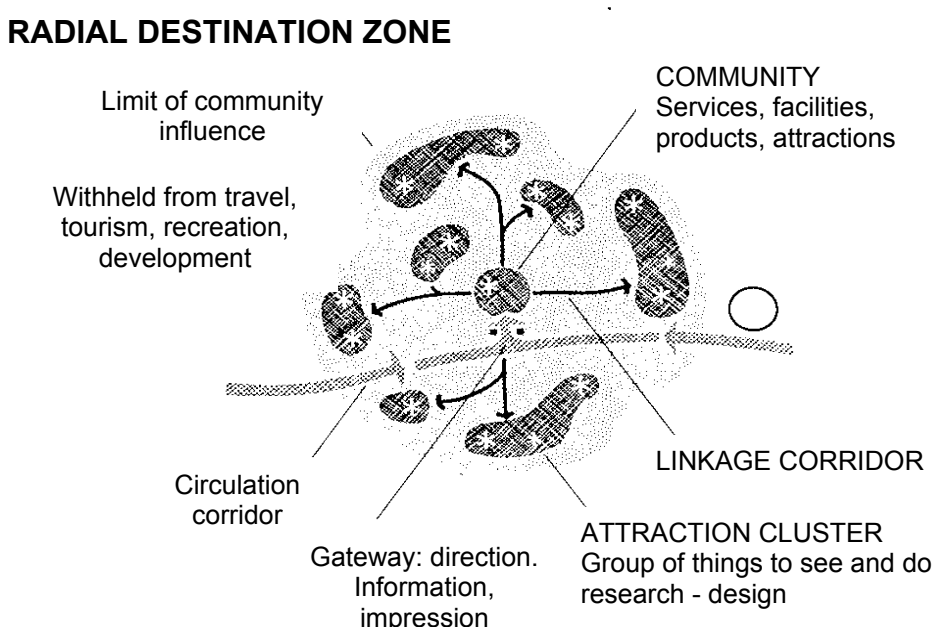


Figure 21: Radial destination zone (Gunn 1991:57).

The following is a brief description of the major elements of destination zones.

- Attraction clusters: a thorough study of the resource potential must be done to identify the possible opportunities to develop new attraction clusters that are of interest to several market segments.
- Service community
- Circulation corridors: accessibility to community deserve special consideration. These corridors, predominantly highways, are pipelines to such services as hotels, eating places and entertainment for the tourists travelling to attraction clusters.
- Linkage corridors: these tie attraction clusters, the vital organs of destination, to community services.

This methodology will be applied in the Development and Management Framework to integrate all the major elements of the destination zones in the GRCA.

4.3 LANDSCAPE ECOLOGY

"The increasingly narrow path followed by twentieth century Ecology made it less equipped to present the holistic outlook that has characteristically enabled ecology to deal with the totality of nature. Narrowing its scope to ecosystem energetics and to a trophic-dynamic analysis of the environment, ecology lost much of the emotional and ethical impetus that had characterised its earlier development" (Makhuziumi & Pungetti 1999:12).

Landscape ecology is a younger branch of the science of ecology and it gradually filled that void. It deals with man and his interrelationships between his open and built-up landscapes. The subject matter for landscape ecology is the landscape, its form, function and genesis (Makhuziumi & Pungetti 1999:12). Its integrative approach takes into consideration human-related, socio-economic and ecological processes which contribute towards a practical and more sophisticated approach.

The difference between landscape ecology and traditional ecology is that landscape ecology focuses on land or landscape as an object, utilising spatial, ecosystemic and aesthetic perspectives. It also operates within a holistic framework, understanding wholes or systems without necessarily knowing all their internal details.

According to Zonneveld and Forman (1990:35), landscape ecologists are mainly concerned with landscape from three overlapping points of view:

- Visual and aesthetic aspects of landscape
- Chorological aspect, which is a conglomerate of land attribute units of map patterns – this is the approach of geography and geomorphology, soil and vegetation sciences
- The perspective that sees the landscape as an ecosystem and combines the two previous views.

4.3.1 ECOLOGICAL LANDSCAPE DESIGN: A REGIONAL CONTEXT

According to Motloch (1991:53), ecological forces operating over time create regional landscapes, that is, regionally differing sets of expressions. Each landscape is an integrated set of expressions, which holistically responds to a multiplicity of influences. As systems, they functions differently, and as a visual resource they express themselves differently but each has its unique spirit of place, or Genius Loci.

4.3.2 LANDSCAPE ASSESSMENT

There are various definitions for landscape assessment but for the purpose of this study the following definition from Makhzoumi and Pungetti (1999:60) will be used. The term "landscape assessment" will be used in a broad sense to encompass the general meaning of assessment, that is, all the ways of looking at, describing, analysing and evaluating the landscape.

According to Makhzoumi and Pungetti (1999:60), there are four phases in landscape assessment: (1) description, (2) evaluation, (3) landscape classification, (4) final analysis.

1. Landscape description: involves the collection of information about landscape components and their interaction. This should be objective as possible and geographical or ecological terms should be used.
2. Landscape evaluation: is the way to attribute values to landscape, based on criteria established in advance for specific purposes. It involves a subjective response, including landscape preference and appreciation.
3. Landscape classification: is a method of sorting the landscape into different types based on similar characteristics and should not involve personal judgment.
4. Final analysis, this sums up the features of the studied landscape. Now landscape is examined according to its natural and man-made components, ecosystems, interactions and values in order how it is made up and what it signifies.

This process will be combined with McHarg's suitability analysis (1999:34) to produce the Environmental Composite of the area.

4.3.3 THE CONCEPT OF "LANDSCAPE RECYCLING"

Recycling is essential in the elimination of waste and also ensures sustainability in natural ecosystems. According to Gilbert (1991:34) landscape recycling can be defined as the reuse of existing ecosystems whether natural, semi-natural or cultural by integrating them into future landscape design and planning. The ecological and cultural integrity of the ecosystem into which the process is integrated must be observed. This implies flexibility in approach that is adaptive to the surprises inherent to the dynamics of any ecosystem (Makhuziumi & Pungetti 1999:248).

Landscape recycling can be applied regionally as well as locally and can be adopted within the framework of the ecological landscape design.

4.3.4 SUSTAINABLE UTILISATION OF LANDSCAPE

Sustainable development ensures that society can benefit from its natural resources virtually indefinitely. Sustainable utilization of ecosystems and landscapes is related to the degree to which the local community is dependent on the resource in question.
Makhzoumi and Pungetti (1999:250) found that it is in subsistence societies, where these resources are most needed, that resource utilisation is least sustainable.
Landscape design and planning should appreciate that the ecological and cultural variability of the regional landscape mean that the objectives and priorities for sustainable development should not be generalised. An idiosyncratic approach to landscape design as well as landscape development is required.

4.3.5 DEVELOPING THE REGIONAL MODEL

The aim of the regional model is to accommodate contemporary development while maintaining landscape integrity, sustainability and enhancing the regional character of place. These aims in turn can be achieved through maintaining essential ecological processes, life-support systems and conserving biodiversity and landscape heterogeneity. Developing the regional conceptual model will, it is hoped, illustrate the workability of the ecological landscape design paradigm and proposed methodology.

SECTION E: ENVIRONMENTAL COMPOSITE

SECTION SYNOPSIS

This section provides a summary and sensitivity analysis of the key environmental characteristics of the site. These assessments will provide the basis for the preparation of the development suitability plan for the GRCA.

The Environmental Composite serves as background for the following:

a) Determining the suitability of the site for the proposed developments

b) Preparing information for the Site Development Plan, which provides the spatial parameters for all aspects of the proposed projects.

5. ENVIRONMENTAL COMPOSITE

5.1 ENVIRONMENTAL COMPOSITE PROCESS

The primary objectives with the Environmental Composite are the following:

1. Provide a basis for the preparation of a Development Suitability Plan
2. Determine the spatial parameters for the proposed projects that will be illustrated by the Site Master Plan. Diagram 1 below illustrates relationship between the various plans and related maps.

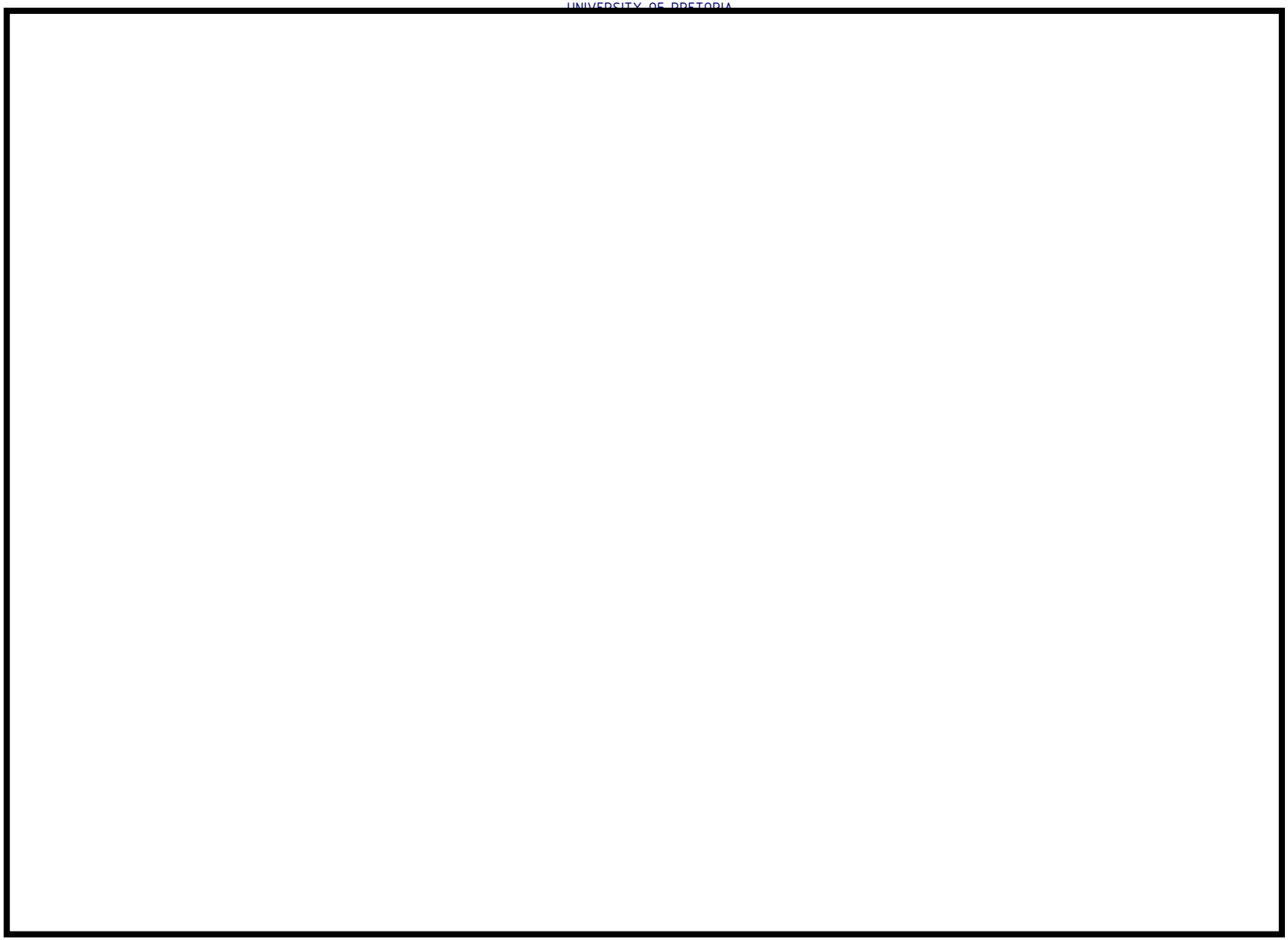


Diagram 1: Process development and relationships

5.2 SPATIAL ZONING PARAMETERS

In Chapter 3 (Site Description and Context), the Biophysical aspects, Social context and Current land use was explained and mapped. The suitability analysis procedure explained in Chapter 4 (Guidelines and Principles for Planning, Design and Management) will now be used to overlay each of the Biophysical Characteristics with Conservation, Agriculture, Recreation and Urbanisation to reveal the relative values for each region. Table 6 gives a description and basic purpose of these four primary zones.

In order to provide more detailed information for the zoning of each of the primary zones, a matrix was developed for both the Gourits River Catchment Area (GRCA) as well as the Kannaland Tourism Node (KTN). It shows all the possible zoning elements and requirements related to each of the primary zones (Refer to Addendum B). These elements are then evaluated and categorized as either suitable (marked with and X) or not suitable. With these categories identified in each zone, a suitability plan for each of the primary zones is drawn up.

ZONES	BASIC PURPOSES
Conservation Zones	• Comprising areas of conservation importance. • Only non-consumptive land-sues may be allowed conditionally.
Agricultural Zones	• Constituting rural areas where extensive and intensive agriculture is practiced, including exotic forestry areas.
Urban Zones	• Representing a broad spectrum of nodal urban related settlements and associated services and infrastructure. • Representing industrial areas.
Recreation Zones	• Representing all the possible recreation and tourism activities.

Table 7: The four primary spatial zones

5.2 SUITABILITY ZONING FOR THE GOURITS RIVER CATCHMENT AREA

5.3.1 Suitability Zones

5.3.1.1 Conservational Suitability Zones

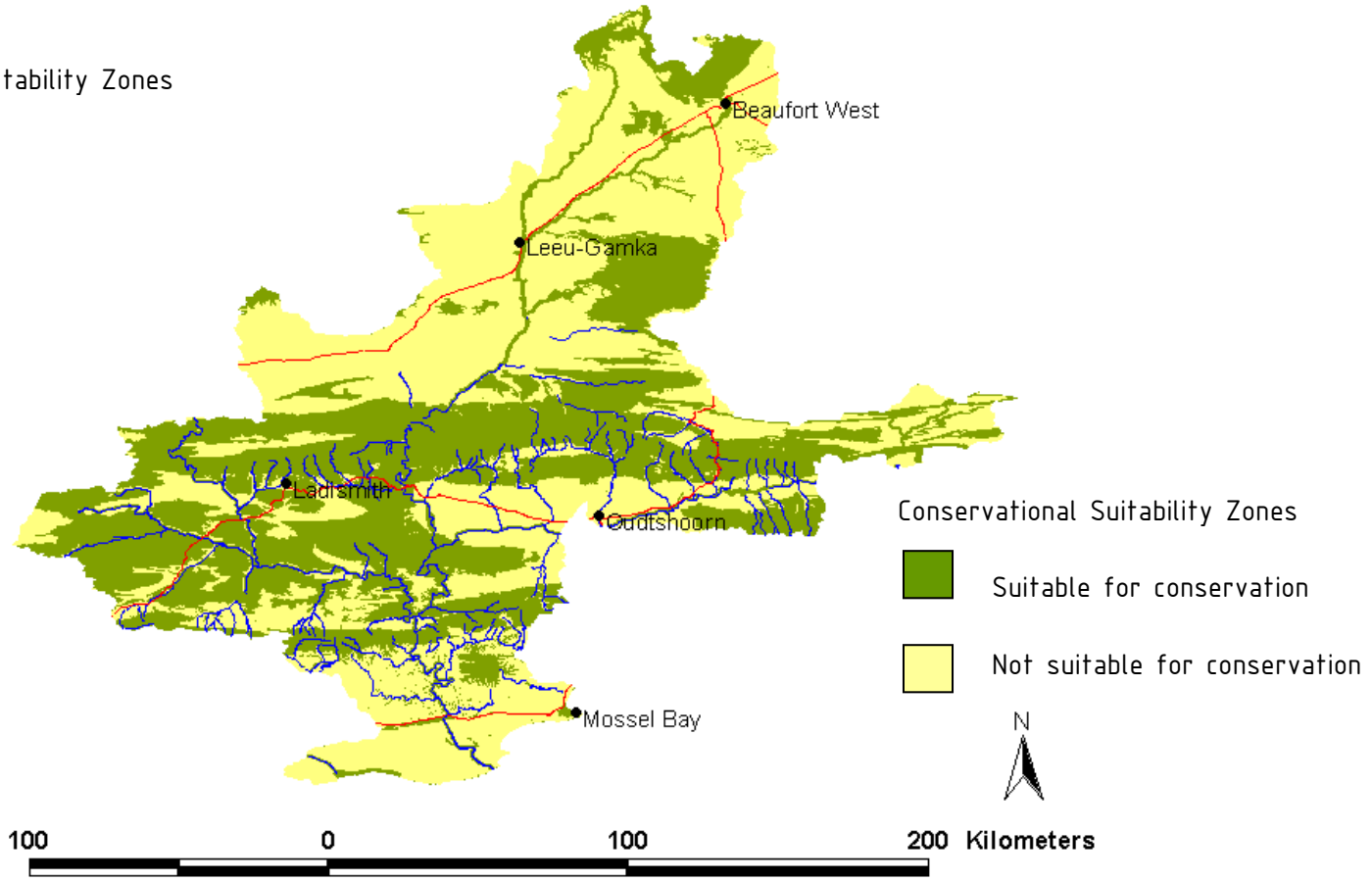


Figure 22: Conservational Suitability Zones in the GRCA

5.3.1.2 Agricultural Suitability Zones

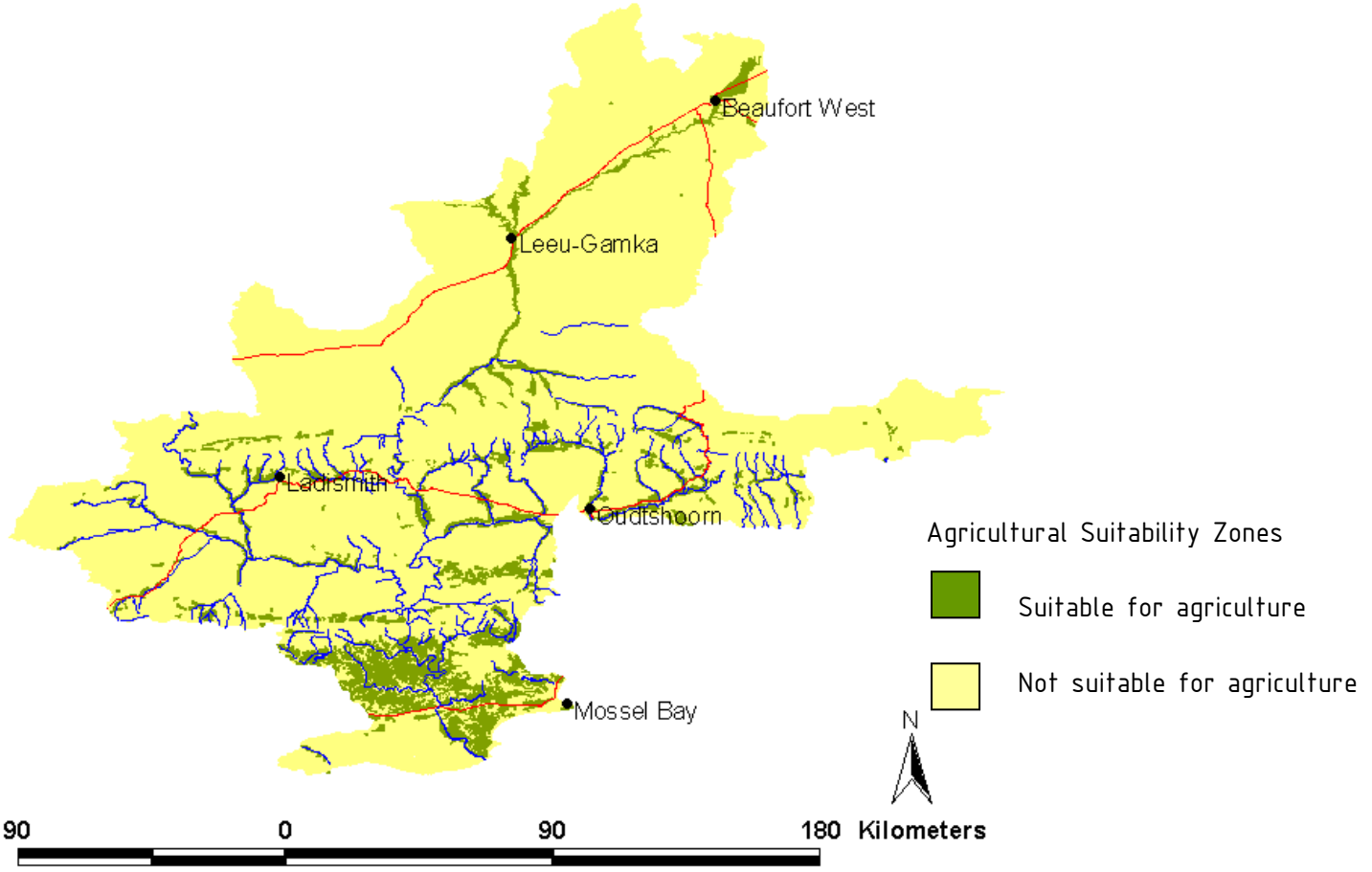


Figure 23: Agricultural Suitability Zones in the GRCA

5.3.1.3 Urban Suitability Zones

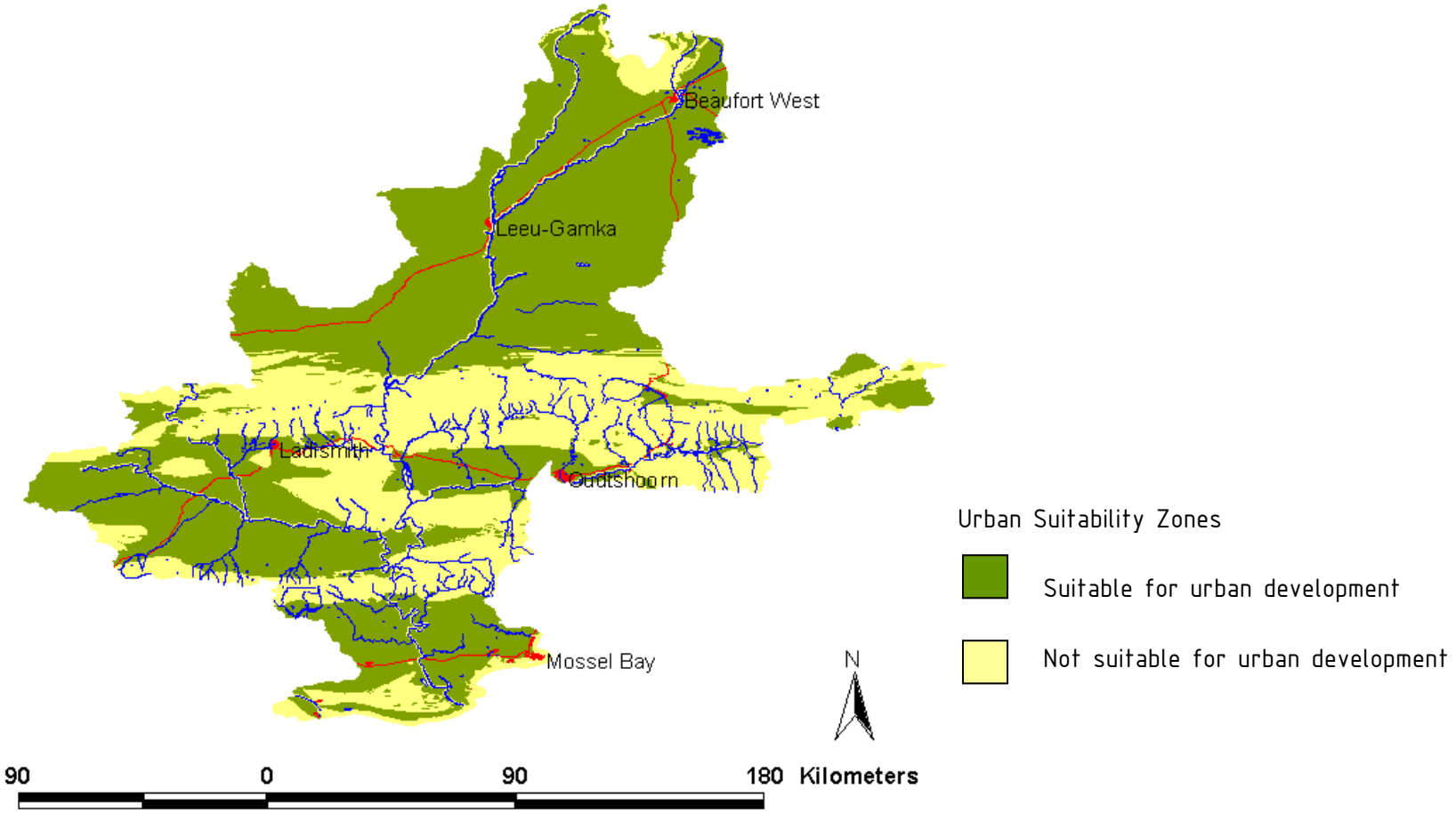


Figure 24: Urban Suitability Zones in the GRCA

5.3.1.4 Recreational Suitability Zones

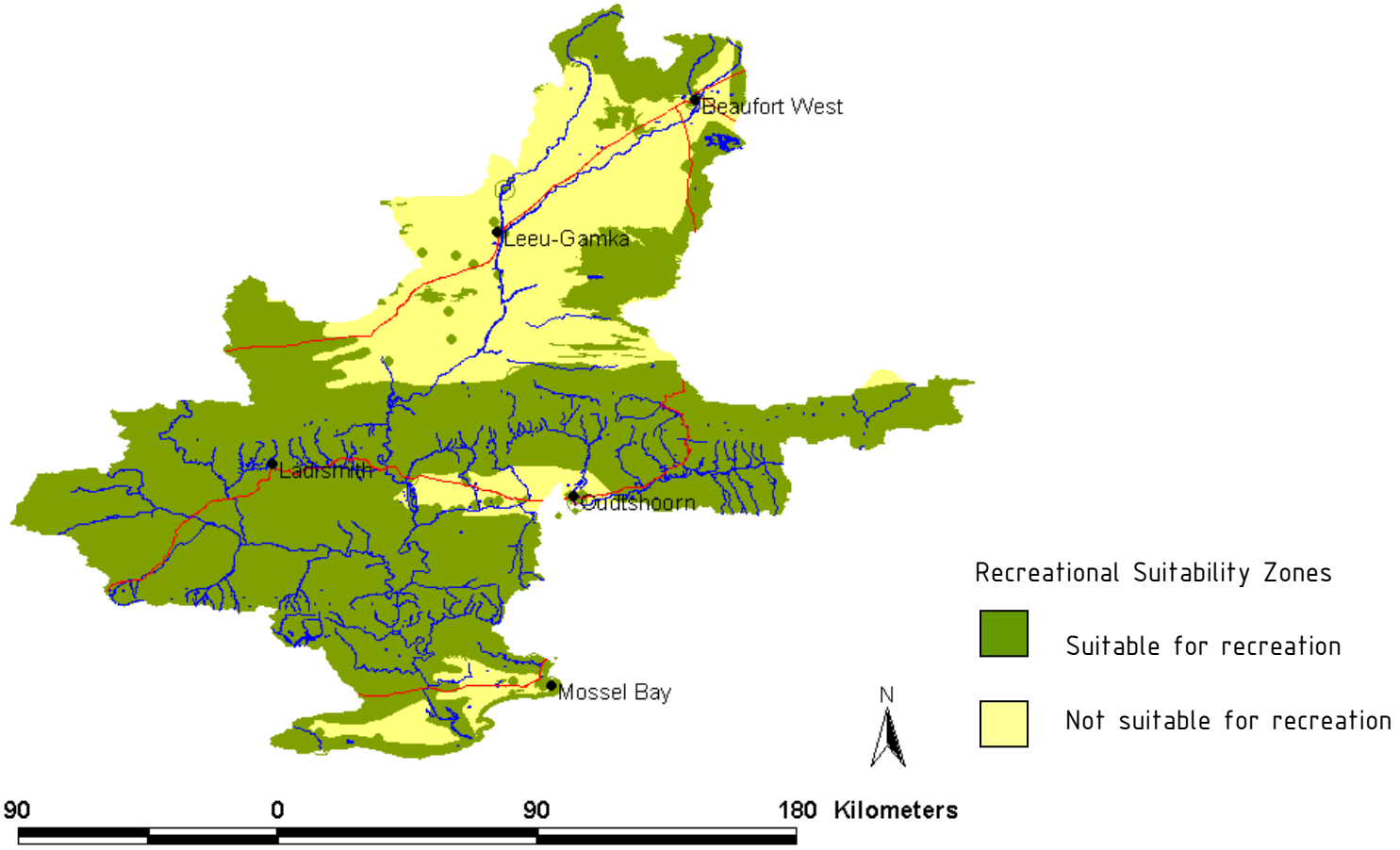


Figure 25: Recreational Suitability Zones in the GRCA

5.4 SUITABILITY ZONING FOR THE KANNALAND TOURISM NODE (KTN)

5.4.1 CONSERVATIONAL SUITABILITY ZONE

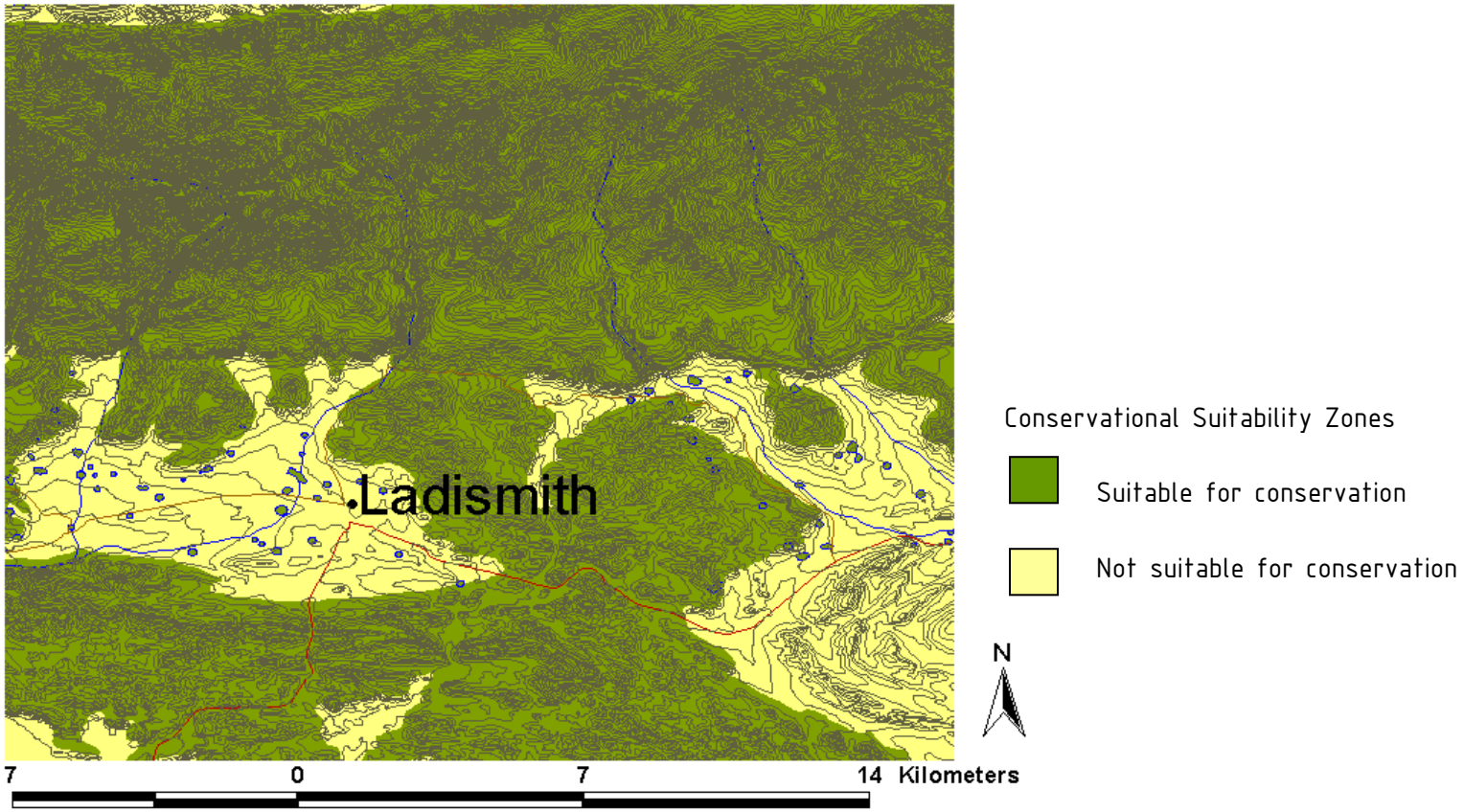


Figure 26: Conservational Suitability Zones in the KTN

5.4.2 AGRICULTURAL SUITABILITY ZONES

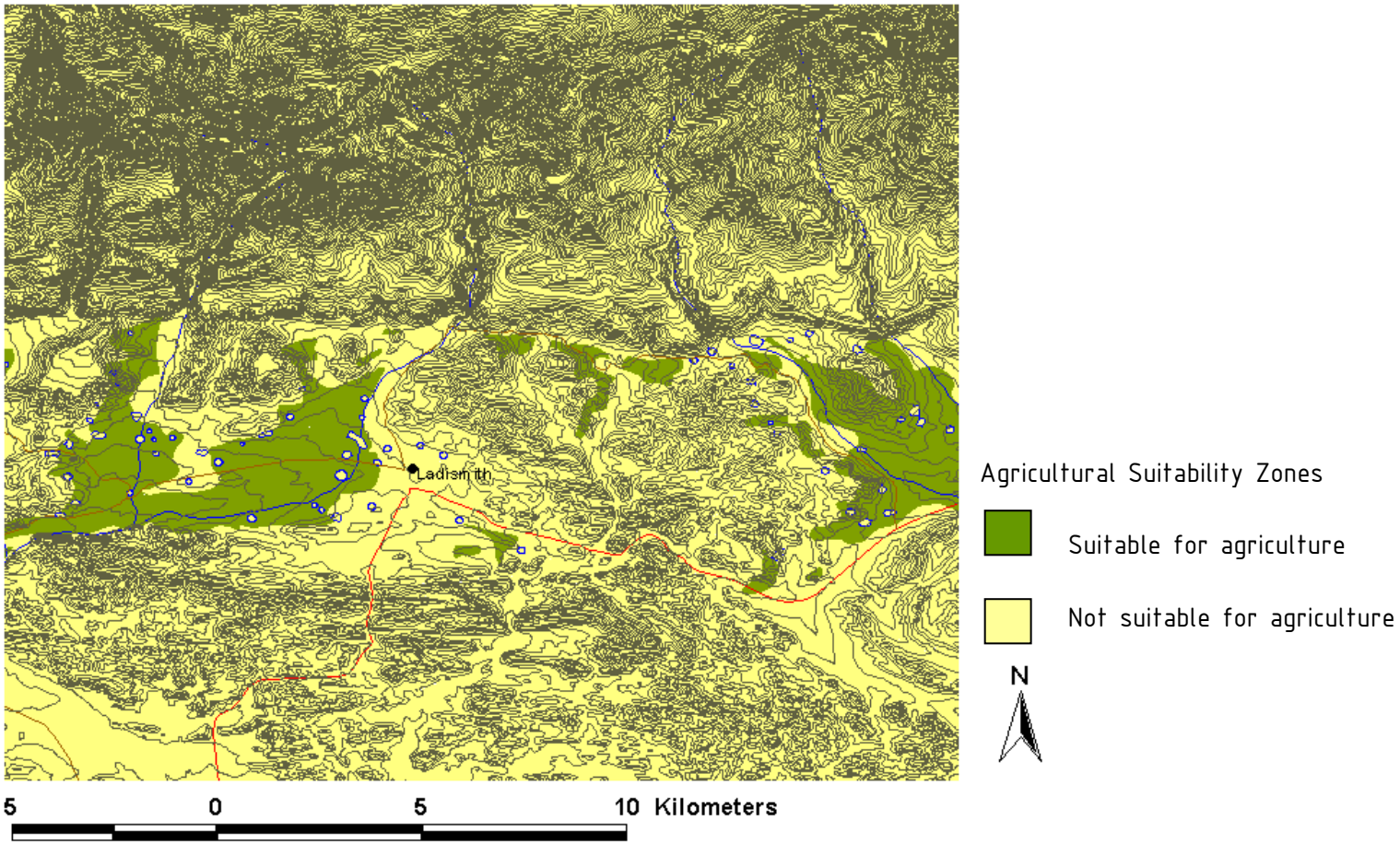


Figure 27: Agricultural Suitability Zones in the KTN

5.4.3 URBAN SUITABILITY ZONES

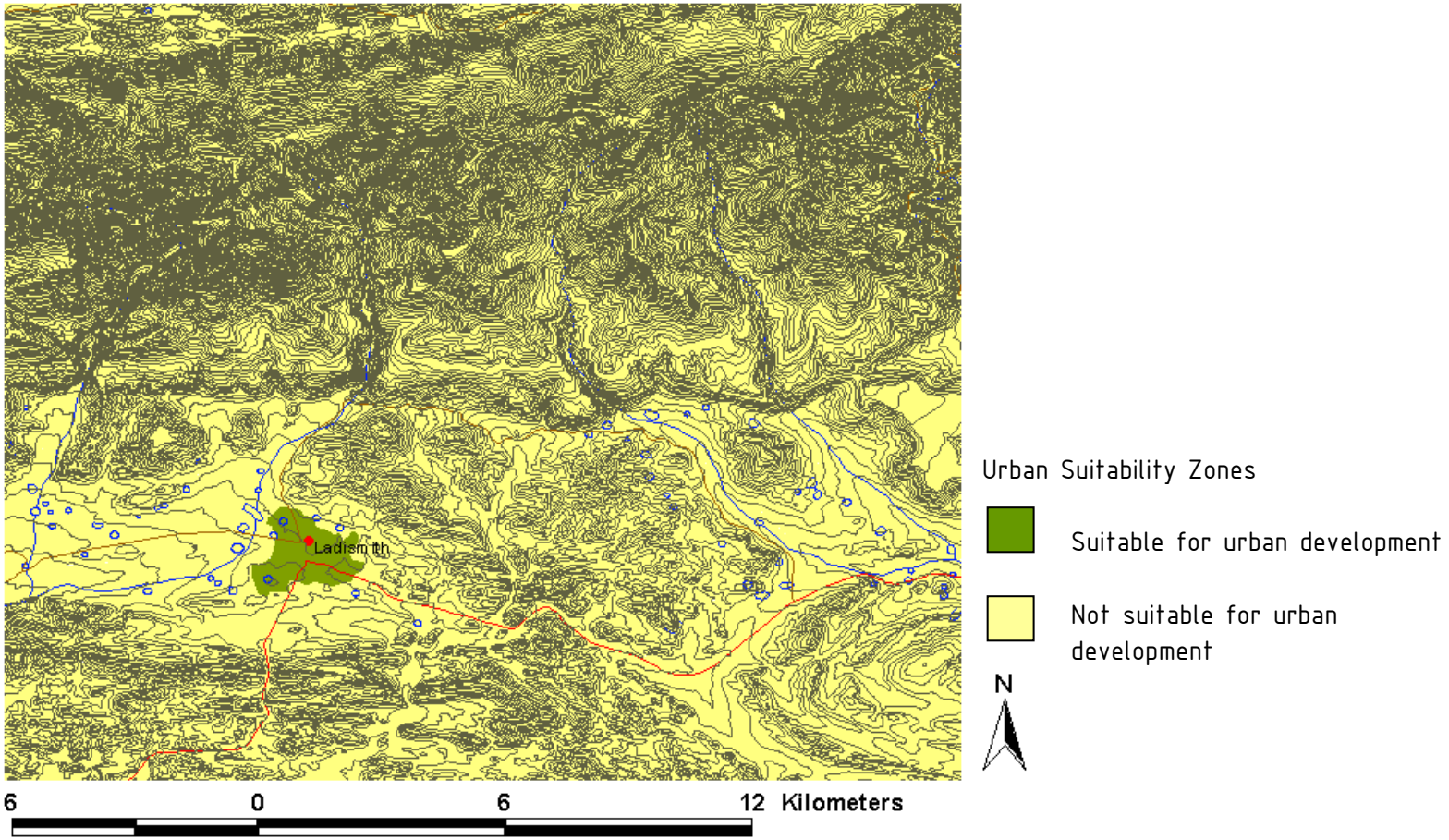


Figure 28: Urban Suitability Zones in the KTN

5.4.4 RECREATIONAL SUITABILITY ZONES

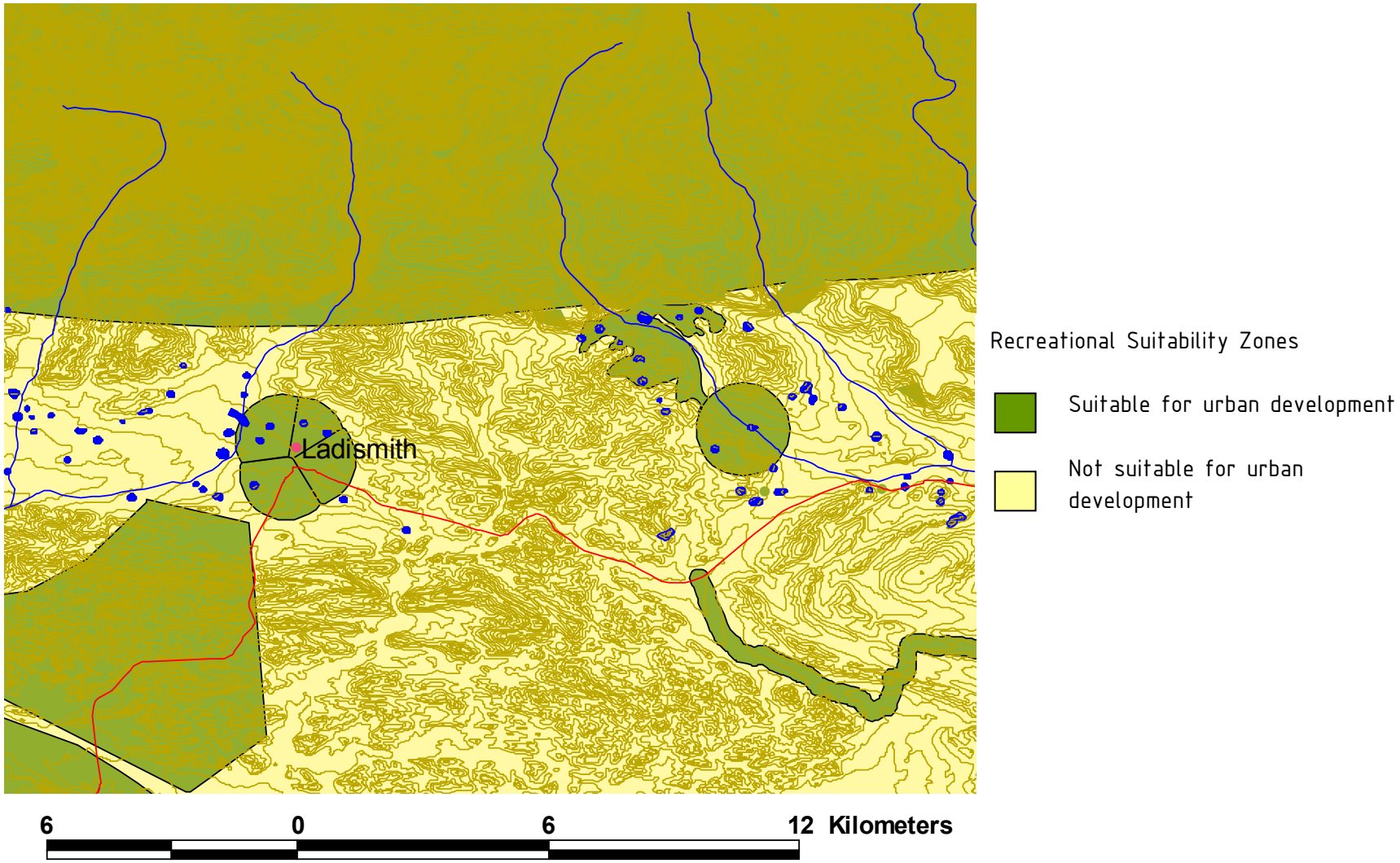


Figure 29: Recreational Suitability Zones in the KTN

5.4.5 RECREATION POTENTIAL

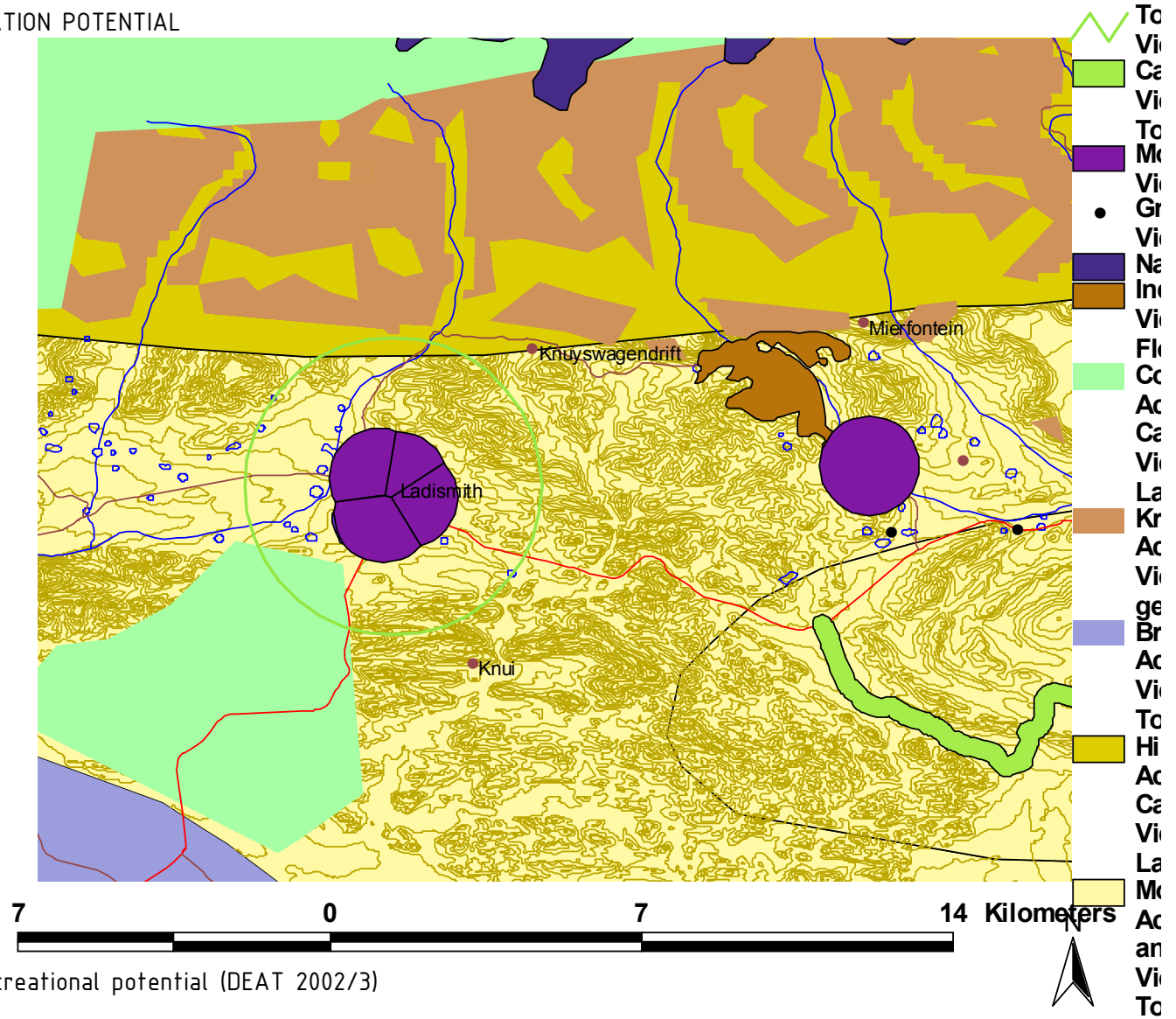


Figure 30: Recreational potential (DEAT 2002/3)

5.5 LAND-USE ZONES

The ecological characteristics, suitability's and potentials have now been identified and mapped. The next step in the planning process is to identify the relevant activities linked to the various values and zone them accordingly. In Table 6 the Zones are divided into activities and facilities needed. The intensity is the possible impact these facilities will have on the environment.

The three zones are:

- Conservational
- Cultural
- Recreational

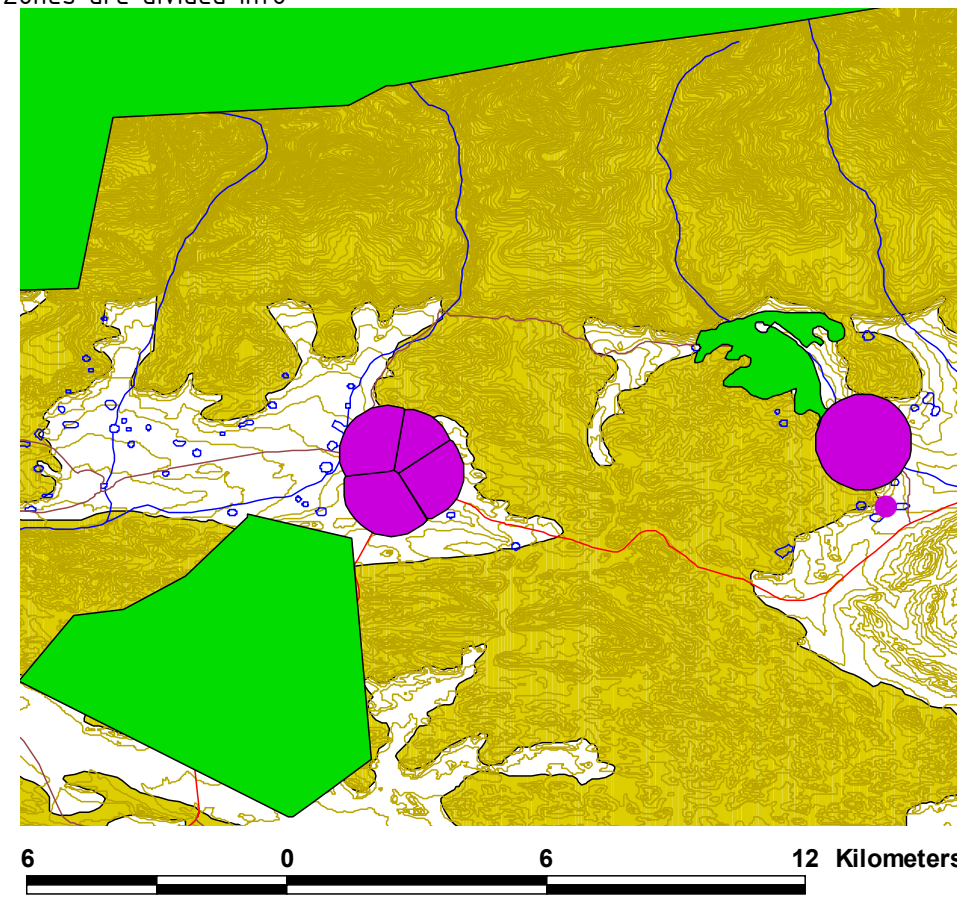


Figure 31: Land-use Zones in the KTN

Table 8: Zoning of Kannaland Tourism Node

ZONING OF LADISMITH TOURISM NODE			
CONSERVATIONAL ZONES			
	ACTIVITIES	**INTENSITY**	**FACILITIES**
SUPPORTING FACILITIES	Entrance	Medium	Entrance control, parking, ablutions, info centre
	Nature management	Medium	Fauna and Flora
	Services	Medium	Service roads
UTILIZATION	Veld study	Low	Fauna and Flora
	Bird watching	Low	Bird hide
	Hiking	Low	Hiking trail, Overnight cabins
	Game viewing	Low	Circulation routes, Water holes, Overnight cabins
	Horse Riding	Low	Horse trails, Stables
CULTURAL ZONES			
SUPPORTING FACILITIES	Entrance	Medium	Entrance control, parking, ablutions, info centre
UTILIZATION	Formal learning	High	Cultural centre
	Informal learning	Low	Info kiosks at cultural historical features
	Educational trips	Low	Cultural, historical features
RECREATIONAL ZONES			
SUPPORTING FACILITIES	Entrance	Low	Entrance control, parking, ablutions, info centre
	Sanitary	Low	Ablutions
	Services	Low	Service roads
	Eat and Drink	Medium	Restaurants, coffee shops, market, kiosks
RECREATION	Hiking	Low	Hiking trail, Overnight cabins
	Walking	Low	Trails, Info centres, waterpoints
	Camping	High	Chalets, ablution, parking, caravan stands, food preparing areas, services
	Picnic	Medium	Picnic area
	Braai	Medium	Picnic area, taps, tables
	Cycling	Low	Cycling routes
	Accomodation	High	Chalets
	Canoeing	Low	Perenial water, waterfront
	Swimming	Low	Swimming pool

RECREATIONAL ZONES			
	ACTIVITIES	**INTENSITY**	**FACILITIES**
RECREATION	Horse Riding	Low	Horse trails, Stables
	Climbing	Low	Info centre
	Scenic Drives	Low	Info boards, Gateway, Roadside stalls, Restaurants
	Viewing	Low	Fauna, Flora, Waterfalls, Rock Formations, Landforms, Topographical features, Cultural Patterns, Man-made structures, Historical, Archeological, Geological

5.5.1 CONSERVATION

Conservational activities are related to the study of nature and natural processes. These activities do not need facilities as such, but are in need of relatively unspoilt natural features. Some of the proposed activities are listed below:

- Veld study
- Bird watching
- Wilderness trail
- Game viewing
- Horse riding
- Hiking

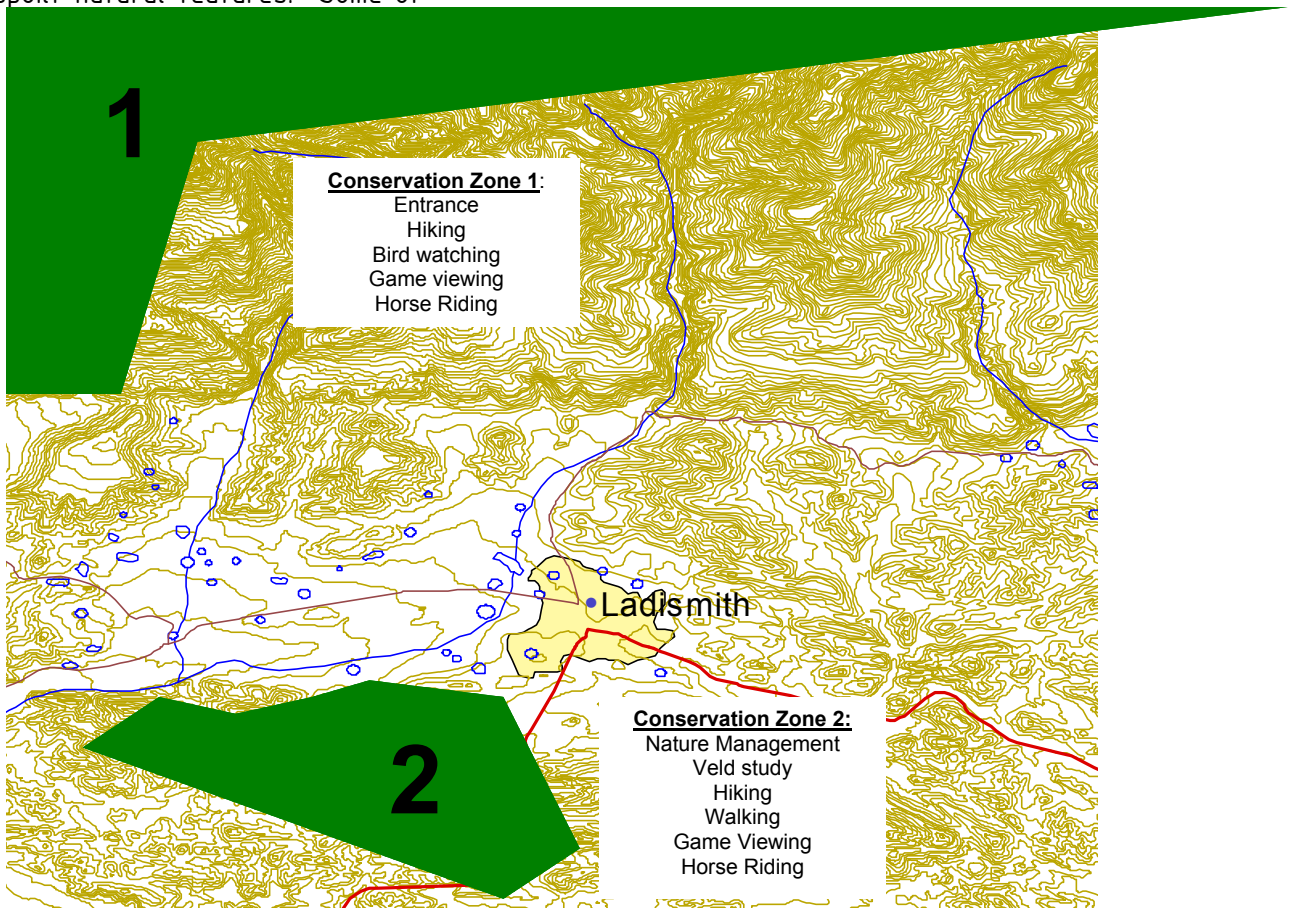


Figure 32: Conservational Zones in the KTN

5.5.2 CULTURE

These activities are linked to the way in which human utilize the environment and relevant historical structures. The successes of these activities are therefore dependent on the integration of these structures such as fountains and homesteads.

They are listed below:

- Formal learning
- Informal learning
- Educational trips

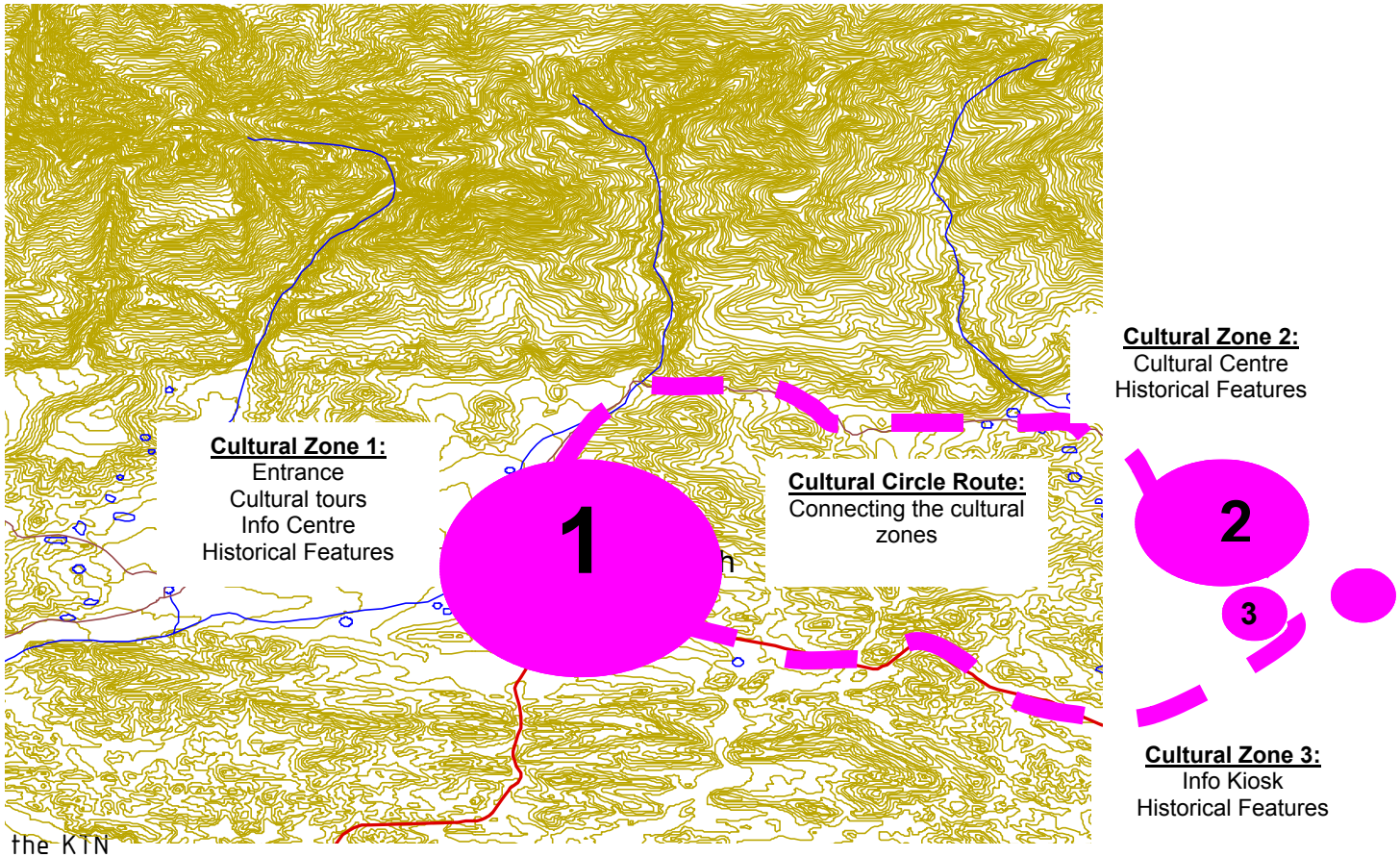


Figure 33: Cultural Zones in the KTN

5.5.3 RECREATION

Recreation activities can be either passive activities linked to the environmental features or active activities linked to both open space and facilities.
Their impact can be fairly high and therefore management input to deal with these impacts must be high.

These activities are listed as follows:

- Hiking
- Walking
- Camping
- Picnic
- Braai
- Cycling
- Accommodation
- Canoeing
- Swimming
- Horse riding
- Climbing
- Scenic drives
- Viewing

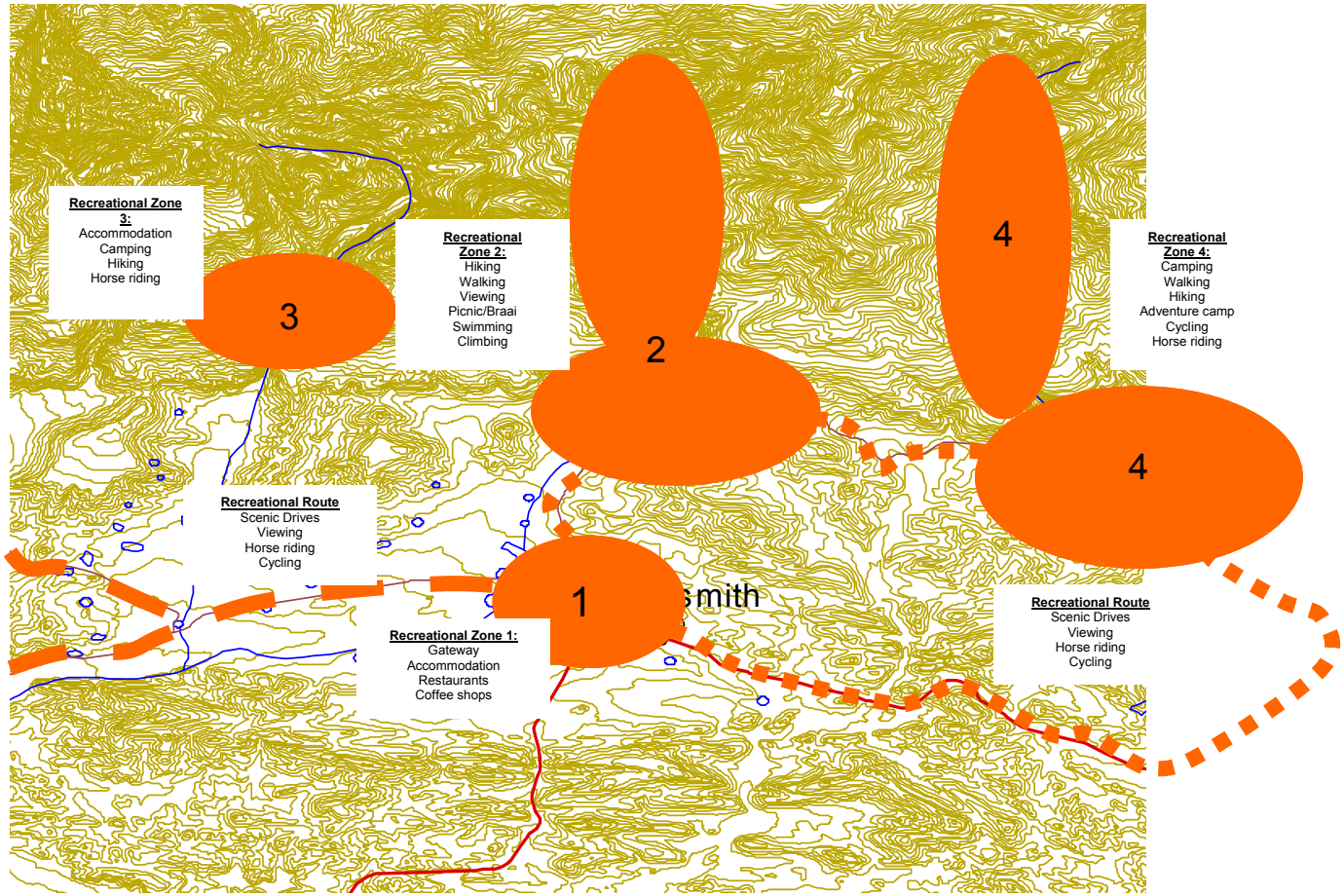


Figure 34: Recreation Zones in the KTN

5.6 SITE ANALYSIS

5.6.1 ZONE 2:

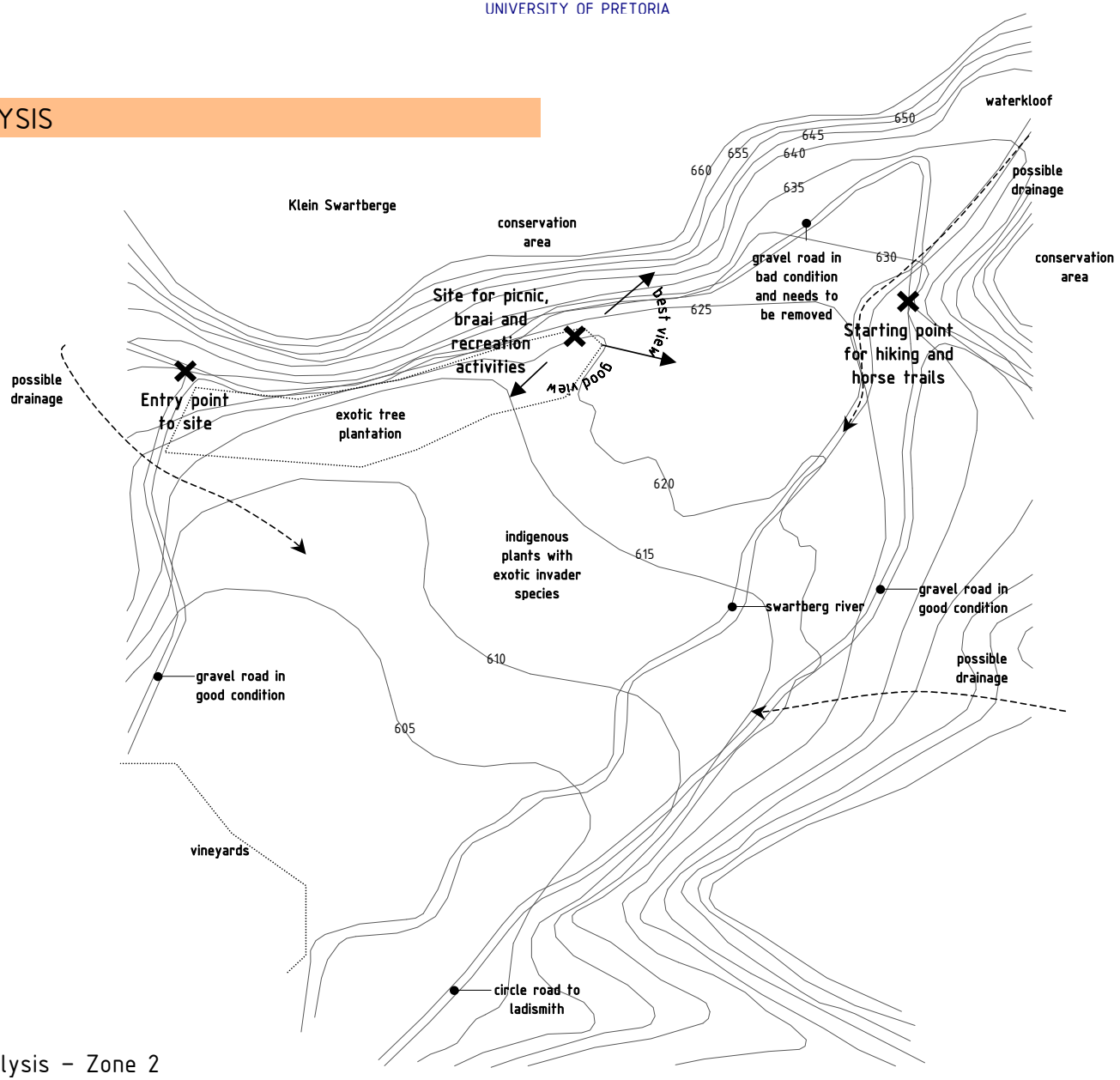


Figure 35: Site Analysis – Zone 2

5.6.2 ZONE 3:

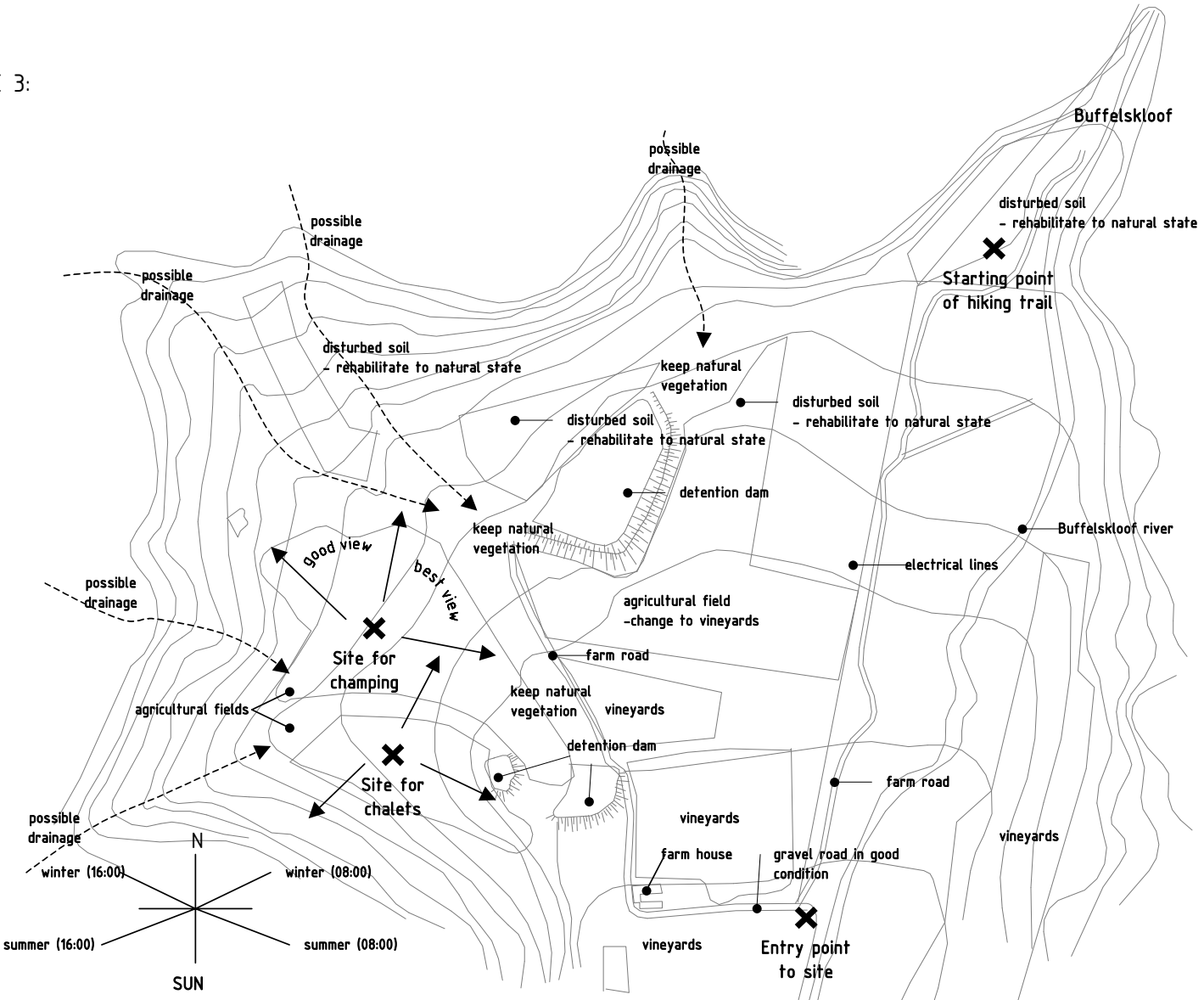


Figure 36: Site Analysis – Zone 3

5.6.3 ZONE 3:

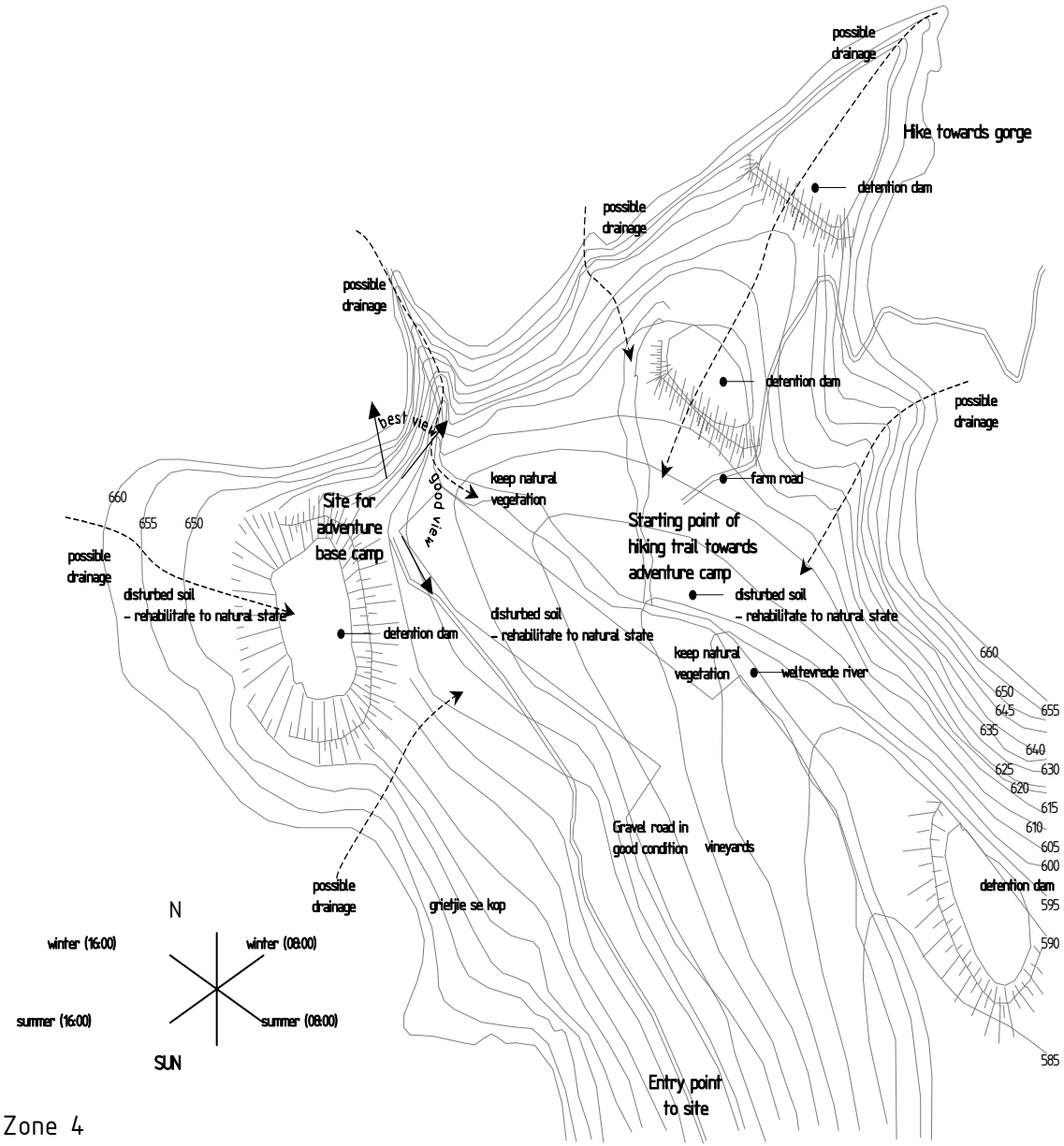


Figure 37: Site Analysis – Zone 4

5.7 SENSITIVITY ANALYSIS

The three zones of the Kannaland Tourism Node is analysed and divided into six sensitivity areas. These areas are then analysed according to the extent of degradation, ecological sensitivity, and aesthetic sensitivity. Table 9 provide the description of each area.

Table 9: Sensitivity analysis area descriptions

AREA	DESCRIPTION	EXTENT OF DEGRADATION	ECOLOGICAL SENSITIVITY	AESTHETIC SENSITIVITY
1	Modified sites	Severe	Very low	Low to medium
2	Former agricultural fields	High	Low	Low
3	Modified natural remnants	Medium	Low to medium	Low to medium
4	Watercourses	High to medium	Medium to high	Low to high
5	Natural vegetations	Medium to low	Medium to high	High
6	Continuous tracts of Fynbos	Medium to low	High	High

5.7.1 ZONE 2

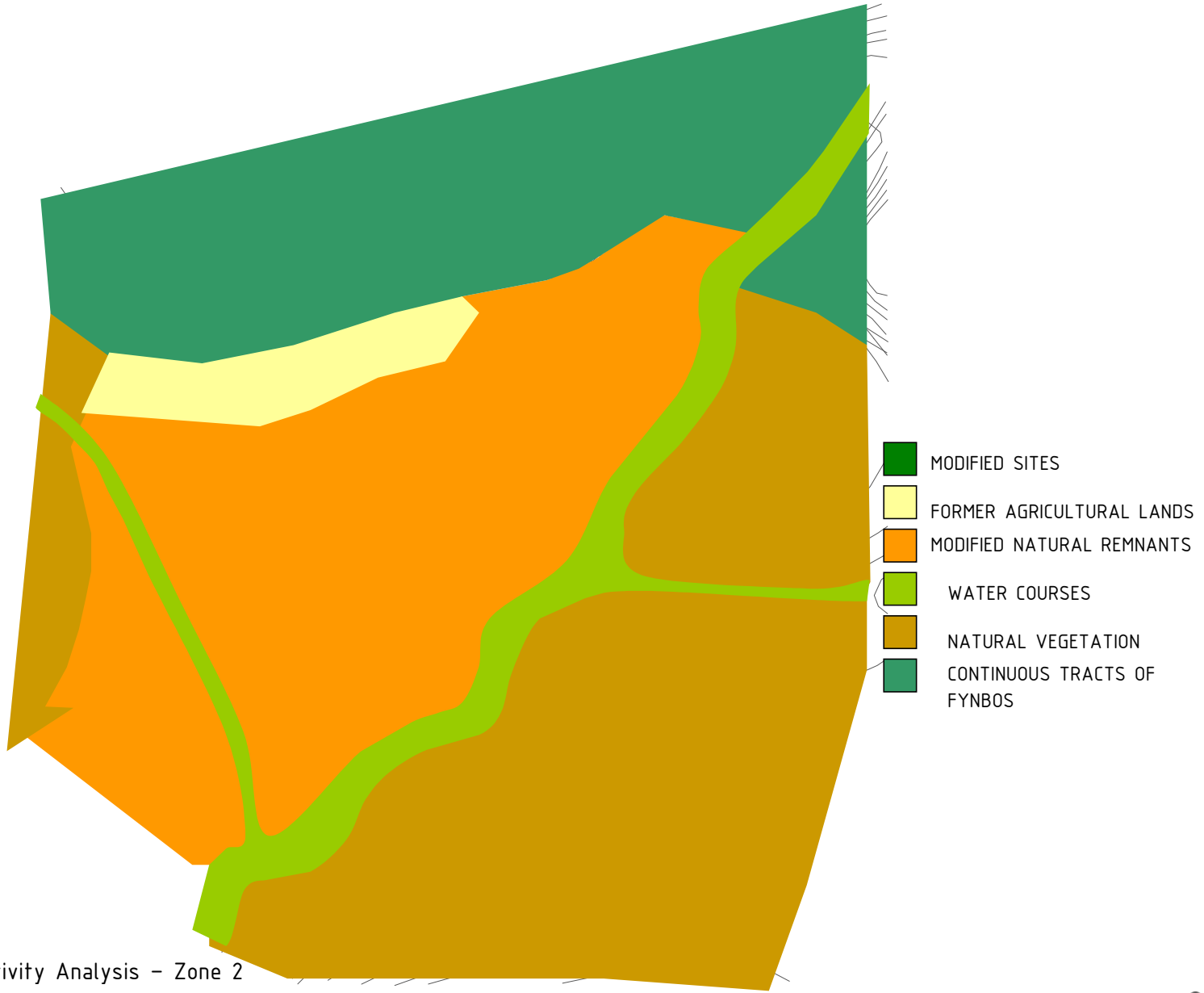


Figure 38: Sensitivity Analysis – Zone 2

5.7.2 ZONE 3

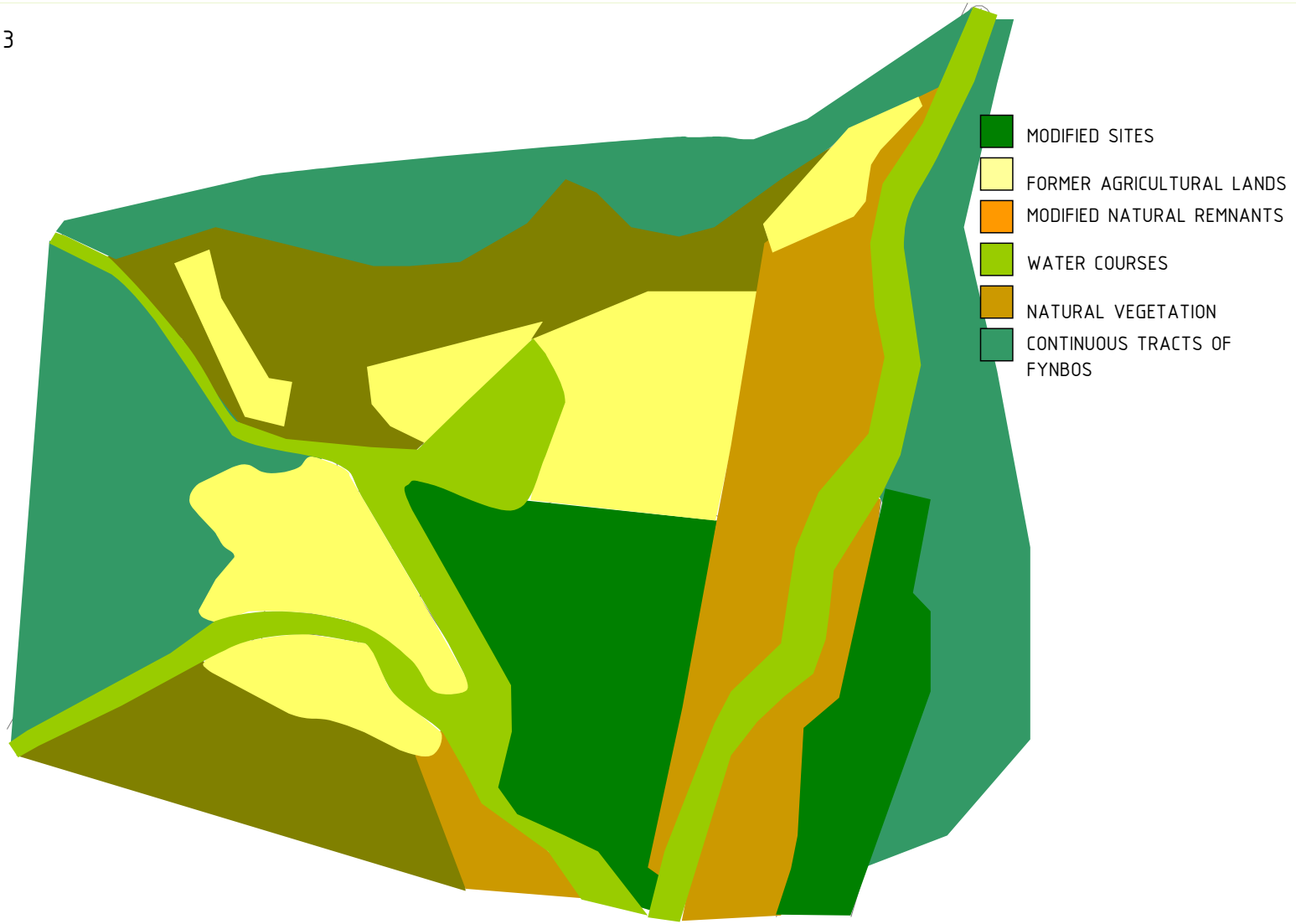


Figure 39: Sensitivity Analysis – Zone 3

5.7.3 ZONE 4

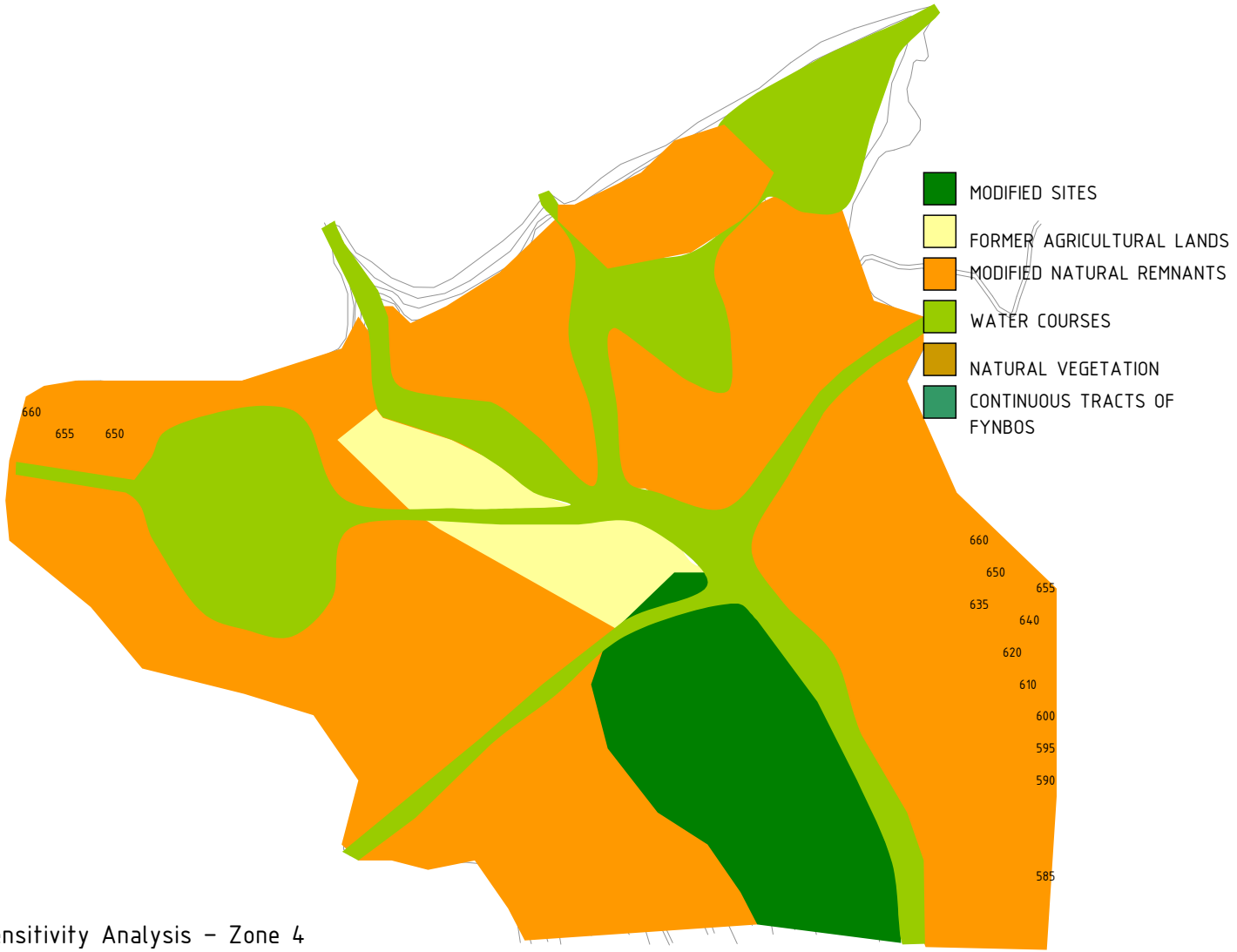


Figure 40: Sensitivity Analysis – Zone 4

SECTION F: SUSTAINABLE DEVELOPMENT BASELINE

SECTION SYNOPSIS

This section provides a summary of the general sustainable development principles and guidelines. The relative legislation gives a context where in these principles and guidelines can be implemented. This is to ensure that the developments conform to the ideas of qualitative environmental design and environmental sustainability.

The Baseline consist of:

a) Social Issues
b) Economical Issues
c) Environmental Issues

6. SUSTAINABLE DEVELOPMENT BASELINE

"*Sustainable development implies the adoption of a holistic view of the interdependent relationship between human society and the natural environment. It acknowledges the links between the impact of human activities (particularly economic activities) on the functioning of physical and social environments and visa versa. Sustainable development has been presented, therefore, as a means for providing an integrating framework for the reconciliation of human economic and social needs with the capacity of the environment to meet such needs in the long term*" (Thompson, J.W. & Sorvig, K. 2000: 2)

6.1 SOCIAL ISSUES

6.1.1 SOCIAL EQUITY

Social equity must be achieved to encourage the whole community to participate in sustainable practices. It can be achieved by:
The workplace:

- Promotion of diversity at all levels
- Policies to stop gender harassment/discrimination
- Support for training/education/professional development
- Empowerment of all staff, in particular historically disadvantaged people
- Incentive schemes for staff at all levels
- Fair and legal retrenchment procedures
- Promotion of health, safety and general wellness

The community:

- Local recruitment
- Support for local businesses
- Community participation in development planning
- Support for local schools and education
- Respect for and promotion of local cultures and heritages
- Social responsibility and environmental criteria when appointing contractors
- Providing access to the mainstream economy through tourism and agriculture

6.1.2 ACCESS TO PUBLIC FACILITIES

6.1.2.1 Public Transport

- Public transport travel distances and times for work trips should be limited to about 40 km, or one hour in each direction. This means that new settlements should be located no further than 40 km from the major work destinations (Adam E. et al 2000:2).
- To improve accessibility, a target has been set of reducing walking distances to public-transport facilities to less than about 1 km (Adam E. et al 2000:5).
- Provision for pedestrians and the disabled
- Potential cycle network plan.

6.1.2.2 Toilets

- Sites should primary be chosen for convenience of access to the potential users.
- Where possible they should be located next to facilities like schools, clinics and libraries, so that when individualised sanitation is provided, they can simply be incorporated into the public facilities. In this way redundant service provision can be avoided (Adam E. et al 2000:7).
- Although it is not possible to lay down rigid criteria for on-site sanitation, because soil and site conditions vary widely. Two basic criteria should, however, be considered, namely whether the soil can effectively drain the liquids brought to the site and whether there is any danger of pollution of the groundwater or surface water (Thompson, J.W. & Sorvig, K. 2000: 120).

6.1.2.3 Communication

- Public telephones need to be highly visible and accessible to the population served
- Public telephones should be located along activity routes within easy walking distance of users.

6.1.3 PARTICIPATION AND CONTROL

Ensuring that users participate in decisions about their environment helps ensure that they care for and manage this properly. Control over aspects of their local environment enables personal satisfaction and comfort. Both of these support sustainability by promoting proper management of landscapes and increasing productivity.

6.1.3.1 Environmental control

- Set up an community based environmental control group in the area
- Promote in the local community a sense of ownership to their environment

6.1.3.2 Social spaces

- Include the local community in the design of social spaces and give them the ownership of such spaces.

6.1.3.3 Community involvement

- Spaces or services must be shared or made available to the local community. This could include access to computers, teaching learning spaces, leisure facilities, and crèche.
- The local community can also participate in programs at the culture centre.

6.1.4 EDUCATION, SAFETY AND HEALTH

The landscape needs to cater for the well-being, development and safety of the people that use them. Awareness, and environments that promote health can help reduce the incidence of diseases such as AIDS. Safe environments and first aid can help limit the incidence of accidents and where these occur, reduce the effect. Learning and access to information is increasingly seen as a requirement of a competitive work force. All of these factors contribute to sustainability by helping ensure that people remain healthy and economically active, thus reducing the 'costs' (to society, the environment and the economy) of unemployment and ill health.

6.1.4.1 Education

- Provision of educational facilities at the major recreational zones for the people who work at these places.
- Access to support for learning must be provided. This can be in the form of Internet access, structured courses, or the provision of learning material such as books, journals and newspapers (Adam E. et al 2000:9).

6.1.4.2 Safety

- Ensure high levels of visibility when landscaping parks, public squares or pedestrian routes.
- Provide sufficient and adequate lighting.
- Encourage pedestrian traffic and direct people along desired routes as this optimises passive surveillance.
- Create awareness of fire safety during the stakeholder participation process.

6.1.4.3 Health

- Provide water, sanitation and drainage within low-income communities (Adam E. et al 2000:10).
- Providing health care and emergency services within each area

6.2 ECONOMIC ISSUES

Economic efficiency and feasibility are generally recognized as one of the three imperatives to achieve sustainable development. In the proposed development every effort will be made to achieve the following

- Ensure that as a whole, the profit – and non-profit projects combine into a financially viable local economy that benefits all stakeholders, partners, employees the community and existing business enterprises.
- Promote the creation of new entrepreneurial and employment opportunities, and where practically possible, labour intensive construction, particularly to benefit the previously disadvantaged (Adam E. et al 2000:25).
- Choose environmentally responsible suppliers and contractors.
- Invest some of the proceeds from the use of non-renewable resources in social and human-made capital. To maintain the capacity to meet the needs of future generations (a trust must be set up and the voluntary levy funding there of)

6.2.1 Local Economy

The construction and management of buildings can have a major impact on the economy of an area. The economy of an area can be stimulated and sustained by buildings that make use and develop local skills and resources.

- 80% of the construction must be carried out by contractors based within 40km of the development
- The local community must be trained the necessary skills to help with the developments and be incorporated into the developments.
- Opportunities must be created and provision provided for small emerging businesses. This includes outsourcing catering, cleaning services and security as well as making space and equipment available for businesses to use for retail and education.
- Training of local people as maintenance workers should be seen as an integral part of capacity building within the community (Adam E. et al 2000:27).
- Providing of mortgages and cross-subsidies, which maximise the number of people to afford adequate quality housing.
- Support for innovative community actions to meet needs and reduce waste/resource consumption.

6.3 ENVIRONMENTAL ISSUES

In the proposed developments there will be a presumption in favour of the environment and a premium will be placed on the conservation of natural resources, wildlife and landscapes. Materials for new development will, for example must be from sustainable resources.

6.3.1 Environmental integrity

- Minimal ecological impact of materials used "ecological footprint"
- Preference to renewable resources
- Most efficient use of energy, water land and materials
- Lowest possible levels of maintenance
- Maximum recycling and re-use of waste and materials
- Pollution prevention (air, land and water)
- Construction of healthy non-toxic environments
- Promotion of biodiversity
- Minimise negative impacts on the scenic, cultural, historical, social and architectural landscape and on infrastructures

6.3.2 Water

Water is required for many activities. However the large-scale provision of conventional water supply has many environmental implications. Water needs to be stored (sometimes taking up large areas of valuable land and disturbing natural drainage patterns with associated problems from erosion), it also needs to be pumped (using energy) through a large network of pipes (that need to be maintained and repaired). Having delivered the water, a parallel efforts is then required to dispose of this after it is used, i.e. sewerage systems. Reducing water consumption supports sustainability by reducing the environmental impact required to deliver water, and dispose of it.

6.3.2.1 Rainwater

- Rainwater must be harvested, stored and used.

6.3.2.2 Water use

- Water efficient devices

6.3.2.3 Grey water

- Grey water (water from washing etc) must be recycled (to flush toilets or water plants) to minimise water use.

6.3.2.4 Runoff

- Run off must be reduced by using pervious or absorbent surfaces (Thompson, J.W. & Sorvig, K. 2000: 45).
- Hard landscaping can be used as water catchments, storing rainwater for landscape irrigation.
- Previous surfaces must be specified for car parking and paths (Thompson, J.W. & Sorvig, K. 2000: 45).

6.3.2.5 Water Quality.

- Reduction in water quality due to soil erosion is caused mainly during rainstorms this is due to a lack of vegetation cover.
- A management plan for storm water and on site pollution control must be compiled and implemented to acceptable ecological standards, and to the satisfaction of the relevant provincial authority or the local authority.
- Water runoff from barren ground, roads, paving areas, and built structures must be properly managed to prevent soil erosion and water pollution (Thompson, J.W. & Sorvig, K. 2000: 67).

6.3.3 Plants

- Promote the use of endemic indigenous species.
- Use drought tolerant plants.
- Use plants with low maintenance requirements.
- Reuse the plants that are in the way of the development.
- Plant deciduous trees near buildings for summer shade and winter sun.
- Plant evergreen trees for windbreaks and year round shade.
- Support local nurseries to provide plants

6.3.4 Recycling and Reuse

Recycling is essential in the elimination of waste and also ensures sustainability in natural ecosystems. Sites as well as materials can be recycled and be reused.

- Reducing the use of Greenfield sites.
- Reduce the use of new materials and components in developing the area.
- Reduce waste by recycling and reuse; it supports sustainability by reducing the energy consumption and resource consumption (Thompson, J.W. & Sorvig, K. 2000: 78).
- Community-level recycling, this includes the reclamation and reuse as well as direct use of wastes (e.g. composting, use of waste water) (Adam E. et al 2000:23).
- Recycle organic waste on site for compost,
- Incorporate waste minimisation and recycling within area of development.
- Minimise construction waste through design and careful management of construction practices.
- Minimise the contribution to mains sewerage from toilet through the use of compost toilets, and other 'local' systems.

6.3.5 Vegetation

- Vegetation clearing must be avoided under all circumstances.
- Where unavoidable, measures must be implemented to avoid loss of topsoil through uncontrolled run-off.
- Grazing must be managed to ensure maximum yield of flowering plants.
- Ploughing must be managed to ensure the minimum disturbance to the grass biome (DEAT 2002/3).
- Fire management plans must be completed and approved by the relevant provincial conservation authority before the development / activity may proceed.
- Off-road vehicles should be restricted to low impact tolerant areas.
- The clearing of grassland for the production of monoculture crops (including commercial tree plantations) should be prohibited unless the relevant provincial nature conservation authority approves an environmental impact assessment and prescribe appropriate and effective mitigation measures that may also include compensative investment (DEAT 2002/3).
- The collection of firewood from indigenous wood sources must be managed to ensure the sustainable use of the resource.
- Where woodlands and forests occur in the riparian zones of rivers and water bodies, no clearing of vegetation should be done other than the removal of alien species (DEAT 2002/3).
- Vegetation that is maintained as protective buffer zones, and for harvesting of wood resources, around indigenous forests should be maintained.
- As required under the National Water Act No 36 of 1998, all alien and invasive species must be removed a part of the conditions under which development may proceed.
- Commercial forestry must abide by the legal requirements by registering for water use.
- Alien species must not be used for rehabilitation or for aesthetic gardening purposes (DEAT 2002/3).

6.3.6 Land use

- The area must be managed in a way that retains or improves the ecological functions.
- Natural habitat corridors and streams must be maintained to ensure the natural function of these resources, and stream corridors must not be channelled (DEAT 2002/3).
- The impact of the development on landscape elements, such as bird watching areas, natural features, cultural features, distinctive landscapes, which have value for tourism, must be assessed and effective preventative and mitigation measures must be adopted.
- Urban open spaces must be developed and maintained for the benefit of the local residents, visitors, and especially the local wildlife, such as bird populations, small mammals (DEAT 2002/3).

6.3.7 Land cover

a) Key Vegetation Community: Fynbos.

- The introduction of the Argentine Ant (destroy fynbos seeds) must be prevented through the introduction of approved and effective measures (DEAT 2002/3).
- The rehabilitation and self-regeneration potential of the vegetation is low.
- Disturbance must be restricted to the absolute minimum.
- Adopt appropriate and effective preventative and/or mitigation measures (DEAT 2002/3).

b) Cultivated land: Agriculture

- Crop production. Irrigated and dry land.
- The potential impact of pesticides and fertilisers on groundwater and river systems must be assessed.
- The use of fertilisers and bio-chemicals for agriculture must be carefully managed and monitored (DEAT 2002/3).
- All cultivation must be in accordance with good agricultural practices that include rotation and resting periods.
- Contact the regional agricultural resource agent and local Agricultural Research Council office for assistance for information (DEAT 2002/3).
- Subsistence farming must be practices according to the traditional methods, which do minimum destruction to the environment (DEAT 2002/3).
- The areas must be managed according to best soil protection methods and best farming methods to include rotational crop planting.
- Irrigation schemes must be properly designed, managed and maintained

c) Vacant Land / Unspecified

- The area must be managed in a way that retains or improves the ecological functions.
- Natural habitat corridors and streams must be maintained to ensure the natural function of these resources, and stream corridors must not be channelled.
- The impact of the development on landscape elements, such as bird watching areas, natural features, cultural features, distinctive landscapes, which have value for tourism, must be assessed and effective preventative and mitigation measures must be adopted.
- Urban open spaces must be developed and maintained for the benefit of the local residents, visitors, and especially the local wildlife, such as bird populations and small mammals.

6.3.8 Soils

- Effective measures to prevent wind erosion of soil must be adopted.
- Erosion removes the topsoil and in severe cases the subsoil of an area where uncontrolled and concentrated water flows over areas devoid of vegetation.
- To prevent erosion, ensure that a vegetation cover is maintained on the area.
- Once erosion has started, stop it by installing gabions or other methods to break the velocity of the water and dissipate the stream into smaller streams.
- Erosion and the loss of topsoil due to wind are detrimental process and must be avoided by retaining a vegetation cover on the land (DEAT 2002/3).
- The nature of the soil requires specialist assessment to determine appropriate construction guidelines in respect of foundations and other structural elements that may be affected by the soil.

6.3.9 Slopes

- No development should be allowed on slopes that exceed the ability of the geology and the soils to retain its structure and the development upon it.
- Ridges and cliffs are of scenic value and the aesthetic quality of these must be maintained.

6.3.10 Geology

- Stability: geological stability for structures must be assessed and the results must be incorporated in design solutions.
- Fossils: the geological feature may contain fossil material or rock paintings. Determine whether fossil beds occur and ensure that appropriate and
effective measures are adopted (DEAT 2002/3).

SECTION G: DESIGN GUIDELINES

SECTION SYNOPSIS

The Master Plan for the Kannaland tourism Node is intended to foster the development of the node as an invisible whole. Similarly, the detailed design of its various components should harmonise with the overall image of the area. Thorough design and detailing of these various elements will contribute to a visual and functional cohesive node. The guidelines in this section spell out important principles aimed at unified area node design for the following elements:

7.1 Stormwater Management and Erosion control
7.2 Parking
7.3 Pedestrianways
7.4 Planting
7.5 Building
7.6 Site Furniture
7.7 Lighting
7.8 Signage

7. DESIGN GUIDELINES

7.1 STORMWATER MANAGEMENT AND EROSION CONTROL

Special consideration must be given for stormwater management for the purpose of preserving natural drainage ways and slowing stormwater runoff from individual sites and route them to streams and rivers by use of catchment ponds and retention-sedimentation basins. Stormwater discharge should be directed away from slopes and into such ponds. The rate of discharge must correspond to the rate prior to site development.

7.1.1 CHARACTER

- Appropriate to the overall visual integrity of the area

7.1.2 FORM

- Visually unobtrusive in most intensively used areas
- Natural-appearing in open spaces wherever possible

7.1.3 SCALE

- Appropriate to function
- Appropriate to setting

7.1.4 CLIMATE RESPONSE

- Aligned according to natural overland flows, open channel and swale routings
- Stabilise and protect disturbed areas to minimise soil erosion
- Reduce water volume and velocity over unpaved areas to reduce erosion (fig42)
  - terraced lawns, recreation fields: 1:50 max slope
  - mowed grass banks: 1:3 max slope
  - unmowed banks: 1:2 max slope
- Re-establish vegetation on barren areas to reduce wind and water erosion
- Locate and design a system to accommodate periodic flooding

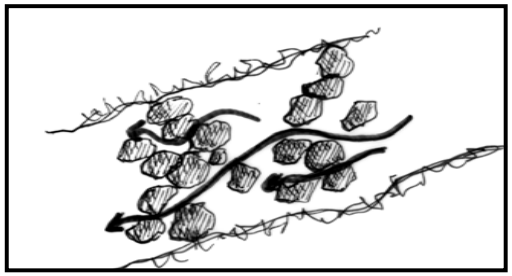


Figure 41: Stormwater - reduce velocity

7.1.5 STRUCTURE (fig 43)

- Stabilise outlets from pipes into natural drainage swales
- 1:100 – 1:33 (1 – 3 %) preferred longitudinal slope for drainage swales and channels (1:4 or 25 % max.)
- 1:100 – 1:10 (1 – 3 %) preferred side slopes for side slopes for drainage swales and channels (1:3,5 or 30 % max.)

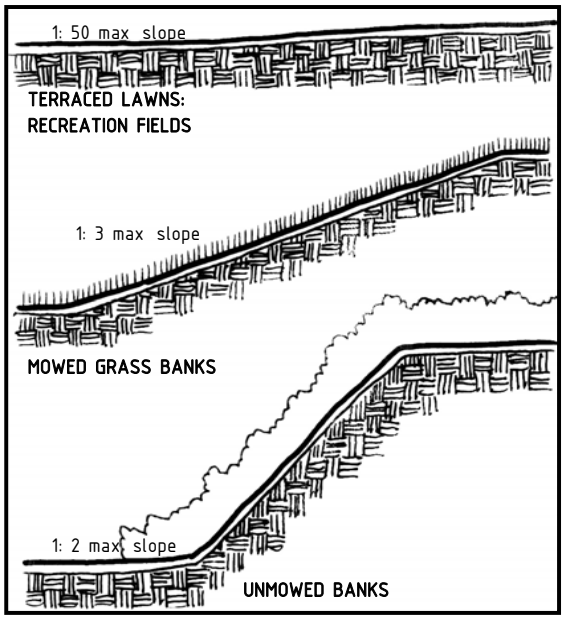


Figure 42: Stormwater management – maximum slopes for planted areas

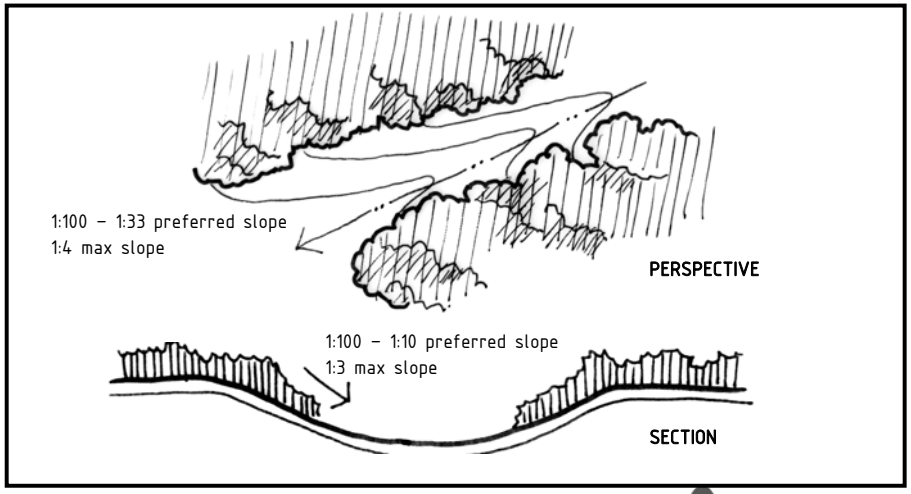


Figure 43: Stormwater management – preferred slopes for drainage swales

7.2 PARKING

Parking will be a major circulation element within the Tourism Node. It should be located according to building and circulation requirements accommodate the maximum number of vehicles and delineate efficient pedestrian and vehicular circulation. Provision must be made for efficient manoeuvring through appropriate dimensions for stalls, turning radius and suitable surface gradients.

Parking lots can be serious visual irritants and safety hazards and must be handled very sensitively. This can be ensured through appropriate siting, the use of planting and lighting and the provision for security surveillance.

7.2.1 CHARACTER

- Appropriate to the surrounding buildings and environment.
- Comfortable and easy to use.
- Be kept small and separated from each other by native vegetation or by landscaped areas.

7.2.2 FORM

- Fitted to the surrounding terrain.
- Regular rectilinear forms for maximum efficiency, manoeuvrability.

7.2.3 SCALE

- Suited to surrounding terrain and building sizes.
- Suited to the size and type of vehicles expected
- Impact visually reduced with planted medians and screening
- Vehicular scale restricted to vehicular areas, i.e., not intruding into pedestrian or other inappropriate areas.

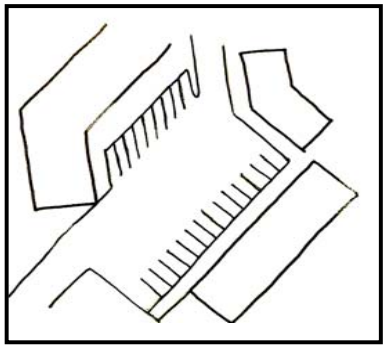


Figure 44: Parking – Large expanses of unrelieved pavement create stormwater runoff problems and poor comfort conditions for pedestrians.

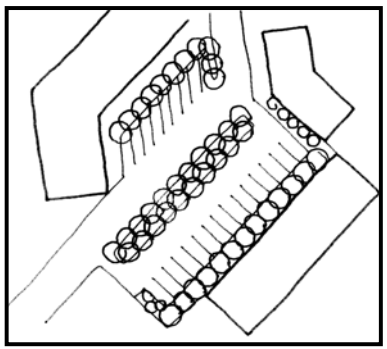


Figure 45: Parking – These problems can be lessened through landscaped planting areas, which include shade

7.2.4 CLIMATE RESPONSE

- Paving materials:
  - low heat-absorption.
  - low radiation/ reflection.
  - permeable paving
  - positive surface drainage with gentlest slopes possible, i.e., 1:100 (1%) min., 1:50 (2%) preferred.
- Planting:
  - reduce heat, noise, pollution and visually break up expanses of paving.

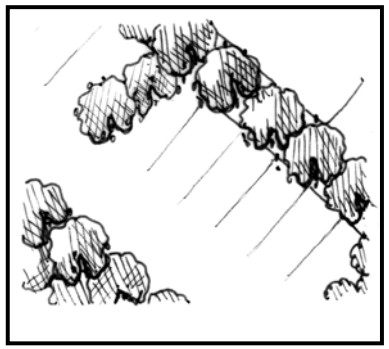


Figure 46: Parking - In an optimum parking arrangement there should be no more than 10 cars in any continuous bay

7.2.5 STRUCTURE

- Access Roads:
  - 6-7 meters min. width for two-way circulation and emergency vehicle access.
  - no parking to be allowed along access roads.
  - no head-in parking along access roads.
  - 1:10 (10%) max. longitudinal slope.
- Aisles:
  - 7m min. width for parking.
  - 6m min. turning radius.
  - 8m turning radius for large busses
  - 1:20 (5%) max. slope for parking and service areas.
  - perpendicular to buildings.

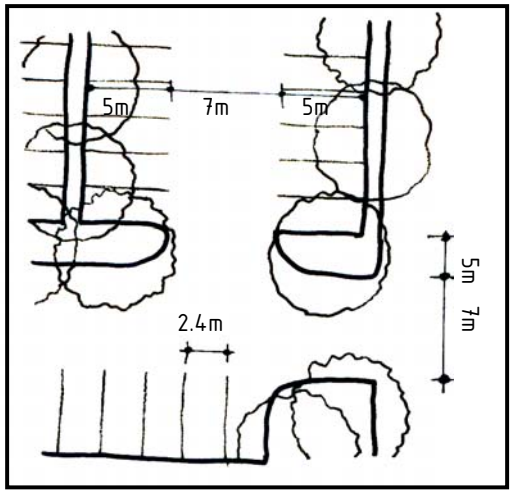


Figure 47: Parking – recommended dimensions

- Stalls:
  - 2.5m wide by 5m deep
  - 3.6m wide by 5m deep for handicapped parking
  - 1 handicapped stall for every 100 regular stalls, located as close to the building entrance as possible
- Bays:
  - use planting to visually reduce length, provide shade in bays over 10 stalls long
- Raised medians:
  - 2.5m recommended minimum width

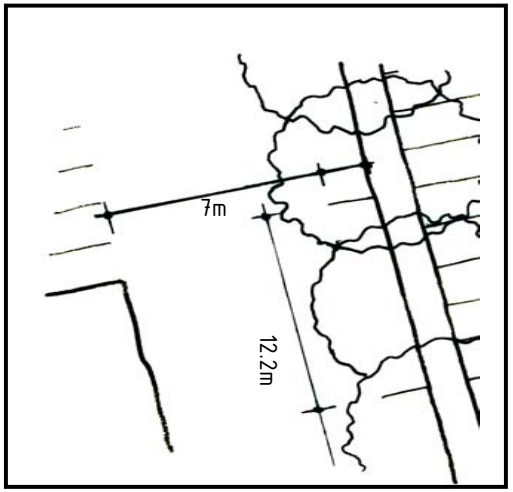


Figure 48: Bus Parking – recommended dimensions

7.2.6 MATERIALS

- Use same materials on parking areas throughout the node
- Select coarse surfaces for good traction, glare and noise reduction.
- Use pervious materials to reduce run-off

7.2.7 COLOUR

- Avoid light colours to reduce glare
- Avoid very dark colours to reduce head absorption
- Contrast with pedestrian way paving colour

7.2.8 SAFETY

- Signage in paved surface to clearly identify vehicular and pedestrian circulation
- Adequate lighting levels in parking areas and pedestrian ways leading to parking (refer to section on Lighting)

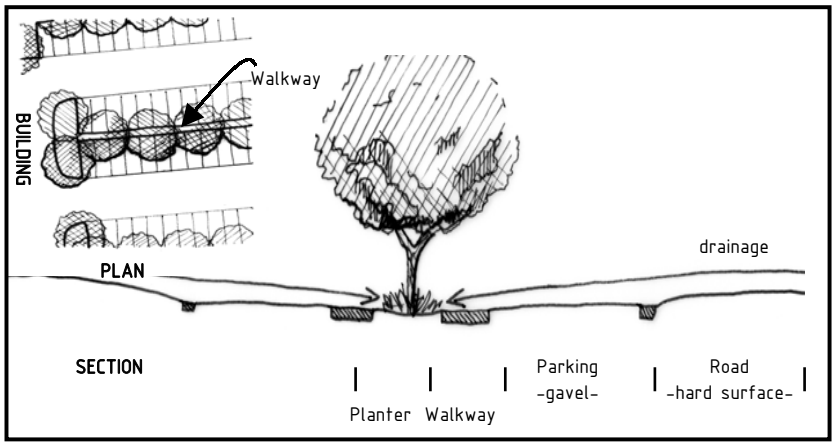


Figure 49: Stormwater management – use pervious materials to reduce runoff

7.3 PEDESTRIANWAYS

Pedestrianways serve an important social, spatial as well as a circulation role. It should be properly designed to manage and direct the flow of pedestrian movement onto and throughout the area, connect major points of origin and destination with clear and conflict free routes. Reduce or prevent conflicts between vehicles and pedestrians and provide opportunities for social interaction throughout the area.

7.3.1 CHARACTER

- Appropriate to the domestic character of the surrounding buildings
- Pleasant and comfortable to use
- Easy to understand

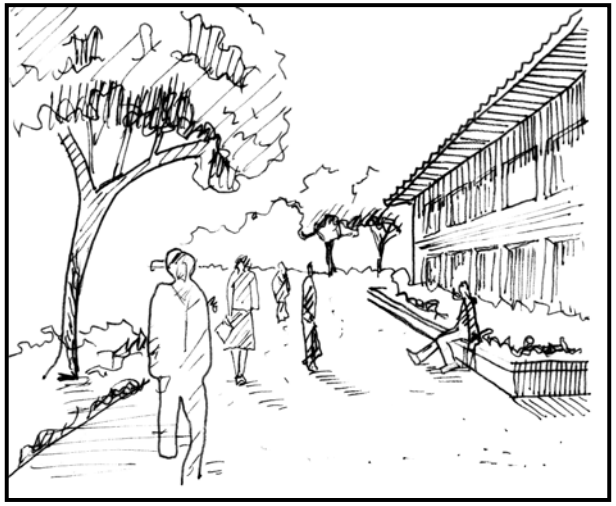


Figure 50: Pedestrianways – structured to buildings

7.3.2 FORM

- Built areas:
  – structured (Fig 50)
- Open space:
  – curvilinear, appropriate to natural topographic relief (Fig 51)
- Appropriate to function/direction of flow
- Lay-out organized to clearly lead users through the main activities and desired destinations

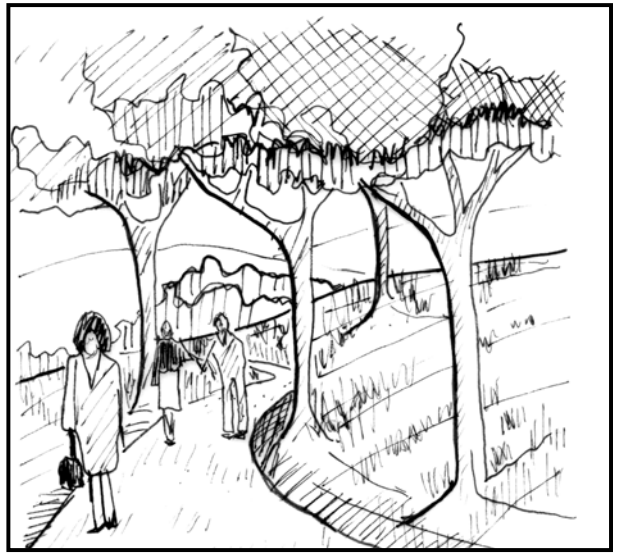


Figure 51: Pedestrianways – curvilinear form to natural areas

7.3.3 SCALE

- Dimensions appropriate to function
- Primary walkways:
  - 3-6m width
- Secondary walkways:
  - 2-3m width
- Paving:
  - pedestrian scale unit pavers

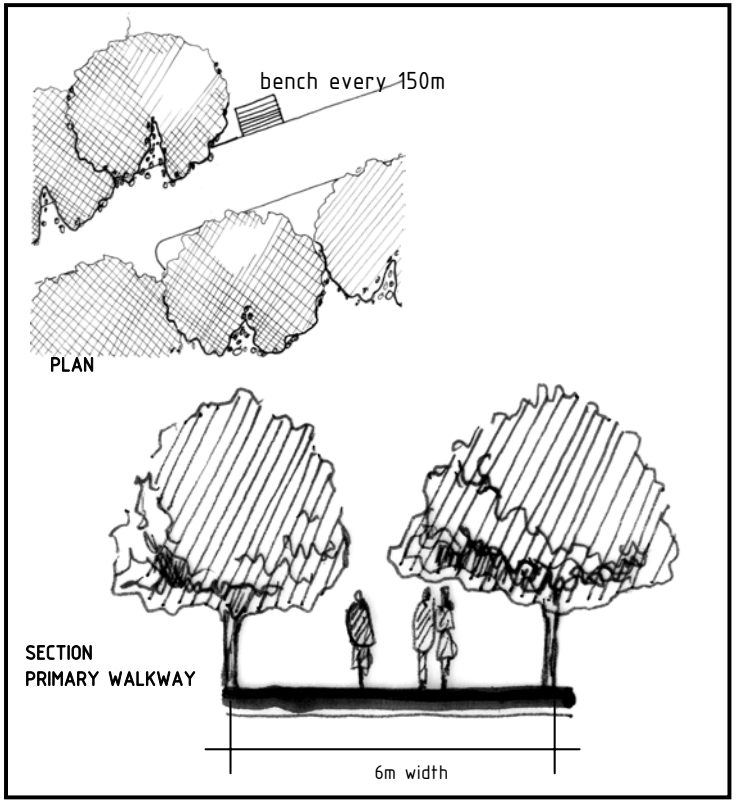


Figure 52: Pedestrianways – recommended dimensions

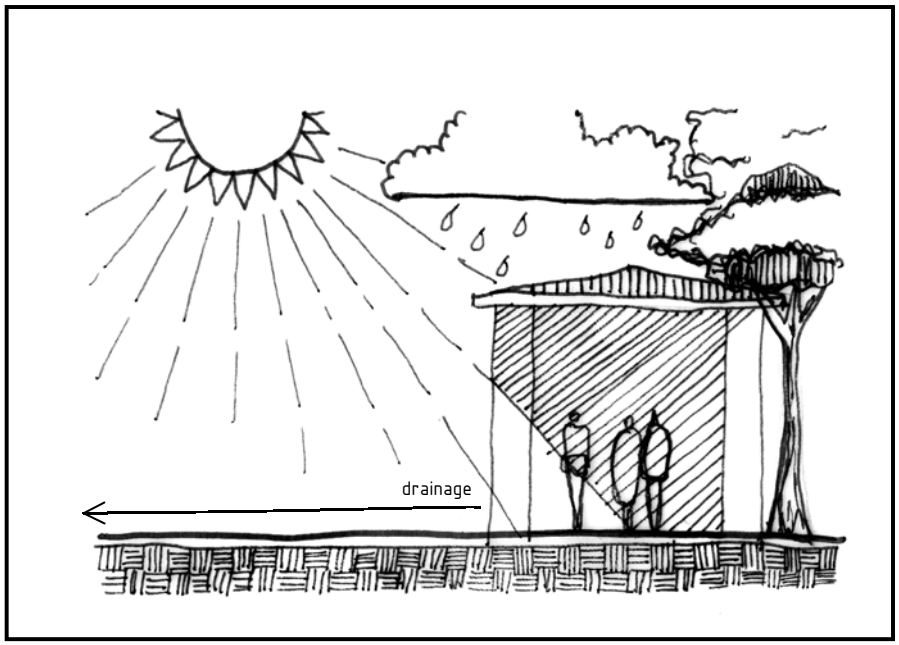


Figure 53: Pedestrianways – climate response

7.3.4 CLIMATE RESPONSE

- Rain protection along primary walkways
- Sun protection continuous along primary pedestrian walkways
- Good natural ventilation along all walkways
- Pavement:
  - low heat-absorption
  - low radiation-reflection
  - positive surface drainage

7.3.5 STRUCTURE (Fig 54)

- Ramps:
  - 1:12 (8%) max. slope
  - 9m max. length (at 1:12 –can be longer if slope is less than 1:12)
  - 1:6 (17%) max slope for curb ramps
- Primary and secondary walkways
  - 1:20 (5%) max. long slope
  - short, level areas (about 1,5m every 30m) required for wheelchairs over sustained long gradients in excess of 1:25 to 1:20
  - 1:25 (4%) max cross slope

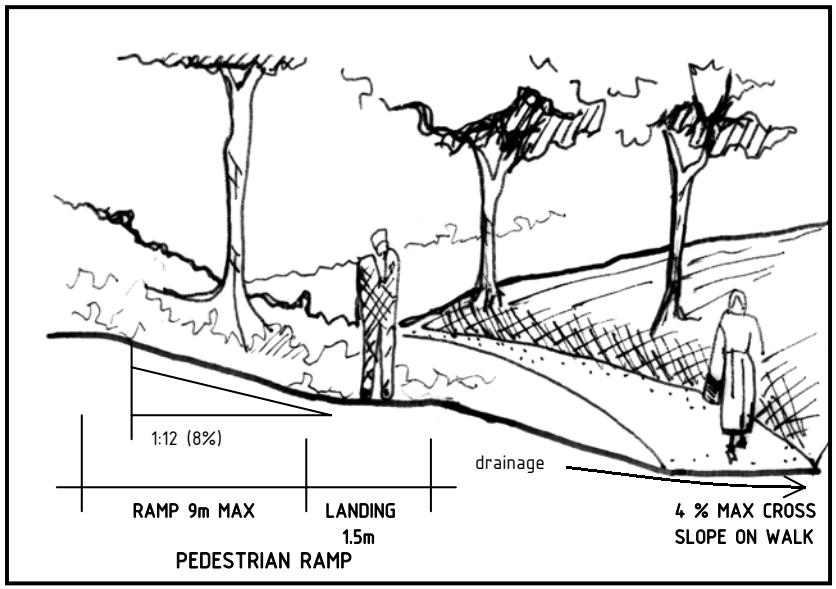


Figure 54: Pedestrianways – recommended slopes

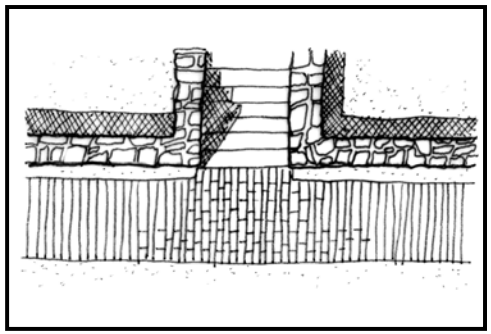


Figure 55: Pedestrianways – change surface materials

- Stairs
  - 1200mm min rise between landings in unprotected exterior stairs
  - 1800mm min between landings in protected exterior stairs
  - 1000mm min width, one-way circulation
  - 1800mm min width, two-way circulation
  - 380mm treads
  - 150mm risers
  - riser tread 530mm
  - nosing rounded or chamfered

7.3.6 MATERIALS

- Brick or unit pavers
- Durable, low-maintenance
- Non-skid surface

7.3.7 COLOUR

- Earth-tone, to co-ordinate with surrounding natural colours
- Complementary colour scheme throughout the area

7.3.8 SAFETY

- Change surface materials or textures at crosswalks, delineate clearly
- Non-skid surface
- Adequate lighting along all pedestrian circulation routes (refer to section on Lighting)
- Providing parking adjacent to the walk as an additional barrier and measure of safety
- Separating sidewalks from the roadway by a planted strip
- Providing for handicapped access along walkways at street intersections and whenever appropriate
- Depressing or raising the walk and constructing adequate barrier (Fig 56)

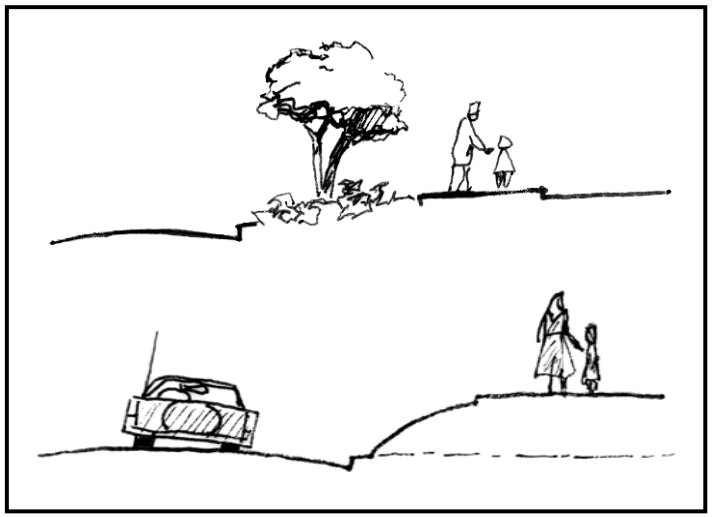


Figure 56: Pedestrianways - safety

7.4 PLANTING

Planting design for the area should be an integral part with the development, reinforcing the lay-out and forms of structural elements and open space, tempering the effects of extreme climatic conditions and visually "pulling together" the various parts of the area. It should accent desirable and screen undesirable views, add variety, texture and seasonal interest of the physical setting.

7.4.1 CHARACTER

- Appropriate to the character of the area
- Harmonious with the indigenous vegetation of the area

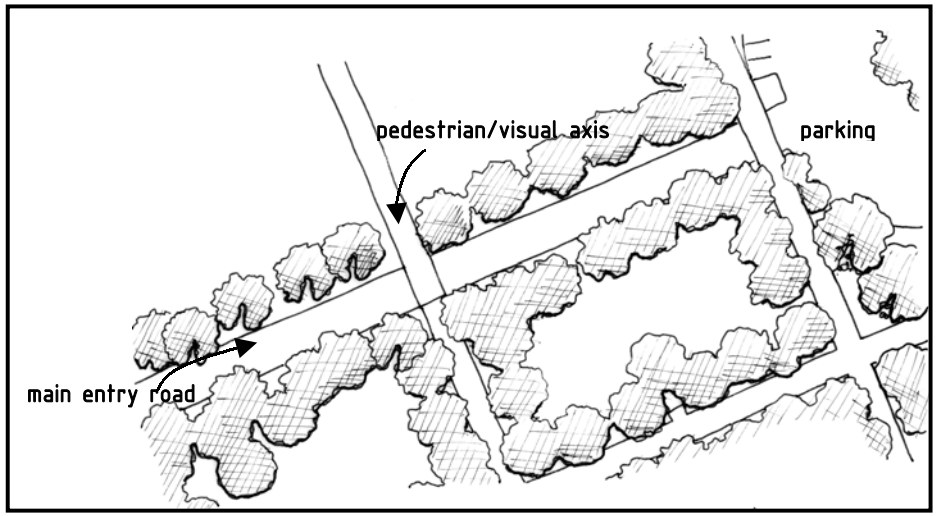


Figure 57: Planting – form suited to surrounding areas

7.4.2 FORM

- Suited to the various areas in which it will be used (i.e., open space, pedestrian paths, parking lots)
- Suited to nearby constructed forms
- Suitable for various architectural uses to create outdoor "rooms" (fig 58)
- Ceilings:
  - trees, tall shrubs or creepers on trellises to create canopies
- Walls:
  - shrubs varying in height, texture, form and colour to create total or partial enclosure as screens, baffles or barriers
- Floors
  -grasses preferred, low spreaders, small shrubs to 45cm to create transitions from one room to another

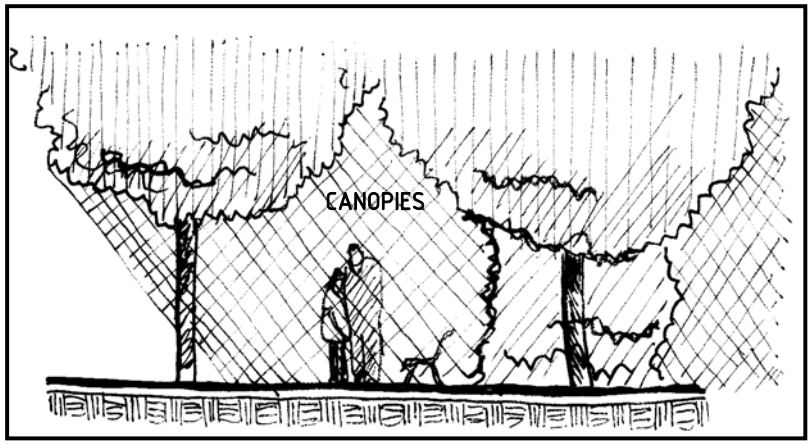


Figure 58: Planting – creating outdoor rooms: canopies

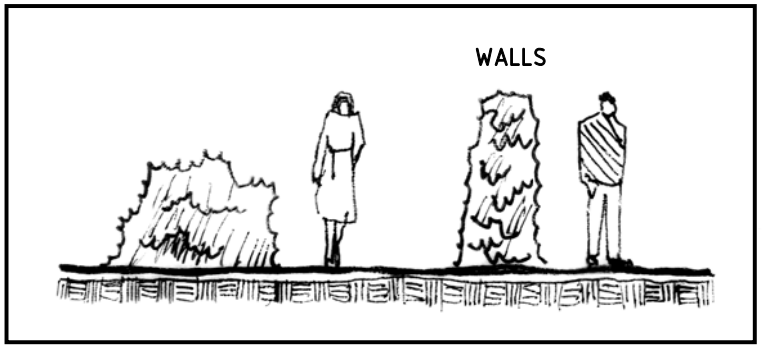


Figure 59: Planting – creating outdoor rooms: walls

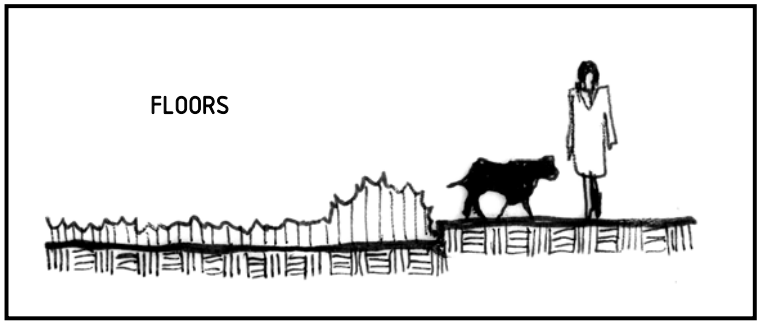


Figure 60: Planting – creating outdoor rooms: floors

7.4.3 SCALE

- Appropriate to the various areas in which it will be used (i.e. large trees in open spaces, more compact trees in plazas)
- Suitable for scaling down buildings to relate to human size
- Suited to scale of nearby hard landscape materials and patterns

7.4.4 CLIMATE RESPONSE

- Solar radiation: reduce undesirable effects of direct and reflected natural and artificial light
  - Trees: deciduous to increase winter solar penetration and summer solar deflection (Fig 61)
  - planted walls and screens: shield windows from low afternoon sun
  - grasses and ground covers: reduce glare from ground-level surfaces

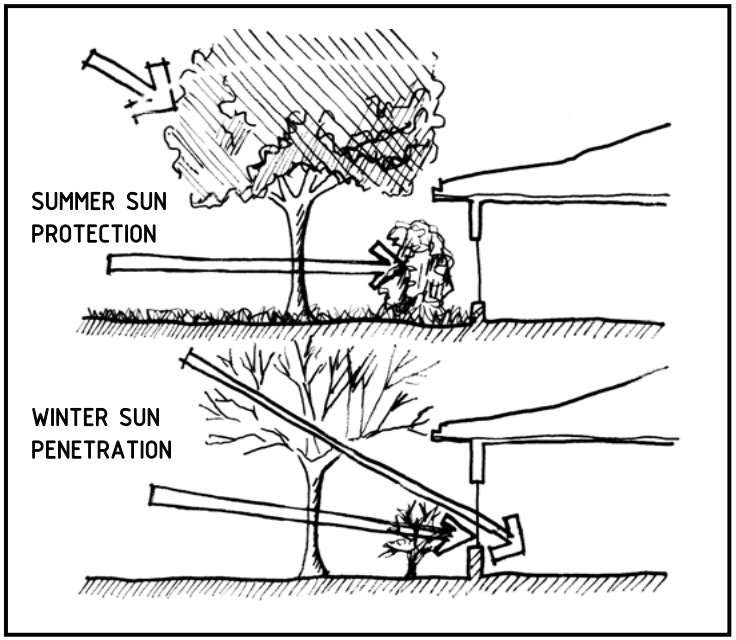


Figure 61: Planting – climate response

- Air temperature
  - reduce surface temperatures over which air moves
- Air filtration
  - foliage traps air-borne particles and buffers winds which stir up dust and dirt
- Wind
  - block, direct or amplify wind
- Erosion control
  - break force of precipitation, bind soil and hold in place, enrich soil and create mulch layer
- Wildlife habitats
  - encourage the presence of insects, birds and some small mammals

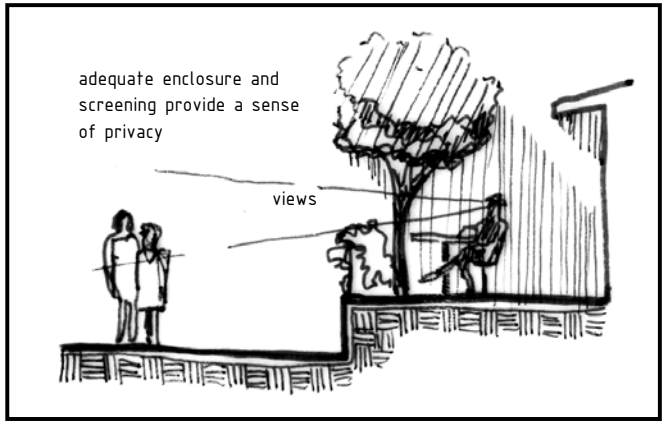


Figure 62: Planting – screening for privacy yet visually accessible

7.4.5 COLOUR/TEXTURE

- Seasonal colour variation for visual interest throughout the year
- Co-ordinated colour themes throughout the area
- Foliage/flower colour used as focal point wherever required
- Avoid competition between building and planting colours
- Textures suited to surroundings (i.e. open space, buildings, river corridor)

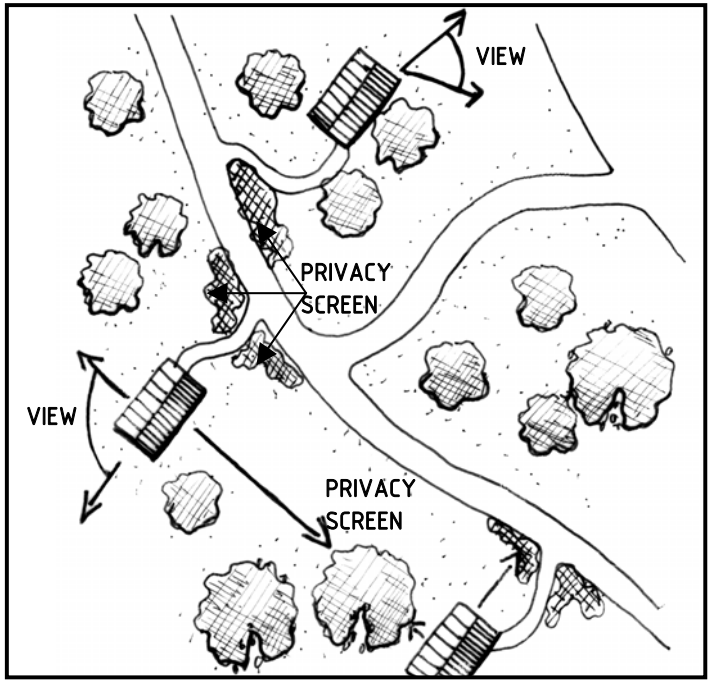


Figure 63: Planting – visual barrier between buildings

7.4.6 INSTALLATION

- Co-ordinate comprehensive planting scheme installation with building construction phase
- Plant only after major construction or disturbance in each area has been completed

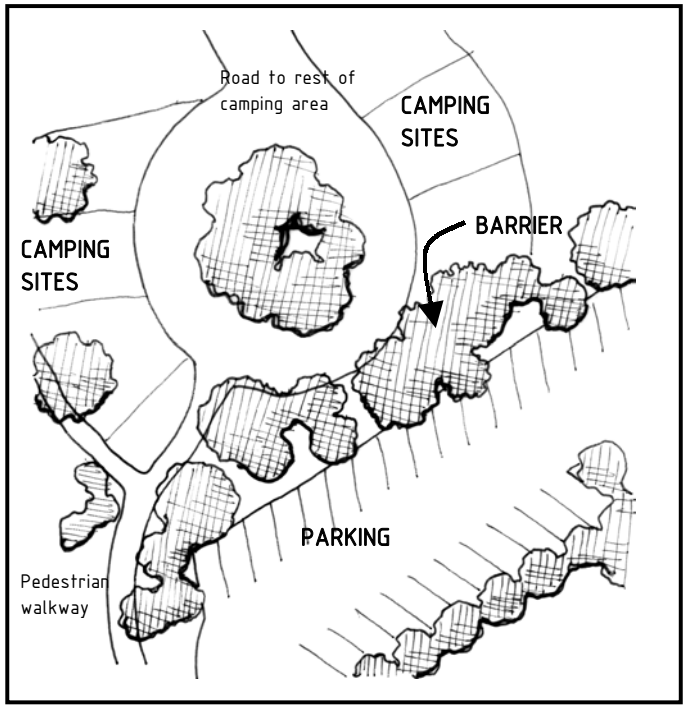


Figure 64: Planting – visual barrier between activities

7.4.7 SAFETY

- Locate and maintain plants to keep clear of sight lines, signs, building entrances
- Locate and maintain plants to keep clear of pathways

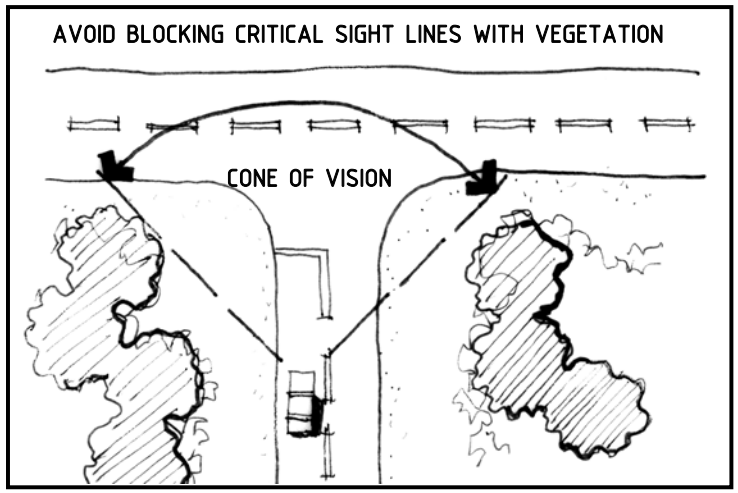


Figure 65: Planting – Safety installation

7.4.8 MAINTENANCE

- Appropriate to the local climate and growing conditions
- Ensure man-power requirements to retain desired conditions of growth, scale or form

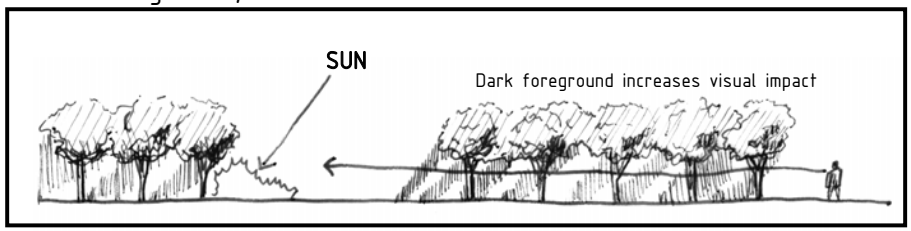


Figure 66: Planting – visual impact

7.5 BUILDING DESIGN GUIDELINES

Buildings will be a strong structural element in the area and their design should contribute to a clear understanding of the organization of both function and space throughout the site. This will be possible through the co-ordination of materials, colours and finishes for structures throughout the area, ensuring consistency of form and scale.

7.5.1 CHARACTER

- Easy to understand
- Comfortable to use
- Appropriate to the function of the development

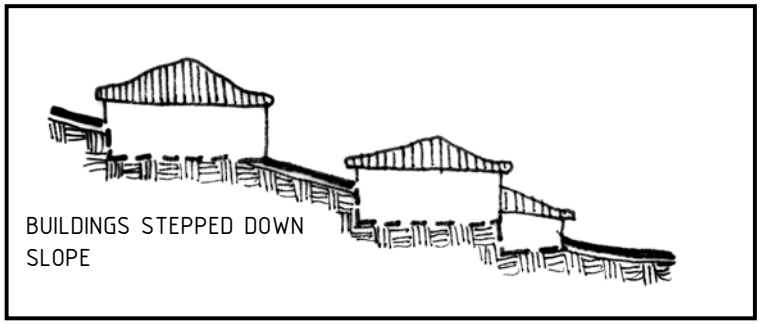


Figure 67: Buildings – form and topography

7.5.2 FORM

- Compact with min. exposed areas
- Conforming to topography
- Structure easily read
- Columns:
  - uniform character throughout
- Modules:
  - avoid monotonous repetition
- Roofs:
  - simple forms
  - pitched at 10 or 22.5 degrees
  - overhangs on all roofs
  - overhangs min. 910mm wide
  - eaves closed

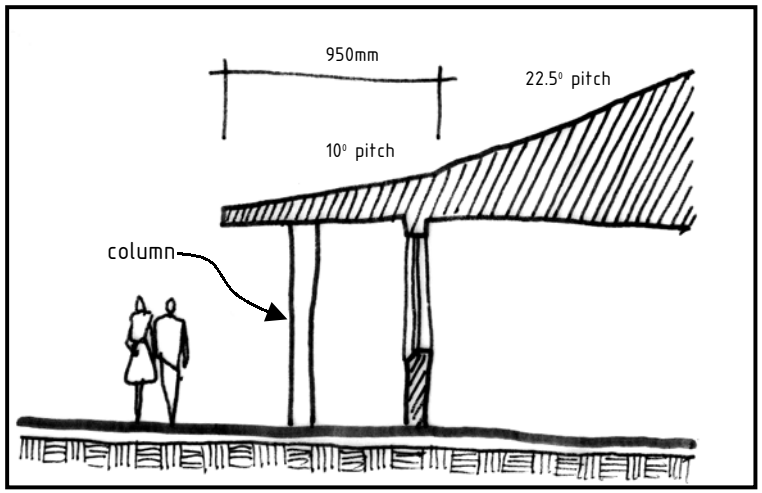


Figure 68: Buildings – roof pitch

7.5.3 SCALE

- Low buildings (1-2 storeys)
- Proportion appropriate to the site and other functions i.e. pedestrian scale
- Individual building units clearly expressed

7.5.4 CLIMATE RESPONSE

- Functions of the buildings should be arranged so that inhabited rooms exploit the equatorial solar gain in winter.
- Storage and buffer rooms should be placed to west and east
- Good natural ventilation, 1,5 m/s needed during summer days
- Glass:
  -shaded wherever possible by overhangs, trees or orientation
- Orientation:
  - longest building dimension along east-west axis
- Walkways:
  - protected from sun
  - protected from rain (concourse)
  - no heat-reflecting floors
- Walls:
  - cavity walls for thermal and moisture protection
- Windows:
  - none facing west, minimum number facing east
- Sun:
  - summer sun must be screened
  - winter sun must be allowed to penetrate

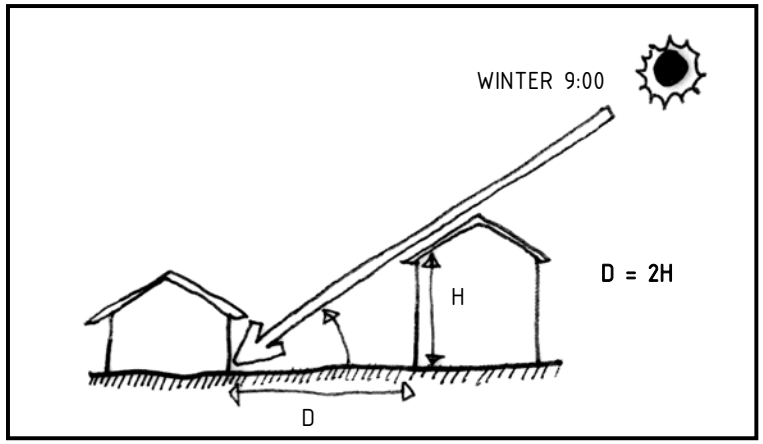


Figure 69: Buildings – solar access for building spacing

7.5.5 MATERIALS AND FINISHES

- Materials appropriate to the local conditions
- Materials with high thermal capacities like water, dense concrete and brick are ideal
- Floors should be concrete finished with grano or hard finish
- Easy to maintain
- Columns:
  - rock
- Exterior floors
  - brick, unit pavers or granolithic
- Roofs:
  - painted corrugated galvanized mild steel sheeting
- Walls:
  - rock
  - wood
- Windows:
  - steel frames

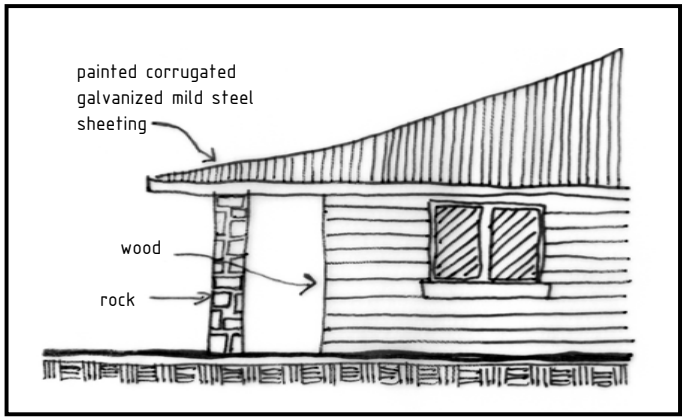


Figure 70: Buildings - materials: wood

7.5.6 EXTERIOR COLOURS

- Floors:
  - earth-tone compatible with pedestrian concourse paving
  - light, to contrast with the walls
  - avoid reflective light colours
- Roofs:
  - terra cotta
- Walls:
  - contrast with roof and walls

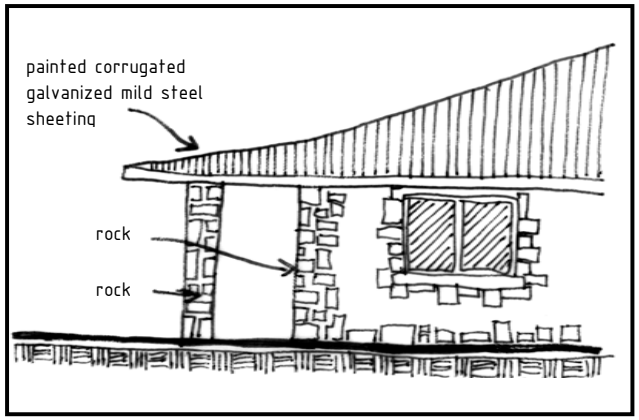


Figure 71: Buildings - materials: rock

7.5.7 SOLAR ACCESS

- Locate highest buildings to the southern side of the open space with lower buildings or trees (as enclosing elements) on the northern side
- To provide adequate solar access to a building, the distance between buildings should be determined with the following: Distance = 2x Height

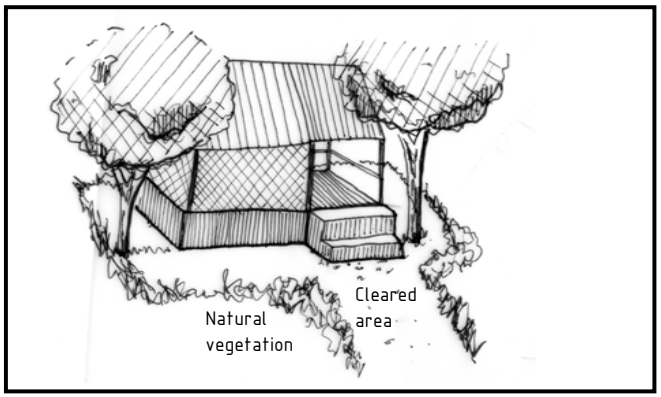


Figure 72: Buildings – Permanent tent structure

7.6 SITE FURNITURE

A well designed site furniture system can help unify the area through the co-ordination of seating, lighting, bus shelters, planters, litter bins and other items throughout the site. These items should be standardized in design and manufacture and be co-ordinate wherever possible for multiple uses. This will prevent clutter in the landscape and contribute to a unified and well-ordered appearance.

Site furniture for the area would include the following items:

- Formal and informal seating
- Formal and informal bollards
- Litter bins
- Tree grilles and guards
- Bus shelters
- Drinking fountains
- Light posts
- Sign boards

7.6.1 CHARACTER

- Appropriate to area design
- Co-ordinated throughout the area

7.6.2 FORM

- Pleasing, simple, resilient appearance
- Appropriate to surroundings
- Comfortable and easy to use and maintain
- Easy form for local manufacturing

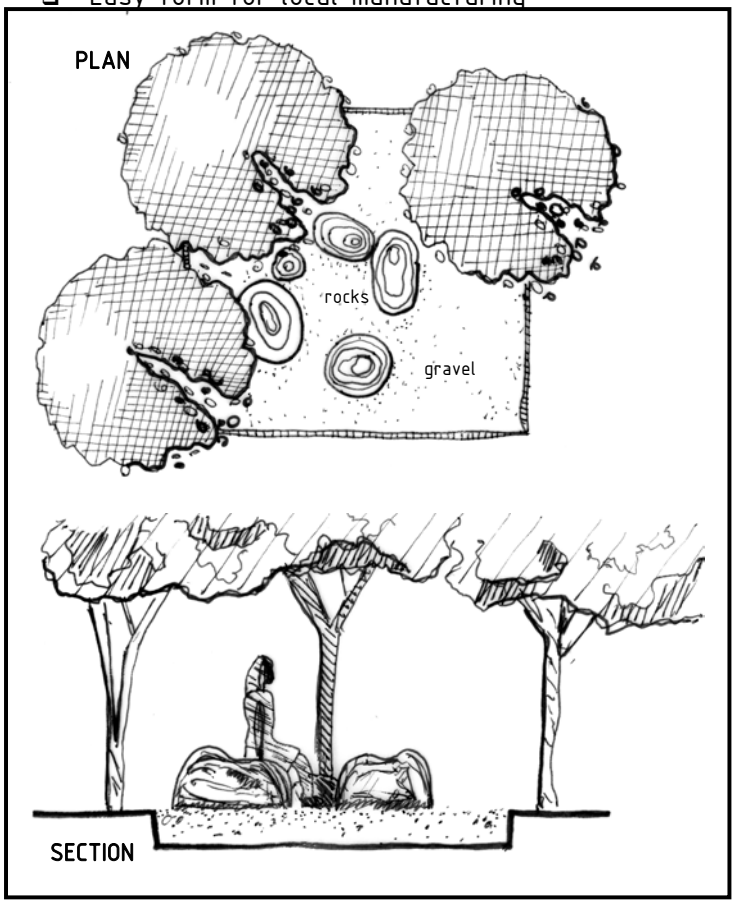


Figure 73: Site Furniture – informal seating

7.6.3 SCALE

- Suited to the locations in which they are used
- Proportioned to co-ordinate with nearby structures or natural features

7.6.4 CLIMATE RESPONSE

- Reduce solar penetration, glare and surface temperatures in seating areas
- Protection from wind and some extent rain

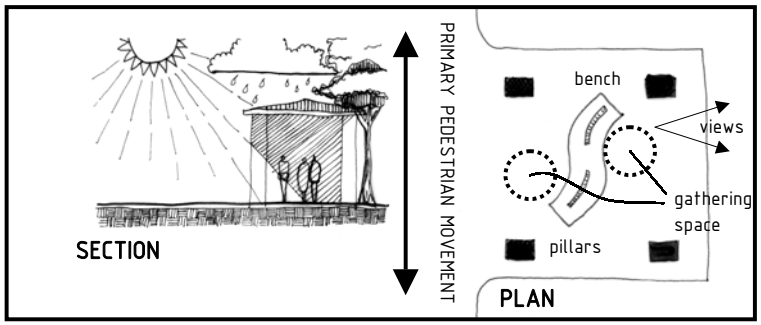


Figure 74: Site furniture – formal seating

7.6.5 STRUCTURE AND FUNCTIONAL ARRANGEMENTS

- Seating
  - 1500mm from seat front to nearest obstacle
  - 1000mm between benches, end-to-end
  - 600mm between seating and adjacent walks
  - 450-600mm seat height
  - 300-400mm seat depth
  - 600mm seating space per person
  - complementary type throughout area

- Permanent planters (Fig 75)
  - 50cm – 1m between weep holes at bottom of walls for drainage
  - avoid draining planters across pavement
- Litter Bins (Fig 76)
  - 1m height above-ground for openings
  - removable liners
  - weep holes (but not draining onto paved surfaces)
  - complimentary type throughout the area

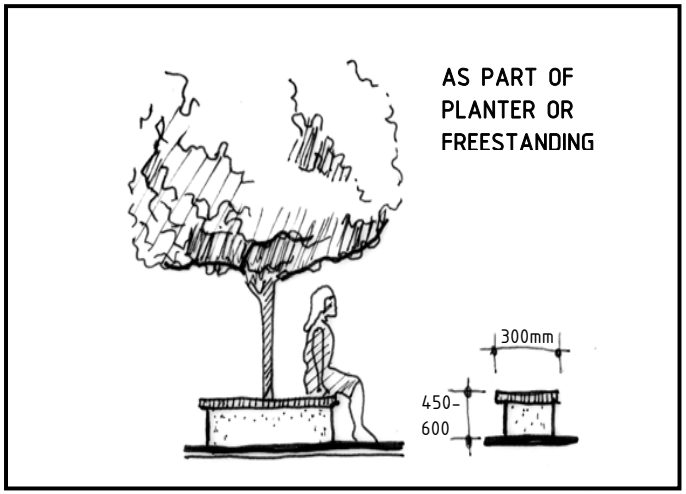


Figure 75: Site furniture – seat dimensions

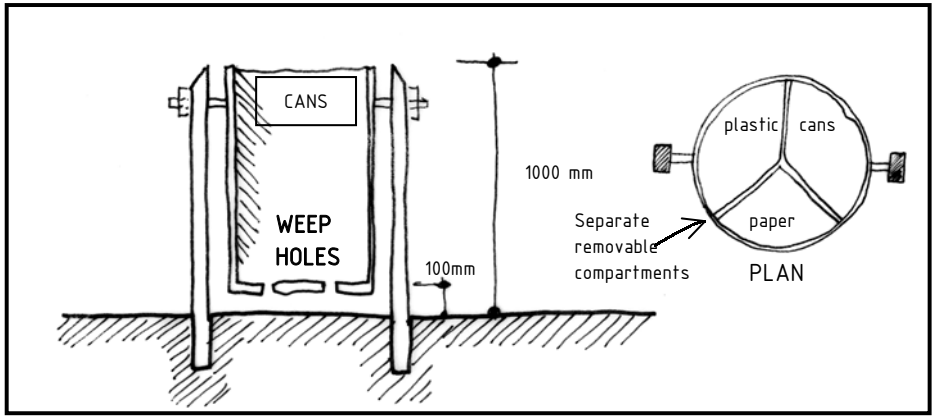


Figure 76: Site furniture – recycle litterbins

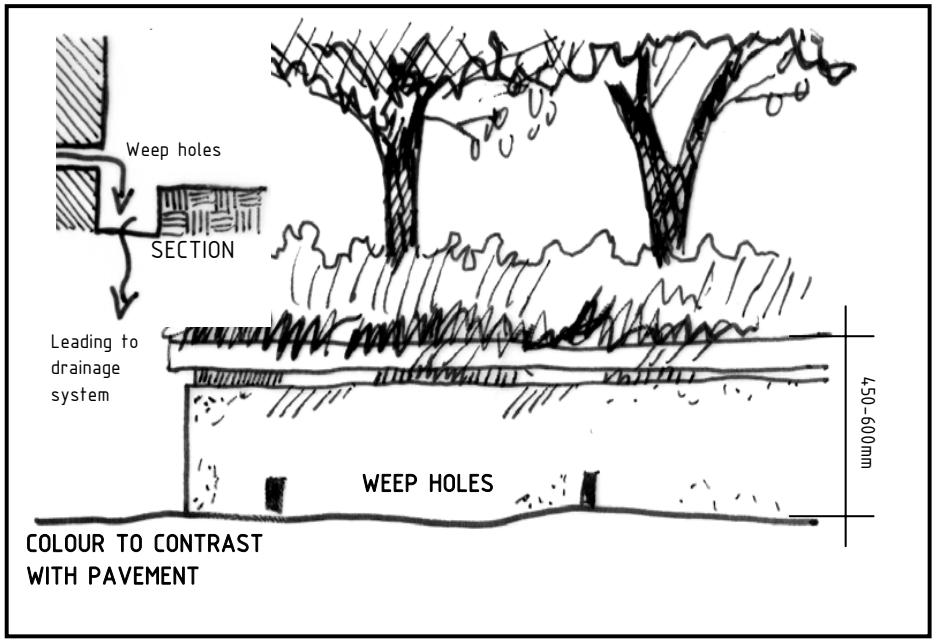


Figure 77: Site furniture – permanent planters

- Bollards (Figs 78)
  - 600–1000mm height
  - 1000mm length of chains if used between bollards to obstruct vehicular or pedestrian movement
  - 1500–2400mm between bollards to block cars
  - colour similar to building walls, nearby structural elements but should contrast with surrounding paving
  - unified type throughout the area

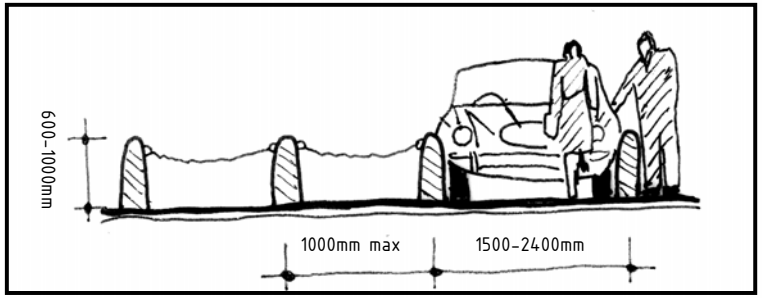


Figure 78: Site furniture – formal bollards

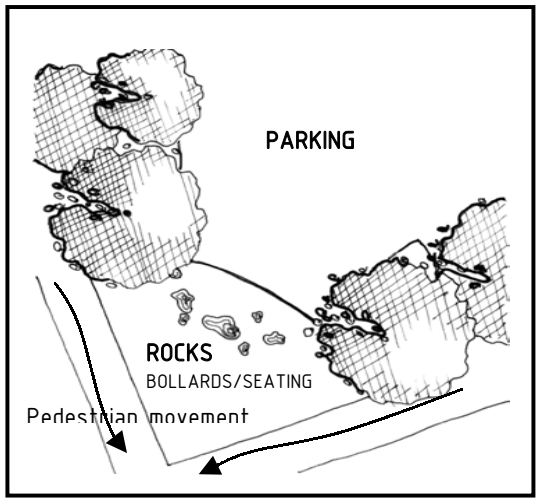


Figure 79: Site furniture – informal bollards/seating

- Tree Grilles (Fig 80)
  - install flush with pavement
  - 15mm min., 20mm max width of openings around trunk
  - 1m or 1 diameter grilles should be constructed in two sections

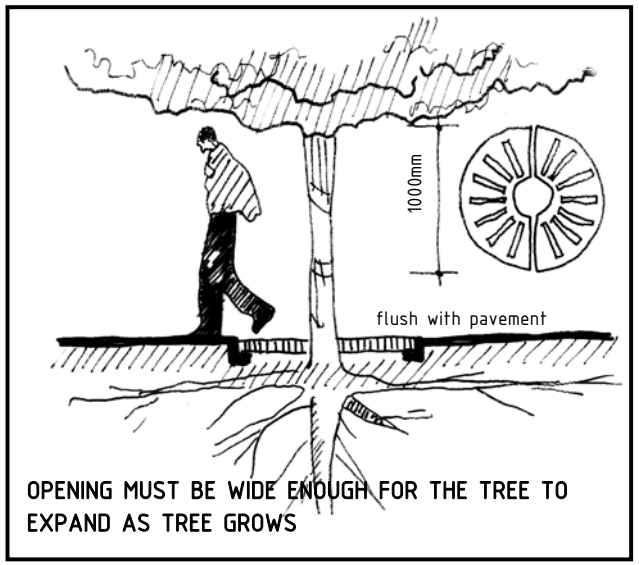


Figure 80: Site furniture – tree grilles

- Bus Shelters (Fig 81)
  - 1000mm set-back kerb, including roof overhang
  - open or transparent sides for visibility
  - seating, litter bins, display surface where appropriate
  - access in and out of shelter at two points
  - well-lighted
  - designed to conform to appropriate architectural style

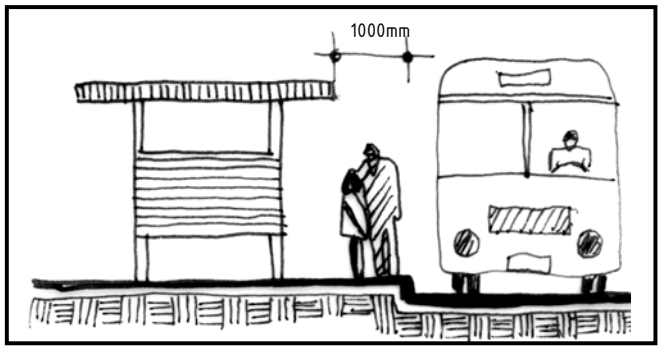


Figure 81: Site furniture – bus shelters

- Drinking Fountains (Fig 82)
  - 850 mm nozzle height for wheelchairs and children
  - 1000mm nozzle height for adults
  - wide paved area around fountain
  - unified type throughout the area

7.6.6 MATERIALS

- Durable and easily maintained
- Resistant to ultraviolet and chemical weathering
- Vandal resistant
- Co-ordinate with surrounding materials
- Seating:
  - easily drained/fast drying
  - avoid rough materials or those that develop splinters
  - comfortable for extended periods of use
- Planters:
  - co-ordinate with buildings, pavement and nearby walls
- Litter Bins:
  - interiors easy to clean
  - co-ordinate with buildings and other site furnishings
- Bus shelters:
  - co-ordinate with buildings

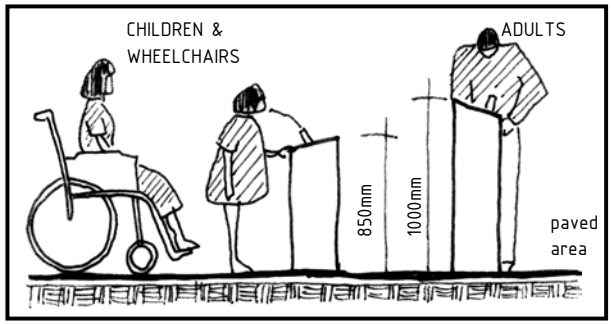


Figure 82: Site furniture – drinking fountain

7.6.7 COLOUR

- Co-ordinate with surroundings
- Bollards and other elements should contrast with surrounding paving but should not be visually obtrusive
- Co-ordinate throughout the area for a unified appearance

7.7 LIGHTING

The location and design of lighting throughout the site should provide adequate illumination for visibility, safety and pleasing appearance. Fixtures should be durable, multifunctional and easy to maintain.

7.7.1 CHARACTER

- Appropriate to the surroundings
- Suitable to the character of the area
- Co-ordinated throughout the area
- Appropriate to the design style of the area elements

7.7.2 FORM

- Suitable for the surrounding spaces
- Appropriate for surrounding structures

7.7.3 SCALE

- Suitable for areas in which it will be used:
  - bollards 1000mm height
  - walkways 3-4m height
  - roadways 9-15m height

7.7.4 CLIMATE RESPONSE

- Fixtures resistant to dust and high solar radiation

7.7.5 MATERIALS

- Co-ordinate with other site furnishings
- Vandalism resistant
- Easy to maintain

7.7.6 SAFETY

- Adequate light levels in various part of the site:
  - Plazas 100 lux
  - Pedestrianways 100 lux
  - Parking areas 100 lux
  - Bus shelters 500 lux
  - General grounds 100 lux
  - Building entrances 500 lux
  - Recreation facilities 500 lux
- Illumination levels may vary to meet special requirements

7.7.7 ECONOMY

- Select energy-efficient systems consistent with the visual quality of the light colour

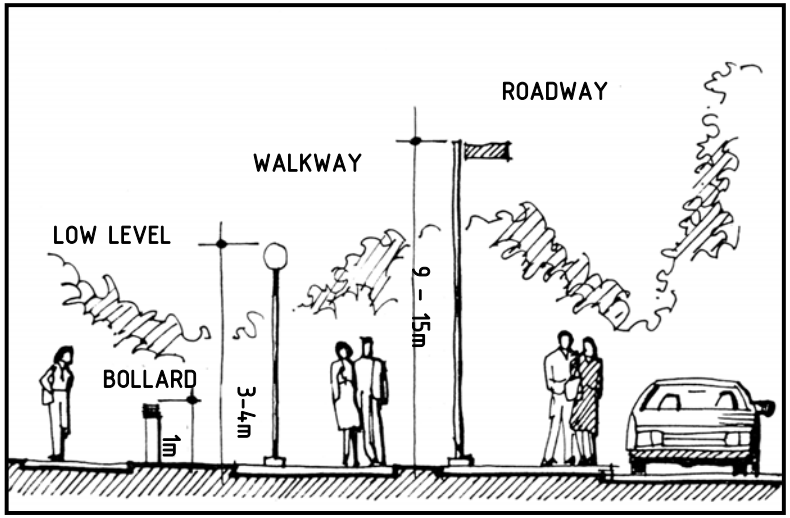


Figure 83: Lighting – recommended lights

7.8 SIGNAGE

The design and location of signage throughout the area should co-ordinate with the design and location of all the components. The directions or information contained on each signage element should be clear and suited to its particular function, while the appearance of the signage should complement and harmonise with the surroundings.

Sign types for the area would include the following items:

- Trail-blazer
- Entrance sign
- Arterial directory
- Internal directory
- Street signs
- Pathway guides
- Destination identification

7.8.1 CHARACTER

- Appropriate to particular functions
- Easily recognizable
- Co-ordinate throughout the area
- Appropriate to the design style and architectural forms

7.8.2 SCALE

- Fitted to surrounding areas
- Appropriate to particular functions:
  - motorist eye level 1070mm – 1200mm
  - pedestrian eye level 1740mm
- Characters/symbols easily read from appropriate distances
- Appropriate to reading distance and speed of viewer travel
- Character/Symbol size Max. Reading Distance

100mm	39m
80mm	30m
60mm	22m
40mm	15m
25mm	10m
13.5mm	6m
7.5mm	3m

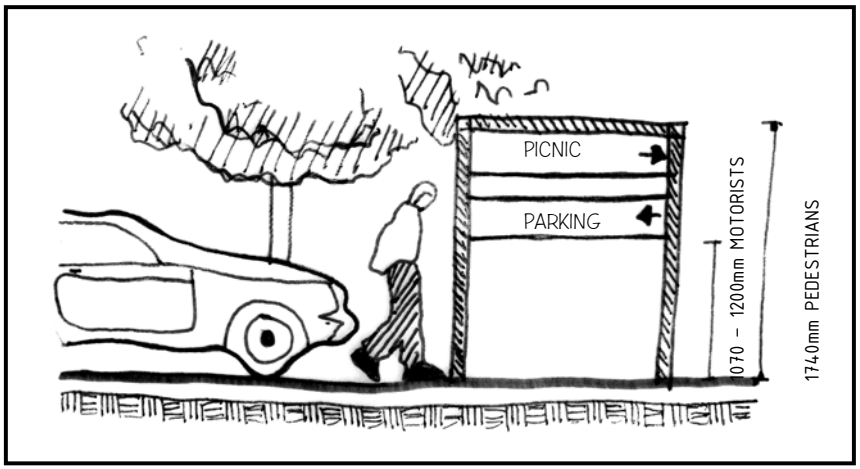


Figure 84: Signage – typical eye levels

7.8.3 FORM

- Fitted to surrounding areas
- Appropriate to particular functions
- Co-ordinate throughout the area

7.8.4 CLIMATE RESPONSE

- Materials resistant to high ultraviolet radiation and dust
- Position to reduce potential glare on readable surfaces
- Locate to reduce maintenance associated with climatic exposure

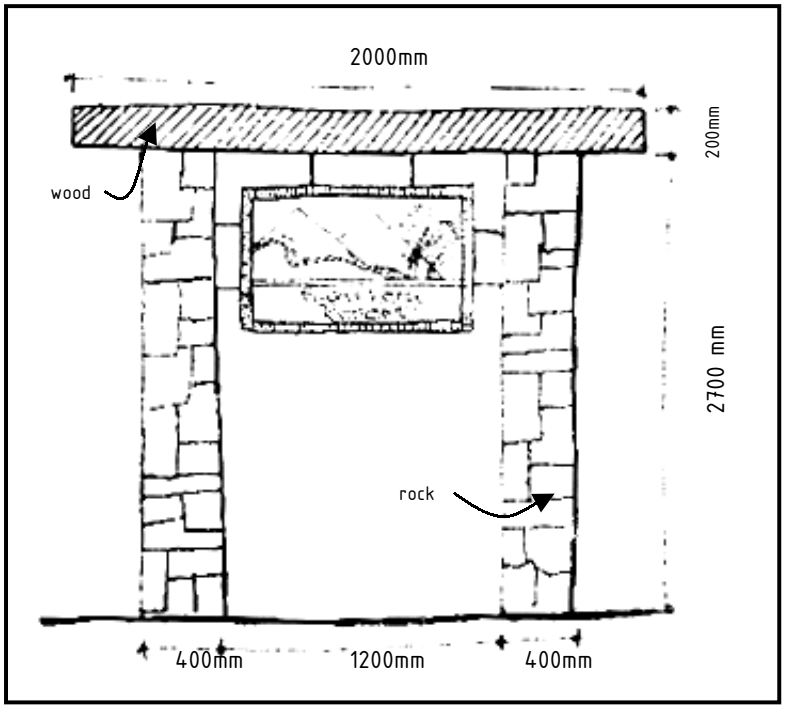


Figure 85: Signage – entrance sign

7.8.5 STRUCTURE AND FUNCTIONAL ARRANGEMENTS

- Trail-blazer
  - located on the major approach roads to alert and guide visitors
- Entrance sign
  - placed inside property lines to announce arrival and help create an attractive portal

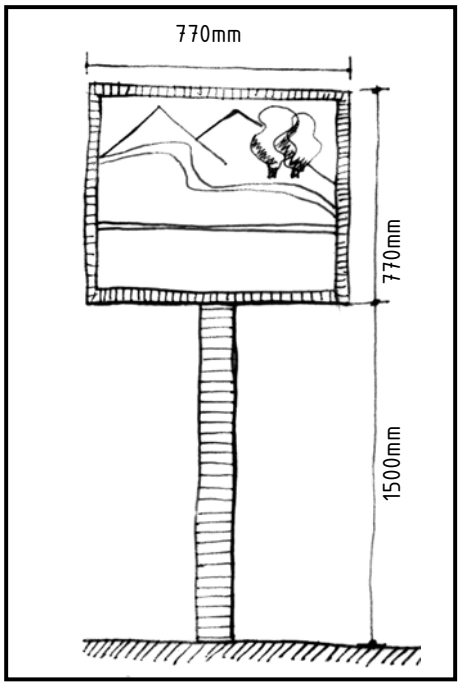


Figure 86: Signage – trail-blazer

- Arterial directory
  - located on the arterial approaches to every major intersection and list the major destinations
- Internal directory
  - placed at each intersection or activity centre and provide essential guidance
- Street signs
  - located with consistent setbacks, at every intersection. Preferably in combination with lighting
- Pathway guides
  - place and way information is to be provided at the main intersections of pedestrian walks and bicycle paths
- Group signs into unified systems
- Avoid clutter
- Informational signs located at major access points, gathering spots
- Incorporate into design of site furniture
- Avoid interfering with pedestrian circulation
- 500mm min. setback from walkways
- Avoid interfering with vehicular circulation and door opening
- Convenient to describe or label displays

7.8.6 COLOUR

- Co-ordinate throughout the area
- Suitable to function
- Appropriate for settings

7.8.7 SAFETY

- Materials resistant to vandalism
- Adequate lighting wherever required
- Locate out of pedestrian and vehicular circulation routes

SECTION H: DESIGN PHILOSOPHY

SECTION SYNOPSIS

This section provides the philosophy of the design and the various thoughts, elements and principles that influenced the design.

8. DESIGN PHILOSOPHY

" Clearly the problem of man and nature is not one of providing a decorative background for the human play, or even ameliorating the grim city: it is the necessity of sustaining nature as source of life, milieu, teacher, sanctum, challenge and most of all, of rediscovering nature's corollary of the unknown in the self, the source of meaning." (McHarg 1999:34)

8.1 THE MAN VERSUS NATURE RELATIONSHIP

From "Individual vs. Community" to "Humankind vs. Nature"

According to Markus Wischermann, the controversies of the last three decades have prevailed both in social philosophy and in environmental ethics (http://www.aynrand.org/medialink 21 Oct 2003). In social philosophy, it is argued that an individual needs the values of a community to develop his or her personality and thus to live out their freedom. In ecological ethics, the dispute was about the higher priority in human actions, human interests (anthropocentrism) or Nature (physiocentrism). While the two controversies took place separately from each other, structural parallels are obvious. Combining both the arguments provide a new approach to environmental ethics.

Human beings are related to Nature in a complex network of interaction, e.g. in the exchange of O_2 and CO_2 with plants. So human actions influence natural processes and vice versa. In this way, the relationship between Humankind and Nature is very similar to that between individuals and a community: it is in Humankind's own interest if Nature continues to flourish, as much as it is in the human individuals' own interest if their community "functions" properly.

On the other hand, individuals have a right to satisfy their own needs and fulfill their own wishes, or, to develop freely. Equally, it can be argued, Nature also needs to develop in some degree of freedom from human interference.

Perceptions of the relationship between people and their environment range from one being dominated by nature, and therefore servant to nature, to one of people as being dominant over, therefore, master of nature.

Currently a more holistic systemic approach with a systems management emphasis is being combined with grass-roots appropriate-technology approach into an expanded and enlightened view of sustainable development.

It is therefore necessary to understand the interrelated components, environmental and social, that constitute a particular landscape before one can successfully design and develop a particular landscape.

8.2 DESIGN AS A STATEMENT OF HUMAN AND ENVIRONMENTAL RELATIONSHIPS

The Gourits River Catchment environment and its landscapes are highly variable. The site and the environment were related through similarity, compatibility or contrast. It is suggested with this proposal that the degree and nature of these relationships were consciously managed so as to develop the appropriate human-environment relationship.

The site and the environment can be synergised by expressing themselves in more naturalistic forms, implying an attitude of people in nature as shown in zone 3 of the Kannaland Tourism Node (Fig 87). Nature dictates where the developable areas are, and what type of development should take place.

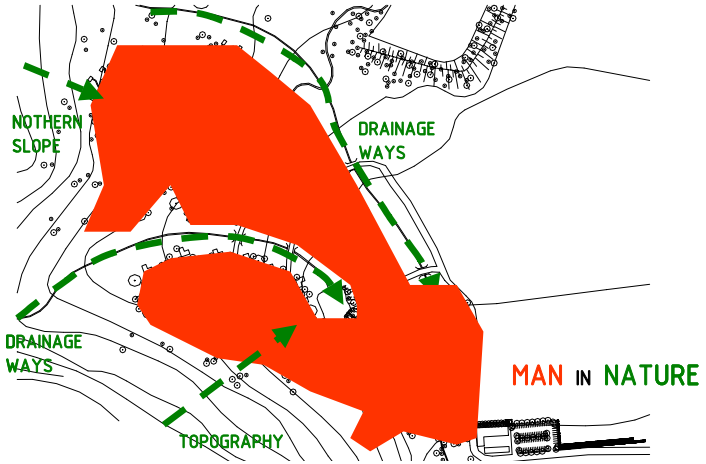


Figure 87: Environmental relationships – Zone 3

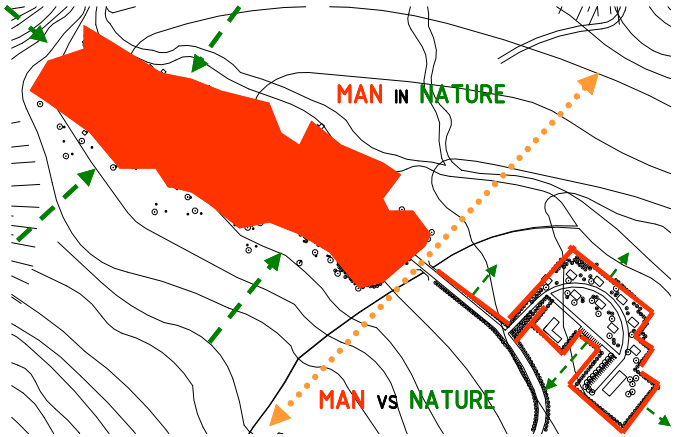


Figure 88: Environmental relationships – Zone 4

It was also expressed as discrete elements, different in character but coming together in a compatible manner, implying humans and nature in coexistence (Fig 88).

They even come together in a condition of contrast implying an attitude of people forming nature shown in zone 2 of the Kannaland Tourism Node (Fig 89).

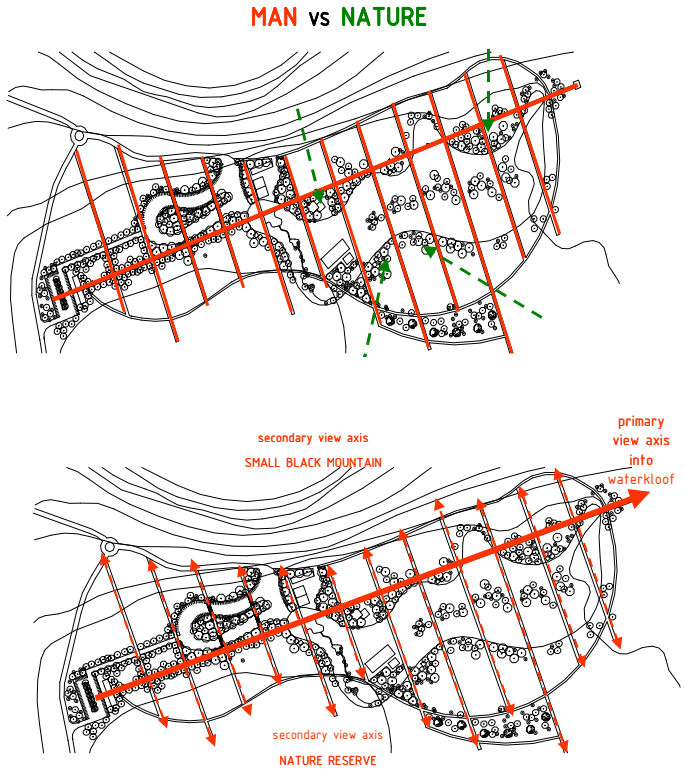


Figure 89: Environmental relationships – Zone 2

8.3 ELEMENTS AND PRINCIPLES OF THE DESIGN

8.3.1 DESIGN ELEMENTS

A variety of design elements are used to create the desired site-nature relationships. In zone 2, a combination of point and line elements are used to create visual prominence as well as implying human assertion into the environment (Fig89). The alignment of elements (such as the trees) as well as strong linear lines created by the paving is used to create the effect. Naturalistic lines are used in Zone 3 and 4 to imply nature's dominance over people (Fig 87 and 88).

Colour and texture are major elements in creating a sense of place as well as a sense of scale that provides character to the place.

8.3.2 DESIGN PRINCIPLES

The main design principles used in this project is unity, focal points, balance, scale and rhythm.

The design guidelines in Section G as well as the lines, points, form, colour and texture can be consciously managed to unify site, buildings and nature. These elements are used to create a sense of unity between the three sites as well as to the surroundings.

Zone 2 was designed symmetrically and was placed in an informal site. The sense of formal symmetrical onto informal unsymmetrical, created a dynamic interplay between site and environment as well as between people and nature.

Scale played an important role in the design of the three sites. There is interplay between human scale and the scale of the surrounding mountains and this creates interest within the site and surrounding landscape..

The dominant lines in zone 2 and 4 convey a rhythmic character. Conversely, they can be irregular, such as in zone 3 and 4, conveying a naturalistic feeling to the site.

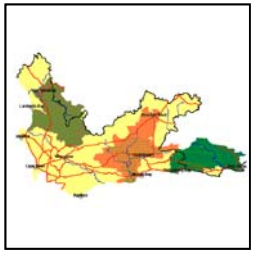
SECTION I: PLANS

9.1 ZONE 2: RECREATIONAL PARK

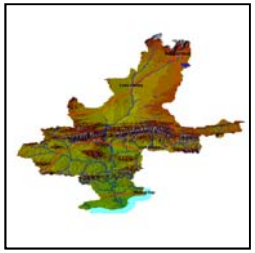
MASTER PLAN

RECREATIONAL PARK

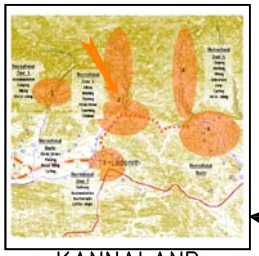
ZONE 2 27 NOVEMBER 2003 SCALE 1:1500



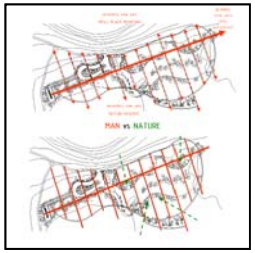
WESTERN CAPE



GOURITS RIVER CATCHMENT



KANNALAND TOURISM NODE



BIG IDEA

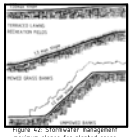


Figure 42: Stormwater Management maximum slopes for planted areas

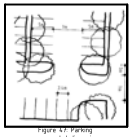


Figure 47: Parking recommended dimensions

Figure 48: Bus Parking recommended dimentions

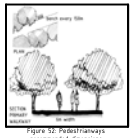


Figure 52: Pedestrianways recommended dimensions

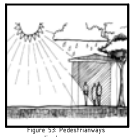


Figure 53: Pedestrianways climate response

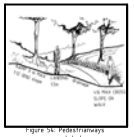


Figure 54: Pedestrianways recommended slopes

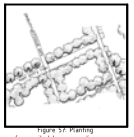


Figure 57: Planting form suited to surrounding areas

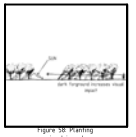


Figure 58: Planting visual impact

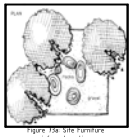


Figure 73a: Site Furniture informal seating

Figure 73b: Site Furniture informal seating

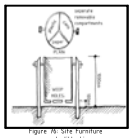


Figure 75: Site Furniture recycle litterbins

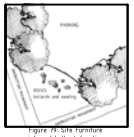


Figure 77: Site Furniture informal bollards/seating

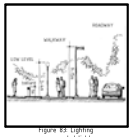


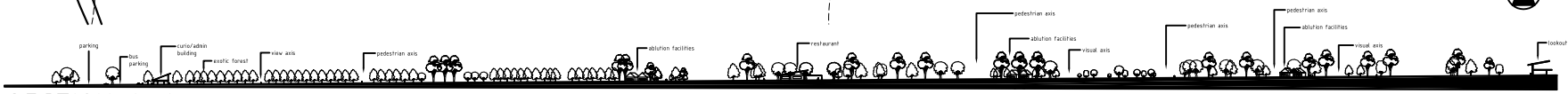
Figure 83: Lighting recommended lights

Figure 84: Signage typical eye levels

NORTH

KEY

NAME PROPOSED



SECTION A-A

GOURITS RIVER CATCHMENT

development and management framework

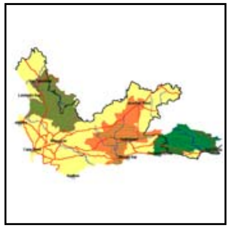
GREENARD GRIESEL MAPP-cc

9.2 ZONE 3: HOLIDAY RESORT

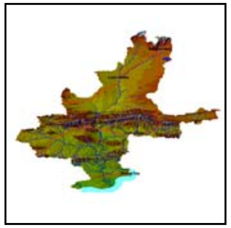
HOLIDAY RESORT

MASTER PLAN

ZONE 3 27 NOVEMBER 2003 SCALE 1:1000



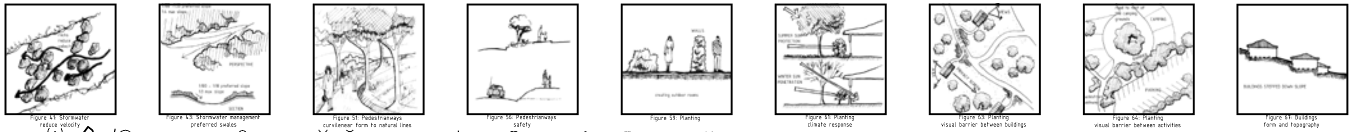
WESTERN CAPE

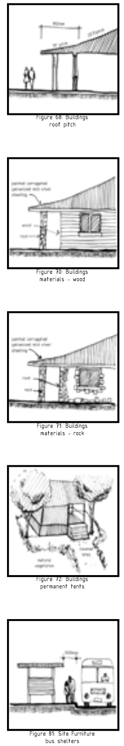


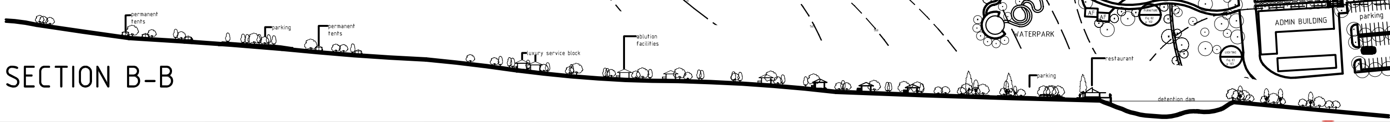
GOURITS RIVER CATCHMENT

KANNALAND TOURISM NODE

BIG IDEA







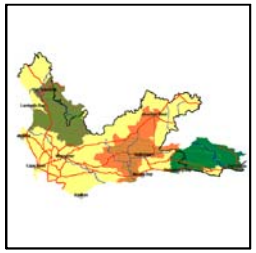
SECTION B-B

9.3 ZONE 4: ADVENTURE BASE CAMP

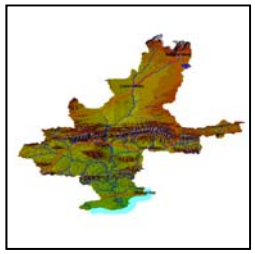
MASTER PLAN

ADVENTURE BASE CAMP

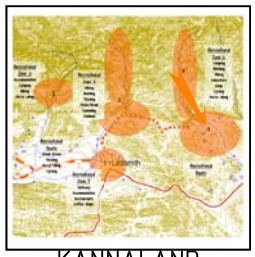
ZONE 4 27 NOVEMBER 2003 SCALE 1:1000



WESTERN CAPE



GOURITS RIVER CATCHMENT



KANNALAND TOURISM NODE

BIG IDEA

SECTION C-C

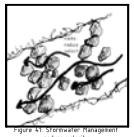


Figure 47: Stormwater Management reduce velocity

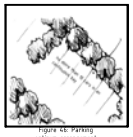


Figure 48: Parking optimum arrangement

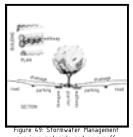


Figure 49: Stormwater Management pervious materials reduce runoff


Figure 50: Pedestrianways structured to buildings

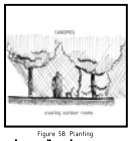


Figure 58: Planting


Figure 62: Planting comfort zone

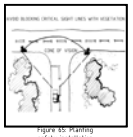


Figure 65: Planting safety installation

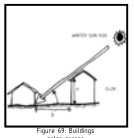


Figure 69: Buildings solar access

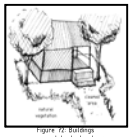


Figure 72: Buildings permanent tent structure

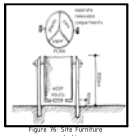


Figure 76: Site Furniture recycle bins

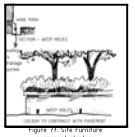


Figure 77: Site Furniture permanent planters


Figure 80: Site Furniture fire grilles

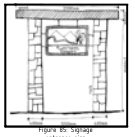


Figure 85: Signage entrance sign

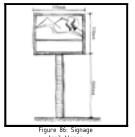


Figure 86: Signage trail-blazer

NORTH

KEY

NAME OF PLAN

GOURITS RIVER CATCHMENT

development and management framework

GERHARD GRIESEL MLA(Prof)

SECTION J: ADDENDUMS

8.1 ADDENDUM A – BIO Atlas Species Report

8.2 ADDENDUM B – Matrix for Suitability Requirements

GOURITS RIVER CATCHMENT AREA: SUITABILITY ZONING REQUIREMENTS

MACRO SCALE

ZONING ELEMENTS	AGRICULTURE	CONSERVATION	BUILT-UP	RECREATION
LAND COVER				
Bare rock and soil		X		
Built-up land: commercial			X	
Built-up land: residential			X	
Cultivated grass	X			X
Cultivated land: commercial	X			
Degraded: shrubland and low fynbos		X		
Degraded: thicket and bushland		X		
Exotic Plantations	X		X	
Grassland		X		X
Indigenous forest		X		
Mines and Quarries			X	
Shrubland/fynbos		X		X
Thicket and Bushland		X		X
SOILPOTENTIAL				
No dominant class		X	X	X
Not suitable for agriculture or commercial forestry; suitable for conservation, recreation or water conservation		X		X
Soils highly suited for arable agriculture where climate permits	X			
Soils not suitable for arable agriculture, suitable for forestry or grazing where climate permits		X		
Soils of intermediate suitability for arable agriculture where climate permits	X			
HYDROLOGY				
Dry pan		X		
Non-perennial		X		
Perennial	X	X		X
Wetland		X		X
HERITAGE				
Buffelspoort		X		X
Rietvlei		X		X
Tierberg		X		X

	AGRICULTURE	CONSERVATION	BUILT-UP	RECREATION
ESTUARY				
Blinde Rivier		X		X
Gourits		X		X
Hartenbos		X		X
Kafferkuils		X		X
BROAD TERRAIN MORPHOLOGY				
Dune hills and lowlands	X	X		X
Escarpments		X		X
Extremely irregular plains		X		X
High mountains		X		X
Lowlands with hills	X	X	X	X
Lowlands with parallel hills	X	X	X	X
Moderately undulating plains	X	X	X	X
Mountains and lowlands				X
Parallel hills and lowlands	X	X	X	X
Plains		X	X	X
Slightly irregular plains		X		
Undulating hills		X		
LANDUSE				
Commercial / industrial			X	
Conservation		X		X
Cultivated land	X			
Forestry	X	X		
Mining			X	
Residential			X	
RIVER BUFFER ZONE				X
FLORA AND FAUNA				
Acmedania agrillophila, Agathosma species, leopard and fish		X		X
Afromontaine forest		X		X
Indigenous forest		X		X

	AGRICULTURE	CONSERVATION	BUILT-UP	RECREATION
NATURAL FEATURES AND PHENOMENON'S				
Bufflelskloof gorge		X		X
Calitzdorp Spa		X		X
Congo caves		X		X
Meiringspoort gorge		X		X
Rust en Vrede waterfall		X		X
Scenic beach - Stilbaai		X		X
Sleeping beauty Mountain peak		X		X
Towerkop peak		X		X
WHALE WATCHING				
Southern Right whales- Mossel Bay			X	X
MOUNTAIN PASSES				
Attaquas Kloof pass		X		X
Caledon Kloof pass		X		X
Cloetes pass		X		X
Huis River pass		X		X
Meirings poort		X		X
Otto du Plessis Road		X		X
Swartberg pass		X		X
DIVING SITES				
Dolosse		X		X
Klein Brak		X		X
Mitchs Reef		X		X
Santos Reef		X		X
Stingray Reef		X		X

	AGRICULTURE	CONSERVATION	BUILT-UP	RECREATION
SCENIC ROUTES				
Calitzdorp		X	X	X
Gamka Mountain 4x4 trail		X		X
Gamkaskloof		X	X	X
Karoo National Park		X		X
Meiringspoort		X		X
Mossel Bay		X	X	X
Oudtshoorn		X	X	X
Scenic Garden route		X		X
Scenic Karoo route		X		X
Scenic route		X		X
Stil Bay		X	X	X
Swartberg pass		X		X
GRAVES				
Grave / burial site		X		X
Monument - graves		X		X
MONUMENTS AND MUSEUMS				X
MAJOR TOWNS				
Beaufort West	X	X	X	X
Ladismith	X	X	X	X
Leeu-Gamka	X	X	X	X
Mossel Bay	X	X	X	X
Oudtshoorn	X	X	X	X
PRIMARY ROADS	X	X	X	X

	AGRICULTURE	CONSERVATION	BUILT-UP	RECREATION
CONSERVATION AREAS				
Boesmansbos State Forest		X		X
Garcia State Forest		X		X
Grootgvadersbosch State Forest		X		X
Karoo National Park		X		X
Klein Karoo Conservation Area		X		X
Langkloof State Forest		X		X
Niegenaamd Nature Reserve		X		X
Paardeberg State Forest		X		X
Ruitersbos State Forest		X		X
Spionkop State Forest		X		X
Swartberg State Forest		X		X
Towerkop State Forest		X		X
ENVIRONMENTAL SENSITIVITY				
0.0 to 1.0	X		X	
1.0 to 3.0	X		X	
3.0 to 5.0		X		X
5.0 to 7.0		X		X
7.0 to 8.0		X		X

	HIKING	WALKING	CLIMBING	CAMPING	SWIMMING	CANOEING	GAMELODGE	ADVENTURE CAMPS	VIEWING	SCENIC DRIVES	CYCLING	PARAGLIDING
BROAD TERRAIN MORPHOLOGY												
Dune hills and lowlands												
Escarpments	X	X	X					X	X	X		X
Extremely irregular plains		X		X				X			X	
High mountains	X	X	X	X				X	X	X		X
Lowlands with hills											X	
Lowlands with parallel hills							X				X	
Moderately undulating plains											X	
Mountains and lowlands	X	X		X			X	X	X	X		X
Parallel hills and lowlands	X	X										
Plains				X			X		X	X	X	
Slightly irregular plains												
Undulating hills											X	
LAND COVER												
Bare rock and soil												
Built-up land: commercial												
Built-up land: residential											X	
Cultivated grass												
Cultivated land: commercial									X	X	X	
Degraded: shrubland and low fynbos												
Degraded: thicket and bushland												
Exotic Plantations	X	X		X				X				
Grassland	X	X		X			X	X			X	
Indigenous forest	X	X		X			X	X	X	X	X	
Mines and Quarries												
Shrubland/fynbos	X	X		X			X	X	X	X	X	
Thicket and Bushland	X	X		X			X	X	X	X	X	

	HIKING	WALKING	CLIMBING	CAMPING	SWIMMING	CANOEING	GAMELODGE	ADVENTURE CAMPS	VIEWING	SCENIC DRIVES	CYCLING	PARAGLIDING
NATURAL FEATURES AND PHENOMENON'S												
Bufflelskloof gorge	X	X	X					X	X	X		
Calitzdorp Spa	X											
Congo caves												
Meiringspoort gorge												
Rust en Vrede waterfall												
Scenic beach - Stilbaai												
Sleeping beauty Mountain peak												
Towerkop peak		X	X					X	X	X		
FLORA AND FAUNA												
Acmedania agrillophila, Agathosma species, leopard and fish							X	X	X	X		
Afromontaine forest								X	X	X		
Indigenous forest	X	X		X			X	X	X	X		
HYDROLOGY												
Dry pan	X											
Non-perennial	X											
Perennial	X	X		X	X	X	X	X	X	X	X	
Wetland	X	X			X	X		X	X	X		
ESTUARY												
Blinde Rivier												
Gourits	X	X			X	X	X	X	X	X		
Hartenbos												
Kafferkuils												
HERITAGE												
Buffelspoort	X	X							X	X		
Rietvlei												
Tierberg												
ARCHITECTURAL TOWN									X	X		
MONUMENTS AND MUSEUMS									X	X		

	HIKING	WALKING	CLIMBING	CAMPING	SWIMMING	CANOEING	GAMELODGE	ADVENTURE CAMPS	VIEWING	SCENIC DRIVES	CYCLING	PARAGLIDING
KRANTZ												
15-25%	X							X				
>25%	X		X						X	X		X
CONSERVATION AREAS												
Boesmansbos State Forest												
Garcia State Forest												
Grootgvadersbosch State Forest												
Karoo National Park												
Klein Karoo Conservation Area	X			X			X	X	X	X		
Langkloof State Forest												
Niegenaamd Nature Reserve												
Paardeberg State Forest												
Ruitersbos State Forest												
Spionkop State Forest												
Swartberg State Forest												
Towerkop State Forest	X			X			X	X	X	X		
GRAVES												
Grave / burial site									X	X		
Monument - graves									X	X		
MOUNTAIN PASSES												
Attaquas Kloof pass												
Caledon Kloof pass									X	X	X	
Cloetes pass												
Huis River pass												
Meirings poort												
Otto du Plessis Road												
Swartberg pass												

8.3 ADDENDUM C – Risk Assessment

RISK IDENTIFICATION AND ASSESSMENT

The assessment of the risks during the development of the Gourits River Catchment Area is divided into the 3 phases of the project namely Predevelopment, Construction and Operations and Maintenance.

Table 9 is the key that describes the symbols used in the process of analysing the risks.

Table 10: Symbols of Risk Analysis

Consequence Measure	C	Probability Measure	P	Risk Category	RF
Catastrophic	5	Likely	5	High	15-25
Major	4	Moderate	4	Medium	7-14
Moderate	3	Unlikely	3	Low	2-6
Minor	2	Rare	2		
Insignificant	1				

Table 11: Risk Analysis

DESCRIPTION	Risk Assessment C	Control Assessment P	Risk Factor RF	Assurance Priority
Pre-development Phase				
Licences	4	2	8	MEDIUM
Contractual misinterpretation	4	2	8	MEDIUM
Misunderstanding	4	2	8	MEDIUM
Legislation	4	4	16	HIGH
Size of the project	2	2	4	LOW
Feasibility	4	4	16	HIGH
Rezoning	3	4	12	MEDIUM
Construction Phase				
Legislation	2	2	4	LOW
Non-performance	3	4	12	MEDIUM
Poor quality	4	3	12	MEDIUM
Pollution	3	5	15	HIGH
Erosion	4	4	16	HIGH
Safety	3	2	6	LOW
Control	3	2	6	LOW
Materials availability	2	2	4	LOW
Operations and Maintenance Phase				
Contractual	4	4	16	HIGH
Change in technology	1	2	2	LOW

RISK MITIGATION

Pre-development Phase:

Legislation:

A comprehensive legislative study must be done in all aspects of the framework to ensure that all the relevant legislature is covered.

Feasibility:

A comprehensive feasibility study of each development must done to ensure that each development is a success. The framework give just an overall possibilities view of each area.

Construction Phase:

Pollution:

The impact of pollution in this area will be significant and a pollution control system must be put into place.

Erosion:

Erosion must be prevented at all costs. Full erosion control programme must be drawn up.

Operations and Maintenance Phase:

Contractual:

A detailed contract for the operational and maintenance phase must be drawn up to ensure continual performance of the contractor.

8.4 ADDENDUM D – Project Analysis

KANNALAND TOURISM NODE
ZONE 2 RECREATIONAL PARK

SCHEDULE OF ACCOMMODATION

NO	SPACE DESCRIPTION	QUANTITY	AREA (TOTAL) m^2	RATE PER SQ.M	TOTAL COST R
1	Parking Areas	2	6230	R 67	419,092
2	Road	1	4290	R 83	357,057
3	Paved Walkways	2	6825	R 67	459,118
4	Gravel Walkways	2	13000	R 10	130,000
5	Lawn Walkways	3	6500	R 10	65,000
6	Lawn	1	46475	R 4	185,900
7	Curio Shop	1	105	R 4,344	456,120
8	Administration Building	1	105	R 4,344	456,120
9	Lookout Point	1	100	R 3,200	320,000
10	Ablution Facilities	5	90	R 4,267	384,021
11	Swimming Pools	2			116,058
12	Pump Room	1			59,734
13	Play equipment	8			18,674
14	Restaurant	1	256	R 4,830	1,236,480
TOTAL			**83976**	**R 1,930**	**4,663,374**

PROJECT BUDGETING AND CASH FLOW

PROJECT ANALYSIS	
AREA OF PROJECT	83976
ESTIMATED COST PER M.SQ	R 1,929.70
ESTIMATED BUILDING COST	R 4,663,373.95
PROFESSIONAL FEES	R 363,743.17
ESTIMATED DISEMBURSEMENT COSTS	R 109,122.95

SUBDIVISION OF FEE FOR VARIOUS STAGES OF WORK

STAGE	STAGE DESCRIPTION	%	FEE/STAGE	COST PER MAN HOUR	AVAIL	USED	% USED	REMAINING	NO OF PER	HOURS DURATION	WEEKS DURATION
1	Master Planning	5%	R 18,187.16	R 179.00	102		0%	1	1	102	2.54
2	Sketch Plans	35%	R 127,310.11	R 104.00	1,224		0%	62	2	612	15.30
3	Documentation	30%	R 109,122.95	R 104.00	1,049		0%	53	2	525	13.12
4	Supervision	30%	R 109,122.95	R 104.00	1,049		0%	53	1	1,049	26.23
TOTAL			R 363,743.17		3,424	0	0%	169		2,288	57.19

OFFICE CASH FLOW

NOVEMBER 2003 TO OCTOBER 2004

PROJECT DESCRIPTION	BUILDING COST	FEES AND DISBURSEMENTS	Budget	Receive	Remain	NOVEMBER Fee	NOVEMBER Disb	DECEMBER Fee	DECEMBER Disb	JANUARY Fee	JANUARY Disb
Recreational Park	R 4,663,374	Fees	R 363,743	R 0	R 363,743			R 18,187		R 31,828	
		Disb	R 109,123	R 0	R 109,123		R 9,094		R 9,094		R 9,094
TOTAL DISBURSEMENTS	R 0						R 9,094		R 9,094		R 9,094
TOTAL FEES	R 0		R 363,743					R 18,187		R 31,828	
OVERHEADS						R 18,187		R 18,187		R 18,187	
BALANCE						-R 18,187		R 0		R 13,641	

FEBRUARY Fee	FEBRUARY Disb	MARCH Fee	MARCH Disb	APRIL Fee	APRIL Disb	MAY Fee	MAY Disb	JUNE Fee	JUNE Disb
R 31,828		R 31,828		R 31,828		R 36,374		R 36,374	
	R 9,094		R 9,094		R 9,094		R 9,094		R 9,094
	R 9,094		R 9,094		R 9,094		R 9,094		R 9,094
R 31,828		R 31,828		R 31,828		R 36,374		R 36,374	
R 18,187		R 18,187		R 18,187		R 18,187		R 18,187	
R 13,641		R 13,641		R 13,641		R 18,187		R 18,187	

JULY		AUGUST		SEPTEMBER		OCTOBER		TOTAL REMAINING		
Fee	Disb	Fee	Disb	Fee	Disb	Fee	Disb	Check	Fee	Disb
R 36,374		R 36,374		R 36,374		R 36,374			R 363,743	
	R 9,094		R 9,094		R 9,094		R 9,094			R 109,123
	R 9,094		R 9,094		R 9,094		R 9,094			
R 36,374		R 36,374		R 36,374		R 36,374			R 195,511	
R 18,187		R 18,187		R 18,187		R 18,187			R 127,310	
R 18,187		R 18,187		R 18,187		R 18,187			R 68,201	

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