CONSULTATIVE DRAFT

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MUNICIPALITY • UMASIPALA • MUNISIPALITEIT

ENVIRONMENTAL MANAGEMENT FRAMEWORK

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Towards achieving a vision of a municipality and communities that recognise the vital importance of their rich natural capital and manage these in a manner that ensures sustainability and fulfils the needs of all concerned.





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ACRONYMS AND DEFINITIONS

The following terms, abbreviations and acronyms have been used, or are referred to in this document.

Activity Refers to an activity identified in any notice published by the Minister of the Department of Environmental Affairs or MEC in terms of Section 24D(1)(a) of NEMA as a listed activity or specified activity.

Affected environment Those parts of the socio-economic and biophysical environment impacted on by development action.

Agenda 21 Agenda 21 is an international program, adopted by more than 178 governments, to put sustainable development into practice around the world. It emerged from the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992.

Alternatives A possible course of action, in place of another, that would meet the same purpose and need. Alternatives can refer to any of the following but are not limited hereto: alternative sites for development, alternative site layouts, alternative designs, alternative processes and materials. In Integrated Environmental Management, the so-called "no action" alternative may also require investigation under certain circumstances.

AQMP Air Quality Management Plan.

Assessment The process of collecting, organising, analysing, interpreting, and communicating data that are relevant to some decisions.

Biodiversity It is an abbreviation of 'biological diversity' which is described as the mix of species in an ecosystem that enables the system both to provide a flow of ecosystem services under given environmental conditions, and to maintain that flow if environmental conditions change. The loss of biodiversity limits the resilience of the affected ecosystem, which in turn, may have direct negative socio-economic implications. Furthermore, biodiversity is the degree of variation of life forms within a given ecosystem, biome, or an entire planet. Biodiversity is one measure of the health of ecosystems, and life on earth today consists of many millions of distinct biological species.

Biological resources Includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual, or potential, value for humanity.

Bioregion A bioregion is internationally defined as a geographical space that contains one or several nested ecosystems characterised by landforms, vegetative cover, human culture, and history as identified by local communities, governments and scientists. It is also understood as a geographical area defined in terms of its unique combination of plants, animals, geology and climate and human activities (including economic, social, and developmental issues) – an area defined by natural boundaries and distinct living communities – the whole of which distinguishes it from other bioregions. A bioregion refers to both a geographical terrain and a terrain of consciousness, i.e. a place and the ideas that have developed about how

	to live in that place. Thus, natural forms and living communities, including human, become the descriptive features of each bioregion – instead of the politically drawn lines used to define municipalities, districts, provinces and the country (Miller, 1996). This is essentially similar to the definition of a bioregion provided in the National Environmental Management: Biodiversity Act 10 of 2004, which states that a bioregion *'means a geographic region which has in terms of section 40(1) been determined as a bioregion for the purposes of this Act.'* *40. (1) The Minister or the MEC for environmental affairs in a province may, by notice in the Gazette-(a) determine a geographic region as a bioregion for the purposes of this Act if that region contains whole or several nested ecosystems and is characterised by its landforms, vegetation cover, human culture and history.*
Bioregional planning	Land-use planning and management that promotes sustainable development by recognizing the relationship between, and giving practical effect to, environmental integrity, human well-being and economic efficiency within a defined geographical space, the boundaries of which were determined in accordance with environmental and social criteria (WRI, IUCN and UNEP, 1992).
Biosphere reserve	An area of terrestrial and coastal/marine ecosystems, or a combination thereof, which is internationally recognised within the framework of the UNESCO's MAB Programme. Each biosphere reserve is intended to fulfil three basic functions, which are complementary and mutually reinforcing: 1. a conservation function - to contribute to the conservation of landscapes, ecosystems, species and genetic variation; 2. a development function - to foster economic and human development which is socio-culturally and ecologically sustainable; 3. a logistic function - to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.
CAADP	Comprehensive African Agricultural Development Programme.
CARA	Conservation of Agricultural Resources Act 43 of 1983.
CASP	Comprehensive Agricultural Support Programme.
Catchment or catchment area	The entire drainage area from which water flows into a river or other water body. Also known as a watershed, it is an extent or area where surface water from rain and melting snow or ice converges to a single point, usually the exit of the basin, where water joins on other water body such as a river, lake, reservoir, estuary, wetland, sea or ocean. Generally consisting of various smaller 'quaternary' catchments, or 'sub-catchments'.
CBA	Critical Biodiversity Area.
CBD	Convention on Biological Diversity (1992).
CDM	Clean Development Mechanism.
CER	Certified Emission Reduction.

CO_2	Carbon Dioxide. It is an important greenhouse gas; and the burning of carbon-based fuels since the industrial revolution has rapidly increased the concentration, leading to global warming. More than 90 percent of South Africa's power is generated from coal and other industries, which is resulting in the release of over 400 million tones of carbon dioxide annually. The South African government has committed the country to reduce carbon dioxide.
Compliance	To act in accordance with the rules and regulations.
Conservation	The management of human use of the biosphere to yield the greatest benefit to present generations while maintaining the potential to meet the needs and aspirations of future generations. Conservation thus includes sustainable use, protection, maintenance, rehabilitation, restoration, and enhancement of the natural and cultural environment.
Constitution	Constitution of the Republic of South Africa Act 108 of 1996.
CPPP	Community Public Private Partnerships are defined as a contract between the public sector institution/municipality and a private party, in which the private party assumes substantial financial, technical and operational risk in the design, financing, building and operation of a project.
CRDP	Comprehensive Rural Development Program.
Critical Regionalism	Critical regionalism constitutes a sensory understanding and appreciation of the environment and its component 'things'. Critical regionalism recognises the quality and attributes of regional characteristics, and builds upon the development of regional idiosyncrasies and variations. It is based on five basic principles or senses that should guide the planning, design and management of development, namely *sense of place*, *sense of history*, *sense of craft*, *sense of nature*, and *sense of place*.
CSIR	Council for Scientific and Industrial Research.
DEA	Department of Environmental Affairs.
DEA&DP	Department of Environmental Affairs and Development Planning (of the Western Cape Provincial Government).
DEAT	Department of Environmental Affairs and Tourism.
Development	The act of altering or modifying resources in order to obtain potential benefits.
Developmental State	A development state tries to balance economic growth and social development. It uses State resources and State influence to attack poverty and expand economic opportunities.
DPLG	Department of Provincial and Local Government.
DTI	Department of Trade and Industry.
DWS	Department of Water and Sanitation.
Ecosystem	A dynamic system of plant, animal and micro-organism communities and their

	non-living environment interacting as a functional unit.
EIA	Environmental Impact Assessment. An EIA is a pro-active and systematic process where potential environmental impacts both positive and negative associated with certain activities are assessed, investigated and reported. The process contributes to giving effect to the objectives of integrated environmental management as decision-makers are informed of the desirability of such activities and on the conditions which authorization of the activity should be subject to, where relevant.
EMF	Environmental Management Framework.
EMP	Environmental Management Plan.
EMS	Environmental Management System.
Endemic species	Any plant or animal species confined to, or exclusive to, a particular, specified area.
Environment	The surroundings within which humans exist and that are made up of: a) the land, water and atmosphere of the earth; b) micro-organisms, plant and animal life; c) any part or combination of (a) and (b) and the interrelationships among and between them; and d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental aspect	A human activity or environmental element.
Environmental impact	The degree of change in an environment resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of activities or may be indirectly caused by them.
Environmental issue	A concern felt by one of more parties about some existing, potential or perceived environmental impact.
ESA	Ecological Support Areas.
ESSP	Environmental Sector Skills Plan.
Evaluation	The process of weighing information, the act of making value judgements or ascribing values to data in order to reach a decision.
Extensive Agriculture	It is an agricultural production system that uses small inputs of labour, fertilizers, and capital, relative to the land area being farmed.
FEPA	Freshwater Ecosystem Priority Area.
GAP Housing	GAP Housing is a term that describes the shortfall, or 'gap' in the market between residential units supplied by the State (which cost R100 000 and less), and houses delivered by the private sector (which are not less than R250 000). The gap housing market comprises people who typically earn between R3 500 and R15 000 per month, which is too little to enable them to participate in the private property market, yet too much to qualify for state assistance.

GDP	Growth Domestic Product.
GEF	Global Environmental Facility.
GHG	Greenhouse gas is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide and ozone.
GIS	Geographical Information System or *'a system that captures, stores, analyses, manages and presents data with reference to geographic location data – it is a system of hardware and software used for storage, retrieval, mapping, and analysis of geographic data''*. It is the merging of cartography, statistical analysis and database technology.
HDI	Human Development Index.
HOA	Home Owner's Associations.
I&AP	Interested and Affected Party. Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental groups, and the general public.
IDC	Industrial Development Corporation.
IDP	Integrated Development Plan.
IEM	Integrated Environmental Management.
IEMS	Integrated Environmental Management Series.
IISD	International Institute for Sustainable Development.
Indigenous	Native to a particular area.
Intensive Agriculture	Is an agricultural production system characterised by the high inputs of capital, labour, or heavy usage of technologies such as pesticides and chemical fertilizers relative to land area.
Irreplaceability	The potential contribution of a site to a preservation or presentation goal. It is a fundamental way of measuring the conservation value of any site. An irreplaceable site will appear in every analysis of alternative combinations of sites. In other words, it is one which must be included in a conservation area because significant options for preservation are lost if the site is excluded.
Irreversible impact	When the character, diversity, or reproductive capacity of an environment is permanently lost.
ISO	The "International Organisation for Standardisation" is an international standard-setting body composed of representatives from various national standard organisations. The organization promulgates worldwide proprietary industrial and commercial standards.

IUCN	International Union for the Conservation of Nature.
Land-use	Is the human use of land. Land-use involves the management and modification of the natural environment into the built environment such as settlements and semi-natural habitats such as arable fields, agriculture, and forestry, etc.
LED	Local Economic Development.
MaB	Man and the Biosphere.
MaB Program	Launched in 1971 by UNESCO, it is a global program of international scientific co-operation, dealing with people-environment interactions over the entire realm of bioclimatic and geographic situations of the biosphere.
Macro biogeographical region	A region defined by its unique biological characteristics (flora and fauna) and biophysical characteristics (climate, geology, soils, etc.), giving rise to a variety of major landscapes, and variations in human settlement patterns and economic activity.
MDGs	Millennium Development Goals.
MEA	Millennium Ecosystem Assessment.
Mitigation	Measures designed to avoid, reduce or remedy adverse impacts.
Monitoring	The repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period of time to assess the efficiency of control measures.
MOSS	Metropolitan Open Spaces System.
Negative impact	A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, property or by causing nuisance).
NEMA	National Environmental Management Act 107 of 1998.
NEMAQA	National Environmental Management: Air Quality Act 20 of 2014.
NEMPA	National Environmental Management: Protected Areas Act 57 of 2003.
NEPA	Ntsika Enterprise Promotion Agency.
NEPAD	New Partnership for Africa's Development.
NDP	National Development Plan. It offers a long-term perspective to South Africa and aims to eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.
NFEPA	National Freshwater Ecosystem Priority Area.

NFSD	National Framework on Sustainable Development (2008).
NGO	Non-Governmental Organisation.
NSDP	National Spatial Development Perspective.
NSSD1	National Strategy for Sustainable Development and Action Plan 2011-2014.
PBO	Public Benefit Organisation.
PGDS	Provincial Growth and Development Strategy.
PGWC	Provincial Government of the Western Cape.
Pollution	As defined by NEMA: Means any change in the environment caused by (i) substances, (ii) radioactive or other waves, or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Positive impact	A change that improves the quality of the environment (for example, by increasing species diversity and the reproductive capacity of the ecosystem, by removing nuisances or improving amenities).
Pristine	Undisturbed natural landscape.
Pro-active	Taking action in anticipation of a problem rather than in reaction to the problem.
PSDF	Provincial Spatial Development Framework.
Rehabilitation	To return a degraded ecosystem or population to a safe, stable, and predetermined condition.
Restoration	To return a degraded ecosystem or place to its original condition.
SAHRA	South African Heritage Resources Agency.
SALGA	South African Local Government Association.
SANBI	South African National Biodiversity Institute.
SANRAL	South African National Roads Agency Limited.
SANS	South African National Standards.
SANS 10400-XA	Published in August 2011, these guidelines form part of the South African standard for environmental sustainability and energy usage in buildings, and forms part of the National Building Regulations.

SARD	Sustainable Agriculture and Rural Development.
Screening	The process whereby the responsible department(s) decides whether or not a project requires assessment, and the level of assessment that may be required.
Scoping	The process of identifying the significant issues, alternatives and decision points, which should be addressed by a particular Environmental Impact Report, may include a preliminary assessment of potential impacts.
SDF	Spatial Development Framework.
SDI	Sustainable Development Initiative.
SEA	Strategic Environmental Assessment.
SEMF	Stellenbosch Environmental Management Framework.
Significant impact	An impact that, by its magnitude, duration or intensity alters an important aspect of the environment.
SMA	Special Management Area which is defined as '*an area of excellence and good practice, where the ethos of sustainable development is served in practice. It is a cadastral geographical unit, which is formally recognised and managed as an area where environmental sustainability is promoted in practice and in accordance with international standards for environmental sustainability*'.
SMMEs	Small Micro Medium Enterprises.
SOE	State of Environment.
SPC	Spatial Planning Category.
Species	Plants, animals, or other organisms that do not normally interbreed with individuals of another kind, including any sub-species, cultivar, variety, strain, hybrid, or geographically separate population provided they are not part of another species.
SPLUMA	Spatial Planning and Land-Use Management Act 16 of 2013.
SSDF	Stellenbosch Municipal Spatial Development Framework.
Sustainable Agriculture	This is refers to agriculture that is socially just, humane, economically viable and environmental sound. Sustainable agriculture integrates three main goals: environmental stewardship, farm profitability and prosperous farming communities.
Sustainable development	Sustainable development is *development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.*
TOD	Transport Orientated Development.
UN	United Nations.

UNCED	United Nations Conference on Environment and Development.
UNDP	United Nations Development Program.
UNESCO	United Nations Educational, Scientific and Cultural Organisation. It is a specialized agency of the United Nations established on 16 November 1945. Its stated purpose is to contribute to peace and security by promoting international collaboration through education, science and culture in order to further universal respect for justice, the rule of law and the human rights along with fundamental freedoms proclaimed in the UN Charter.
UNEP	United nations Environmental Program
UNIDO	United Nations Industrial Development Organisation.
Urban Edge	Is the demarcated outer boundary of urban areas and marks the transition between urban and rural land-uses.
WMA	Water Management Area.
World Heritage Site	A World Heritage Site is a place (such as a desert, mountain, building, architectural monument, etc.) that is listed by UNESCO as of special cultural or physical significance. The list is maintained by the International World Heritage Programme administered by the UNESCO World Heritage Committee. Each World Heritage Site belongs to the country in which it is located, but it is conserved for the benefit of the global community and future generations.
WRI	World Resource Institute. It is an environmental think tank that conducts research to find practical ways to protect the earth and improve people's lives. It focuses on four key programs, namely: climate protection, governance, markets and enterprise, and people and ecosystems.
WSA	Water Services Authority.
WSP	Water Services Provider.
WSSD	World Summit on Sustainable Development, Johannesburg, 2002.
WUA	Water User Association.
WWF	World Wide Fund for Nature.

SECTION A
INTRODUCTION AND PRIMARY ADMINISTRATIVE ASPECTS OF THE SEMF

SECTION A: INTRODUCTION AND KEY ADMINISTRATIVE ASPECTS OF THE SEMF

SECTION SYNOPSIS

This section addresses the primary contextual and administrative aspects of the Stellenbosch Environmental Management Framework (SEMF), with specific reference to the following:

a) Serving as a guide to the various sections of the SEMF.
b) Providing a definition and description of the SEMF, its status and functions.
c) Proposing guidelines for the administration of the SEMF as a municipal sectoral policy.
d) Stating the applicable planning and implementation context for the SEMF.
e) Describing the environmental vision, goals and objectives of the SEMF as it relates to creating a sustainability framework for Stellenbosch Municipality.
f) Summarising the planning principles adopted for the drafting and long-term implementation of the SEMF.

CHAPTER A1 INTRODUCTION

The SEMF addresses the legal and moral obligations of Stellenbosch Municipality (further also referred to as the Municipality) as it relates to the environment and provides a dynamic vision, goals and objectives, and spatial and strategic directives towards giving effect to such obligations.

The SEMF consists of three interrelated sections together with a set of user's 'toolkits' (refer to Figure A1). These are colour-coded so as to enhance referencing and the use of the SEMF.

Figure A1: Structure of the SEMF.

CHAPTER A2 KEY ASPECTS OF THE SEMF

A2.1 WHAT IS THE SEMF ?

The SEMF is a municipal strategic environmental management policy that responds to and complies with the relevant statutes and directives. As such, the SEMF serves as a:

a) Spatial and strategic supplement to the Stellenbosch Municipal Spatial Development Framework (SSDF).
b) Policy for ensuring environmental sustainability and for the aligning/integrating land-use activities in accordance with defined sustainability objectives.
c) Strategy towards enhancing the well-being of the people and the environment of the Municipality by providing for:
    (i) A uniform, effective and comprehensive system of environmental planning and management throughout the Municipality.
    (ii) Environmental and sustainability principles, norms and standards.
    (iii) Sustainable and efficient use of land and other forms of environmental capital.
    (iv) Providing for cooperative governance and intergovernmental relations within the sphere of the Municipality and between the latter and all other institutional spheres and the private sector.
d) A compilation of and alignment directive for the strategies and plans of the various sectoral departments and directorates of the Municipality. It is not the function of the SEMF to replace sectoral strategies and plans, it serves as a standard spatial and principle framework for drafting and implementation of such strategies and plans.

A2.2 LEGISLATIVE PREMISE FOR THE SEMF

Stellenbosch Municipality is an international focal point as it relates to both its natural and its cultural environment. The Municipality, accordingly, commits to lead the way as it relates to giving effect to its mandate to conserve the environment on behalf of all its inhabitants. This commitment stems from the Municipality's moral and self-imposed responsibilities as it relates to the efficient management of its environmental capital.

The planning-related legislative context for the SEMF was provided by, in particular, the:

- South African Constitution Act 108 of 1996[1]
- Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA)
- National Environmental Management Act 107 of 1998 (NEMA)

The latter presents a set of directives that embodies the essence of the national directives as it relates to environmental planning and land-use governance in a manner that ensures

[1] Section 24 of the Constitution states that everyone has the right to-
a) an environment that is not harmful to their health or well-being; and
b) have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-
    (i) prevent pollution and ecological degradation;
    (ii) promote conservation; and
    (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

environmental sustainability. Specific reference is made to the following stipulations of the SPLUMA:

Land use planning principles and objectives
Section 59
(1) To promote sound and sustainable land use planning practice, a competent authority must –

- *a) acknowledge the right of owners to develop land in accordance with current use rights;*
- *b) consider the rightful and reasonable interests of affected communities when changing use rights;*
- *c) seek solutions to the conflicting interests of the various sectors and stakeholders involved in, or affected by, development and resources;*
- *d) coordinate the spatial planning and development management activities of public institutions in the applicable area of jurisdiction;*
- *e) ensure efficient administrative practices concerning land use planning;*
- *f) build the capacity of political representatives and employees to –*
  - *(i) integrate spatial planning and development management;*
  - *(ii) further development in a sustainable manner;*
- *g) consider the current and future availability of infrastructure;*
- *h) ensure that land use planning heeds the aesthetic properties of landscapes and the ecology; and*
- *i) ensure the physically safe use of land, with due regard to factors such as geological formations and flood plains.*

(3) To promote socio-economic integration in land use planning, a competent authority must —

- *a) address historically distorted spatial patterns of settlement;*
- *b) encourage mixed land use;*
- *c) discourage urban sprawl, through the maintenance of urban edges;*
- *d) promote the integration of settlement, infrastructure and social facilities with public transportation;*
- *e) consider the use of instruments, such as —*
  - (i) *contributions towards low-cost housing and social facilities; or*
  - (ii) *the provision of low-cost housing and social facilities;*
  - (iii) *to accommodate the impact of proposed development;*
- *f) address the reasons for, and counter the illegal occupation of land;*
- *g) consider the appropriate location of nodes, including social facilities, for rural farm and forestry workers;*
- *h) strive to achieve integrated, socio-economically efficient, energy-efficient and transport-efficient cities and towns;*
- *i) promote the quality and functionality of the public spatial environment;*
- *j) ensure the optimal utilisation of existing resources, including the utilisation of aspects of the environment that facilitate tourism;*
- *k) discourage the inappropriate conversion of —*
  - (i) *areas with existing agricultural activity; and*
  - (ii) *areas with high agricultural potential.*

(4) To promote environmental integration in land use planning, a competent authority must —

- *a) strive towards ecologically, socially and economically sustainable development, taking into account —*
  - *(i) the economic potential of the relevant area or region;*
  - *(ii) biodiversity;*
  - *(iii) social needs;*
  - *(iv) cultural heritage resources;*
  - *(v) agricultural resources*
- *b) ensure that development heeds the natural processes that control the relevant area;*
- *c) strive to achieve development that is harmonised with the ecological characteristics of the environment;*
- *d) promote the conservation and management of biodiversity;*
- *e) discourage development in unsuitable environments such as —*
  - *(i) areas with a high water table;*
  - *(ii) swamps;*
  - *(iii) flood plains;*
  - *(iv) steep slopes;*
  - *(v) areas sensitive to drift-sands and sea-level rise;*
  - *(vi) areas with high biodiversity importance;*
  - *(vii) areas with important cultural and scenic landscapes –*

f) minimise the fragmentation of natural habitat in ecological corridors and areas with high biodiversity importance;
g) facilitate soil conservation and the control of pollution;
h) address the land use implications of —
(i) the provision and conservation of energy;
(ii) the management of the demand for energy;
(iii) climate change mitigation and climate change adaptation strategies;
i) protect the cultural heritage and tourism resources of the Municipality.

A2.3 INSTITUTIONAL ARRANGEMENTS FOR ADMINISTRATION OF THE SEMF

The Department Community Services of the Directorate Community and Protection Services of Stellenbosch Municipality is responsible for the overarching administration and implementation of the SEMF. The Department is responsible for, among others, the following:

a) Serving as the municipal representative and interface with all other spheres of government as it relates to environmental planning and management.
b) Facilitating and regulating environmental planning and management in accordance with the SSDF and the associated package of municipal policies which collectively represent the common ground for all land-use decisions in the Municipality (refer to Chapter A4).
c) Assisting municipal departments and other stakeholders with the incorporation in their sectoral plans of the directives of the SEMF and the package of municipal policies.
d) Ensuring on-going compliance of sectoral departments and other stakeholders with the SEMF and the package of municipal policies.

A2.4 ROLES AND RESPONSIBILITIES REGARDING IMPLEMENTATION OF THE SEMF

The SEMF provides an appropriate spatial and strategic context for environmental management throughout the Municipality, from a *municipal* perspective. It is an expression of the mental image, vision and aspirations of the Municipality for its environment. It is imperative that all partners are fully committed to the objectives of the SEMF. The roles and responsibilities of the various partners subsequently constitute the following:

a) Municipality: The Municipality has a key responsibility as it relates to demonstrating commitment to the guidance of the SEMF. The roles and responsibilities include the following:
   (i) Providing strategic leadership in the implementation of the SEMF.
   (ii) Creating a conducive and supportive environment for the implementation of the SEMF.
   (iii) Establishing the required institutional mechanisms for the implementation of the SEMF.
   (iv) Developing the necessary capacity for the implementation of the SEMF.
   (v) Providing adequate resources for the implementation of the SEMF.
   (vi) Monitoring and auditing performance as it relates to the implementation of the SEMF.
b) Private Sector: The private sector is the owners and *de facto* custodians of much of the surface area of the Municipality. The private sector is also a key role-player in the local economy which depends upon meaningful economic interventions. It is therefore important that the public sector sees the SEMF as a mechanism that strives to promote long-term sustainability of the environment and its resources. The private sector is required to respond to the SEMF in terms of the following:

(i) Committing to the implementation of the objectives of the SEMF as part of the business process.
(ii) Applying the policies, strategies and spatial directives presented in the SEMF to optimise the financial return from land-use and to invest a portion of such benefits into the enhancement of human well-being and environmental integrity.
(iii) Contributing to human resource development in response to SEMF imperatives.
(iv) Encouraging ownership of the objectives of SEMF in the communities.
(v) Participating in multi-sectoral structures central to the implementation SEMF.
(vi) Ensuring transparency, inclusiveness, responsiveness and accountability as it relates to the implementation of the SEMF.
(vii) Monitoring and auditing performance as it relates to the implementation of the SEMF.

A2.5 PRINCIPLES FOR APPLICATION OF THE SEMF

The following principles apply to the use of the SEMF as a land-use directive:

a) Any land-use amendment has to conform to the SEMF. This means that the relevant organs of state must take account of, and apply relevant provisions of the SEMF, when making decisions that affect the use of land and other resources. However, this guideline is subject to the principle that *each proposed land development area should be judged on its own merits and no particular use of land, such as residential, commercial, conservational, industrial, community facility, mining, agricultural or public use, should in advance or in general be regarded as being less important or desirable than any other land-use*.
b) The SEMF does not create, or take away, land-use rights.
c) The SEMF is to be applied in a flexible and pragmatic manner that focuses on promoting a developmental state and sustainability and which takes into account the merits and particular circumstances of each case, as required by law (e.g. through an Environmental Impact Assessment {EIA} undertaken in terms of NEMA).

CHAPTER A3 PURPOSE AND FUNCTIONS OF THE SEMF

The SEMF has a pivotal role in giving effect to the Stellenbosch Environmental Vision (refer to Chapter A5.2) by means of contextualizing international and national environmental imperatives applicable to the Municipality and bringing them to fruition within the realities and site-specific characteristics of the Municipality.

The SEMF is a critical instrument in guiding the use of the resources of the Municipality in a manner that will ensure sustainable outcomes based on municipal development needs and priorities. These functions should be read together with those cited in Chapter A2.1. The overarching aims, purpose and functions of the SEMF include the aspects cited below. This should be read together with the dedicated SEMF pillars and drivers described in Chapter A5.3.

A3.1 ALIGNING SPATIAL PLANNING AND LAND-USE MANAGEMENT WITH THE APPLICABLE LEGISLATION

The SPLUMA and the Western Cape Land Use Planning Act 3 of 2014 (LUPA) require that spatial planning and development be guided by normative principles and that policy and plans should explicitly indicate how they would meet the requirements of such principles. The SEMF is

premised upon and gives effect to the following normative principles for spatial development stipulated by the above statutes:

- ❖ Justice
  The historic policy of confining particular groups to limited space and the unfair allocation of public resources between areas must be reversed to ensure that the needs of the poor are addressed first rather than last.
- ❖ Sustainability
  Sustainable patterns of consumption and production should be supported, and ways of living promoted that do not damage the natural environment.
- ❖ Resilience
  Vulnerability to environmental degradation, resource scarcity and climatic shocks must be reduced. Ecological systems should be protected and replenished. The resilience of all other forms of capital, including social, monetary and infrastructural capital should be enhanced to the extent possible.
- ❖ Efficiency
  Productive activity and jobs should be supported, and burdens on business minimised. Efficient commuting patterns and circulation of goods and services should be encouraged, with regulatory procedures that do not impose unnecessary costs on development.
- ❖ Good governance
  Good governance is the key to long-term sustainability.

The SEMF is to serve as a framework and manual for integrated spatial planning and land-use management in accordance with the principles of sustainability and sustainable development. Embodied in this function are the following:

a) Providing a spatial rationale and directive for future development in terms of the principles of sustainability as advocated by the National Framework on Sustainable Development (Department of Environmental Affairs {DEA}, 2008) and the National Strategy for Sustainable Development and Action Plan 2011-2014 (NSSD1) (DEA, 2011).
b) Giving effect to the directives of the national government as expressed in, among others, the NDP, the National Framework on Sustainable Development, and the NSSD1.
c) Enabling intergovernmental alignment and guiding the activities of the relevant role-players and agencies (including national and provincial sectoral departments and municipalities).
d) Giving effect to the approach and principles set by the SPLUMA and LUPA.
e) Serving as a basis for ongoing monitoring and auditing of performance and for continual improvement of land-use methodologies, technologies and practices.

To this end, the SEMF focuses on the following:

(i) Providing an environmental premise and rationale for the future drafting of SDFs and IDPs with specific reference to the following:
  - Providing a standard spatial format for giving effect to land-use indices.
  - Facilitating the land-use classification of the Municipality in a standard format in accordance with defined *Spatial Planning Categories* (SPCs).
  - Recording the land-use (SPC) plans and associated strategies and guidelines.
  - Illustrating the desired future spatial patterns that provide for integrated, efficient and sustainable settlements based upon development priorities.

(ii) Providing certainty to all interested and affected parties (I&APs) regarding spatial implications of future development in Stellenbosch Municipality.

(iii) Providing a basis for co-ordinated decision-making and policy-formulation regarding future land-use with specific reference to the following:
- Serving as a basis for decision-makers in respect of development applications.
- Facilitating the replacement of inappropriate policy frameworks with a more integrated approach to planning.

(iv) Facilitating cross-boundary co-operation and co-ordination between Stellenbosch Municipality, the City of Cape Town, and neighbouring local municipalities in respect of issues that are of mutual interest for their respective areas of jurisdiction.

A3.2 INFORMING ONGOING REFORM OF SPATIAL PLANNING AND LAND-USE MANAGEMENT POLICY

The SEMF responds to and aims to support ongoing reform of spatial planning and land-use management and aligning these with international directives and the relevant legislation and policy. The key objectives of the SEMF in this regard are the following:

a) Actively support the development of land-use plans that cross municipal, and even provincial boundaries, and which would promote collaborative action in fields such as biodiversity protection, climate change adaptation, tourism and transportation.

b) Develop a capability framework for environmental governance together with professional bodies, educational institutions and relevant government agencies. This framework should deal with strengthening the education and training of planners and other spatial professionals, improving quality of professional work, etc.

c) Eliminate inefficiencies in administrative procedures for land development without compromising the need for careful evaluation of proposals.

d) Ensure that every municipality has an explicit environmental restructuring strategy that is linked to instruments for implementation.

e) Require all municipal and provincial plans, including IDPs and their SDF components, to be translated into spatial contracts that are binding across national, provincial and local government.

f) Strengthen the enforcement of local planning and environmental control.

A3.3 GUIDING LAND-USE IN CONTEXT OF THE DOMAINS OF SUSTAINABILITY

The key generic function of the SEMF is to guide land-use in the Municipality in accordance with principles and guidelines for sustainability and in context of defined domains. The systems approach to sustainable development advocated by the SEMF recognises the vital importance of addressing all land-use domains in an integrated and holistic manner.

Stellenbosch Municipality sees the moving towards sustainability as a social challenge that entails international and national law, urban planning and transport, local and individual lifestyles and ethical consumerism. Ways of living more sustainably can take many forms from reorganising living conditions, reappraising economic sectors (permaculture, green building, sustainable agriculture), or work practices (sustainable architecture), using science to develop new technologies (green technologies and renewable energy), to adjustments in individual lifestyles that conserve natural resources. The various domains of sustainability addressed by the SEMF are the:

A3.3.1 ECOLOGY DOMAIN

This domain refers to:

a) Healthy ecosystems

Healthy ecosystems and environments are necessary to the survival of humans and other organisms. Healthy ecosystems provide vital goods and services to humans and other organisms. There are two major ways of reducing negative human impact and enhancing ecosystem services and the first of these is environmental management. This direct approach is based largely on information gained from earth science, environmental science and conservation biology. However, this is management at the end of a long series of indirect causal factors that are initiated by human consumption, so a second approach is through demand management of human resource use. Loss of biodiversity stems largely from the habitat loss and fragmentation produced by the human appropriation of land for development, forestry and agriculture as natural capital is progressively converted to man-made capital. Land use change is fundamental to the operations of the biosphere because alterations in the relative proportions of land dedicated to urbanisation, agriculture, forest, and pasture have a marked effect on the global water, carbon and nitrogen biogeochemical cycles and this can impact negatively on both natural and human systems.

b) Atmosphere

Management of the atmosphere involves assessment of all aspects of the carbon cycle to identify opportunities to address human-induced climate change and this has become a major focus of scientific research because of the potential catastrophic effects on biodiversity and human communities. Other human impacts on the atmosphere include the air pollution in cities, the pollutants including toxic chemicals like nitrogen oxides, sulphur oxides, volatile organic compounds and airborne particulate matter that produce photochemical smog and acid rain, and the chlorofluorocarbons that degrade the ozone layer.

c) Water

Water security and food security are inextricably linked. The rapid increase in water consumption over the past two decades resulted from scientific and technological developments impacting through the economy – especially the increase in irrigated land, growth in industrial and power sectors, and intensive dam construction on all continents. This altered the water cycle of rivers affected their water quality and had a significant impact on the global water cycle. Water efficiency is to be improved by increased demand management, improved infrastructure, improved water productivity of agriculture, minimising the water intensity (embodied water) of goods and services, addressing shortages in the non-industrialised world, concentrating food production in areas of high productivity, and planning for climate change. At the local level, people are becoming more self-sufficient by harvesting rainwater and reducing use of mains water.

d) Waste

Every economic activity produces material that can be classified as waste. To reduce waste industry, business and government are now mimicking nature by turning the waste produced by industrial metabolism into resource. Dematerialization is being encouraged through the ideas of industrial ecology, eco-design and eco-labelling. In addition to the well-established ‘reduce, reuse and recycle,’ shoppers are using their purchasing power for ethical consumerism.

A3.3.2 ECONOMY DOMAIN

Sustainability concerns the specification of a set of actions to be taken by present persons that will not diminish the prospects of future persons to enjoy levels of consumption, wealth, utility, or welfare comparable to those enjoyed by present persons. Sustainability interfaces with economics through the social and ecological consequences of economic activity.

A recent UNEP[2] report proposes a green economy defined as *one that improves human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It does not favour one political perspective over another but works to minimise excessive depletion of natural capital*. The report makes three key findings, namely *that greening not only generates increases in wealth, in particular a gain in ecological commons or natural capital, but also (over a period of six years) produces a higher rate of GDP growth; that there is an inextricable link between poverty eradication and better maintenance and conservation of the ecological commons, arising from the benefit flows from natural capital that are received directly by the poor; in the transition to a green economy, new jobs are created, which in time exceed the losses in 'brown economy' jobs.*

Historically there has been a close correlation between economic growth and environmental degradation - as communities grow, so the environment declines. There is concern that, unless resource use is checked, modern global civilization will follow the path of ancient civilizations that collapsed through overexploitation of their resource base. While conventional economics is concerned largely with economic growth and the efficient allocation of resources, ecological economics has the explicit goal of sustainable scale (rather than continual growth), fair distribution and efficient allocation, in that order. The World Business Council for Sustainable Development states that 'business cannot succeed in societies that fail'.

The economic importance of nature is indicated by the use of the expression ecosystem services to highlight the market relevance of an increasingly scarce natural world that can no longer be regarded as both unlimited and free. In general, as a commodity or service becomes scarcer the price increases and this acts as a restraint that encourages frugality, technical innovation and alternative products. However, this only applies when the product or service falls within the market system. As ecosystem services are generally treated as economic externalities they are unpriced and therefore overused and degraded.

Treating the environment as an externality may generate short-term profit at the expense of sustainability. Sustainable business practices, on the other hand, integrate ecological concerns with social and economic ones (i.e. the triple bottom line). Growth that depletes ecosystem services is sometimes termed 'uneconomic growth' as it leads to a decline in quality of life. Minimising such growth can provide opportunities for local businesses. For example, industrial waste can be treated as an 'economic resource in the wrong place'.

A3.3.3 SOCIAL DOMAIN

Sustainability issues are generally expressed in scientific and environmental terms, as well as in ethical terms of stewardship, but implementing change is a social challenge that entails, among

[2] United Nations Environmental Programme

other things, international and national law, urban planning and transport, local and individual lifestyles and ethical consumerism. The relationship between human rights and human development, corporate power and environmental justice, global poverty and citizen action, suggest that responsible global citizenship is an inescapable element of what may at first glance seem to be simply matters of personal consumer and moral choice.

The social domain refers to:

a) Peace, security, social justice

Social disruptions like crime and corruption divert resources from areas of greatest human need, damage the capacity of societies to plan for the future, and generally threaten human well-being and the environment.

b) Poverty

A major hurdle to achieve sustainability is the alleviation of poverty. It has been widely acknowledged that poverty is one source of environmental degradation. The Brundtland Commission report Our Common Future and the Millennium Development Goals recognises that there is a growing realization it is impossible to separate economic development issues from environment issues. The report states that *poverty is a major cause and effect of global environmental problems.* It is therefore futile to attempt to deal with environmental problems without a broader perspective that encompasses the factors underlying poverty.

c) Human settlements

In this regard, the objective should be to reduce environmental impacts by altering the built environment to create and preserve sustainable settlements which support sustainable transport. In principle, residents in compact urban neighbourhoods drive fewer miles, and have significantly lower environmental impacts across a range of measures, compared with those living in sprawling suburbs.

d) Food

Stellenbosch Municipality strives for a 'sustainable food system' which is 'one that provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment. A sustainable food system also encourages local production and distribution infrastructures and makes nutritious food available, accessible, and affordable to all.

CHAPTER A4 PLANNING CONTEXT

In terms of the bioregional planning principles applied in the preparation of the SEMF (refer to Chapter A6), it is recognised that Stellenbosch Municipality is not an 'island' isolated from its surroundings – it is an integral part of the global biosphere of which the cultural, social and economic functions are uniquely interdependent. Accordingly, the SEMF is based upon the principle that the Municipality should be managed as a pivotal part of the Western Cape and the global biosphere in terms a holistic integrated structure or package of plans that have a common vision of sustainability.

The South African Government is a signatory to a number of international protocols, conventions and agreements pertaining to the above aspects. Consequently, all spheres of government are obliged to adopt and give effect to these protocols, conventions and agreements. The SEMF is based upon, and promotes, an integrated and holistic approach to environmental planning and land-use management which implies that the interrelationships between economic activities and other developmental dimensions (e.g. social, financial, demographic, institutional, and

infrastructural aspects), and environmental constraints and opportunities are carefully considered in accordance with a standard framework and at all applicable spheres of planning, ranging from the international to the local level. Figure A2 lists the applicable levels of context and compliance.

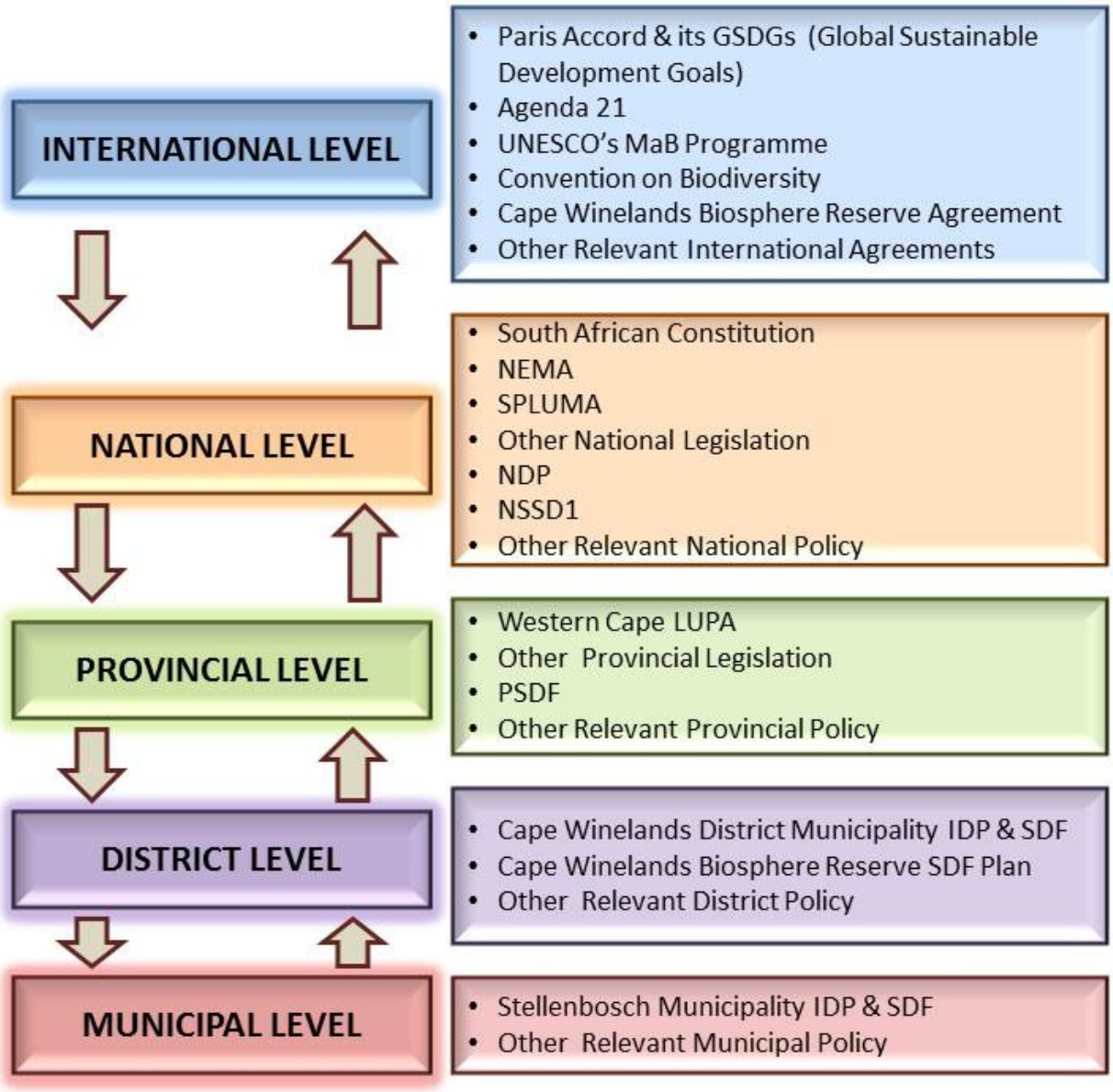


Figure A2: Planning and compliance levels and items applicable to the SEMF.

A4.1 SEMF IN CONTEXT OF THE INTEGRATED SPATIAL PLANNING SYSTEM

In terms of the applicable spatial planning principles the various layers of the package of plans express the place-specific characteristics and idiosyncrasies of the places to which the relevant layer applies and illustrate land-use proposals for that specific place. Figure A3 illustrates this spatial planning system and the associated integrated structure of plans. This document forms an integral part of the hierarchy of frameworks and policy documents that guide planning and development and associated decision-making in the Municipality.

The SEMF is to be implemented in accordance with the alignment principle that applies in the relations between development applications vis-à-vis the SSDF, and in the relations between the SSDF and the SEMF. The relationship between the SEMF and the SSDF is determined by the

principle that where the SSDF is not aligned with the SEMF, the SSDF must be amended so as to affect such alignment. The SEMF is therefore a determining factor in the future spatial planning of Stellenbosch Municipality.

Relevant NDP Directive

Environmental policy should seek to coordinate and connect the principal decisions that create and shape places to improve how they function. Environmental policy does not operate in isolation – unaided it cannot transform the economic geography or promote growth. However, environmental policies can make a difference when they are integrated with plans for tangible public and private investment that are sustained over time, and carefully adapted to the needs and opportunities of specific places. Good environmental planning also builds communities and improves social cohesion. Environmental policy can be used to strengthen ties between different places (such as neighbouring municipalities, neighbourhood areas etc.) by guiding measures to improve cross-border infrastructure connections, ensure better integration and management of a wider network of human settlements and support the sharing of economic assets to secure economies of scale.

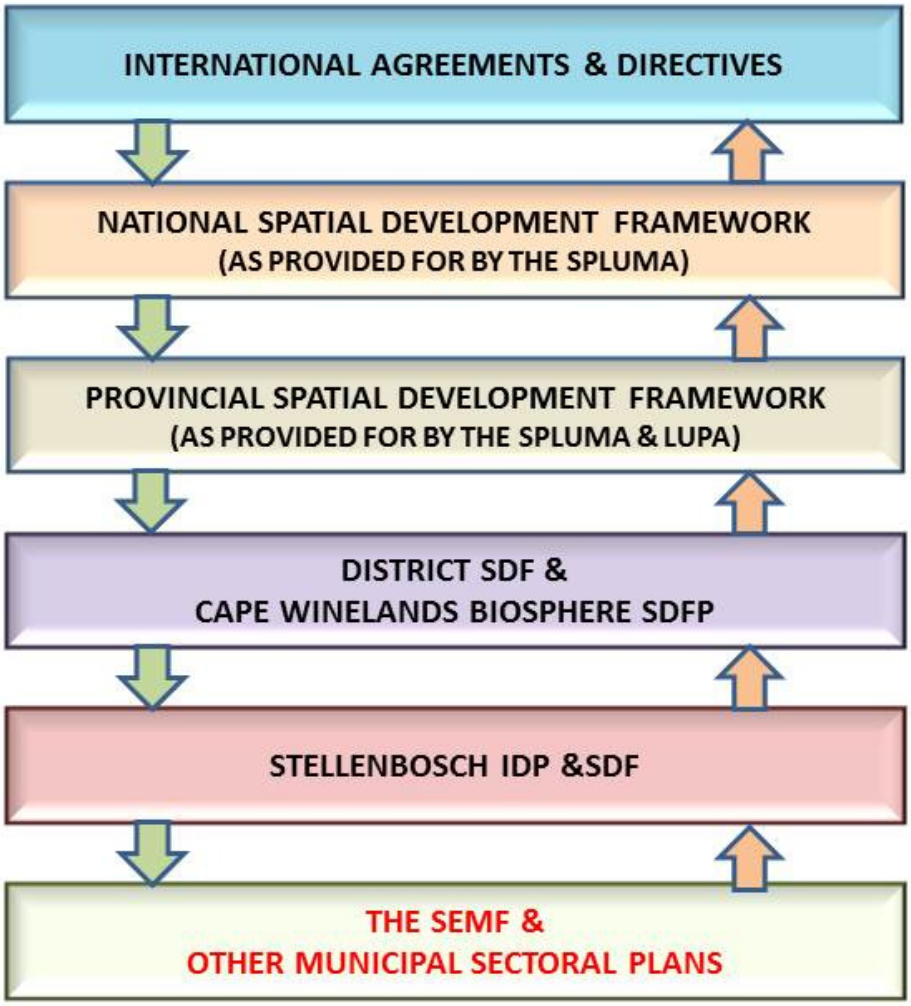


Figure A3: SEMF as part of the planning system and associated package of plans.

CHAPTER A5 VISION, GOALS AND OBJECTIVES

A5.1 GENERAL VISION FOR STELLENBOSCH MUNICIPALITY

The vision for Stellenbosch is summarised in the figure below.

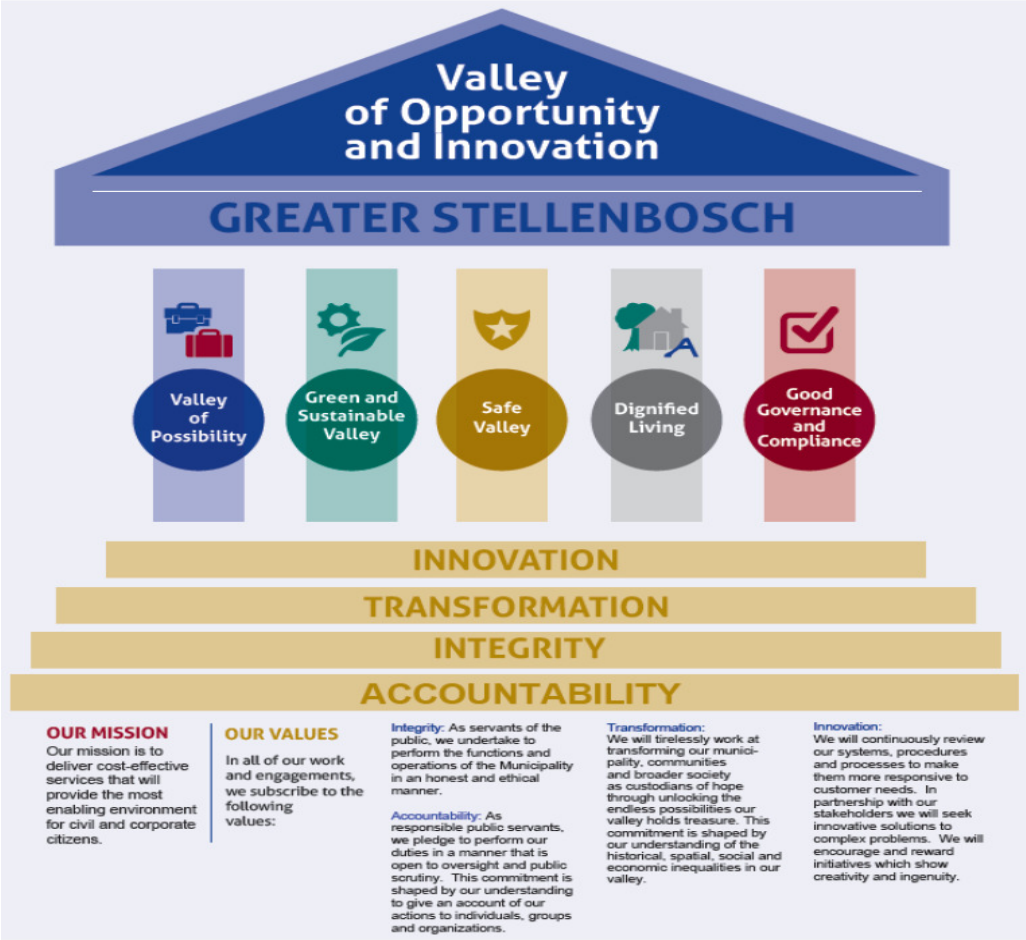


Figure A4: General vision for Stellenbosch Municipality.

This vision embodies a systems approach to governance akin to the sustainability approach advocated by the NSSD1. This approach implies that the economic system, the socio-political system and the ecosystem are embedded within each other, and integrated through the governance system that holds all together in a legitimate regulatory framework (refer to Figure A5).

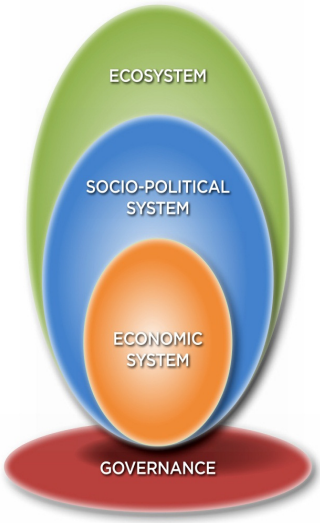


Figure A5: A systems approach to governance.

The achievement of the key components of this general vision depends on the long-term sustainability and general integrity of the environment. Environmental integrity refers to the '*wholeness*' of the environment. Environmental integrity is determined by the *value* of the environment or place (natural or human-made), with specific reference to its intrinsic, systemic, and/or instrumental value.

'Environment' is defined as the aggregate of all external conditions and influences affecting the life of an organism. In particular, 'environment' refers to the surroundings within which humans exist

and that are made up of:

a) the land, water and atmosphere of the earth;
b) micro-organisms, plant and animal life;
c) any part or combination of (a) and (b) and the interrelationships among and between them; and
d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

A5.2 STELLENBOSCH ENVIRONMENTAL VISION

The SEMF responds to the need of the Municipality to create and maintain an environment that would enable the achievement of the general vision. To this end, the SEMF describes and maps the future destiny of the Municipality through long-term environmental planning, and serves as a premise for forging a common and shared sustainability agenda across the total spectrum of service delivery mechanisms of the Municipality. Accordingly, the SEMF strives to give effect to the following environmental vision:

A municipality and communities that recognise the vital importance of their rich natural capital and manage these in a manner that ensures sustainability and fulfils the needs of all concerned.

The SEMF impels both the Municipality and its social partners to be focused and decisive, to weigh up trade-offs, to make choices in the face of competing demands, to develop and implement aligned strategies and programmes, and to and ensure that their plans reflect a vision shared by all.

A5.3 SEMF PILLARS AND DRIVERS

The SEMF draws upon and aims to help give effect to the views of the NDP and the Municipality. The SEMF is premised on the principle that, in order to achieve sustainability in the Municipality, a holistic and all-embracing approach to the governance of the environment is required. Such an approach should focus on ensuring the sustainability of the resource base upon which the general well-being of the people of Stellenbosch Municipality depend.

The SEMF is based on two pillars and enabling drivers which comply with the directives of, among others, the National Framework on Sustainable Development (NFSD) (DEA, 2008) and the NSSD1 (DEA, 2011). Without these additional pillars the stated environmental vision is not attainable. The dedicated SEMF pillars and drivers constitute the following:

PILLAR 1: BIOPHYSICAL, SOCIAL, ECONOMIC AND TECHNICAL SUSTAINABILITY OF ALL LAND-USE PROGRAMMES AND PROJECTS

Driver 1: Managing human use of the biosphere and its resources.

a) Ensure that the environment is able to yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs and aspirations of future generations.
b) Conserve natural resources, biodiversity and landscapes.
c) Encourage the use of materials obtained from sustainable sources in new development and in the design of buildings.

d) Facilitate the use of green energy.
e) Promote the implementation of climate-neutrality strategies in all large-scale land-use projects.
f) Minimise the use of the four generic resources, namely energy, water, land and materials.
g) Maximise the re-use and/or recycling of resources.
h) Use renewable resources in preference to non-renewable resources.
i) Minimise air, land and water pollution.
j) Create a healthy, non-toxic environment.
k) Minimise damage to sensitive landscapes, including scenic, cultural, and historical aspects.

Driver 2: Enhancing the integrity of the environment as an imperative for long-term sustainability.

a) Maintain essential ecological processes, preservation of genetic diversity and the insurance of the sustainable utilisation of natural resources.
b) Plan and design the cultural (human) environment in a manner that enhances the intrinsic value (including heritage and traditional legacy) of the subject places and Stellenbosch Municipality as a whole, and creates places where people can live with dignity and pride (a key element of social equity).

Relevant NDP Directive

South Africa has a rich endowment of natural resources and mineral resources, which, if responsibly used, can fund the transition to a low-carbon future and a more diverse and inclusive economy. South Africa must leverage its solar resource and regional hydropower opportunities as competitive advantages, in parallel with the responsible exploitation of fossil fuels and minerals. For this to happen, the country must invest in the skills, technology and institutional capacity required to support a competitive renewable energy sector. Developmental challenges must be addressed in a manner that ensures environmental sustainability and builds resilience to the effects of climate change, particularly in poorer communities. South Africa's primary approach to adapting to climate change is to strengthen the nation's economic and societal resilience. This includes ensuring that all sectors of society are more resilient to the future impacts of climate-change by maintaining the integrity of ecosystems and the many services that they provide.

Driver 3: Incorporating biodiversity into the management of all biological resources.

a) Biodiversity conservation is a prerequisite for sustainable development, and for biodiversity conservation to succeed, the maintenance of environmental integrity (as defined by *ecological*, *economic* and *social* criteria) must be one of the primary determinants of land-use planning.
b) The mix of species in an ecosystem enables that system both to *provide* a flow of ecosystem services under given environmental conditions, and to *maintain* that flow if environmental conditions change. The loss of biodiversity therefore limits the resilience of the affected ecosystem, which in turn, may have direct negative economic implications.

Driver 4: Supporting conservation initiatives in the private sector.

Conservation on private land should become an integral part of the provincial conservation strategy. This, in turn, requires that forward planning must be done on a holistic bioregional basis. *Environmental health* is the key to sustainable development. The primary threat to environmental health is fragmentation of community-supporting ecosystems. Fragmentation generally leads to a cycle of environmental degradation, which subsequently influences the well-being of the dependent communities. It is, therefore, of

paramount importance that issues, such as biodiversity conservation, economic growth, human resources development, and social development, should be addressed in all SDFs.

Driver 5: Ensuring spatial sustainability.

a) Promote land development that is within the environmental, fiscal, institutional and administrative means of Stellenbosch Municipality.
b) Ensure that special consideration is given to the protection of high-potential farm land.
c) Uphold consistency of land-use measures in accordance with environmental requirements and associated management instruments.
d) Limit urban development to locations where such development can be sustainable, where urban sprawl can be limited, and where such development can result in sustainable communities.
e) Implement strategies to ensure that any form of development, on balance, improves current circumstances in the subject area.

Driver 6: Facilitate efficient use of all forms of capital available to Stellenbosch Municipality.

a) Implement plans to ensure that development optimises the use of existing resources and infrastructure (i.e. monetary capital, environmental capital and infrastructural capital) and that such development result in beneficial synergies and multipliers in the local economy.
b) Invest a meaningful share 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.
c) Ensure that new development promotes qualitative urban integration, affordable housing, and densification in a financially viable manner, without undermining property values.
d) Protect and enhance the property and investments of all inhabitants.
e) Pursue quality in creating the built environment.

PILLAR 2: INTEGRATED ENVIRONMENTAL PLANNING AND LAND-USE MANAGEMENT

Driver 1: Appropriate demarcation of administrative units.

Municipal wards or other forms of community domains should be based on bioregional parameters (i.e. applicable economic, social and environmental criteria).

Driver 2: Innovative spatial planning that provides for a structure of interrelated cores, corridors and matrices.

Land-use plans should include core conservation areas that feature representative samples of the municipality's characteristic biodiversity. Ideally such sites should be linked by corridors of natural or restored natural plant cover to permit migration and adaptation to global change. Both the core sites and corridors should be nested within a matrix of mixed land-uses and ownership patterns.

Driver 3: Adaptive management.

This implies that land-use management is undertaken in a manner that responds to lessons drawn from experience. The SSDF has to respond accordingly.

Driver 4: Building human capacity and ability

a) Cooperative skills development: Communities and public and private organisations, together, must locate and mobilise the skills, knowledge, and information needed to ensure sustainability as promoted by the SEMF.

b) Full involvement of stakeholders: All stakeholders must be fully involved in its planning and management (governance) of the areas where they live. Of primary importance in this regard, is to build the capacity to participate in such processes.

Driver 5: Efficient information management.

a) Reliable and comprehensive information: In order to contribute to continual improvement all stakeholders must have at their disposal the critical information needed to achieve the goal of sustainability.
b) Research and monitoring: Research and inquiries should focus on people-environment interactions, the development of innovative methods for managing natural resources, and the long-term monitoring of environmental factors and the impact of management practices.
c) Use of knowledge: Scientific, local and traditional knowledge should be employed in planning and management activities. Biology, anthropology, economics, engineering and other related fields are to be tapped. Such knowledge helps stakeholders and programme managers to anticipate nature's long and short cycles and to track global change.

The SEMF creates the enabling spatial and policy context required to give effect to sustainability and sustainable development as imperatives for the attainment of the Stellenbosch Environmental Vision.

A5.4 OVERARCHING GOAL OF THE SEMF

The overarching goal of the SEMF is to enable sustainability. Sustainability implies ecological sustainability which recognizes that healthy ecosystems and natural resources are preconditions for human well-being and that human beings are part of nature and not a separate entity.

In ecology, sustainability refers to is how biological systems endure and remain diverse and productive. In more general terms, sustainability refers to the endurance of systems and processes. The organizing principle for sustainability is sustainable development, which includes the interconnected domains of ecology, economy and socio politics.

A5.5 RELATIONSHIP BETWEEN SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

As stated previously, the organizing principle for sustainability is sustainable development. The SEMF supports the NDP principle that structured interventions (such as sustainable development) are required to promote sustainability. Such structured interventions constitute the equitable use of resources to create benefit for all.

Accordingly, the SEMF promotes a bespoke form of sustainable development which is described as the *enhancement of human well-being and environmental integrity* through the *efficient and just use of the resources (capital)* vested in Stellenbosch Municipality.

This goal is based upon the directives presented in the NFSD (DEA, 2008) [3] and the NSSD1 (DEA, 2011).

[3] The National Cabinet, in 2008, approved the South Africa National Framework for Sustainable Development (NFSD). This approval signalled a new wave of thinking aimed at promoting the effective stewardship of South Africa's natural, social and economic resources. The NSSD1 was approved by Cabinet on 23 November 2011.

In terms of the NSSD1, sustainable development is considered *the process that is followed to achieve the goal of sustainability. Sustainable development constitutes the selection and implementation of development options which allow for appropriate and justifiable social and economic goals to be achieved, based on the meeting of basic needs and equity, and without compromising the natural system on which it is based*.

According to the NSSD1 sustainability implies ecological sustainability which recognizes that healthy ecosystems and natural resources are preconditions for human well-being and that human beings are part of nature and not a separate entity. Sustainability constitutes the continuous and mutually compatible integration of these systems over time. Sustainable development means making sure that these systems remain mutually compatible while key development challenges are met through specific actions and interventions to eradicate poverty and severe inequalities.

The SEMF builds on the NSSD1 as a proactive strategy that regards sustainable development as a long-term commitment, which combines environmental protection, social equity and economic efficiency within the vision and values of the country. The SEMF, is premised upon and gives effect to the following five strategic objectives of the NSSD1:

a) Enhancing systems for integrated planning and implementation.
b) Sustaining our ecosystems and using natural resources efficiently.
c) Towards a green economy.
d) Building sustainable communities.
e) Responding effectively to climate change.

A5.6 IMPERATIVES FOR SUSTAINABLE DEVELOPMENT

Sustainable development has three global imperatives, namely *human well-being, environmental integrity* and *economic efficiency* (International Institute for Sustainable Development {IISD}, 1995). The Rio Declaration, which forms the preamble to Agenda 21, states that *'human beings are at the centre of concern for sustainable development'* (CSIR, 2002). The SEMF builds on the following understanding of the three global imperatives:

a) Human Well-Being:
   This refers to both *material* and *spiritual* well-being. Material well-being refers to the absence of poverty. Spiritual well-being, among others, refers to the absence of inequality and being in a position to obtain new powers, emotionally, intellectually and physically and to be able to play a meaningful role at all spheres of society.
b) Economic Efficiency:
   This is understood as *the optimisation of benefit at the lowest cost*. It includes the innovative and efficient use of available resources.
c) Environmental Integrity:
   This imperative refers to the relative '*wholeness'* of the environment. 'Environment' is defined as the aggregate of all external conditions and influences affecting the life of an organism. Environmental integrity is determined by the *value* of the environment or place (natural or human-made), with specific reference to its intrinsic, systemic, and/or instrumental value.

A5.7 GUIDING PRINCIPLES FOR SUSTAINABLE DEVELOPMENT IN STELLENBOSCH MUNICIPALITY

In the over-arching goal of enabling sustainable development, the following inter-related principles and objectives apply:

a) The human-made environment is located within and 'contained' by the natural environment. The manner in which human settlements are developed, therefore, has an immense impact on the quality and integrity of the environment as a totality. Ecological integrity is a key factor in the sustainable development equation. Ecological integrity, among others, requires that biodiversity is protected and essential ecological processes and services (e.g. water yield and quality, soil conservation, decomposition, etc.) are maintained.

b) Stellenbosch Municipality has a significant comparative economic advantage vested in its inherent resources (both renewable and non-renewable). The sustainable use of such resources holds the key to long-term sustainability and growing prosperity in the Municipality.

c) Benefits arising from the use and development of the inherent resources of the Municipality are to be shared in an equitable manner.

d) The benefits derived from the use of the resources of the Municipality depend upon such resources being used within:
   - their renewal capacity;
   - maintenance of the integrity of the natural systems which produce such resources;
   - minimising, or avoiding, the risk or irreversible change induced by humans;
   - adequate investments being made to ensure the conservation of resources; and,
   - avoiding or minimising the adverse impacts of the use of non-renewable resources.

e) The people and the institutions of Stellenbosch Municipality have a responsibility as it relates to the management of such resources and they are to act with due care to conserve and avoid negative impacts on the environment and use resources in a sustainable, equitable and efficient manner.

The SEMF recognises that, from and ecological perspective, sustainable development amounts to living equal to or below the carrying capacity of the land – that is, not taking resources from the environment faster than they can be replenished. *Acceptance of the need for resources to be kept at regenerative levels is perhaps the foundational pattern of spatial planning* (Thayer, 2003). Social sustainability is more closely related to the development of strong, active, just, and inclusive communities and distributing the opportunity to achieve wealth equitably. Sustainability is thus the '*equitably distributed achievement of social, ecological and economic quality of life'* (Aberley, 1999). Therefore, sustainability is more than maintaining the regenerative capacities of natural ecosystems. It is about simultaneously meeting our material needs, striving for social and economic equitability and justice, and preserving all aspects of biodiversity and the natural environment. While this is a tall order, the interconnected and complex nature of these three facets of society makes it easier, more logical, and, hopefully, more effective to address them simultaneously and holistically than to artificially divide them.

A5.8 LEGAL PREMISE FOR SUSTAINABLE DEVELOPMENT

NEMA provides a legal premise for the SEMF's stance on sustainable development. Of specific relevance are the following sections of the Act:

Section 2.1: *The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment, and – shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote, and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination*.

Section 2.2: *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*

Section 2.3: *Development must be socially, environmentally and economically sustainable.*

A5.9 POLICY PREMISE FOR SUSTAINABLE DEVELOPMENT

The policy premise for sustainability and sustainable as advocated in the SEMF was primarily drawn from the NFSD and the NSSD1. Figure A6 summarises the key aspects of the NSSD1 that are particularly relevant to the SEMF and to environmental governance in the Municipality.

A5.10 ROLE OF THE MUNICIPALITY IN PROMOTING SUSTAINABLE DEVELOPMENT

It is recognised that the Municipality plays a vital role in fostering sustainable development. The policies, programs and practices adopted and promoted by the Municipality are *inter alia* aimed at enhancing the efficient use of energy, water, sensitive habitats and other environmental resources. In addition, the sustainable development strategies of the Municipality aim to help local businesses reduce costs, generate new business opportunities, create jobs and increase economic competitiveness.

It is furthermore recognised that the Municipality can exert tremendous influence on whether its communities adopt more sustainable paths. This involves shifting public resources, services, investments, purchasing power and policies to encourage more economically and environmentally sustainable outcomes. In this regard, the Municipality should fulfil the following interrelated roles:

ROLE 1: LEADING BY EXAMPLE

In this regard, reference is made to the following:

a) Ensuring environmental sustainability. This refers to giving effect to applicable international, national, provincial and local legislation, policy directives, agreements and protocols pertaining to aimed at ensuring global sustainability. Specific reference is made to the intergovernmental agreement on the Cape Winelands Biosphere Reserve, the World Heritage Convention as it relates to the Cape Floral Region Protected Areas World Heritage Site, the NDP, and the NSSD1.

b) Sustainable use of resources. This includes the wise and just use of environmental resources (capital) (land, water, air, biodiversity products for the benefit of all concerned.

c) Environmental care. This refers to giving effect to the functions, mandates, and delegations of the Municipality in a manner that complies with legislation, policy, and international best practice.

d) Efficient management of municipal properties, including buildings, parks and open space. Applying sustainable development principles to the planning and management of such properties can help the municipality to operate in a sustainable manner and provide excellent examples in this regard.

e) Renewable energy and air quality. The municipality aims to lead by example and save money by adopting sustainable practices in this regard.

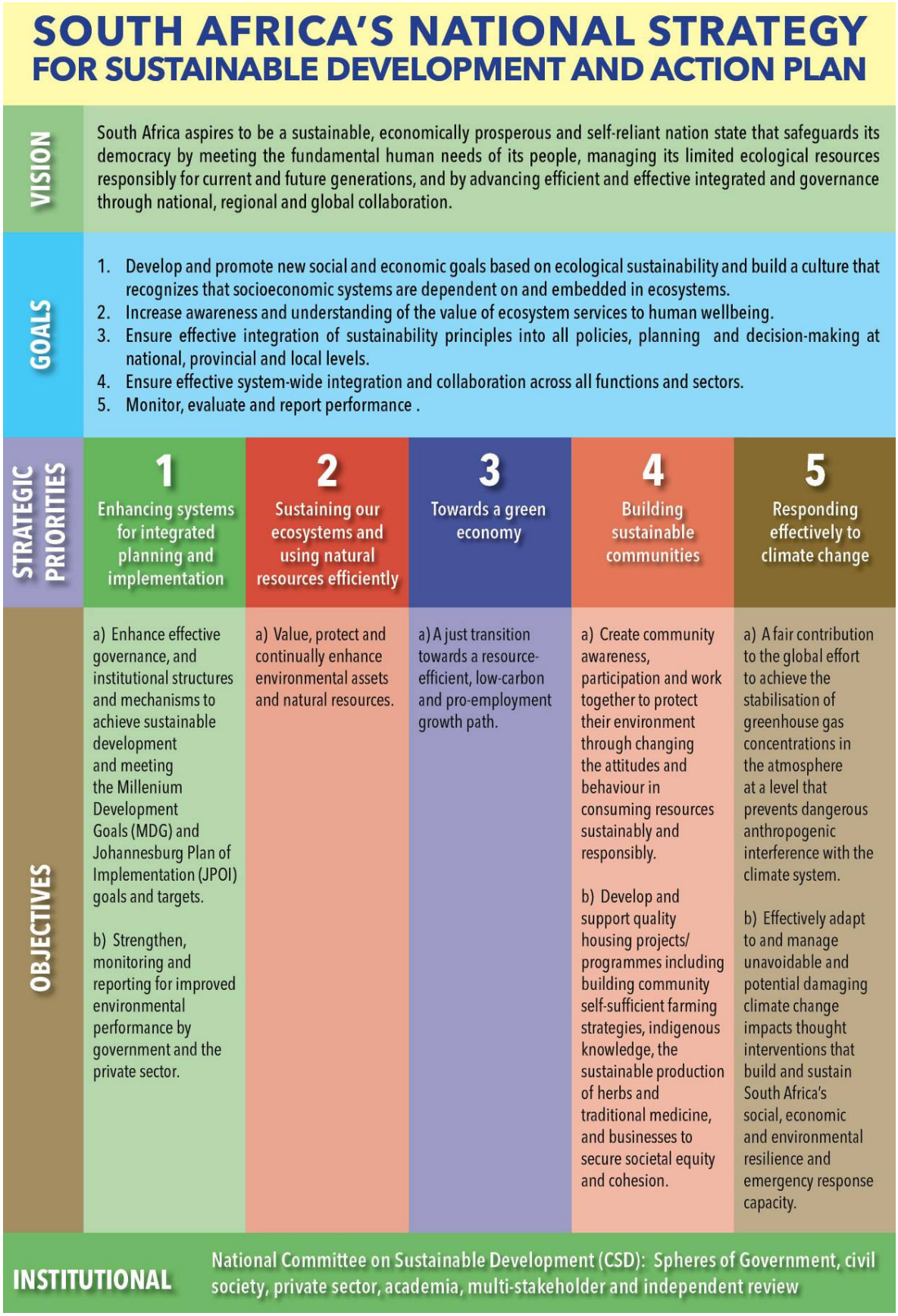


Figure A7: The NSSD1 in a nutshell (Source: DEA, 2011).

ROLE 2: PROMOTING PUBLIC-PRIVATE-COMMUNITY BASED SUSTAINABLE DEVELOPMENT PARTNERSHIPS

The Municipality aims to establish a framework to foster, support and guide public-private-community based programs and partnerships promoting sustainable development at the neighbourhood area level. Ideally such partnerships should evolve around a co-operative venture between three major stakeholders, namely the private sector, the municipality, and the community. The main aims of such partnerships should be to:

a) Enable the municipality to cross-subsidise much-needed low-cost and medium-cost housing.
b) Ensure that equitable and just solutions are found for the needs of people who had been left landless due to past policies.
c) Create opportunities for meaningful community empowerment.
d) Promote access to mainstream of the economy for the previously disadvantaged through agriculture, tourism, environmental conservation, utilisation of biodiversity components, etc.
e) Engaging local communities in ongoing assessment of their environmental and economic conditions, trends and risks. This can provide a baseline to help the community determine its current status and its development goals and objectives.
f) Establishing clear, measurable sustainability goals and targets for the municipality, the private sector and communities.

A5.11 MUNICIPAL STRATEGIES FOR SUSTAINABLE DEVELOPMENT

The strategies for sustainable development of the Stellenbosch Municipality are based on the following principles:

- Eradication of poverty is an indispensable requirement for sustainable development.
- Eradication of poverty requires environmentally sustainable solutions.
- Sustainable development requires a balance between economic growth, social development and environmental sustainability, but with the emphasis on economic growth until such time as large-scale poverty has been successfully eradicated[4].

The strategies for sustainable development focus on the following:

a) Providing a mechanism for integrating environmental and poverty concerns into municipal decision-making.
b) Providing a strategic and participatory process of analysis, debate, capacity strengthening, planning and action towards sustainable development.
c) Integrating sustainable development strategies and strategy processes into the IDP and SDF.
d) Participation, representation, ownership and involvement of all relevant stake-holders promoting broad-based policy learning and capacity development.
e) Giving effect to government commitment and political will through negotiation and conflict management and balancing technical analysis with participatory planning process.

[4] There is an increasing global awareness against economic growth at the expense of the natural environment. United Nations organisations such as UNEP; UNESCO; and international conservation bodies such as the IUCN; the WRI; and the WWF plead for national and regional development policy, and strategies that can facilitate sustainable development.

CHAPTER A6 PLANNING PRINCIPLES ADOPTED FOR THE SEMF

The SEMF was drafted in accordance with the principles of bioregional planning as defined by the WRI, IUCN and UNEP (1992), and the National Environment Biodiversity Act 10 of 2004. The objective was to facilitate coherent and place-specific planning of Stellenbosch Municipality as a distinct and unique place and to facilitate its management in accordance with local and global best-practice.

The planning principles adopted for the SEMF provides for *planning and land management that promote sustainable development by enhancing environmental integrity and human well-being through economic efficiency within a defined geographical area, the boundaries of which are determined in accordance with environmental, social and economic criteria* (WRI, IUCN and UNEP, 1992).

Municipal Stance on Bioregional Planning

The 2004 IDP provided guidance regarding the approach and process to be followed in the preparation of the Stellenbosch SDF and the future management of the Municipality. In this regard, reference is made to the following:

a) Foster and promote the principles of sustainable development and bioregional planning (Greater Stellenbosch IDP, Section 6.3).
b) Incorporate the principles of the IDF of the former Winelands District Council into the Stellenbosch SDF and implement it as a matter of urgency (Greater Stellenbosch IDP, Section 7.13).

The adopted planning principles are dialectic in that that they aim to integrate values long held to be at odds with one another, including society/nature, economy/ecology, science/other ways of knowing, development/conservation, and change/stability. The principles aim to capitalize on the strength of scientific, industrial, and democratic processes while extending and expanding them to address the new social, environmental, and economic problems facing the world today. The tenets of the adopted planning approach are as follows:

a) <u>A world view</u>
- Widespread social and ecological crises exist, without fundamental change preservation of biodiversity, including survival of the human species, is in doubt.
- The root cause of these threats is the inability of governments and industrial capitalism to measure progress in terms other than those related to monetary wealth, economic efficiency or centralized power.
- Sustainability is better gained within a more decentralised structure of governance and development.

b) <u>Culture</u>
- Humans and other species have an intrinsic right to co-evolve in local, regional and global ecosystem association.
- Cultures are knowledgeable of past and present indigenous cultural foundations, and seek to incorporate the best elements of these traditions in ‘newly indigenous’ or ‘future primitive’ configurations.

c) <u>Governance</u>
- Regional governance is autonomous, democratic and employs culturally-sensitive participatory decision-making processes.

d) Economy

- Human agency is reintegrated with ecological processes, especially through careful understanding of carrying capacity, preservation and restoration of native diversity and ecosystem health.
- The goal of economic activity is to achieve the highest possible level of cooperative self-reliance.
- Reliance on locally manufactured and maintained appropriate technology, devised through an on-going program of ecological design research, is favoured.

The spatial dimension of the adopted planning approach constitutes the identification and mapping of logical form determinants (including spatial patterns and resources). This generally suggests a logical spatial form that promotes sustainability. Bio-cultural regional patterns provide solutions pertaining to where to develop and where not to develop. This can help policy-makers to set goals that are within the capacities of the natural systems, and at the same time, are more likely to meet social values for an area.

The SEMF supports the goal of accelerating change towards improved human and environmental well-being for a number of reasons, including the following:

(i) It makes little sense to discuss the topic of sustainability at the global scale if insufficient thought is given to the local places and scales where human life actually occurs. Societal actions that are sustainable for humans, other life-forms, and earthly systems can best be achieved by means of a spatial framework in which people live as rooted, active, participating members of a reasonably-scaled, naturally-bounded, and ecologically-defined 'place.'

(ii) Considering problems and solutions from a regional perspective offers an opportunity to engage in comprehensive, adaptively-managed change improving society's overall opportunity to achieve sustainability at a scale not possible within a single community effort.

(iii) National and international human communities will have to undergo significant adaptive change to deal with a transition from climate change. But large-scale social change will only happen where people share common concerns, goals and core values. Acknowledging that community-by-community change is too slow, the bioregion offers an example of where communities with common ecology, culture, and economy can converge for a greater good.

(iv) Regional-based planning and action can help society narrow down problems and solutions, and help participants to acknowledge the limitations of a place and its resources so that they will not continue to overestimate the carrying capacity of the regions they inhabit, and live more sustainably.

(v) For every region, there may be a unique set of practices, tools, models, and successes within individual organisations that support planning, design, and management. Instead of 'reinventing the wheel' with each new initiative, project, or campaign, the regional scale of sustainability work can enhance a transfer of knowledge and technology for the betterment of the entire region.

SECTION B
ENVIRONMENTAL CAPITAL OF STELLENBOSCH MUNICIPALITY AND SITUATIONAL ANALYSIS

SECTION B: ENVIRONMENTAL INHERENT CAPITAL OF STELLENBOSCH MUNICIPALITY

SECTION SYNOPSIS

Section B is a summary of the environmental characteristics of Stellenbosch Municipality as a distinct place or environment. The SEMF has adopted the broad definition of environment as presented in NEMA, namely *the surroundings within which humans exist and that are made up of:*

a) the land, water and atmosphere of the earth;
b) micro-organisms, plant and animal life;
c) any part or combination of (a) and (b) and the interrelationships among and between them; and,
d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

This section serves as a broad state of the environment report which would, in turn, be used as a premise for the monitoring and auditing to be undertaken as an integral part of the long-term environmental management to be undertaken under the guidance of the SEMF.

STELLENBOSCH MUNICIPALITY AS A UNIQUE PLACE (ENVIRONMENT)

Stellenbosch Municipality is a compilation of a unique set of natural and cultural components or constructs. These collectively create the sense of place which characterises the area.

The world consists of concrete phenomena such as people, animals, trees, stones, towns, water, homes, the moon, stars, clouds, night, day, etc. The concrete 'things', which constitute the world for humans, are interrelated and complex and some phenomena may include others. In general, it can be said that some phenomena form an environment to others. The concrete term for 'environment' is place (Norberg-Schulz, 1984). Place can therefore be defined as 'a totality of concrete things, which have material substance, shape, texture and colour'. These substances determine the environmental character, which is the essence of place (Norberg-Schulz, 1984). However, whilst natural and material elements are usually the primary components of place and the latter is usually described in physical or geographical terms, place means more than a geographical location and comprises more than material substance. Place also comprises intangible phenomena such as feelings, which provide the content of human existence. Distinction is made between natural place and human-made place.

Natural place is broadly defined as the natural environment that has not been substantially modified by man and where natural ecosystem processes are maintained. The relationship between the inhabited and natural landscapes is a fragile one (Norberg-Schulz, 1993).

The human-made (cultural) place is defined as the environment that has been created or modified by humans to the extent that its primary ecosystem functions and natural aesthetic appeal are lost or diminished (Schmithusen, 1964). Inhabited landscapes are the works of humankind and a general understanding of what constitutes qualitative inhabited landscapes, and what to do to maintain such landscapes, are of decisive importance for long-term sustainable development.

CHAPTER B1 INTRODUCTION TO STELLENBOSCH MUNICIPALITY

B1.1 LOCATION

Stellenbosch Municipality forms part of the Cape Winelands District Municipality of the Western Cape Province of South Africa (refer to Figure B1). The Municipality adjoins the Cape Metropolitan Area to the west and the Breede Valley, Drakenstein and Theewaterskloof Municipalities to the east, south and north respectively.

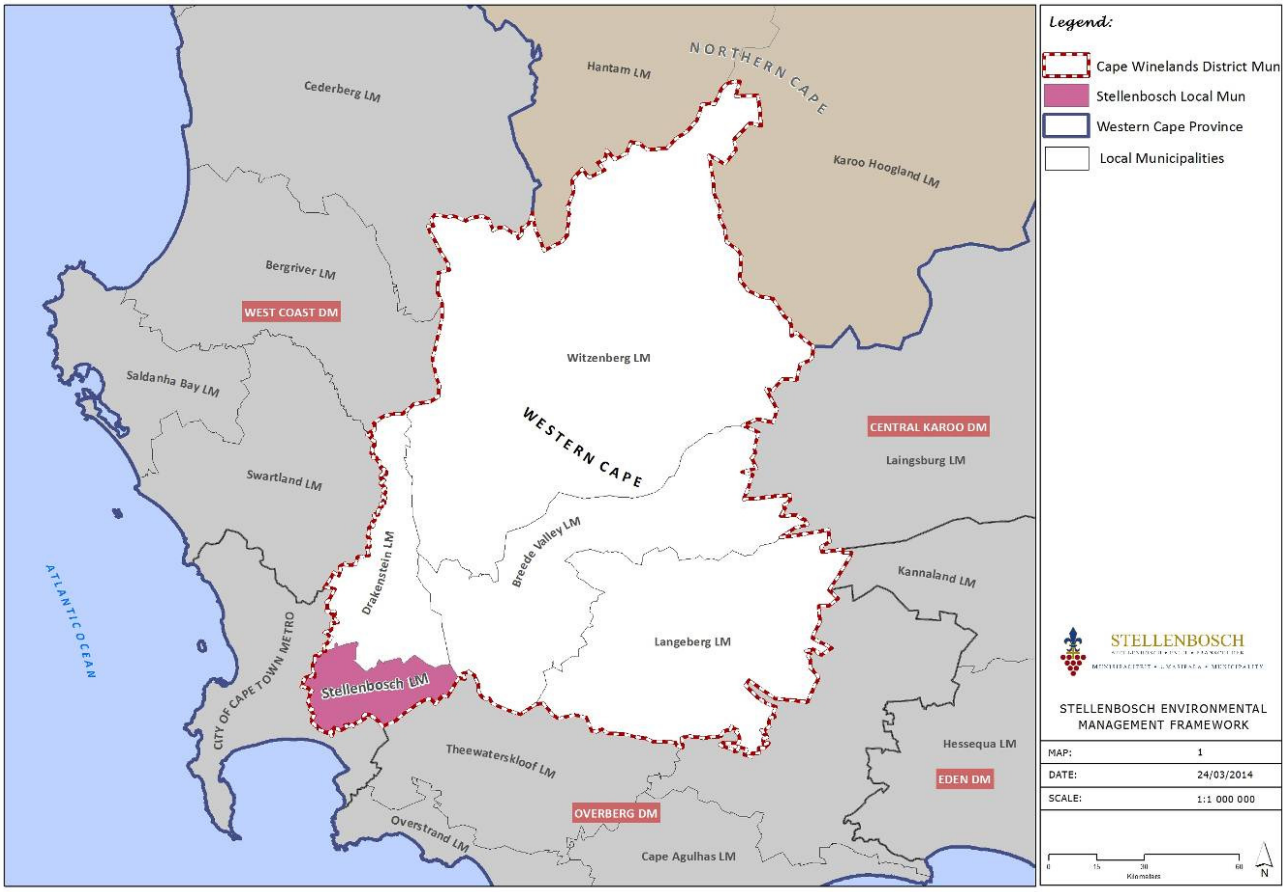


Figure B1: Location and context of Stellenbosch Municipality.

Stellenbosch Municipality is an amalgamation of the previous municipal areas of Stellenbosch, Franschhoek and Pniel as well as a major portion of the previous Winelands District Council's area of jurisdiction and constitutes a geographical area of approximately 830 km². The Municipality is located in the heart of the Cape Winelands, which is dominated by agricultural land of historic and aesthetic value, and globally-important natural habitats. The Municipality is bounded to the east and south by the Drakenstein, Wemmershoek and Limietberg mountain ranges. The Hottentots Holland range (i.e. Stellenbosch, Jonkershoek and Simonsberg Mountains) and the Bottelary Hills are in the immediate vicinity of the town of Stellenbosch.

Centuries ago small groups of people or herders, often widely scattered over the land, would come together at locations where water, grazing and shelter were available and when conditions were favourable in order to socialise, swap information, trade and conduct rituals[7]. According to

[7] Cape Winelands Professional Practices in Association (Pty) Ltd (2017). Stellenbosch Heritage Inventory.

colonial records both the 'Goringhaiqua' and 'Gorachoqua' would have moved through the Stellenbosch region in early summer months of the year, grazing their cattle and following water sources. It has been suggested that the movement of these groups of people and their flocks of sheep and cattle created broad trails which later became the basis of the Dutch East India Company (VOC) trading routes into the Drakenstein Valley, and over mountains such as present day Hottentots-Holland, Franschhoek Pass and most likely even the route across the Cape Flats to present day Stellenbosch.

Governor Simon van der Stel discovered the Eerste River on 8 November 1679 and, what he described, as the *'most charming valley he had yet seen'*. The valley of the Eerste River, as its name (meaning first) indicates, was the first of the inland valleys to be settled. The diversity of the hills, the richness of the grass, the patches of evergreen forest trees, the river of sweet water, all delighted his eye and mind. He called the site *Van der Stel se Bosch* (Van der Stel's bush), and was determined on founding a settlement in an area so obviously suited to habitation of man. Within a month the first settler arrived and so on the hamlet became a prosperous farming area and in 1685 the town of Stellenbosch was declared.

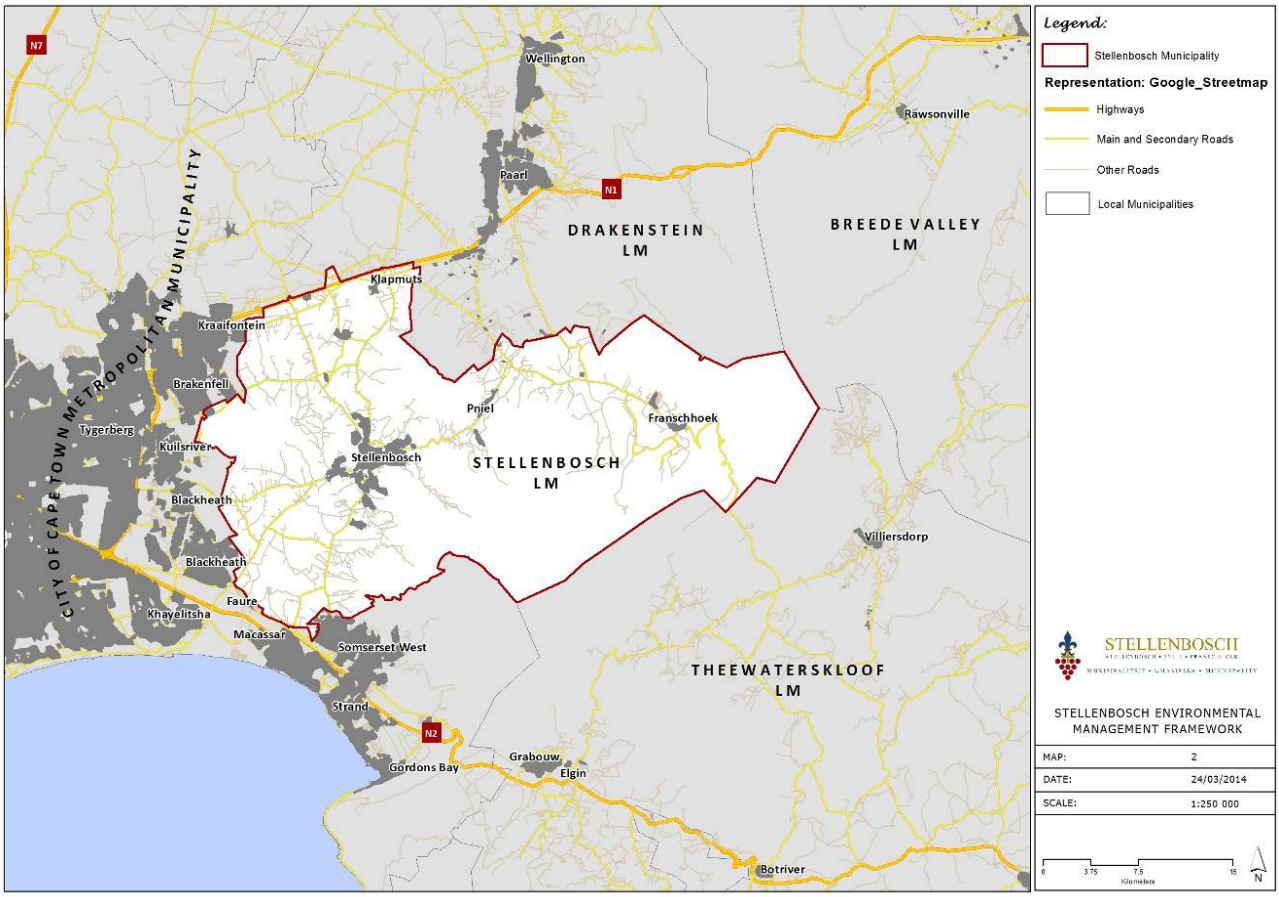


Figure B2: Local context of the Stellenbosch Municipality.

For over a century Stellenbosch remained the seat of this frontier magistracy. Missionaries and rural settlements, such as Simondium, Raithby, Pniel, Lanquedoc, Jamestown, Johannesdal, Kylemore, and Klapmuts developed around Stellenbosch. The early settlers were encouraged to plant oak trees as the oak lined streets bear testimony today, and it became affectionately known as 'Eikestad' – town of oaks. It is the second oldest European town (after Cape Town) in South Africa, and its well-preserved buildings are fine examples of the impact of many architectural styles.

The Franschhoek of today has its origins in 1688, when the Huguenots (French Protestants) fled from their homeland because of religious persecution by the Catholic monarch, Louis XIV. Facing an uncertain future as refugees in Europe, about 200 Huguenots arrived at the Cape. The French settlers brought with them a sound knowledge of viniculture and settled down to make wine in the French tradition. These French at the Cape soon lost their national identity, but the French farm names are still with us to this day. Franschhoek, is also a town decorated with restored Cape Dutch and Victorian houses, wine stores, grand wine estates, and even today still retains an underlying French ambiance. The French Huguenot Memorial was constructed in 1938 to commemorate the arrival and importance of the French culture to South Africa.

The village of Pniel lies on the banks of the Dwars River in the Drakenstein Valley. The valley is located between the the Simonsberg Mountains in the west and the Hottentots Holland Mountains in the east. When slavery was abolished in South Africa during 1834 land was purchased and a mission station founded in 1843. Today the United Congregation Church still stands at the centre of daily life of the town.

CHAPTER B2 BIOPHYSICAL CHARACTERISTICS

B2.1 CLIMATE

The Municipality has a Mediterranean climate, characterised by warm, dry summers and cold, wet winters. Summers are generally hot with temperatures averaging between 25° and 30°C. Heat waves lasting a few days occur reasonably frequently in summer. The southern part of the Municipality is on average 0.5°C cooler that the northern part. Winter temperatures are usually mild, varying from about 5-6°C in the Stellenbosch and Franschhoek areas. Occasional cold snaps accompanied by snowfalls on the higher mountain peaks are an annual winter occurrence. The *Status Quo report on the climate change in the Western Cape* (June 2005)[8] states that the future climate of the Western Cape is likely to be warmer and drier than at present, according to a number of current model projections. In support of these projections, recent temperatures trends reveal appreciable warming in the Western Cape over the past three decades. Rainfall trends are not as clearly identifiable. A future that is warmer, and possibly drier, will encompass a range of consequences that will affect the economy, the livelihoods of people and the ecological integrity of the Western Cape region.

B2.2 RAINFALL

Stellenbosch Municipality is located within the winter rainfall area. The Municipality receives approximately 80% of its annual rainfall in the winter months typically as cyclonic rain from cold fronts, and 20% during its summer months (Elsenburg, 1990). Most areas of the Municipality have moderate to low rainfall, except for the mountain areas, which have been known to receive some of the highest rainfalls in the country. These high rainfall areas, however, constitute only a very small part of the Municipality. Rainfall across the Municipality thus varies from 200 mm to 3 000 mm per year, in the higher peaks of the Groot Drakenstein mountain range, decreasing to the west away from the influence of the mountains.

[8] Department of Environmental Affairs and Development Planning (DEA&DP) 2005: *A Status Quo, vulnerability and adaptation assessment of the physical and socio-economic effects of climate change in the Western Cape.* CSIR Environmentek: Stellenbosch. Report No. ENV-S-C 2005-073

B2.3 GEOMORPHOLOGY AND LANDSCAPE UNITS

Stellenbosch Municipality[9] is characterised by a diversity of topographical features from gently rolling hills to wide open plains, high impressive mountains and secluded valleys. As stated above, the most defining feature of the Municipality is its mountain ranges, which give shape and a magnificent backdrop to its fertile agricultural valleys. These mountain ranges, which form part of the Cape Fold Belt, comprise the Klein Drakenstein and Limietberg Mountains, which run in an north-south direction forming the eastern and north-eastern boundary of the Municipality, and the Hottentots Holland mountain range which, together with the Helderberg mountains, form the southern boundary.

The central part of the Municipality is characterised by steep valleys and high peaks, i.e. Simonsberg, Jonkershoek Mountains and Groot Drakenstein Mountains. These mountains create the secluded Ida's Valley and are a natural divider between the two main towns of Stellenbosch and Franschhoek. The Franschhoek valley characterises the eastern part of the municipality. The enclosed valley formed by the Drakenstein and Hottentots Holland mountain ranges flattens into gently undulating plains to the north up to Paarl Mountain.

B2.4 GEOLOGY AND SOILS

A variety of geological formations occurs in the Municipality and pose moderate to high engineering constraints to development. Figure B3 illustrates the main geological formation zones.

The greater part of the Municipality comprises fertile soils, capable of efficient agricultural production (refer to Figure B4). Since agriculture is one of the main contributors to the GDP of the municipality soil conservation is of economic importance.

B2.5 HYDROLOGY

Water is the most critical natural resource in the municipality. All sectors and communities are dependent on a sustainable supply of water. The importance of water resources must also be considered within the context of South Africa's dominantly semi-arid climate. Projected surface water demand estimates indicate that the country faces water scarcity by the end of the century (Bosch *et al,* 1984).

In addition to its ecological functions, the study area has an immensely important socio-economic function as water catchment area. The municipality forms part of eleven quarternary catchments[4] as shown in Figure B5 below. These catchments feed a number of large dams such as the Theewaterskloof, Brandvlei, Voëlvlei, and Wemmershoek, as well as numerous smaller farm dams. These dams provide water to the Cape Metropolitan Area and various rural towns and agricultural areas, including Stellenbosch, Villiersdorp, and large areas of the Winelands, Overberg and Swartland.

[4] Catchment (or catchment area) is defined as the entire land area from which water flows into a river; catchments can be divided into smaller 'sub-catchments' which are usually the area which drains a tributary to the main river or a part of the main river.

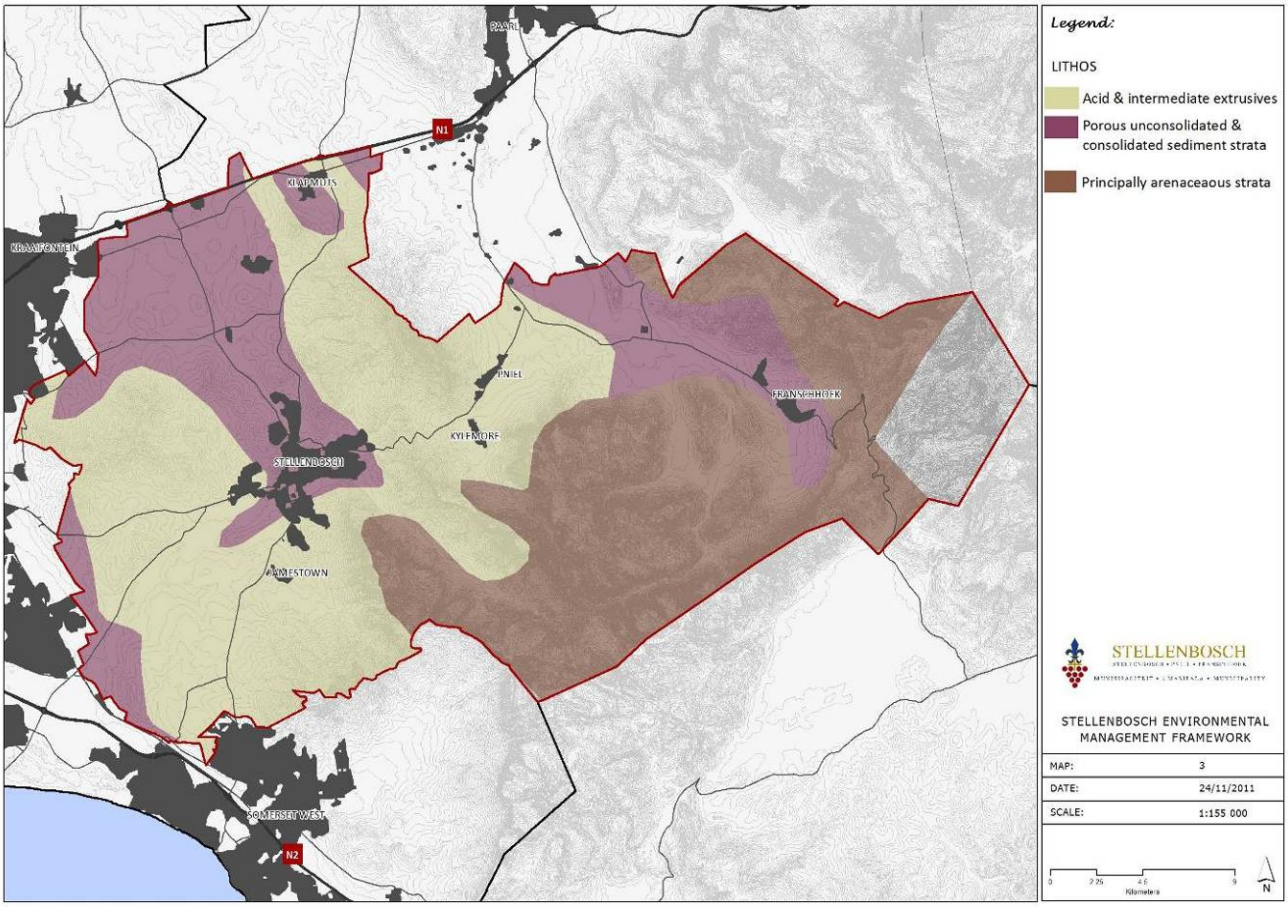


Figure B3: Geology of Stellenbosch Municipality.

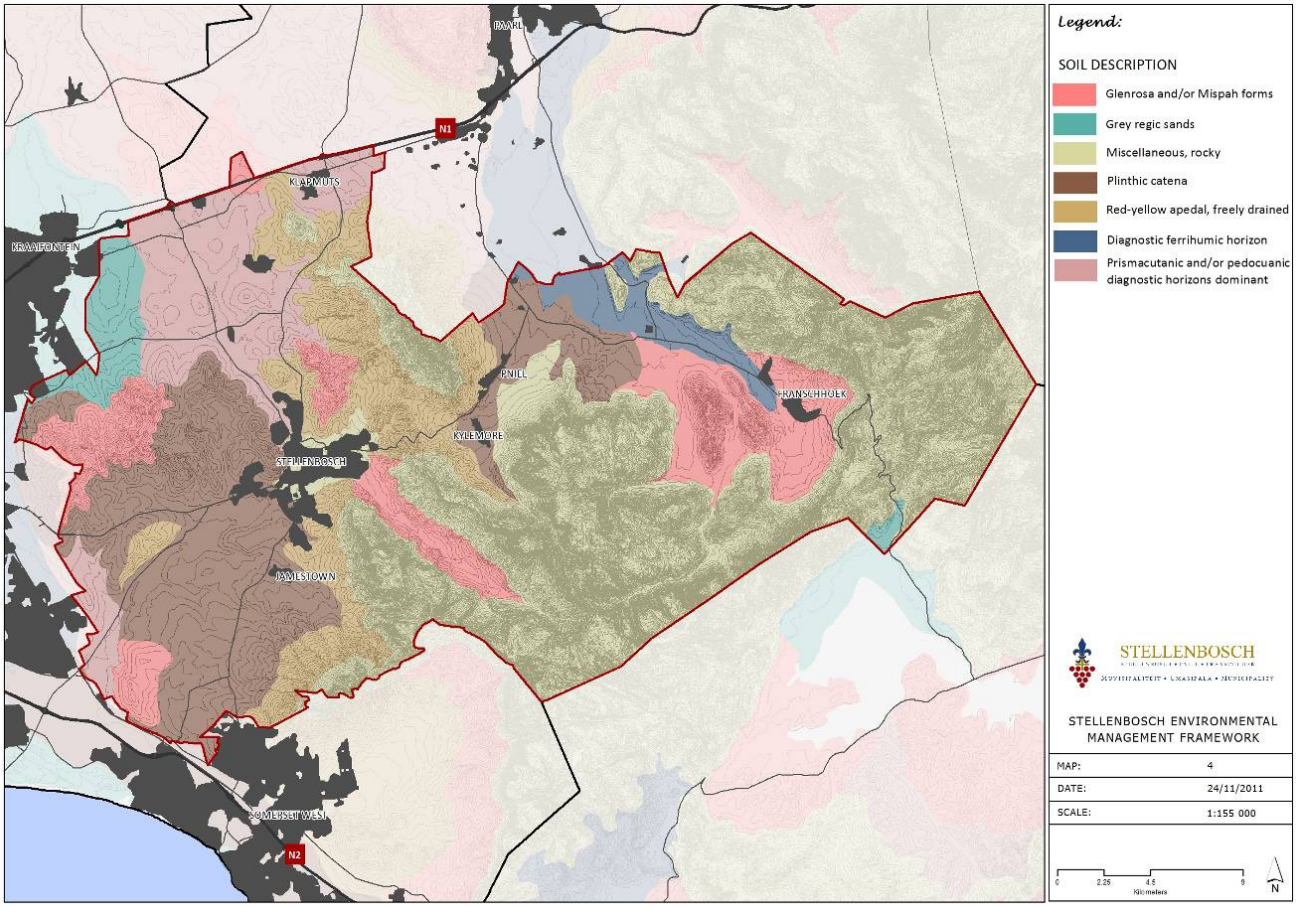


Figure B4: Soils and agricultural potential of Stellenbosch Municipality.

The catchments illustrated by Figure B5 are mutually dependent on every natural component for their existence. The loss, or degradation, of one component thus affects all others, possibly leading to the collapse of the total system on which communities may depend for their livelihood. Hence the importance of conserving every natural component, or life form, of a system that forms part of the natural water cycle[5].

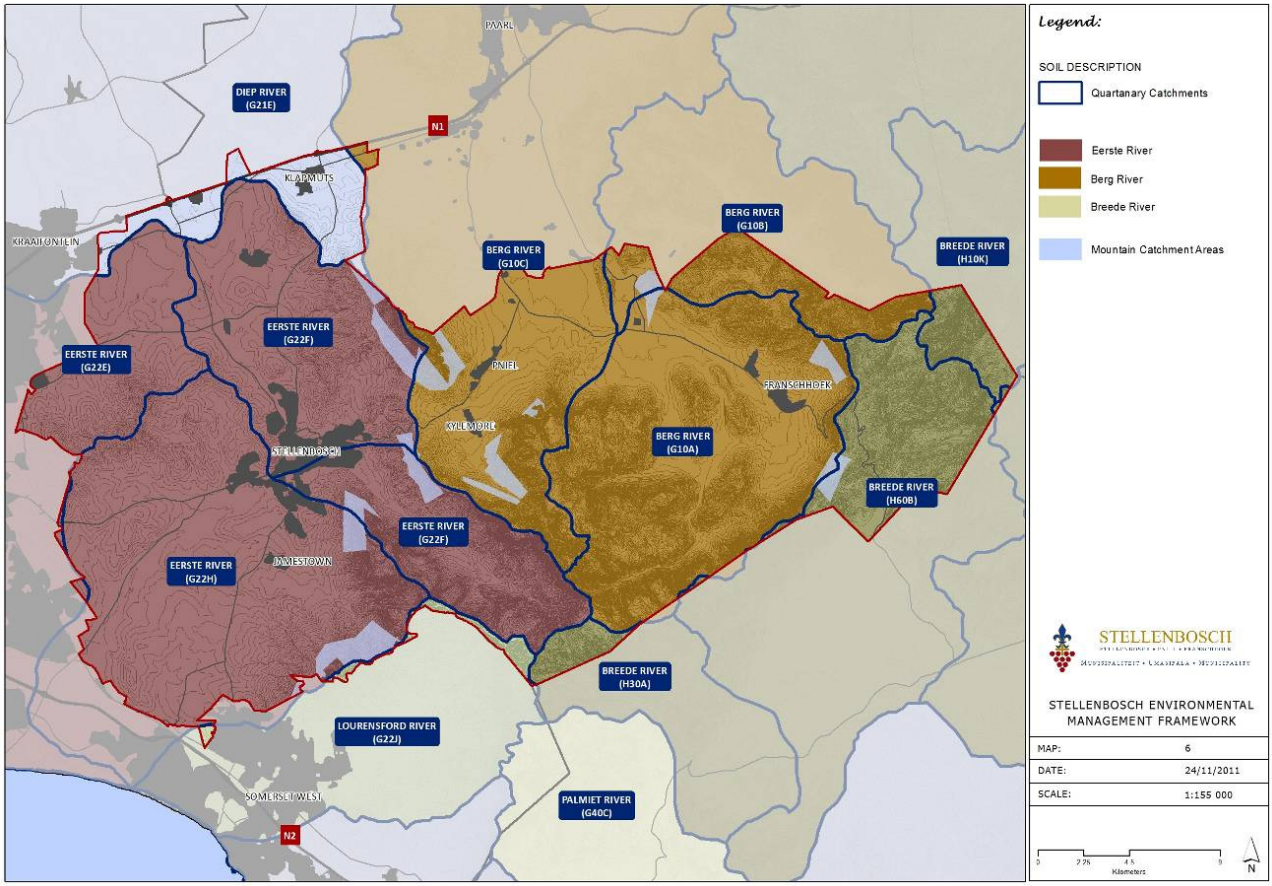


Figure B5: Catchments in the Stellenbosch Municipality.

Two major river systems occur in the Municipality, namely the Eerste River and Franschhoek River. The latter flows into the Upper Berg River System. Besides being important sources of water, these river systems are prominent place-making features of the landscape, and valuable tourist and recreational assets. Furthermore, the Eerste and Franschhoek River Systems are also important recipients of storm water.

B2.5.1 EERSTE RIVER SYSTEM

The Eerste River, which flows through the town of Stellenbosch rises in the Dwarsberg, at the head of the Jonkershoek Valley, and stretches for approximately 40 km. The river flows through the Jonkershoek Nature Reserve, pine plantations and farmland containing vineyards. The Kleinplaas Dam has been constructed on the river before entering Stellenbosch. During summer months, the Municipality diverts much of the water in the Eerste River, upstream of the Kleinplaas Dam, to the Idas Valley Dam at the Jonkershoek diversion.

[5] The water (hydrological) cycle describes the natural process of moving water out of the oceans, into the atmosphere, and back to the land and oceans.

The role of the Eerste River is diverse. Although it has an important engineering role in handling storm water and has been substantially altered, it is still a habitat for indigenous fauna and flora.

B2.5.2 UPPER BERG RIVER (FRANSCHHOEK RIVER) SYSTEM

The Upper Berg River Catchment area gives rise to two main tributaries, namely the Berg and the Franschhoek Rivers. The Berg River rises in the Assegaaiboskloof and flows to the west of Middenberg before joining the Franschhoek River beyond La Motte.

The Franschhoek River rises in the Franschhoek Mountains and flows past Franschhoek and La Motte before joining the Berg River. Two important tributaries, the Wemmershoek River and the Dwars River, also join the Berg River in its upper reaches. The Dwars River, which rises in the Jonkershoek and Drakenstein mountains, flows past Kylemore, Johannesdal, Pniel, and Groot Drakenstein before finally joining the Berg River.

The Berg River Dam is located in the upper reaches of the Berg River. It has a delivery capacity of approximately 70 million m³ of water per year. This is enough to irrigate 10 000 ha of land or supply water to 640 000 people. The water supports agricultural irrigation and urban uses in the Greater Cape Town Metropolitan Area.

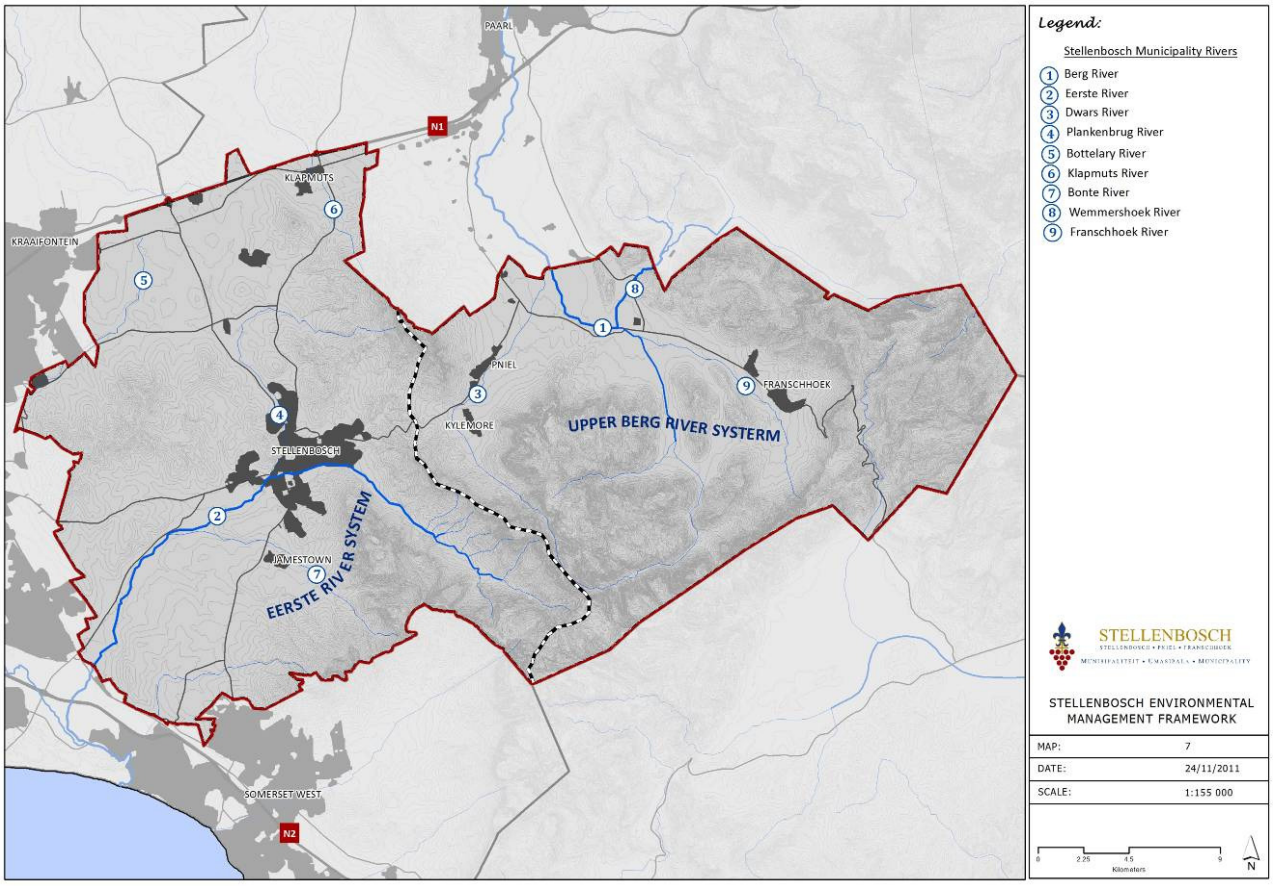


Figure B6: River systems in the Stellenbosch Municipality.

A large portion of Stellenbosch Municipality is defined as a Strategic Water Source Areas (SWSA)[10]. SWSAs are defined as strategic Water Source Areas are those areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest. These areas are important

[10] http://bgis.sanbi.org/nfepa/SWSAmap.asp

because they have the potential to contribute significantly to overall water quality and supply, supporting growth and development needs that are often a far distance away. SWSA areas make up 8% of the land area across South Africa, Lesotho and Swaziland but provide 50% of the water in these countries. At a national level, Strategic Water Source Areas form the foundational ecological infrastructure on which a great deal of built infrastructure for water services depends. Investing in Strategic Water Source Areas is also an important mechanism for long-term adaptation to the effects on climate change on water provision growth and development. The importance of managing this small fraction of land that contributes so vitally to our water security should be acknowledged at the highest level across all sectors.

Deterioration of water quality and quantity in these areas can have a disproportionately large negative effect on the functioning of downstream ecosystems and the overall sustainability of growth and development in the regions they support. Appropriate management includes:

- maintaining healthy functioning riparian zones and wetlands; ensuring good agricultural management leads to soil conservation that supports the water cycle;
- avoiding activities that reduce stream flow (e.g. irrigated agriculture and forestry plantations) and where this is not possible ensuring careful regulation of these activities;
- minimizing ground water abstraction;
- clearing invasive alien plants;
- restoring the hydrological functioning of degraded landscapes.

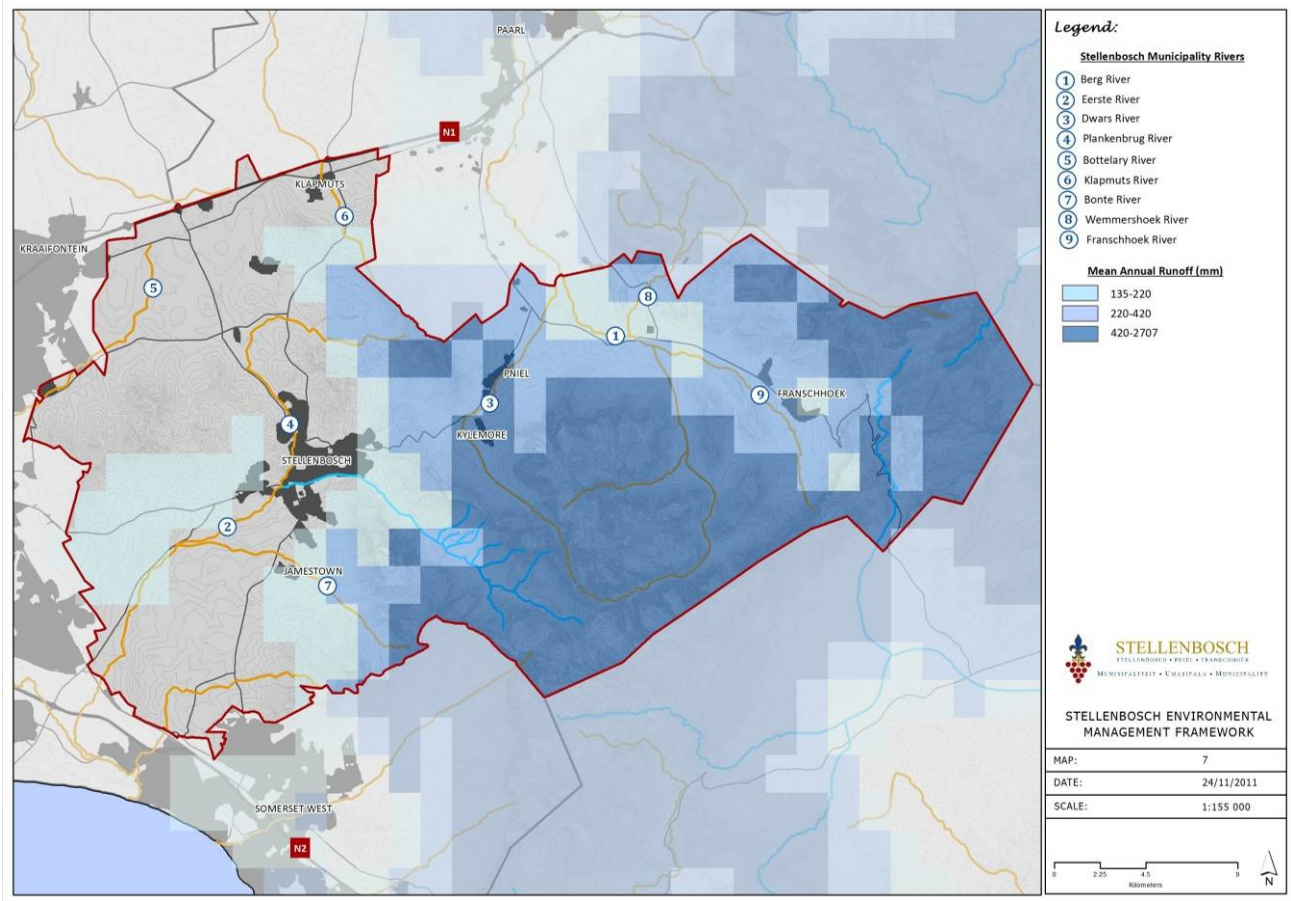


Figure B7: Strategic Water Source Areas (SWSAs) in Stellenbosch Municipality.

CHAPTER B3 BIOLOGICAL CHARACTERISTICS

B3.1 FLORA

A primary reason for the conservation of the natural environment of the Greater Stellenbosch Municipality is that it forms an integral part of the world-renowned Cape Floral Kingdom.

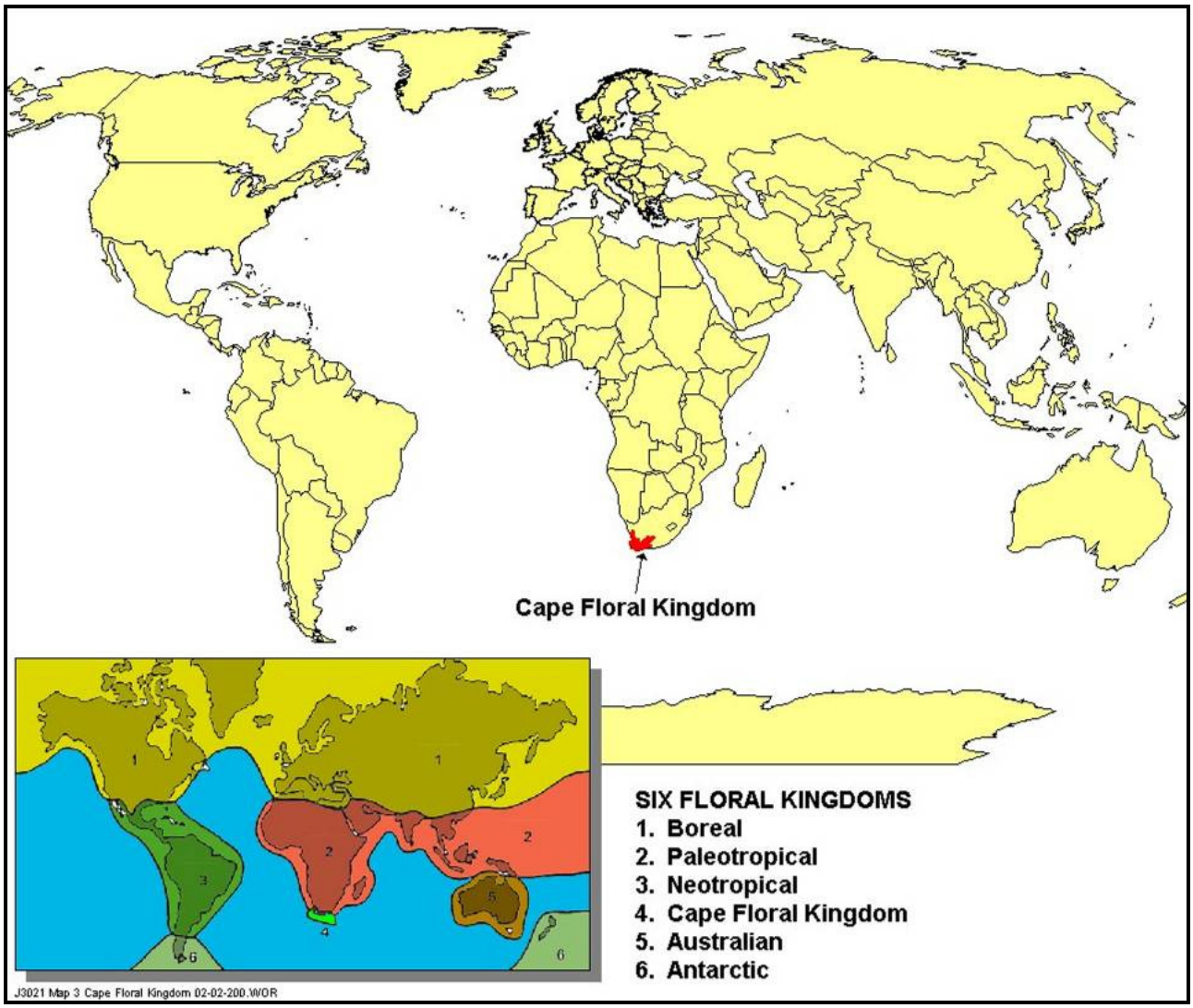


Figure B8: The Cape Floral Kingdom in International Context.

The Cape Floral Kingdom is internationally recognised as one of the six Floral Kingdoms of the world (0,06% of the earth's surface). As shown by Figure B8, it is the only Floral Kingdom contained, in its entirety, within a single country. The Cape Floral Kingdom is characterised by its exceptional richness in plant species and its endemicity. More than 8 700 species are known to occur, with more than 68% of these species being confined to the Cape Floral Kingdom. Thus this Floral Kingdom compares with some of the richest floras worldwide, surpassing many tropical forest regions in its floral diversity.

The enormous diversity found in the Cape Floral Kingdom is attributed to the age of this kingdom. The last Ice Age had far less of an influence on this area that it did on the Northern Hemisphere. Plant life in the Northern Hemisphere was almost wiped out while conditions in the Western Cape

were altered very little. The diversity can also be attributed to the harsh conditions and infertile soil of the area which has forced plants to adapt to ensure their survival.

The Cape Floral Kingdom is of immense scientific importance, both nationally and internationally. It covers only 4% of South Africa, but contains 45% of all plant species of Southern Africa. About 75% of all plants in the South African Red Data Book are found in the Cape Floral Kingdom. Of these species, 1 700 are threatened. Many Fynbos species are extremely localised in their distribution, with sets of such localised species organised into 'centres of endemism' (Low and Robelo, 1996).

B3.1.1 VEGETATION TYPES

In the mountainous areas of the Municipality, more than 1 300 plant species are known to occur, of which a number are rare or endemic to the area. Some of these distinctive species are *Protea repens, P. neriifolia*, mountain cypress, as well as various ericas and restois. Several relic forest communities occur in narrow, moist kloofs where they are relatively sheltered from fire. Dense riparian vegetation grows along the banks of the Eerste River and adjoining streams (www.capenature.co.za). The natural vegetation of the Municipality includes the following:

a) West Coast Renosterveld

West Coast Renosterveld occurs on Western Cape forelands from just north of Piketberg, to Somerset West, mainly on lowlands and low hills. It is confined largely to Malmesbury Group shales, Cape Granite Suite and Klipheuwel Formation shales, which weather to form heavy clays and loamy soils. Occurring on more fertile soils, most of this vegetation type has been ploughed up for wheat, or vineyards in wetter areas. Less than 3% of the original area remains, with less than 1% of the original area being found in nature reserves.

This vegetation type is characterised by mid-dense to closed cupressoid and small-leaved, mid-high evergreen shrubs, with regular clumps of broad-leaved, tall shrubs as emergents (especially on heuweltjies). The overstorey is dominated by Renosterbos *Elytropappus rhinocerotis*, with subdominants of Wild Rosemary *Eriocephalus africanus*, Dune Teabush *Leysera gnaphalodes*, Jakkalsstert *Anthospermum aethiopicum*, *Athanasia trifurcata*, *Felicia filifolia*, *Metalasia muricata* and *Stoebe spiralis*. The understorey is mainly annual and herbaceous with perennial grasses.

The Mediterranean annual grasses, Oats *Avena*, Quaking Grass *Briza* and Ryegrass *Lolium*, have become widespread and common, and their effect on the indigenous grasses and geophytes is unknown. Bush clumps are dominated by typical Thicket Biome species such as Wild Olive *Olea europaea* subsp. *africana*, Dune Taaibos *Rhus laevigata* and Bush Guarri *Euclea racemosa* (Low & Robelo, 1998).

b) Mountain Fynbos

Mountain Fynbos is the most widespread vegetation type of the Fynbos Biome, occurring mainly along the Cape Fold Belt from north of Nieuwoudtville to near Port Elizabeth.It is largely confined to soils derived from sandstones of the Cape Supergroup, except where the rainfall is sufficiently high, when it occurs on leached soils derived from granites (more than 300 mm to 400 mm per year) and even shales (more than 600 mm to 800 mm per year).

Woody alien plants are the major threat in this vegetation type, with Pines (Pinus spp.), Needlebushes (Hakea spp.), and Wattles (Acacia spp.) being the most notable impacting on the flora, fauna and water yield (Low and Robelo, 1998).

In general, mountain fynbos vegetation is well conserved as the land is generally not suitable for agriculture, forestry or other forms of development, but this is threatened by encroachment of invasive alien species. The wetter valleys, lower slopes and riverine areas are under slightly more pressure due to agriculture, forestry operations and water resource development. The fynbos biome, and the riverine zone in particular, is vulnerable to invasion by woody exotic vegetation (Ninham Shand, 1998).

c) Sand Plain Fynbos

Sand Plain Fynbos is typically Asteraceous (species representing the Daisy family) and Proteoid (tall Protea shrubs with large leaves) and does not differ structurally from equivalent Mountain Fynbos types, although very few species are shared. Heaths (Ericaceae) are seldom dominant, but ericoid-leaved shrubs tend to dominate with the Reeds (Restionaceae) and Sugarbushes (Proteaceae).

Sand Plain Fynbos is characterised by the presence of Ninepin Heath *Erica mammosa*, Starface *Phylica cephalanta*, Baboonface *P. stipularis*, and the restioids *Thamnochortus obtusus* and Sandveld Thatching Reed *T. punctatus*. Three centres of endemism occur within this vegetation type, each characterised by their own suite of proteoid overstorey.

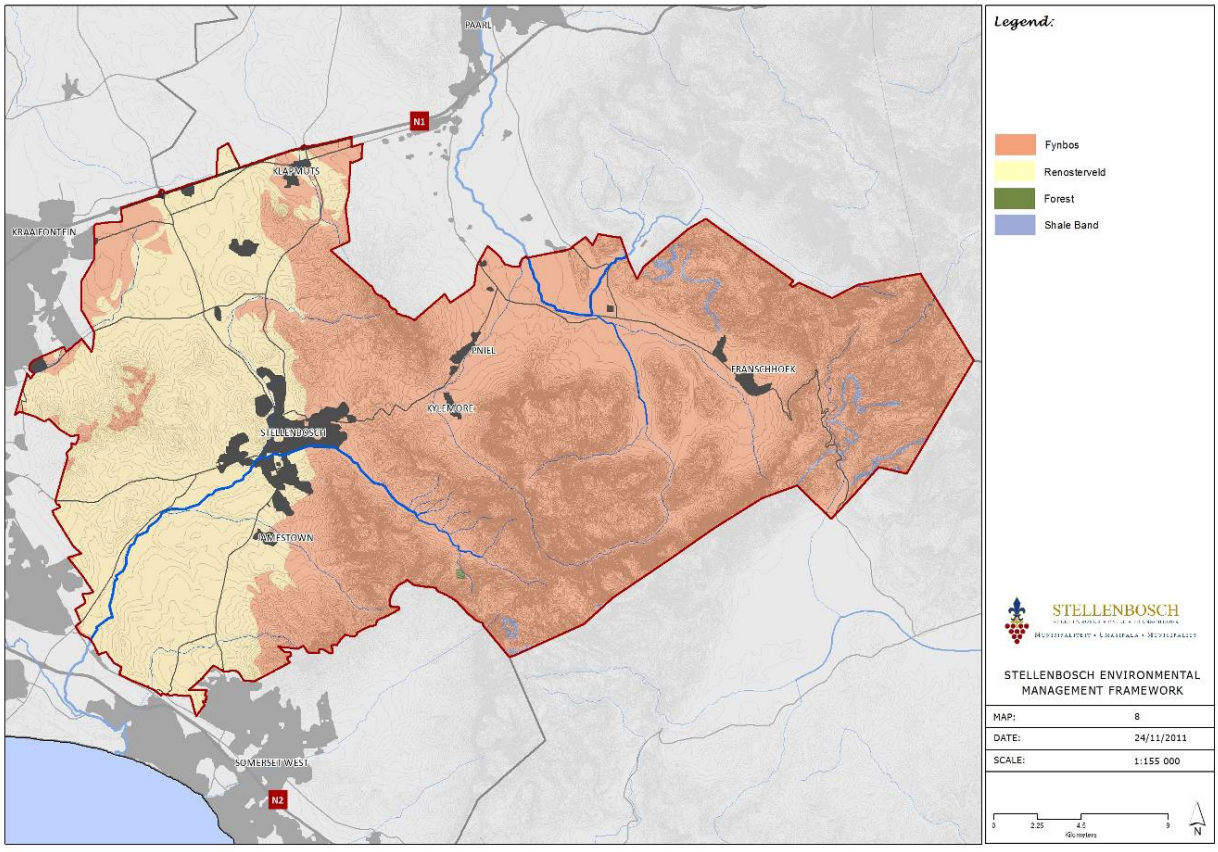


Figure B9: Broad vegetation types and their distribution in Stellenbosch Municipality.

The information provided by the South African National Biodiversity Institute (SANBI) and the Cape Action for People and the Environment (C.A.P.E.) with regard to the irreplaceability[11] of habitats indicates that the natural environment of the Stellenbosch Municipality is of immense conservation importance. This is confirmed with the Critical Biodiversity Areas (CBAs) data released as part of the Western Cape Biodiversity Spatial Plan (2017) Figure B11 and Table 1. This is mainly due to the fact that the area is, or used to be, the habitat of the now almost extinct West Coast Renosterveld. The objective is to rehabilitate and conserve as much as possible of this area.

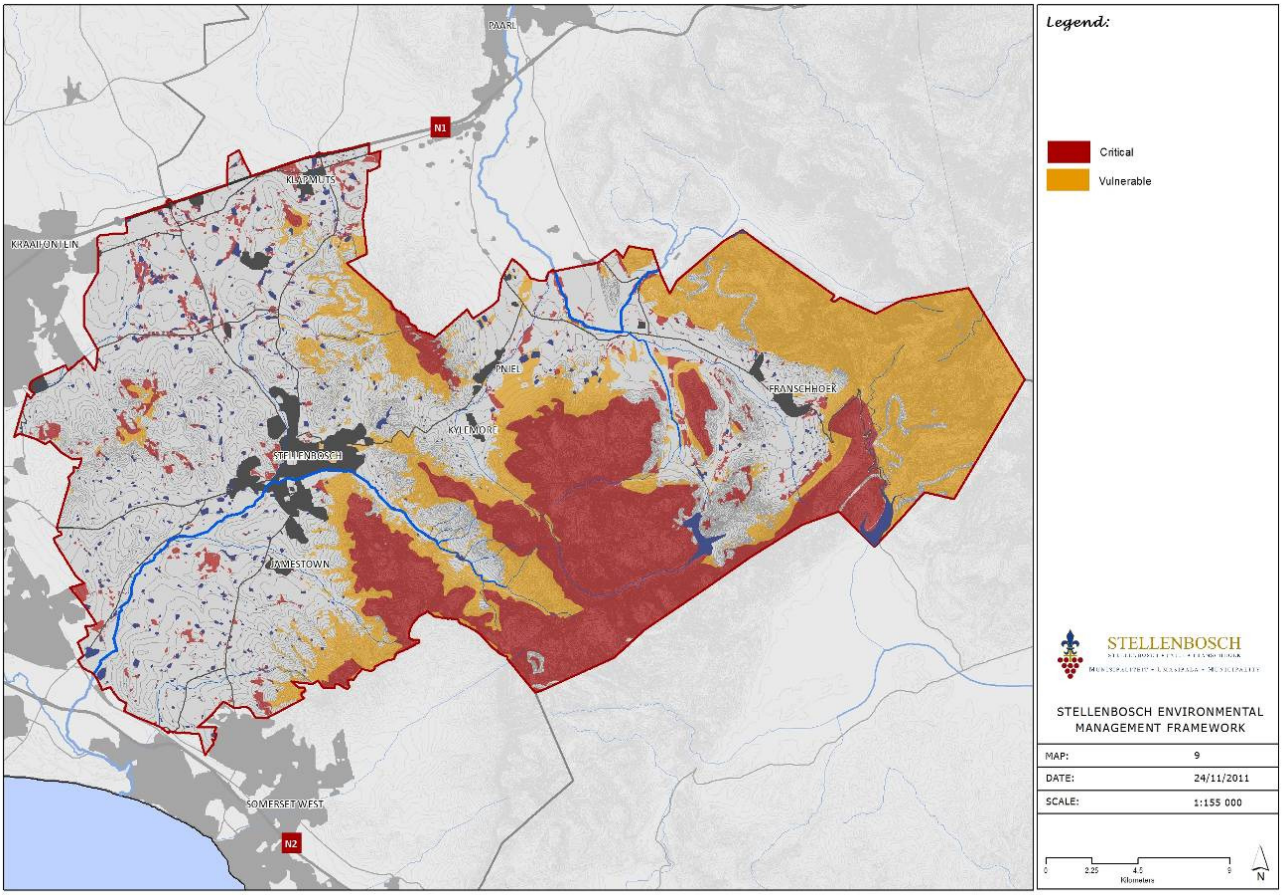


Figure B10: Irreplaceability of habitats in Stellenbosch Municipality (Source: C.A.P.E.).

Table B1: Western Cape Biodiversity Spatial Plan map categories.

MAP CATEGORY		DEFINITION
	Protected Area	Areas that are proclaimed as protected areas under national or provincial legislation.
	CBA 1	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.
	CBA 2	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.
	ESA 1[12]	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.

[11] The potential contribution of a site to a preservation or representation goal. It is a fundamental way of measuring the conservation value of any site. An irreplaceable site will appear in every analysis of alternative combinations of sites. In other words, it is one which must be included in a conservation area because significant options for preservation are lost if the site is excluded.

[12] Ecological Support Area

	ESA 2	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.
	Other Natural Area	Areas that have not been identified as a priority in the current systematic biodiversity plan, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem.

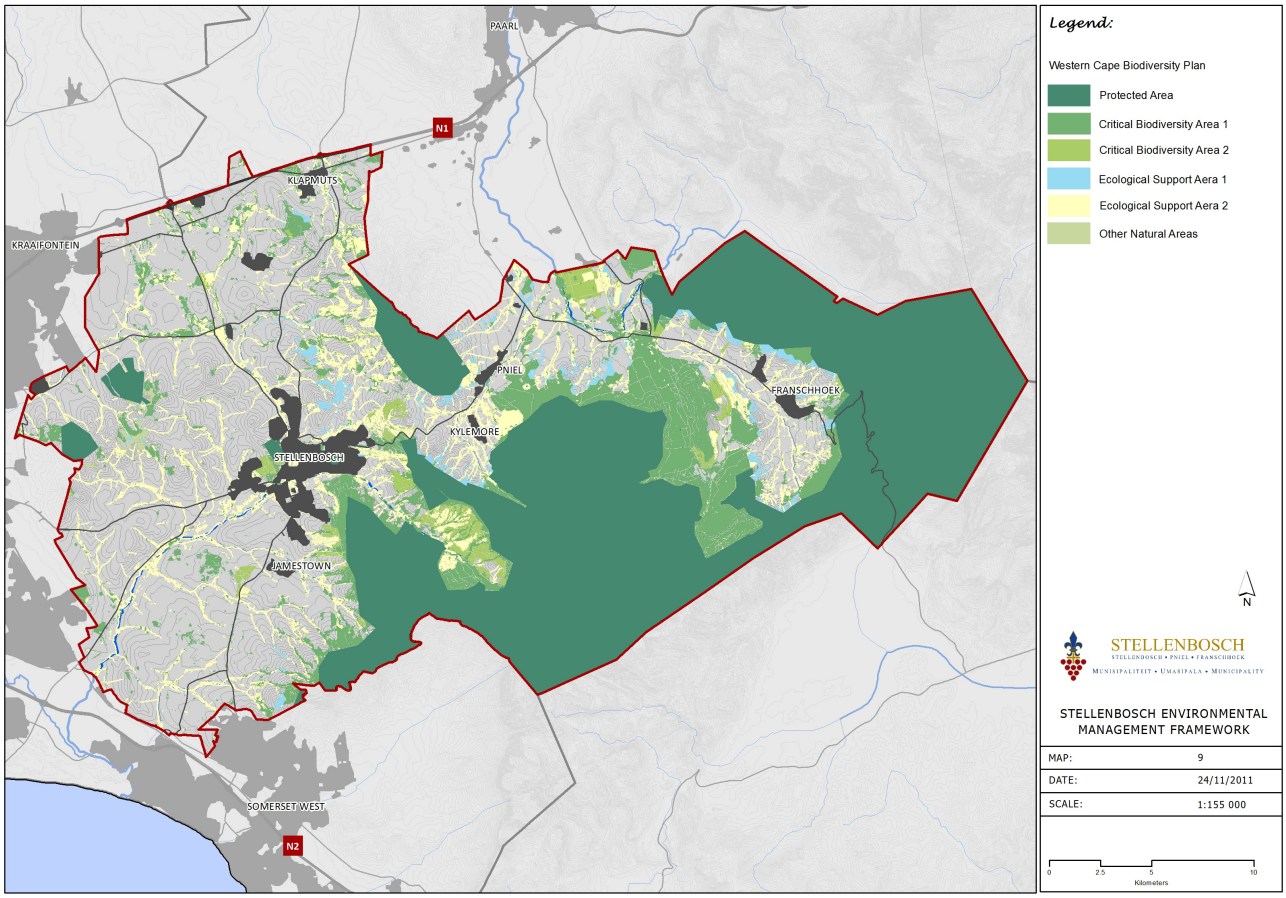


Figure B11: Biodiversity Spatial Plan – Map of priority areas (Critical Biodiversity Areas).

B.3.2 FAUNA

The Cape Fold Mountains is a centre of endemic mammal richness. Most of the wildlife of the Greater Stellenbosch Municipality is confined to the nature areas, with fauna including:

a) Invertebrates: There is a high diversity amongst insects and mollusc groups. This diversity provides a wealth of resources and biological processes low in the food chain that supports a more conspicuous fauna.

b) Fish: Indigenous fish recorded from the Berg River, upstream of the Berg River Dam, include *Barbus andrewii* (witvis) which is critically endangered in the Berg River and *Pseudobarbus burgi* (Berg River redfin) which is critically endangered and restricted to tributaries of the Berg River (Skelton, 1993). *Sandelia capensis* (Cape kurper) is commonly found in the rivers within the municipality, while *Galaxius zebratus* (Cape galaxias) is near threatened.

c) Amphibians and Reptiles: Relatively high levels of species richness occur in the herpetofauna. On warm days rock agamas are often encountered on the rocky outcrops

where they display typical head-bobbing antics to defend their territories. Berg adder, puff adder, boomslang and Cape cobra are fairly common throughout the municipality.

d) Birds: The area has a high species diversity, with more than 140 species occurring. This is a consequence of the wide variety of terrestrial and wetland habitats in the region and is typical of that of the Cape Mountains. Two endemic birds namely, the Cape sugarbird (*Promerops carer*) and the Protea Canary are found in the Limietberg Mountains near Franschhoek. Other large raptors that are found in the municipality include the black eagle, occasional fish eagle and spotted eagle owl, while kingfishers and typical Fynbos birds such as the sugarbird, orange-breasted sunbird and protea seed-eater are more abundant.

e) Mammals: The mammals within the municipality represent a relatively small biomass. This fauna ranges from the smallest groups such as rodents and shrews, to larger species such as Honey Badgers, Baboons, Klipspringers, Grey Rhebuck and the Common Duiker. The Leopard (*Panthera pardus*) is the largest carnivore occurring in the mountains of Stellenbosch Municipality.

CHAPTER B4 INTERNATIONAL CONSERVATION FOCAL AREAS

The Cape Floral Region is referred to as the world's 'hottest hot-spot' for plant diversity and endemism and has been designated as one of the IUCN World Centres of Plant Diversity. Although the smallest of the world's six principal floristic regions and in a temperate zone, it has a degree of species richness comparable with most tropical hotspots. In less than 0.5% of the area of Africa it has nearly 20% of its flora and in less than 4% of the area of southern Africa it has nearly 44% of the sub-continental flora of 20 367 species. Due to the above Stellenbosch Municipality, or portions thereof, have been afforded the highest global conservation status vested with UNESCO's MaB Programme, namely in the form of the:

- The Cape Floral Region Protected Areas World Heritage Site
- Cape Winelands Biosphere Reserve

B4.1 CAPE FLORAL REGION PROTECTED AREAS WORLD HERITAGE SITE

The Cape Floral Region Protected Areas World Heritage Site was registered on the World Heritage List of UNESCO in 2004. Cape Nature in collaboration with SANBI (South African National Biodiversity Institute) facilitated the application and registration process.

The World Heritage Site comprises eight clusters extending from 50 km south of the City of Cape Town, 210 km northwards to the Cederberg, and 450 km northeast to the Swartberg. It covers 553 000 hectares and together forms a representative sample of the eight phytogeographic[13] centres of the Cape Floral Region.

The eight clusters that collectively form the World Heritage Site are as follows (World Heritage Nomination, 2004)[14]:

a) Cape Peninsula National Park: 17 000 ha
b) Cederberg Wilderness Area: 64 000 ha
c) Groot Winterhoek Wilderness Area: 26 000 ha
d) Boland Mountain Complex (includes parts of the Stellenbosch Municipal Area): 113 000 ha

[13] Refers to the geographical distribution of plant species over an area.

[14] World Heritage Nomination 2004: *IUCN Technical Evaluation – The Cape Floral Region (South Africa) ID N°: 1007 REV.*

e) De Hoop Nature Reserve: 32 000 ha
f) Boosmansbos Wilderness Area: 15 000 ha
g) Swartberg Complex: 112 000 ha
h) Baviaanskloof Protected Area: 174 000 ha

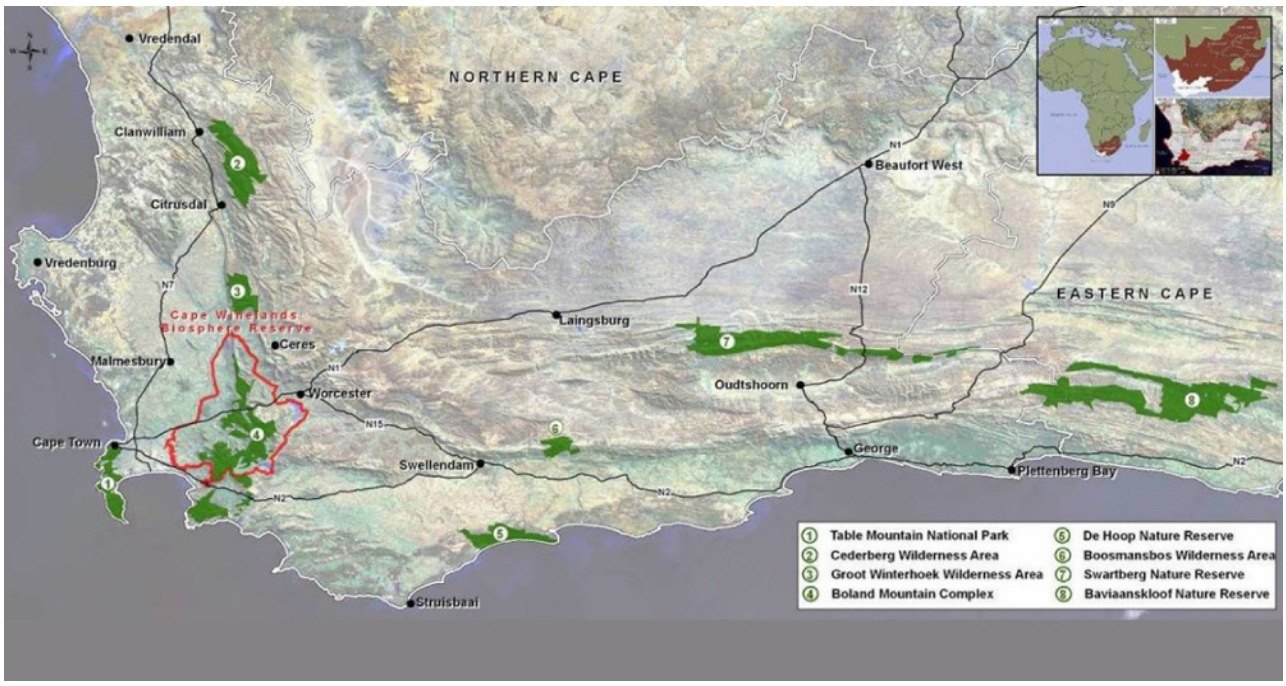


Figure B12: The Cape Floral Region Protected Areas World Heritage Site

The Boland Mountain Complex, is considered the as the most important site in the Cape Floral Region in terms of floristic diversity and represents the highest concentration of threatened and locally endemic species in the Fynbos biome (Indigenous Vegetation Consultancy et al, 2003).

B4.2 CAPE WINELANDS BIOSPHERE RESERVE

The Cape Winelands Biosphere Reserve within which Stellenbosch Municipality is located was established on 18 September 2007 in terms of UNESCO's MaB Programme. The biosphere reserve project was initiated and driven by Stellenbosch Municipality until it was passed on to the Cape Winelands District Municipality.

There are currently 621 biosphere reserves world-wide. Only six of these are in South Africa, with three being in the Western Cape, namely the Kogelberg Biosphere Reserve (1998), Cape West Coast Biosphere Reserve (2000), and the Cape Winelands Biosphere Reserve (2007). The Cape Winelands Biosphere Reserve was established as part of the vision of the former Cape Nature Conservation to establish a cluster system of biosphere reserves across the 'hot spots' of the Cape Floral Kingdom. This vision was subsequently adapted to allow for the establishment of 'conservation corridors', such as the Cederberg.

As is stipulated by UNESCO's guiding principles on biosphere reserves, the Cape Winelands Biosphere Reserve was established in terms of an international and inter-governmental agreement. The signatories of the agreement are as follows:

a) National Government of South Africa (represented by the Department of Environmental Affairs and Tourism).

b) Provincial Government of the Western Cape (represented by the Department of Environmental Affairs and Development Planning).
c) Cape Winelands District Municipality
d) Breede River Valley Municipality
e) Drakenstein Municipality
f) Overberg District Municipality
g) Stellenbosch Municipality
h) Theewaterskloof Municipality
i) Witzenberg Municipality
j) CapeNature
k) Elandsberg Farms

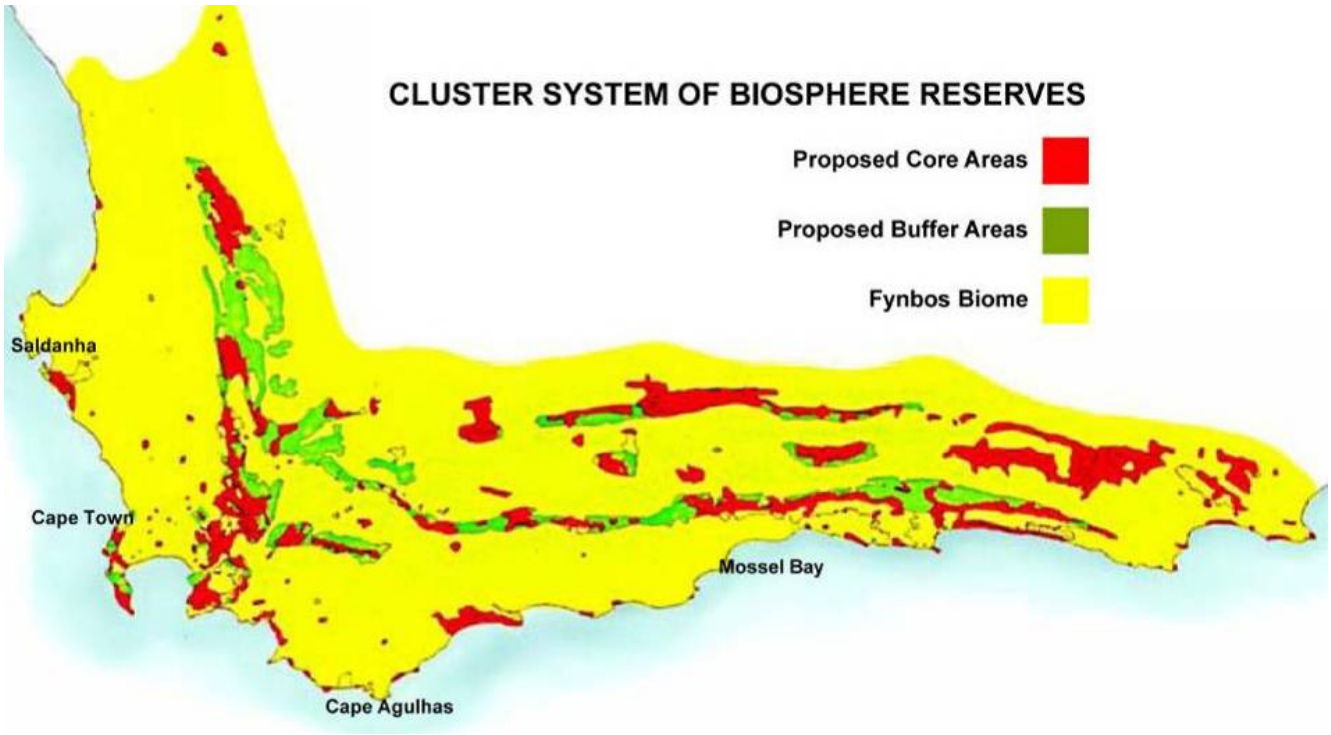


Figure B13: Cluster system of biosphere reserves as envisioned by Cape Nature Conservation in 1991

Biosphere reserves in a nutshell

Biosphere reserves are defined as areas of terrestrial and coastal/marine ecosystems or a combination thereof, which are internationally recognised within the framework of UNESCO's MaB Programme. Biosphere reserves aim to provide the ecological and social framework within which government, community, corporate and other private interests, share responsibility for co-ordinating land-use planning, for both public and private land and for dealing and implementing development options that would ensure that human needs are met in a sustainable way. A key objective of biosphere reserves is to promote and test innovative approaches to sustainable development challenges.

A Spatial Development Framework Plan (SDFP) has been prepared for the Biosphere Reserve. The SDFP was approved by the Cape Winelands District Municipality on 29 March 2011 in terms of the Municipal System Act 32 of 2000. This gives legal status to the biosphere reserve, its broad land-use designation and, in particular, the inter-governmental terms of agreement cited above.

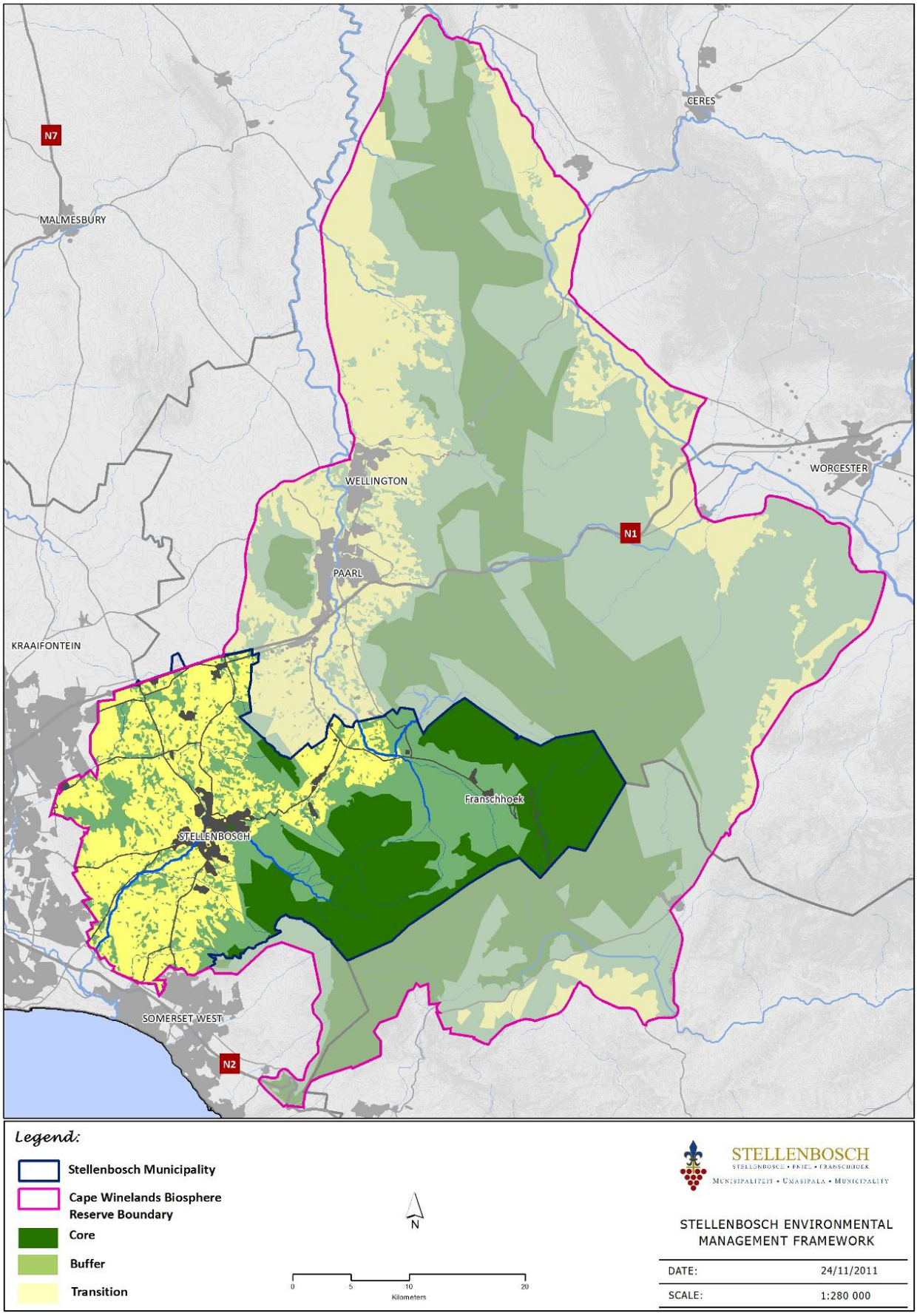


Figure B14: The Cape Winelands Biosphere Reserve.

The SDFP is an implementation mechanism, in terms of the relevant statutes and policies, for the biosphere reserve and its functions. In general terms, the SDFP serves to:

(i) Indicate, in a detailed manner, the spatial implications of the Biosphere Reserve.

(ii) Serve as spatial plan and strategy that facilitates Local Economic Development (LED).

(iii) Lay down strategies, proposals and guidelines for the future spatial development of the Biosphere Reserve. This includes, without being limited to, development objectives, proposals for land reform, urban renewal, reconstruction, integration, environmental planning, and urban design so that the general well-being of the relevant local communities and order in the area are promoted in the most effective manner.

(iv) Promote social, economic, and environmental sustainability in an integrated and holistic manner and in accordance with the applicable legislation, policy and protocols. The SDFP has to create conditions that will facilitate economic benefit through the promotion of the comparative and competitive economic advantages of the Biosphere Reserve.

CHAPTER B5 PROTECTED AREAS

Significant portions of the Municipality fall within both public and private conservation areas that have been designated for conservation purposes.

B5.1 PUBLIC CONSERVATION AREAS

The public conservation areas located in Stellenbosch Municipality include the following (refer to Figure B15 and Table B2):

Table B2: Public conservation areas in Stellenbosch Municipality.

NAME	CATEGORY	SIZE (% of Mun.)
Assegaaibosch Nature Reserve	Provincial Nature Reserve	197.8ha (0.24%)
Hawequas Mountain Catchment Area	Mountain Catchment Area	346.1ha (0.42%)
Haweqwa Nature Reserve	State Forest Nature Reserve	3997.8ha (4.81%)
Helderberg Nature Reserve	State Forest Nature Reserve	115.7ha (0.14%)
Hottentots-Holland Mountain Catchment Area	Mountain Catchment Area	2430.9ha (2.93%)
Hottentots-Holland Nature Reserve	State Forest Nature Reserve	1298.3ha (1.56%)
Jan Marais Park	Local Authority Nature Reserve	24.2ha (0.03%)
Jonkershoek Nature Reserve	State Forest Nature Reserve	13848.3ha (16.66%)
Mont Rochelle	Local Authority Nature Reserve	1681.6ha (2.02%)
Papegaaiberg Nature Reserve	Section 23 Nature Reserve in terms of the National Environmental Management: Protected Areas Act	140.5ha (1.69%)
Simonsberg Nature Reserve	State Forest Nature Reserve	460.3ha (0.55%)
Theewaters Nature Reserve	State Forest Nature Reserve	4200ha (5.05%)
Total of 11 reserves in Stellenbosch Municipality covering 28 741 ha (34.6% of municipality)		

B5.2 PRIVATE CONSERVATION AREAS AND NATURAL HERITAGE SITES

Table B3 lists the private conservation areas and Table B4 lists the Natural and Rural Heritage Sites in the Municipality listed by the South African Heritage Association (refer to Figure B16).

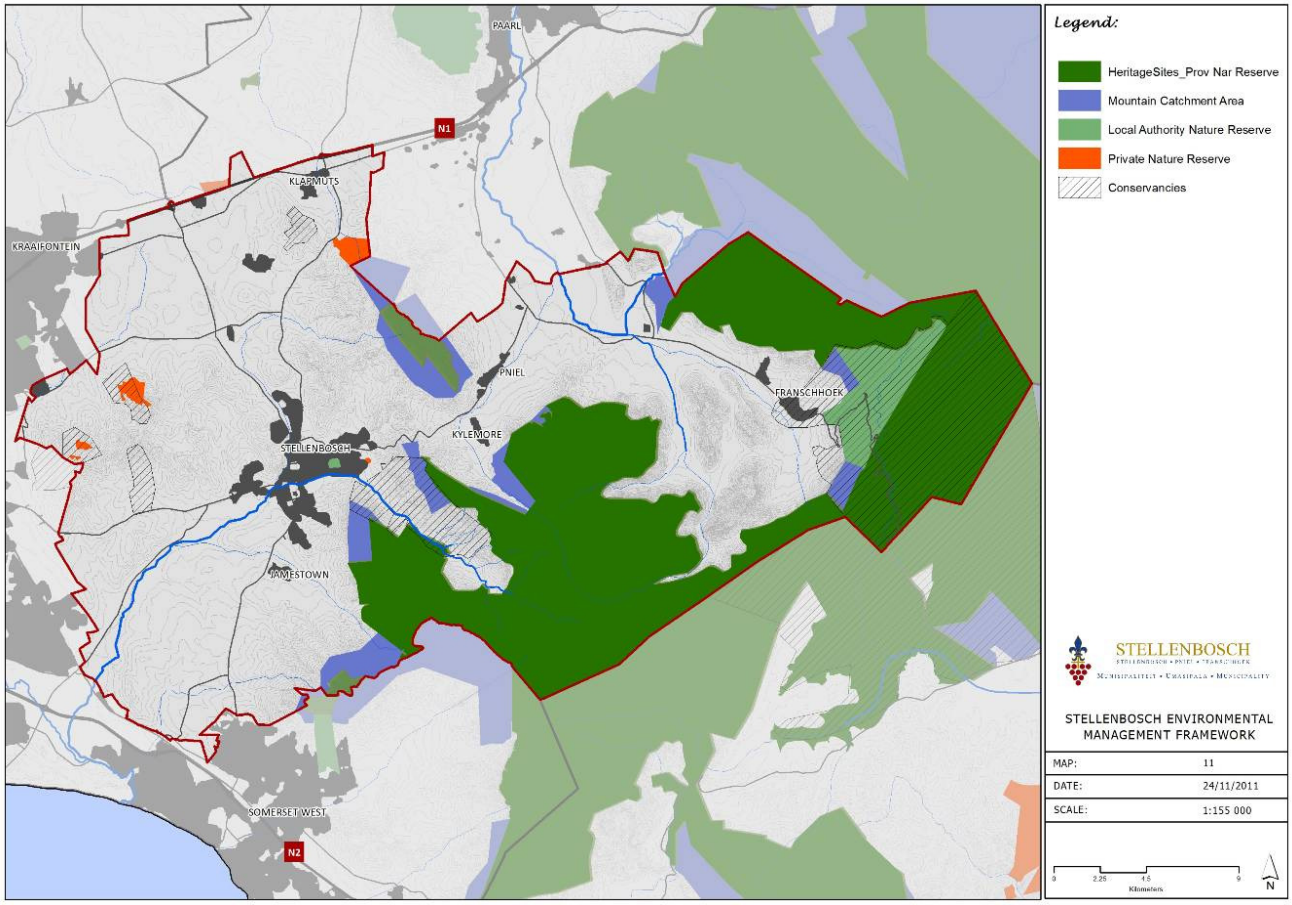


Figure B15: Conservation areas in the Greater Stellenbosch Municipality.

Table B3: Private conservation areas in the Municipality.

CONSERVATION AREA		
Town/Vicinity	**Property Name**	**Area (ha)**
Stellenbosch	Koopmanskloof Private Nature Reserve	2 901
Stellenbosch	Karindal Private Nature Reserve	3.35
Klapmuts	Wiesenhof Wildpark Private Nature Reserve	175

Table B4: Natural Heritage Sites in the Municipality.

HERITAGE SITE		
Town/Vicinity	**Property Name**	**Area (ha)**
Muldersvlei	Muldersvlei Salvation Army Site	3
Stellenbosch	Duthie Reserve, Stellenbosch	2.2
Franschhoek	Purgatory Outspan	127

CHAPTER B6 LAND COVER AND RESOURCE USE

Components of Stellenbosch Municipality Environment

Natural place is broadly defined as the natural environment that has not been substantially modified by man and where natural ecosystem processes are maintained. The relationship between the inhabited and natural landscapes is a fragile one (Norberg-Schulz, 1993). The human-made (cultural) place is defined as the environment that has been created or modified by humans to the extent that its primary ecosystem functions and natural aesthetic appeal are lost or diminished (Schmithusen, 1964). Inhabited landscapes are the works of humankind and a general understanding of what constitutes qualitative inhabited landscapes, and what to do to maintain such landscapes, are of decisive importance for long-term sustainable development.

Figure B17 illustrates the various forms of land-use and land coverage that currently constitute the natural and cultural components of the Municipality. Figure B17 should be read together with Figure B18 which provides broad indices as it relates to land-use potential and suitability.

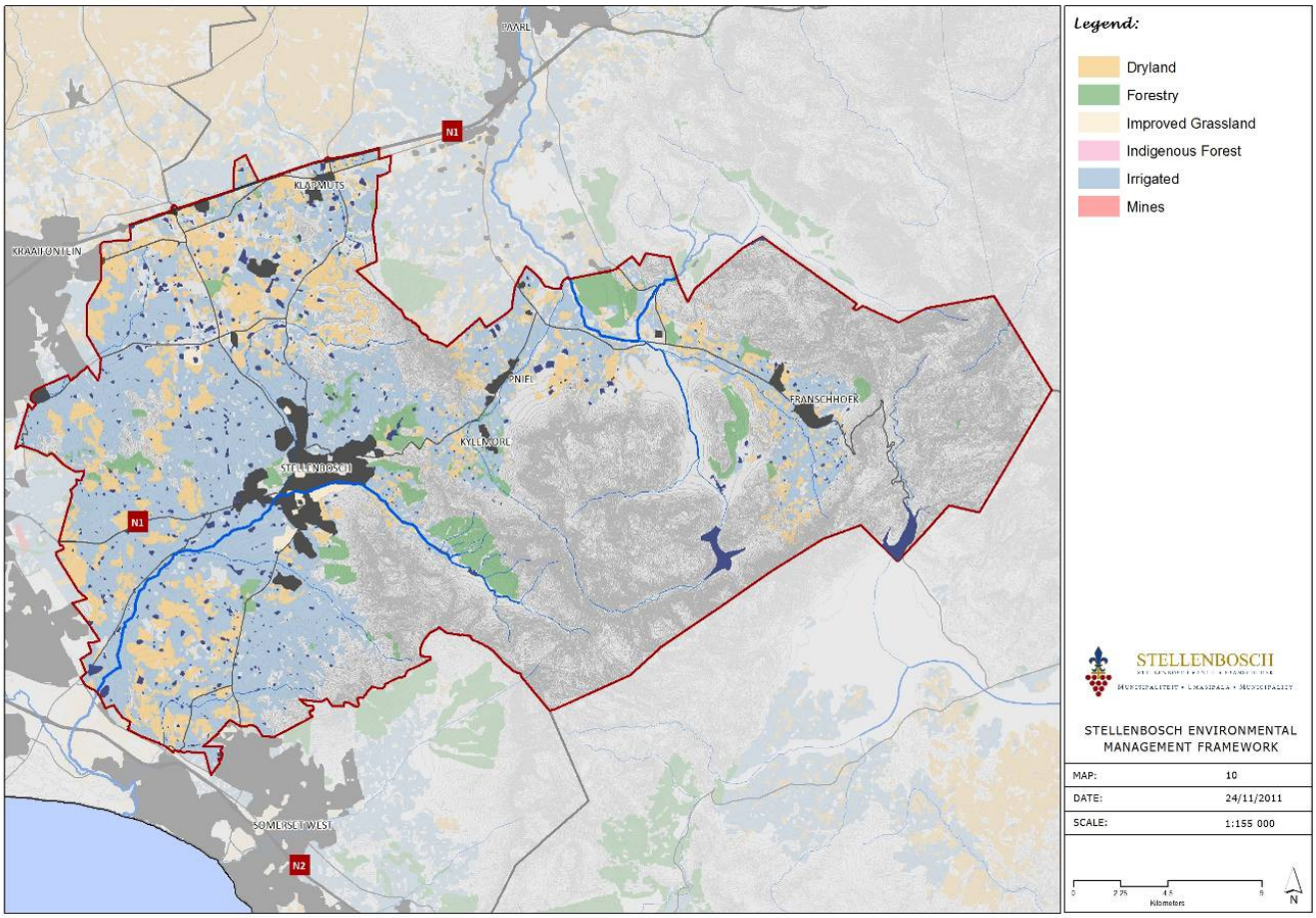


Figure B16: Land-use and land coverage in Stellenbosch Municipality.

B6.1 MAIN ECONOMIC AND CULTURAL USES

B6.1.1 AGRICULTURE

The Stellenbosch Winelands has an agri-based economy, with more than 40% of the total land area having been modified through cultivation. The areas of high agricultural potential are scattered throughout the region with the largest concentration of such land situated in the Franschhoek Valley. This area of high potential also extends to the Ida's Valley in the vicinity of

Pniel and Kylemore. High potential areas also occur to the east of Stellenbosch town, in the vicinity of Raithby, and in portions of the Bottelary Hills.

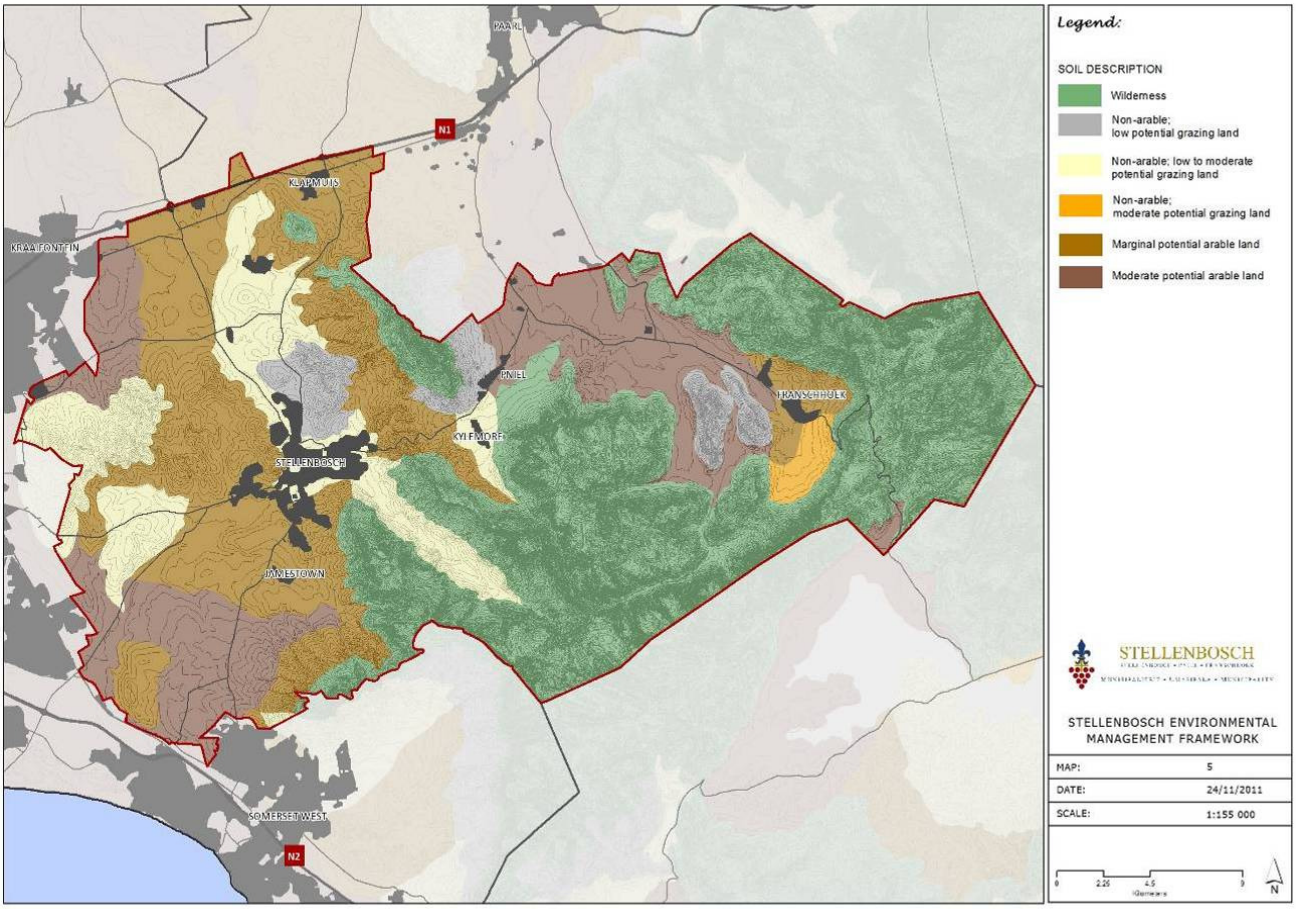


Figure B17: Land-use potential and suitability assessment.

The agricultural potential of the lower slopes of the Stellenbosch, Jonkershoek and Simonsberg Mountains is classified as 'medium'. The area of medium potential agricultural land is most extensive in the region west of Simonsberg, and forms a broad belt that extends along the Krom and Eerste Rivers towards Lynedoch. Other areas of medium potential agricultural land occur north of the Helderberg Mountain and on the western boundary of the municipality. The collective influences of topography, temperature, rainfall, and good soils mean that few areas of low agricultural potential exist in the Municipality.

Consequently, Stellenbosch Municipality constitutes some of the country's highest yielding agricultural land (in terms of income and employment generation)[6]. The region's extensive agricultural areas, particularly those under vineyards and orchards, also attribute scenic value and character to the region, which is valued by both the local inhabitants and visitors. This is a significant contributor to the value of the area as one of South Africa's premier tourist destinations. Tourism in its various forms (e.g. culture tourism, nature-related tourism, wine-related, and general hospitality) represents a viable economic sector. It is therefore imperative that all land-use decisions should enhance the integrity of both the natural and the cultural environment as an important form of capital.

The environmental threats of agriculture vests with the following:

[6] Agricultural land constitutes 2-3% of the country's land that produces 40% of its agricultural output.

a) Loss of the intrinsic value of natural landscapes. Well-maintained vineyards or pastures in suitable areas, and appropriately designed farmsteads are key components of the much-valued Stellenbosch Winelands cultural landscape[15]. However, cultivation undertaken in visually-prominent areas (e.g. mountain slopes) and unattractive infrastructure are often visually-intrusive and detrimental for the aesthetic quality of the cultural environment.

b) Loss of irreplaceable natural habitats of scarce endemic species. As illustrated previously, in terms of SANBI's criteria, much of the Stellenbosch Winelands is considered to be Critical Biodiversity Areas (CBAs) that are highly irreplaceable. The cultivation of land for agricultural purposes and the various forms of pollution, agri-induced alien plant infestation and alterations to the natural fire regime are major causes of habitat destruction.

c) Inappropriate use of water and catchment modification. Agriculture often results in inappropriate storage and use of scarce water resources. The extremely important aspect of efficient catchment management is in many instances neglected as is illustrated by illegal stream diversion and obstructions, uncontrolled abstraction, water wasting resulting from inappropriate irrigation systems, and stream pollution.

B6.1.2 URBAN DEVELOPMENT

The Provincial Bioregional Planning Policy (PGWC 2003) advocates a landscape typology which envisions *compact settlements, encircled by productive rural landscapes, and a connected matrix of nature areas stretching across the planning area. With this geometry, human populations can exist side-by-side with productive rural areas and fully functional ecosystems*.

The environmental threats of urban development vests with the following:

a) Loss of high potential agricultural land and biodiversity sites. Urban sprawl and unplanned growth of informal settlements have resulted in the loss of agricultural land on the periphery of most of the settlements in the Municipality.

b) Ecosystem degradation due to pollution. Inadequate provision of municipal services (primarily resulting from unforeseen informal settlement growth) has led to severe pollution of urban and rural areas. Water pollution, in particular, is a serious problem in places, with specific reference to the Plankenbrug River. This has the potential to induce epidemic water-borne diseases. Leachate from the solid waste disposal sites have resulted in pollution of water courses and groundwater systems. The solid waste disposal sites generally have detrimental visual impacts. Most of the municipal sites are approaching full capacity. Inadequately treated (sub-standard) sewage effluent deposited in the river systems of the Municipality, has resulted in nutrient overloading, ecological degradation, and ultimately, severe pollution problems. Soak-away sanitation systems (e.g. septic tanks) in areas with very shallow or perched water tables, or in soils with poor permeability (clays) have lead to swampy and unsanitary conditions and the pollution of surface and underground water in places. Inadequately managed stormwater from certain settlements has resulted in erosion problems, damage to property, and the pollution of water courses.

c) Loss of intrinsic value of settlements. All of the settlements in the Municipality have a rich history and they are characterised by a cultural heritage demonstrated by architecture, building types, etc. These attributes represent a unique sense of place which is one of the unique selling points of the Municipality as it relates to tourism. However, inappropriate

[15] The South African World Heritage Convention Committee during 2006 resolved to apply to the World Heritage Convention Committee for world heritage status for the so-called Cape Winelands Cultural Landscape including the Dwars River Valley and the Idas Valley.

planning and design of urban developments have resulted in a significant loss of intrinsic value in places.

CHAPTER B7 STATE OF THE ENVIRONMENT

A Strategic Environmental Assessment (SEA) will be undertaken for the Municipality and a comprehensive state of the environment report will be prepared as part of the implementation of the SEMF.

As a first step towards creating a basis and benchmark for assessing the environmental performance of the Municipality and for ensuring continual improvement of such performance, a basic assessment of the current (i.e. 2014) state of the environment has been undertaken as part of the preparation of the SEMF. The latter is based upon cursory environmental studies and the SEA undertaken for the Cape Winelands District in 2007.

The key finding is that the overall trend in the health of ecosystem services in the area is a gradual deterioration, which without the necessary interventions will lead to a crisis in the ability of these ecosystem services to support the sustainable economic development and improved quality of life. Human activity is imposing pressures on the continued ability of the ecosystems to deliver ecosystem services.

A brief overview of these pressures as it relates to each component of the ecosystem is provided below:

B7.1 BIODIVERSITY

a) The integrity of the Cape Floristic Kingdom is significantly threatened by fragmentation, transformation and degradation. Due to the incredible diverse biodiversity of the Cape Winelands, the formal protected areas network is unable to protect an adequate representation of biodiversity, leaving many areas of high conservation value outside of formally protected areas.

b) Current activities adding to this increasing fragmentation and degradation include:
   (i) Development on marginal or vulnerable land (e.g. vineyards on steep slopes (foothills) by investors in the Stellenbosch area
   (ii) The expansion of vegetable and fruit production onto nature areas.
   (iii) The rapid spread of urban development.
   (iv) Poor fire management.
   (v) Sand and gravel mining.
   (vi) Increasing infestation by alien vegetation.

c) The increasing incidence of uncontrolled fires and the inappropriate use of fire as a management tool is causing a potential permanent loss of species and damage to the soil, e.g. lower infiltration capacity and higher risk of erosion.

B7.2 RIVERS AND WATER

The upper reaches of the Eerste and the Berg rivers are relatively pristine and able to contribute towards river ecosystem targets[16] (SRK Consulting, 2011).

In terms of the Freshwater Ecosystem Priority Areas (FEPAs) classification most of the rivers located in the intensively cultivated and built-up of Stellenbosch, Franschhoek, Pniel and Klapmuts are largely modified and degraded (refer to Figure B18).

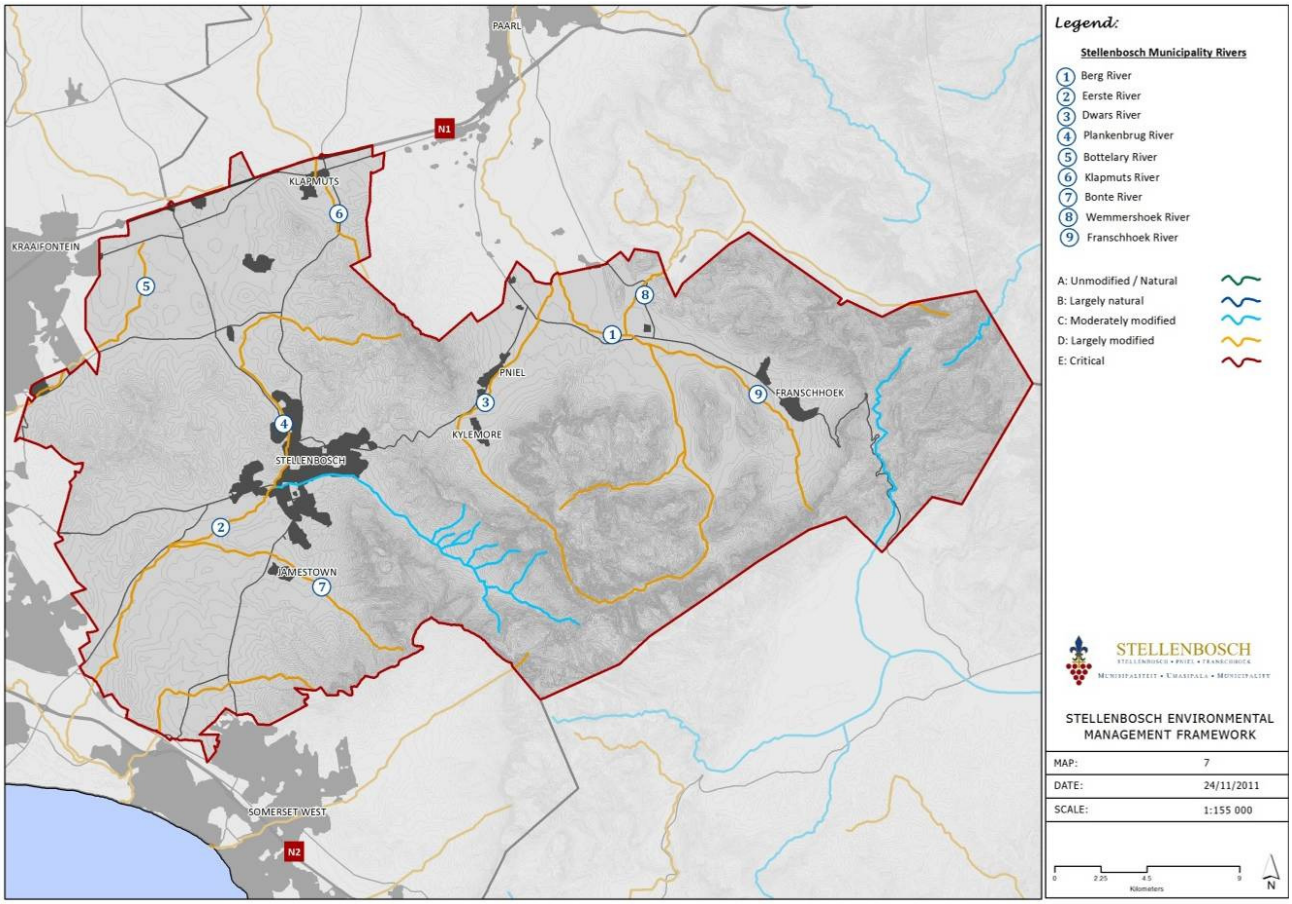


Figure B18: State of the rivers in Stellenbosch Municipality.

In general, there is a relatively close relationship between the condition of river buffer areas (the amount of natural vegetation remaining), the condition of the river itself and the presence of agriculture and/or towns along the river. More degraded rivers generally have less natural vegetation remaining in their river buffers, and rivers that are largely natural in their upper reaches become noticeably degraded once they enter agricultural areas or downstream of urban areas (SRK Consulting, 2011).

The rivers in the region are of immense conservation importance. This is largely due to their function as ecological corridors that link the various core conservation areas and provide for the migration species between habitats. Most of the rivers in the Municipality are under pressure from pollution and can present a serious health threat to the surrounding settlements. The following key factors have been identified:

[16] Defined in the National Freshwater Ecosystem Priority Areas Project (NFEPA) undertaken by SANBI and the CSIR.

a) Stormwater run-off from urban areas has a detrimental effect on water-quality, especially in areas where there is a lack of formal services.
b) There is a rapid expansion of inappropriate agricultural development in spite of the problems associated with manifesting climate change (e.g. crops with high water needs such fruit).
c) Demands for increased urban water supply by the Cape Metropolitan Area. There is a general sustained increased demand for water supply (from within and outside the City of Cape Town), and this could increase the demand for inter-catchment water transfers which have ecological effects.
d) Water quality and quantity in the Cape Winelands is being negatively affected by agricultural activities along certain rivers (e.g. Plankenbrug River), by increasing abstraction of surface and groundwater resources, infestation by alien vegetation that consumes high volumes of water, a general increase in the pollution of rivers (e.g. the Berg River and Plankenbrug River) due to factors such as storm water and wastewater discharges, and by the effects of climate change that are reducing river flow in the area. This has a significant ecological effect and the delivery of goods and services by the rivers in the area is decreased.

B7.3 AIR QUALITY

a) There is a general trend towards increased industrial emissions (including those from brickworks), an increase in the application of agrochemicals including pesticides (including occasional aerial spraying due to rapid expansion of agricultural development) and increased greenhouse gas and particulate emissions from the increasing incidence of veld fries in the region and the burning of crop residues. In addition, potentially hazardous chemicals are emitted from the burning of materials such as tyres, in vineyards.
b) Many households are still dependent on wood and paraffin for heating and cooking and these fuels emit volatile organic compounds, nitrogen oxide and particulate matter.
c) Some of these conditions could be exacerbated by climate change, due to an increase in the number of days on which temperature inversions occur and the resulting entrapment of air pollution at low levels in the atmosphere with risks to health and the environment. An increased incidence of berg wind conditions could also result in more frequent wild fires.

B7.4 LAND AND SOIL

a) Salination of soils has occurred in some areas, in particular along the Berg River as a result of poor agricultural practices.
b) In many other areas, soils and surface and ground water are being contaminated by irrigation with untreated winery and industrial effluent (wine and other industries), by substandard releases from waste water treatment works, leachate from poorly designed and operated landfill sites, and poorly designed and maintained on-site domestic sanitation. The microbial life in the soil is significantly reduced by conventional agrochemical based agricultural practice, which is the most common form of farming in the Municipality.
c) Alien infestation in the catchments poses a serious threat to water and soil conservation.
d) High potential agricultural land is being lost to changes in land use.

SECTION C
ENVIRONMENTAL VISION, OBJECTIVES, POLICY AND STRATEGIES

SECTION C: ENVIRONMENTAL MANAGEMENT VISION AND DIRECTIVES

SECTION SYNOPSIS

Section C addresses the environmental management challenges of Stellenbosch Municipality under the four systems of the sustainability approach advocated by the NSSD1. These systems are the:

- Economic system;
- Socio-political system; and the,
- Ecosystem which are embedded within each other, and integrated through the,
- Governance system that holds all together in a legitimate regulatory framework.

The SEMF considers the Stellenbosch Environment as the *aggregate of all external conditions and influences affecting the life of an organism. In particular, 'environment' refers to the surroundings within which humans exist and that are made up of:*

a) the land, water and atmosphere of the earth;
b) micro-organisms, plant and animal life;
c) any part or combination of (a) and (b) and the interrelationships among and between them; and
d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

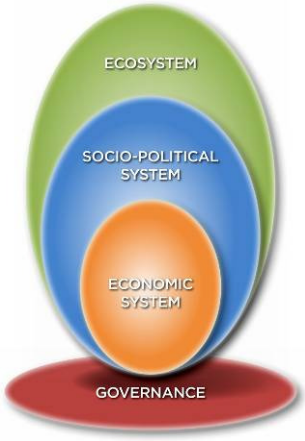


Figure C1: Systems applicable to the SEMF.

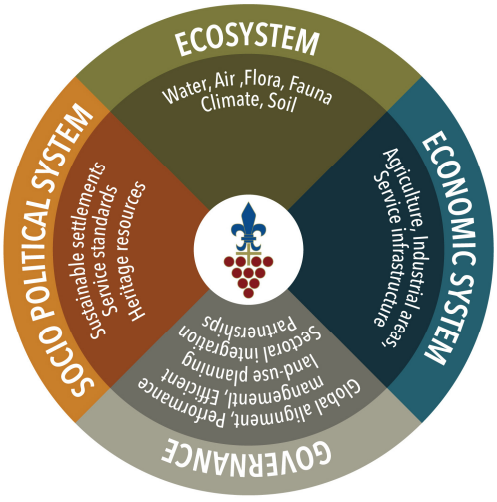


Figure C2: Systems and their components addressed in Section C.

Figure C2 summarises the various systems and their parts relevant to the Municipality. The SEMF was prepared in context of and in compliance with the guidelines put forward by SANS ISO 14004:1996(E). It thus incorporates all phases of the environmental governance process as presented by the SANS model (refer to Figure C3).

Figure C3: Dimensions of environmental governance embodied in the SEMF.

Chapters C3 to C9 collectively address the key aspects, sectoral issues and interventions through which the environmental vision for Stellenbosch Municipality (as illustrated by Plan C1) is to be manifested. Figure C4 illustrates the structure and content of the chapters of Section C.

Figure C4: Structure and content of Section C.

The strategies and projects listed in Chapters C3 to C9 have been prioritised in terms of the following criteria and principles:

a) Need and desirability and potential contribution of the strategy or project to the enhancement environmental integrity.
b) IDP and SDF status of the proposed intervention or strategy.
c) Input received from stakeholders.

The prioritisation provides for 3-5 year capital expenditure programs that inform the annual capital and operations budget allocations of the Municipality. Accordingly, the following criteria apply:

- High priority implies immediate implementation (i.e. within 1 to 3 years).
- Medium Priority implies implementation within 4 to 6 years.
- Low Priority implies implementation within 7 to 10 years.

The application of the above criteria and principles largely negates the possibility of subjective prioritisation. The priority ratings presented in Chapters C3 to C9 are subject to annual revision in accordance with the principles and guidelines for *institutional integration*, *integrated development planning* and *co-operative governance* cited in Chapter C9.3.

CHAPTER C1 LAND-USE PLANNING DIRECTIVES

C1.1 OBJECTIVES

The key objectives of the SEMF as it relates to municipal planning are to integrate and standardise planning within the Municipality with specific reference to the following:

a) Supporting the municipal departments in preparing their sectoral plans and strategies. Specific reference is made to:
   (i) Facilitating the land-use classification of the entire Municipality in a standard format in accordance with a set of dedicated Spatial Planning Categories (SPCs).
   (ii) Providing a reliable and defensible environmental framework for the preparation of sectoral plans and strategies.

b) Guiding the investment of public resources through the following:
   (i) Providing a credible environmental context for public investment.
   (ii) Providing certainty to all stakeholders regarding environmental implications of future development in the Municipality.
   (iii) Providing a basis for co-ordinated decision-making and policy-formulation regarding future land-use.

c) Facilitating cross-boundary co-operation and co-ordination between Stellenbosch Municipality and adjoining municipalities as it relates to issues that are of mutual interest for their respective areas of jurisdiction (refer to *inter alia* issues pertaining to land-use, biodiversity conservation and resource utilisation).

C1.2 SPATIAL PLANNING CATEGORIES

In order to give effect to the conceptual spatial vision cited in Chapter C1 a composite plan was prepared for the Municipality in accordance with six SPCs. These SPCs collectively illustrate the desired matrix of land-uses throughout the Municipality. The SPCs adopted are those presented in the Western Cape Bioregional Planning Policy (PGWC, 2003).

Figure C5: Spatial Planning Categories applicable to the SEMF.

The land-use classification is based upon UNESCO's biosphere reserve zoning model as advocated by the MaB Program[15]. South Africa's endorsement of the MaB Program implies that the said model should logically be applied. The model provides for three broad land-use categories, i.e. a core conservation area (SPC A), a conservation-focussed buffer area (SPC B) and a transition area (SPC C-F).

[15] MaB is a global programme of international scientific co-operation, dealing with people-environment interactions over the entire realm of bioclimatic and geographic situations of the biosphere.

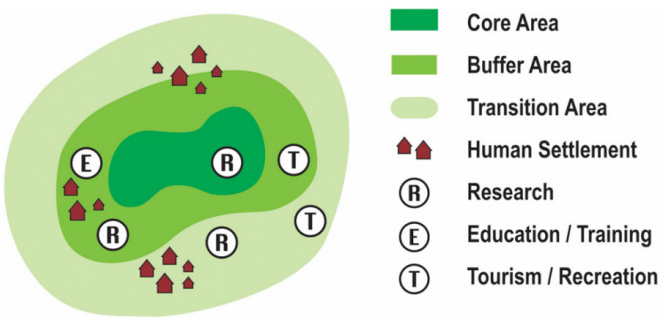


Figure C6: Land-use classification model adopted for Stellenbosch Municipality.

A comprehensive set of Sub-Categories has been created to serve as a guide for more detailed land-use planning as required for the SDF (refer to Figure C7). Toolkit D1 provides a summary of how the SPCs are to be applied in the SDF planning process. The sub-categories may be refined as required to address site-specific needs of the Municipality.

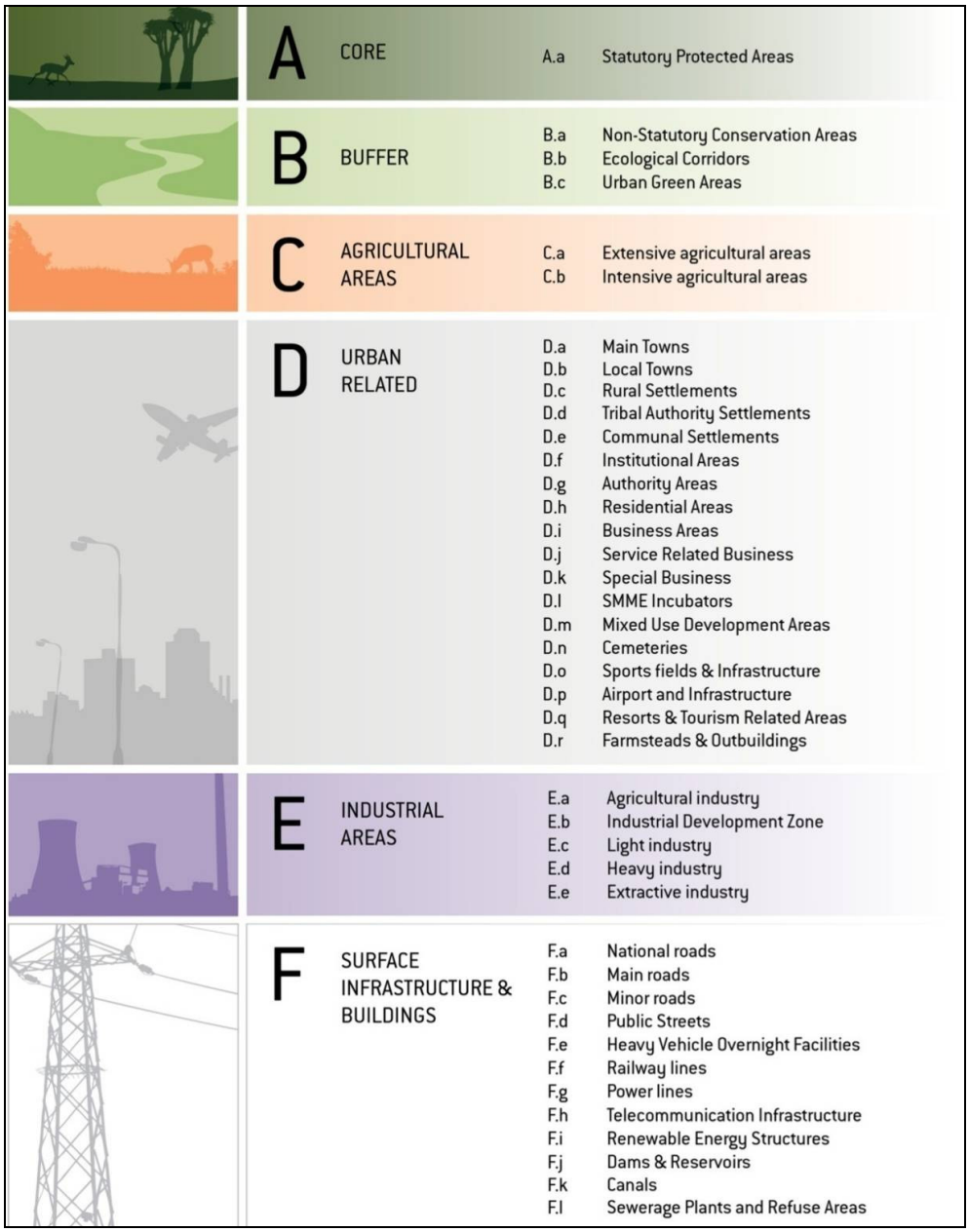


Figure C7: Spatial Planning Categories and Sub-categories applicable in Stellenbosch Municipality.

C1.3 POLICY

The following policy guidelines apply:

a) Land-use planning (e.g. the drafting of the SDF) must be undertaken in terms of the spatial planning principles cited in Chapter A6.

b) Detailed land-use planning is to be undertaken in accordance with the guidelines presented in the SEMF.

c) The SEMF does not create, or take away, land-use rights. However, any land-use amendment has to conform to the SEMF.

d) The SEMF is to be applied in a flexible and pragmatic manner that promotes a developmental state and which takes into account the merits and particular circumstances of each case as required by law (i.e. through an Environmental Impact Assessment [EIA] undertaken in terms of the National Environmental Management Act 107 of 1998 [NEMA]).

e) No land-use changes may be approved until the parameters of the SPCs applicable to the subject area have been verified and ground-truthed through a detailed site analysis. This is to be undertaken by the proponent of the land-use change.

f) The SPC designation illustrated by the municipal SDFs must be used as a criterion for evaluation of rezoning and development applications. In the case where an application is inconsistent with relevant SPC, or where it implies a change of SPC designation, the onus will be on the applicant to prove that the proposed change is desirable and that it will not have a significant detrimental impact on the environment.

C1.4 A SPATIAL PLANNING INFORMATION SYSTEM

A key dimension of environmental and land-use management as contemplated by the SEMF is a well maintained spatial planning information system. The purpose of the latter is to facilitate land-use planning and governance throughout the Municipality in terms of standard formats and procedures. The spatial planning information system is an information system comprising an integrated set of components for collecting, storing and processing data and for delivering information, knowledge and digital products. It combines hardware, software, infrastructure and trained personnel organised to facilitate effective land-use planning throughout the Municipality through the implementation of the SPCs and Sub-Categories. The implementation of GIS software will ensure geo-referencing, standardisation and coordination of spatial data in digital format.

Relevant NDP Directive

The development of a national spatial framework, as well as ongoing spatial management, must be supported by integrated national system of spatial data infrastructure. A key objective is the creation of a national observatory for spatial data assembly and analysis. This observatory would be informed by the success and experience of other observatories internationally, and at provincial and city-region scale in South Africa. It would collect, continually update and analyse data and other information relevant to spatial planning.

Policy directives in respect of a spatial planning information system is as follow:

a) A spatial planning information system must be implemented as part of the SDF, the SEMF and all other municipal policy.

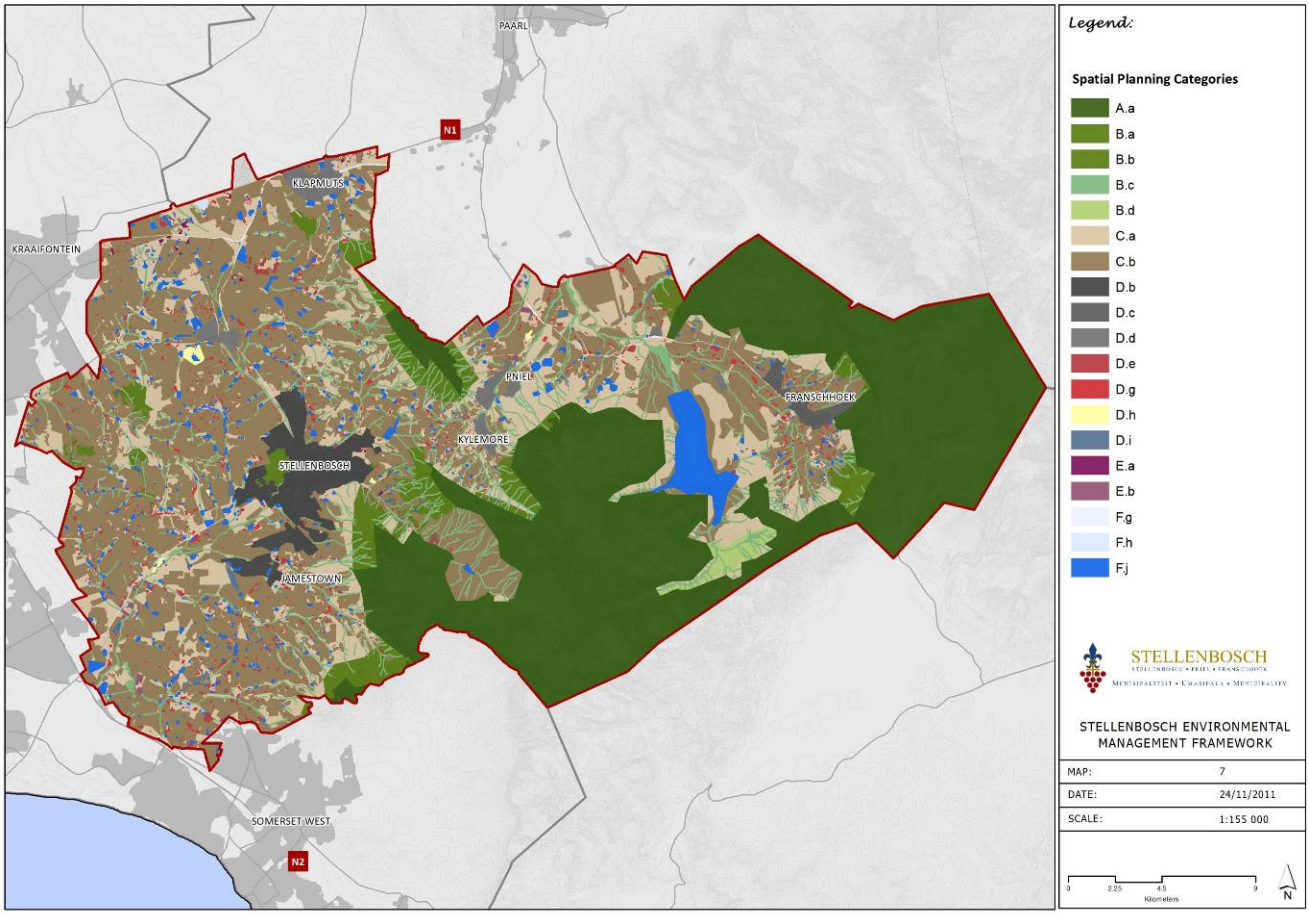
b) To ensure effective functioning of the spatial planning information system data must be exchangeable throughout the various departments of the municipality.

c) The spatial planning information system should conform to the following requirements:
   (i) Providing information that is easy to use and maintain.

(ii) Providing fast, but accurate results.
(iii) Centralising and standardising applications and procedures.
(iv) Aligning applications and procedures with the SPCs and Sub-Categories.
(v) Providing municipal departments with shared access to the same up-to-date data.
(vi) Providing an improved service to the community.
(vii) Serving public interest by making relevant information accessible.

C1.5 COMPOSITE SPATIAL PLAN FOR STELLENBOSCH MUNICIPALITY

The SPCs were used to draft a spatial environmental vision for Stellenbosch Municipality (refer to Plan C1). This plan serves as a first level broad guide to environmental management, spatial planning, and land-use throughout the Municipality. Essentially the purpose of the SEMF is to help create an environment that is conducive to economic, social and ecological sustainability.



Plan C1: Stellenbosch Municipality Composite Spatial Plan.

CHAPTER C2 CREATING A BIOREGIONAL PLANNING AND MANAGEMENT FRAMEWORK

C2.1 POLICY CONTEXT

In the *Manual for the Application of Bioregional Planning in the Western Cape* (PGWC, 2003) the institutional responsibility for the delimitation of bioregional planning units at the district and the local level is described as follows:

a) District Level: District Municipalities are *inter alia* responsible for detailed delimitation of bioregions, preparation of a district-wide land-use classification plan in accordance with a set of primary Spatial Planning Categories, and the formulation of strategies for sustainable development and land management in the district as a whole. In addition, they are to manage the relationship between local municipalities to ensure the integrated management of bioregions (in this regard, specific reference is made to areas where the municipal boundaries do not correspond with bioregional parameters, giving rise to overlapping and necessitating close co-operation between the relevant local municipalities).

b) Local Level Local municipalities are to delimit wards that comply with bioregional parameters as fine-grain planning units ensuring constructive community participation, undertake detailed land-use classification in accordance with the *Spatial Planning Categories* and *Sub-Categories*, formulate and implement detailed sustainable development and conservation strategies and projects, and establish sustainable public-private partnerships by making use of Special Management Areas.

C2.2 BIOREGIONAL PLANNING UNITS APPLICABLE TO STELLENBOSCH MUNICIPALITY

A key aspect of bioregional planning and management is the delimitation of the various planning units that incorporate and influence the planning area and *vice versa*. In terms of the *Western Cape Bioregional Planning Policy* the following units are to be defined and management strategies formulated to facilitate their integrated management:

- Bioregions
- Wards that correspond with bioregional parameters

The objectives of the delimitation of bioregional planning units are to:

- Achieve holistic integrated planning, i.e. ensure that all aspects that may have an influence on the planning area are addressed in the SDF.
- Identify areas of co-operation between municipalities (i.e. overlapping areas where municipal boundaries do not correspond with bioregional parameters) in order to achieve holistic integrated planning.

Miller (1996) defines a bioregion as a '*geographical space that contains one whole or several nested ecosystems characterized by landforms, vegetative cover, human culture and history as identified by local communities, governments and scientists'.* The IUCN describes a bioregion as a *'land and water territory, the limits of which are not defined by political parameters but by the geographical boundaries of human communities and ecological systems.*'

In municipal planning terms the bioregion is viewed as a regional planning unit that can be supra- or sub-municipal or more-or-less at the municipal level and, as such, is not in conflict with administrative boundaries, but supplementary thereto. With regard to its role in the planning

process it is important to recognise that the bioregion is but one layer in a system of planning units required for coherent and integrated planning. Places manifest themselves on various environmental levels. The bioregion is an effective planning unit for integrated planning on the level of the region, district and greater municipal area and provides an effective intermediate framework to co-ordinate planning on other scales. The bioregion is one layer in a system of planning units used for coherent and integrated planning. It is an effective planning unit for integrated planning on the level of the district and greater municipal area, and provides an effective intermediate framework to co-ordinate planning between the various spheres of government.

C2.2.1 CAPE WINELANDS BIOREGION

The *Bioregional Planning Framework* provides a conceptual bioregional plan. The purpose of the latter plan is to provide authorities and planners with a framework for more detailed bioregional delimitation. This plan was used as a basis for the delimitation of the Cape Winelands Bioregion and its component wards that comply with bioregional parameters.

C2.2.2 WARDS THAT COMPLY WITH BIOREGIONAL PARAMETERS

A challenge facing the Municipality is to ensure that the future management of its natural environment is undertaken in a manner that promotes enthusiastic and effective participation and support of those people that are directly affected by the land-use and status of the environment. A decisively important aspect in this regard is to ensure that the physical scale of the planning area (*or area of influence*) is such that the residents of that area would identify with it to the extent that they are encouraged to actively take part in its planning and management.

Ideally the municipal wards should provide the basis for effective community participation. However, in many instances the wards have been demarcated in a manner that does not promote enthusiastic community participation and representation[16].

C2.3 OBJECTIVES

The key objectives of bioregional planning are to:

a) Ensure an integrated approach to the planning and management of land resources. The broad objective is to facilitate the allocation of land-uses that provide the greatest sustainable benefits and to promote sustainable and integrated management of resources. Environmental, social and economic issues should be taken into consideration.

b) Promote sustainable human settlement development. This implies *inter alia* the following:
   (i) Providing adequate shelter for all, especially rapidly growing populations.
   (ii) Improving human settlement management to ensure sustainability of all urban settlements.

[16] Moughtin (1997) states that the delimitation of *neighbourhoods, districts, etc.* is essential for achieving sustainable development. *'This process of the division of the settlements is most effective in promoting sustainable development when these divisions of the settlements are legitimised politically and when their elected councillors are given a mandate to protect and enhance the quality of the local environment'* (Moughtin, 1997). It is suggested that the latter view be considered against the background of the objectives of both the Municipal Structures Act and the Municipal Demarcation Act, particularly with regard to the role wards and ward councillors and ward committees can play in the future.

(iii) Promoting sustainable land-use through environmentally sound planning and management.

(iv) Promoting the integrated provision of services such as water, sewage, stormwater and solid waste management.

d) Integrating environmental and developmental concerns in decision-making. Stellenbosch Municipality cannot afford to make decisions concerning developmental issues without taking the environment into account. Changes are needed in the institutional structures of the Municipality to enable more systemic consideration of the environment when decisions are made on, amongst others, land-use, conservation, economic, social, agricultural, transportation and other policies.

e) Establishing systems for integrated environmental management and auditing. This includes the use of Integrated Environmental Management (IEM) procedures, include the implementation of environmental management systems, monitoring and auditing in all development and conservation initiatives.

C2.4 POLICY

The policy directives as it relates to bioregional planning and management are as follows:

a) The Municipality has adopted bioregional planning as a guiding overarching framework for land-ue planning and management[17]. Accordingly, the IDP and the SDF in particular, must give effect to the approach.

b) The Municipality will give effect to bioregional planning and management as is stipulated in the inter-governmental agreement regarding the Cape Winelands Biosphere Reserve.

c) The Municipality will create the capacity and spatial planning mechanisms (as part of the SDF) to give effect to the key dimensions of bioregional planning.

d) Boundaries of municipal wards should, as far as possible, be aligned with those of bioregional units (e.g. wards that comply with bioregional parameters).

C2.5 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C2.5(a)	Strengthen institutional capacity and capability to integrate social, economic and environmental issues at all levels of developmental decision-making and implementation. Attention should be given to moving away from narrow sectoral approaches and progressing towards full cross-sectoral co-ordination, co-operation and integration. This implies the following: a) Integrating environment and development at the policy, planning and management levels, with the objective of improving the decision-making process. b) Making effective use of economic instruments and other	High/On-going

[17] The 2004 IDP provided the following directives regarding the approach and process to be followed in the preparation of the Stellenbosch SDF and the future management of the Municipality:

a) Foster and promote the principles of sustainable development and bioregional planning (Greater Stellenbosch IDP, Section 6.3).

b) Incorporate the principles of the IDF of the former Winelands District Council into the Stellenbosch SDF and implement it as a matter of urgency (Greater Stellenbosch IDP, Section 7.13).

	incentives, by: (i) Incorporating environmental costs into the decisions of producers and consumers and not passing these costs onto society in general or to future generations. (ii) Moving towards integrating social and environmental costs into economic activities so that prices will appropriately reflect the relative scarcity and total value of resources (water and electricity as examples) and contribute to the prevention of environmental degradation. c) Decisions must be based on an assessment of the full social and environmental costs and benefits of policies, plans, programs, projects and activities that impact on the environment.	
C2.5(b)	Interrogate, as part of the revision of the SDF, the boundaries of the bioregional components, including wards that comply with bioregional parameters.	High

CHAPTER C3 MANAGING STELLENBOSCH MUNICIPALITY AS PART OF THE GLOBAL BIOSPHERE

C3.1 GIVING EFFECT TO INTERNATIONAL OBLIGATIONS

There is an increasing global awareness against economic growth at the expense of the natural environment. United Nations organisations such as UNEP[18] and UNESCO[19], and international conservation bodies such as the IUCN[20], WRI[21], and WWF[22] plead for national and regional development policies and strategies that can facilitate sustainable development. In the *World Conservation Strateg,* sustainable development is considered to be a set of tools and strategies which respond to five broad requirements, namely:

a) Integration of conservation with development.
b) Satisfaction of basic human needs.
c) Achievement of equity and justice.
d) Provision of social self-determination and cultural diversity.
e) Maintenance of ecological integrity.

Sustainable development will not be achieved by only conserving natural areas. The *Global Biodiversity Strategy* (IUCN/UNEP/WWF) states that conservation strategies must be aimed at accommodating cultural, economic and political circumstances at local and regional spheres. Such strategies must *inter alia* be aimed at improving the well-being of local and regional communities through the implementation of conservation strategies.

[18] United Nations Environmental Program.
[19] United Nations Educational, Scientific and Cultural Organisation.
[20] International Union for the Conservation of Nature.
[21] World Resources Institute.
[22] World Wide Fund for Nature.

Relevant NDP Directive

In order for South Africa to achieve its national goals of eradicating poverty, lowering inequality, creating jobs and making the transition to a resilient low-carbon economy, foreign relations must be driven by the country's domestic economic, political and social demands, as well as its regional, continental and global obligations. South Africa needs to identify potential synergies between countries and support programs that take advantage of complementary human and natural endowments to promote development and built resilience to natural disasters. On the basis of our identity as an African country, South Africa's foreign policy should be driven by a clear and critical understanding of our national, regional and continental priorities in a multi-polar world where the geo-strategic politics of the continent is, once again, becoming increasingly central to global political economic competition for natural resources and market share.

The South African Government is a signatory to a number of international protocols, conventions and agreements pertaining to the above aspects. Consequently, all spheres of government are obliged to adopt and give effect to these protocols, conventions and agreements.

C3.1.1 OBJECTIVES

The key objectives are to:

a) Give effect to the international sustainability obligations placed on Stellenbosch Municipality by virtue of the protocols, conventions and agreements endorsed by the South African Government on behalf of the country.
b) Assist all concerned in managing the Cape Winelands Biosphere Reserve and developing it into an international model.
c) Obtain the highest international recognition for globally-unique natural manifestations in the Municipality.
d) Implement and reap the benefit vested in international programs promoting environmental sustainability through integrated land-use planning.
e) Adopt a global program of international scientific co-operation dealing with people-environment interactions over the entire realm of bioclimatic and geographic situations of the biosphere.
f) Create a efficient premise for joint research, information management and investment facilitation between Stellenbosch Municipality, Stellenbosch University, and other similar institutions.

C3.1.2 POLICY

a) Stellenbosch Municipality is not an 'island' isolated from its surroundings – it is an integral part of the global biosphere of which the cultural, social and economic functions are uniquely interdependent. The status of Stellenbosch Municipality as a unique entity is to be enhanced and maintained through efficient land-use management as provided for in this SEMF.
b) Compliance with the strategies listed in Chapter C3.1.3 is mandatory and is to be given effect through the SDF and IDP. In particular, effect is to be given to the United Nations' Sustainable Development Goals (referred to as the Global SDGs) adopted in September 2016 as part of the Paris Accord (refer to Figure C8 below):
c) Stellenbosch Municipality supports and strives to give effect to the protocols, agreements and conventions listed below:
    (i) United Nations Paris Accord.

(ii) Rio +20 on Sustainable Development.
(iii) Agenda 21.
(iv) Local Agenda 21.
(v) UNESCO's World Heritage Convention.
(vi) Convention on Biological Diversity.
(vii) United Nations Framework Convention on Climate Change.
(viii) Kyoto Protocol on Climate Change.
(ix) Ramsar Convention.

d) Stellenbosch Municipality supports and gives effect to the ideals of Agenda 21 pertaining to the promotion of sustainable agriculture and rural development. In the *United Nations' Document on Sustainable Development*[23] it is stated that major adjustments are needed in agricultural, environmental and macro-economic policy, at both the national and the international level to create the conditions for *Sustainable Agriculture and Rural Development* (SARD)[24].

The vital importance of sustainable development for the immediate and long-term wellbeing of the globe and its inhabitant human, faunal and floral communities and for the supporting ecosystems has been reiterated and confirmed by the adoption of the Global SDGs by the United Nations on 25 September 2015. South Africa, as a member of the United Nations, is obliged and committed to giving practical effect to the relevant 17 SDGs illustrated by the figure below.

Figure C8: Sustainable Development Goals (UN: 25/09/2015)

23 http://www.un.org/esa/sustdev/agenda21chapter14

24 The United Nations' Document on Sustainable Development states that the priority must be on maintaining and improving the capacity of the higher potential agricultural lands to support an expanding population. However, conserving and rehabilitating the natural resources on lower potential lands in order to maintain sustainable human/land ratios is also necessary.

SEMF and the MaB Program

The over-arching goal of the SEMF is to promote sustainability throughout Stellenbosch Municipality. It is generally accepted that UNESCO's MaB Program provides an ideal framework for achieving this objective. The MaB Program is a global program of international scientific co-operation, dealing with people-environment interactions over the entire realm of bioclimatic and geographic situations of the biosphere. It was designed to solve practical problems of resource management, and aims to fill gaps in the understanding of the structure and function of ecosystems, and of the impact of different types of human interaction.

C3.1.3 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C3.1.3(a)	Implement UNESCO Man and Biosphere (MaB) Program[25] as an overarching strategy to give effect to the policy cited under Chapter C3.1.2 with specific reference to the implementation of international protocols, agreements and conventions and, in particular the Cape Winelands Biosphere Reserve intergovernmental agreement.	High
C3.1.3(b)	Prepare and implement a comprehensive climate neutrality strategy that is to be implemented through all development projects.	"
C3.1.3(c)	Under the auspices of the Cape Winelands Biosphere Reserve and UNESCO's MaB Program, apply for the support of the institutions associated with the Program, including the following: a) Conservation International. b) Development Bank of Southern Africa. c) Global Environmental Facility. d) International Union for the Conservation of Nature. e) Smithsonian Institute. f) Third World Academy of Sciences. g) World Bank. h) World Resources Institute. i) World Wide Fund for Nature.	"
C3.2.3(e)	Comply with and give effect to the intergovernmental and international agreement pertaining to the Cape Winelands Biosphere Reserve with specific reference to the following terms of agreement: a) Conservation (contributing to the conservation of landscapes, ecosystems, species and genetic variation). b) Development (fostering economic and human development, which is socio-culturally and ecologically sustainable). c) Logistical support (supporting demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global	High

[25] The over-arching goal of the SEMF is to promote environmental sustainability throughout Stellenbosch Municipality. It is generally accepted that UNESCO's MaB Programme provides an ideal framework for achieving this objective.

	issues of conservation and sustainable development). d) Implementation of bioregional planning and management in all projects. e) Promotion of UNESCO's MaB Program (fostering sustainable economic and human development and environmental conservation).	

CHAPTER C4 MANAGING SPC A AND SPC B AREAS: THE NATURAL ENVIRONMENT

In meeting its international obligations of the Rio Summit of the United Nations (refer to Agenda 21) the South African government is required to develop national strategies, plans or programs, or adapt existing ones, to integrate the conservation and sustainable use of biodiversity into sectoral and cross-sectoral plans, programs and policies. To this end the Government has published the White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (Government Gazette No. 1095 of 1997) and promulgated NEMA (Act 107 of 1998). These provide for the conservation and sustainable use of the country's rich biological diversity. Of particular relevance are the following aims of the Biodiversity Policy:

(a) Conserve the diversity of landscapes, ecosystems, habitats, communities, populations, species and genes in South Africa, through the following:
  (i) Establishing and managing a representative and effective system of protected areas.
  (ii) Promoting environmentally sound and sustainable development in areas adjacent to, or within, protected areas with a view to furthering protection of these areas.

(b) Use biological resources sustainably and minimise adverse impacts on biological diversity by integrating biodiversity considerations into land-use planning procedures and environmental assessments.

Relevant NDP Directive

The biodiversity and ecosystems in conservation areas are national assets. Long-term planning to promote biodiversity and the conservation and rehabilitation of natural assets is critical, and should be complemented by a strategy for assessing the environmental impact of new developments as an important component of overall development and spatial planning.

A rational and consolidated system of formally protected areas is essential to ensure effective conservation of biodiversity. Current trends indicate that a systems approach to conservation is more effective than designing conservation efforts around protecting individual species (DEAT, 2001). Such an approach is effective if the designated protected areas are located in areas that contribute to the representation of the local/regional biodiversity (Margules and Pressey, 2000). In South Africa the existing protected area system poorly represents biodiversity patterns and processes. As many as 50 of South Africa's 68 vegetation types are less than 10% conserved.

Natural biodiversity[26] is essential to human survival. On the genetic level, for example, biodiversity underpins the development of cultivated food crops varieties and animal breeds. Many of Stellenbosch Municipality's people have livelihoods dependent on direct use of species, including the gathering, harvesting or hunting of animals and plants for food, medicine, shelter, fuel and

[26] The Convention on Biological Diversity defines biodiversity as *the variability among living organisms from all sources including terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within, and between, species and of ecosystems.*

fibre (Wynberg, 2002). Ecosystem services such as the maintenance of soil fertility, climate regulation and natural pest control, as well as intangible benefits such as aesthetic and cultural values, all support human activity and sustain human life (Chapin et al, 2002). Biodiversity provides a variety of environmental services, including the regulation of the gaseous composition of the atmosphere, regulation of the hydrological cycle and climate, generation and conservation of fertile soils, dispersal and breakdown of wastes, pollination of many crops, and absorption of pollutants. Biodiversity is no longer an issue confined to conservation and wildlife proponents, rather its importance to farmers, to indigenous people and their livelihoods, to human rights, political dispensations, and global trade issues (CSIR, 2004).

Ecosystem management, like sustainability, also reflects the holistic philosophy of ecological science. Ecosystem management is an attempt to manage entire ecological systems rather than individual and fragmented components. *No environmental factor in an ecological system operates in isolation. And because the environment is holocoenotic and undergoing changes day to day, season to season and year to year and because a change in one factor affects the rates of others and the rates of all life processes, ecological systems are not to be understood by the study of each factor, process or condition separately* (Wolfe, 1970).

Humans are an integral part of today's ecosystems and depend on natural ecosystems for survival and welfare. Ecosystems must therefore be sustained for the long-term well-being of humans and other forms of live. Human intervention should not impact on the sustainability of ecosystems by destroying or significantly degrading components that affect the capabilities of the ecosystem. The cumulative effects of human influences, including the production of commodities and services, should therefore maintain resilient ecosystems that are capable of returning to the natural range of variability when left alone. Management activities should therefore conserve or restore natural ecosystem disturbance patterns (Kaufman, M.R. *et al,* 1994).

Holistic management of ecological systems acknowledges man, and habitats of humanity, as being integral components of ecological systems. Aldo Leopold states '*when we see the land as a community to which we belong, we may begin to use it with love and respect*'. This reflects the significant difference between a <u>man in nature</u> versus a <u>man and nature</u> philosophy. To achieve sustainability the municipality must have resource management policies and implementation strategies, which promote economic, environmental and social equitability across generations. Holistic ecosystem management requires management of entire ecosystems at a geographic scale of watersheds and river basins and integrated management of public and private lands.

The principles summarised below can contribute to the achievement of the preservation, protection, and/or restoration of the integrity of an ecosystem while maintaining sustainable societies and economies:

a) <u>Multiple boundaries and scale</u>: Ecosystems do not have permanent or absolute boundaries. Rather, multiple factors considered in multiple boundaries are necessary for ecosystem management.
b) <u>Natural resources, biodiversity, and conservation biology</u>: It is imperative that the Municipality work to restore and/or maintain biological diversity (species, genetic and ecosystem) and the ecological patterns and processes that maintain that diversity.
c) <u>Natural resources and traditions</u>: This entails preserving and maintaining significant resources and advocating or assisting others to protect important archaeological, historical, and ethnographic resources in their historic contest.

d) Social, cultural, economic and political factors: The resources of the natural environment/conserved areas are not separate and removed from society, but are an integral part of thereof. Social, economic, and political reality must be understood by environmental/conservation managers. Economic and social needs of surrounding communities may be supported without compromising conservation values.

e) Information management/scientific basis for decisions: Management decisions should be grounded in the best scientific natural, cultural, economic, and social data available in order to gauge effectively the full impact of policy alternatives and to help choose the course of action that will best achieve ecosystem management goals.

f) Partnerships: Ecosystem management is best understood as shared responsibility, and the Municipality should collaborate, communicate, cooperate and coordinate with partners (Toolkit D2 provides guidelines for community-based environmental governance).

g) Interdisciplinary approach to management: Rather than separating employees by discipline, varied disciplines should work together in teams toward specific objectives.

h) Long-term ecosystem management focus: Managers of resources common to an ecosystem should cooperatively develop a long-term ecosystem vision and specific management objectives in conjunction with partners.

i) Adaptive and flexible management: Ecosystem management can be best served by allowing innovative management approaches to be tailored to specific ecosystems.

Ecosystem services are the processes and conditions of natural ecosystems that support human activity and sustain human life. They encompass all the benefits that we derive both directly and indirectly from the functioning of ecosystems.

An ecosystem approach is widely recognised as a valuable way to analyse the relationship between people and the environment and for this reason has been endorsed by the Convention on Biological Diversity (CBD, 1992). The CBD describes the ecosystem approach as '*a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way - humans, with their cultural diversity, are an integral component of many ecosystems'* (Millennium Ecosystem Assessment {MEA}, 2003). It therefore provides a useful framework to conceptualise the link between wellbeing and the natural environment. It also enables a better grasp of living within environmental limits, which describes the limits of the planet's environment, resources and biodiversity (Defra, 2005). The fact that 60% of the world's ecosystems services are being degraded and used unsustainably and presents significant challenges to maintaining the wellbeing of current population and future generations (MEA, 2003). MEA categorises ecosystem services into four types namely:

- Provisioning services: the products obtained from ecosystems including food, fresh water, fuelwood, fibre, biochemicals and genetic resources.
- Regulating services: the benefits obtained from regulation of ecosystem processes such as air quality maintenance, climate regulation, erosion control, disease regulation, water regulation, water purification, storm protection and pollination.
- Cultural services: the nonmaterial benefits obtained from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences. This covers the role that ecosystems play in contributing to cultural diversity, spiritual and religious values, knowledge systems, educational values, social relations, inspiration, aesthetic values, sense of place, cultural heritage values, recreation and ecotourism.
- Supporting services: the services necessary for the production of all other ecosystem services such as soil formation, nutrient cycling and primary production. They differ from the other three types of services because their impacts on people are either indirect or

occur over long period of time. The other categories in comparison have relatively direct and short-term impacts on people.

The ability of the ecosystem to provide services on a sustainable basis is directly dependent on the health of the ecosystem. The ecosystem services provided by the natural systems of Stellenbosch Municipality include:

a) Biodiversity:
   (i) Pollination of crops and natural vegetation, from which humans derive fruits and other foods.
   (ii) Provision of useful species for beneficial uses such as flower harvesting, wood for fuel, food, medicines.
   (iii) Cycling and movement of nutrients, soil stability and soil carbon storage, providing fertile and non-eroding soils and the potential fro carbon trading.
   (iv) Control of vast majority of potential agricultural pests prevents loss of livelihood from damage of crops.
   (v) Climate stabilisation and moderation of weather extremes and their impacts, providing liveable climates.
   (vi) The provision of aesthetic beauty and intellectual stimulation in a place that tourists want to visit.

b) Water:
   (i) Purification of water and attenuation of floods by wetlands.
   (ii) Supply of water by rivers and from ground water for drinking, irrigation and manufacture of products.
   (iii) Breakdown or dilution of waste in rivers.
   (iv) Provision, by rivers and freshwater bodies, if places of recreational, aesthetic, spiritual or religious value.

c) Air (quality):
   (i) Provision of clean air that is beneficial for humans and the ecosystem, including the conversion of CO_2 to oxygen by plants through photosynthesis.

d) Land and soil:
   (i) Provision of nutrients, water and physical rooting support for agricultural crops.
   (ii) Provision of nutrients, water and physical rooting support for natural vegetation, as well as other roles that soil plays in natural ecosystem functioning, such as a medium for completion of insect life cycles.
   (iii) Role played in hydrology and water supply, which includes infiltration of precipitation, run-off control and recharge of groundwater.
   (iv) Attenuation of environmental pollution, which is a specific role of soil in land fills and land farming, but also more generally in attenuating the potential effects of air pollution on surface and groundwaters.
   (v) Provision of construction and road building material in the form of sand and laterite gravel that are sourced from the soil profile.

C4.1 SPC A: CORE CONSERVATION AREA

In Stellenbosch Municipality SPC A areas constitute sites of high conservation importance including terrestrial land, aquatic systems (rivers and wetlands). Due to their highly irreplaceable status such areas should be protected from change or restored to their former level of ecological functioning. SPC A areas are a natural resource (capital) of international, national and provincial significance within which the natural environment is able to provide a range of ecosystem services

essential for sustainable life of humans. The integrity of the SPC A areas is therefore an imperative for the long-term future of Stellenbosch Municipality.

The Core Area is considered the mainstay of the proclaimed Cape Floral Region Protected Areas World Heritage Site. The Boland Mountain Complex is acknowledged as the most important site in the Cape Floral Region in terms of floristic diversity and represents the highest concentration of threatened and locally endemic species (Indigenous Vegetation Consultancy *et al*, 2003).

C4.1.1 DESCRIPTION AND PURPOSE

CATEGORY A: CORE AREAS		
SUB-CATEGORY		**DESCRIPTION**
A.a	Statutory Protected Areas	Areas designated in terms of legislation for biodiversity conservation, defined categories of outdoor recreation and non-consumptive resource use. Conservation purposes are purposes normally or reasonably associated with the use of land for the protection of the natural and/or built environment, including the protection of the physical, ecological, cultural and historical characteristics of land against undesirable change.
A.a.1	Wilderness Areas (declared in terms of NEMPA[27] 57 of 2003)	Areas characterised by their intrinsically wild and pristine appearance and character, or that are capable of being restored to such, and which are undeveloped, without permanent improvements or human habitation. Such areas are declared to: a) protect and maintain the natural character of the environment, biodiversity resources, associated natural and cultural resources; b) provide environmental goods and services; c) provide outstanding opportunities for solitude and primitive outdoor experiences; and, d) provide controlled access to those who understand and appreciate wilderness, and those who wish to develop such an understanding.
A.a.2	Special Nature Reserves (declared in terms of NEMPA 57 of 2003)	Areas characterised by sensitive, ecologically outstanding ecosystems or natural habitats, natural communities, populations or species, or unique geological or biophysical features conserved primarily for scientific research, educational and limited nature-based recreational purposes.
A.a.3	National Parks (declared in terms of NEMPA 57 of 2003)	Designated to protect areas of national or international biodiversity importance; or containing a representative sample of South Africa's natural systems, scenic areas or cultural heritage sites; or the ecological integrity of one or more ecosystems. National parks provide spiritual, scientific, educational, recreational and tourism-related opportunities which are mutually and environmentally compatible and can contribute to local and regional economic development.
A.a.4	Nature Reserves, including provincial, local authority and registered private nature reserves (declared in terms of NEMPA 57 of 2003)	Areas of significant ecological, biophysical, historical, or archaeological interest or that are in need of long-term protection for the maintenance of its biodiversity or for the

[27] National Environmental Management: Protected Areas Act 57 of 2003.

	provision of environmental goods and services. Nature reserves are declared to: a) Supplement the systems of wilderness areas and national parks in South Africa; b) Sustainably provide natural products and services to local communities; c) Enable the continuation of traditional resource uses; and d) Provide nature-based recreational and tourism opportunities.
A.a.5	Protected Environments (declared in terms of NEMPA 57 of 2003) Areas may be declared as a protected environment to: a) Conserve the area as a buffer zone for the protection of a wilderness area, special natural reserve, national park, world heritage site or nature reserve. b) Enable owners of land to take collective action to conserve biodiversity on their land and to seek legal recognition for such actions. c) Protect the area if it is sensitive to development due to its – – Biological diversity; – Natural, cultural, historical, archaeological or geological value; – Scenic and landscape value; or – Provision of environmental goods and services. d) Protect a specific ecosystem outside of a wilderness area, special nature reserve, natural park, and world heritage site. e) Ensure that the use of natural resources is sustainable. f) Control change in land-use if the area is earmarked for declaration as, or inclusion in, a wilderness area, national park or nature reserve.
A.a.6	Forest Wilderness Areas / Forest Nature Reserves (in terms of Section 8[1] of National Forests Act 84 of 1998) Declared forest wilderness areas and forest nature reserves include: a) Natural forests, i.e. tract of indigenous trees whose crowns are largely contiguous and which comprise all other floral and faunal forest elements; b) Woodlands, i.e. a group of indigenous trees which are not a natural forest, but whose crowns cover more than 5% of the area bounded by the trees forming the perimeter of the group; and c) Natural habitats or ecosystem components.
A.a.8	World Heritage Sites (declared in terms of the World Heritage Convention Act 49 of 1999) Cultural[28] or natural[29] areas that has been: a) Included on the World Heritage List, or the tentative list of the Republic, and has been proclaimed as a World Heritage Site, or b) Proclaimed to be a special heritage site for management in accordance with the Act

[28] The *Convention Concerning the Protection of the World Cultural and Natural Heritage* defines cultural heritage which constitutes monuments, architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science, groups of buildings, groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science, sites, works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.

[29] Natural heritage is natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view, geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants, and natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or intrinsic beauty.

	(such areas cannot be referred to as a World Heritage Site).
A.a.9	Mountain Catchment Areas (declared in terms of the Mountain Catchment Areas Act 63 of 1970) Areas declared as mountain catchment areas that provide for the conservation, use, management and control of such land.

SOUTH AFRICA'S NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

To reinforce the protection of our natural heritage and in keeping with South Africa's commitments under the Convention on Biological Diversity, the National Biodiversity Strategy and Action Plan (NBSAP) was launched by the Department of Environmental Affairs which will guide South Africa's conservation and management of biodiversity and help to ensure sustainable and equitable benefits for all communities. The development and implementation of the NBSAP is an ongoing and iterative process.

The NBSAP and the National Biodiversity Framework (NBF) must be seen as a continual cycle of implementation, monitoring, review and revision. The significance of the NBSAP is that:

a) Biodiversity considerations are integrated into all other strategies and plans, such as poverty eradication strategies and development programs.
b) It will provide the road map for achieving the biodiversity related objectives contained the Johannesburg Plan of Implementation (2002)[30], such as reducing the rate of loss of biodiversity by 2010.
c) It will lay the groundwork for the National Biodiversity Framework (NBF) required in terms of Chapter 3 of the National Environmental Management: Biodiversity Act 10 of 2004.
d) It will further develop White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity, 1997 by translating policy goals into an implementation plan, with firm targets, clear roles and responsibilities, realistic timeframes and measurable indicators.

The strategic objectives of the NBSAP can be summarised as follows:

(i) An enabling framework integrates biodiversity into the socio-economy.
(ii) Biodiversity contributes to socio-economic development and sustainable livelihoods.
(iii) Biodiversity, including species, ecosystems and ecological processes, is effectively conserved across the landscape and seascape, with a focus on biodiversity priority areas.
(iv) South Africa's international obligations are met where feasible.
(v) A cross-cutting objective which relates to all the above objectives is: *Enhanced institutional effectiveness and efficiency ensures good governance in the biodiversity sector.*

The NBSAP states that '*planning frameworks at various levels – national, provincial and local – must take biodiversity into consideration in order to guide development. Provision is made in various pieces of legislation to encourage co-ordinated and integrated planning, but the legislation is still in the process of being implemented. For example, legislation administered by the Department of Land Affairs (DLA) and the Department of Provincial and Local Government (DPLG), requires provincial and local administrations to develop, with public consultation, economic development and spatial plans that integrate social, economic and environmental considerations*'.

This means that it is especially important that Provincial Growth and Development Strategies and Plans, and IDPs include biodiversity considerations in planning. Biodiversity must be integrated fully into the planning processes.

C4.1.2 OBJECTIVES

a) Create representative core conservation areas in all centres of endemism.
b) Facilitate SPC A status for all Critical Biodiversity Areas (CBAs) through innovative public-private partnerships.
c) Manage SPC A areas as:

[30] This Plan was agreed upon at the World Summit on Sustainable Development (WSSD) or Earth Summit 2002 that was held in Johannesburg from 26 August to 4 September 2002.

(i) Benchmarks ('a base-datum of normality or naturalness') or as standards for environmental health and self-sustaining ecosystems.
(ii) Secure refugia for source populations and biodiversity.
(iii) Sites where natural processes can continue without human interference.
(iv) Sites providing opportunities for solitude or primitive and unconfined types of recreation.
(v) Sites containing ecological, geological, or other features of scientific, educational, scenic, historical or cultural value.
(vi) Sites providing ecosystem functions, including the provision of clean water from catchments, serving as carbon sinks, etc.

C4.1.3 POLICY

a) South Africa's National Biodiversity Strategy and Action Plan will be complied with and given effect in all land-use management.
b) The highest statutory protection must be afforded to SPC A areas.
c) Only non-consumptive activities are permitted, for example, passive outdoor recreation and tourism, traditional ceremonies, research and environmental education.
d) Where such pristine areas are in state control they should be conserved in Provincial Nature Reserves (Category A.b), and if in private ownership they should be conserved in Special Management Areas (SMAs) (refer to Toolkit D3) or Natural Heritage Sites (Category A.b).
e) Aesthetically prominent natural features or areas should be declared Protected Natural Environments if such declaration would promote natural scenic beauty or biodiversity.
f) Important cultural-historic or archaeological sites are protected in terms of the National Heritage Resources Act 25 of 1999 and must be entered into a National Registry of conservation-worthy immovable property to facilitate their protection. Future planning and development that could affect such sites would then be controlled by the South African Heritage Resources Agency (SAHRA) and the relevant local government authority.
g) A system of protected areas must be established throughout the Municipality in accordance with the National Environmental Management: Protected Areas Act 24 of 2008. Such a system should radiate out from core reserves, and should be connected through a network of ecological corridors and buffer zones where people pursue livelihoods subject to an agreed-upon system of values and environmental ethics.
h) The system of protected nature areas must cover SPC A areas (refer specifically to those areas that have a high intrinsic and systemic value).
i) The protected nature area system must comply with the following criteria:
    (i) It should transect the Municipality from low-to-high elevation, terrestrial, freshwater, wetlands, rivers, and other ecosystem types, as well as the full range of climate, soil types, geology, etc.
    (ii) It should be large enough to provide functional habitats for the indigenous organisms that inhabit them.
    (iii) It should include representation from all levels of biodiversity, including populations, species and landscapes.
    (iv) It should include terrestrial and freshwater ecosystems as may be required.
j) The system of protected areas must be managed in a manner that honours long-standing, benign uses by local people for whom the system should include places of spiritual and cultural renewal.

k) Proposals for new reserves must be scientifically defensible. In this regard, the establishment of protected areas must be based upon scientific information indicating the irreplaceability of habitats or broad habitat units.

l) The management plans for a protected area system must make provision for the following:
   (i) Effective integration of reserves with their surrounding environments, which could be achieved through the establishment of SMAs (Special Management Areas) and/or Stewardship agreements.
   (ii) Appropriate management of ecological corridors that link the statutory conservation areas.
   (iii) Appropriate management of private land that forms part of the ecological corridors and sustainable use of resources, to be achieved through *inter alia* the establishment of SMAs and/or Stewardship agreements.

m) Biodiversity must be mainstreamed throughout the economy. All sectors that impact on biodiversity, especially agriculture and urban planning, need to factor biodiversity considerations into their policies, plans and programs.

n) The value and importance of biodiversity to people's livelihoods must be recognized and biodiversity management must be integrated with poverty alleviation strategies and local economic development.

o) Prioritise landscapes according to their comparative value contribution of essential ecosystem goods. Agricultural land can not simply be seen as only providing value in terms of food generation. Landscapes also generate water, absorb carbon and harbour critical biodiversity and may help to control pests and pollinate crops.

C4.1.4 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C4.1.4(a)	Secure additional potential SPC A areas.	Medium
C4.1.4(b)	Seek international recognition for all SPC A areas in terms of, for example, the World Heritage Convention, Biodiversity Convention, UNESCO's MaB Program, etc.	"
C4.1.4(c)	Establish a system of protected areas incorporating the diverse landscapes, ecosystems, habitats, communities, species, and culturally significant sites.	High
C4.1.4(d)	Conserve existing ecological corridors, and consolidate and rehabilitate any remnants of corridors that link ecosystems.	"
C4.1.4(e)	Develop and implement a municipal air quality management plan.	Medium
C4.1.4(f)	Implement dedicated strategies to conserve river biodiversity and functioning: a) Integrate land and water policy and management as a basis for integrated management strategies. b) Integrate rivers and wetland systems into regional plans and programs and fine-scale biodiversity assessments.	"
C4.1.4(g)	Broaden environmental capacity and skills in the environment sector (specifically) and in the cross-sectoral situation (generally). Improve the capacity of the Muncipality to enforce its cross-sectoral mandate: a) Increase the numbers of suitably qualified environmental	"

	officials in the Municipality and society. b) Increase the awareness and formal knowledge of law enforcers and the judiciary regarding environmental issues. a) Implement formal environmental skills training through tertiary educational institutions.	
C4.1.4(h)	Implement a coordinated awareness program/approach encompassing all sectors of the Municipality and its social partners.	"

C4.2 SPC B: BUFFER AREA

The buffer areas have a very important function in that they form vitally important linkages between the statutory conservation areas, such as between the Helderberg and Jonkershoek Nature Reserves and between the Groenberg and Limietberg Nature Reserves. The rehabilitation of degraded river systems to create ecological corridors as part of the buffer area can therefore play an important role in connecting conservation areas that have been isolated through human activities.

Buffer areas are primarily in private ownership. Therefore, a key challenge to any land-use strategy or plan is to address the conflicts that often occur between biodiversity conservation and consumptive agricultural practices. In order to start addressing this phenomenon it is imperative to understand and appreciate the often-divergent perspectives of landowners and other stakeholders, and to respect the landowners' rights to use land in accordance with defined legal directives.

Private land-owners and conservation

Private landowners often express concern for the environment (Norton, 2000), but their support for conservation varies depending on perceived threats to their livelihood or private property rights (James, 2002, Russell and Harshbarger, 2003). Biodiversity conservation is often viewed with suspicion, fueled in part by legal conflicts arising from the implementation of environmental laws and policies (James, 2002). When private land and private land rights dominate the social and physical landscape, a balance between individual rights and conservation goals is needed to plan for cultural and ecological sustainability (Riebsame, 1998). Kemmis (1990) argues that, to reduce potential conflicts, environmental policy should be set within the context of the community and should reflect landowner and stakeholder values. The revealing and understanding the meanings of places to landowners and other people can help policy and decision-makers understand people's perspectives, and provide the foundation for appropriate regional resource plans (Cheng *et al,* 2003). Conservation action in landscapes dominated by private ownership will depend on the decisions and attitudes of individual landowners and is promoted when social and environmental values converge (Luzar and Diagne, 1999).

Accordingly, the SEMF provides a coherent and equitable approach to managing SPC B areas on private land in a manner that ensures sustainability and enhances the three global imperatives for sustainable development, namely *environmental integrity*, *human well-being* and *economic efficiency* (refer to Chapter A5.6).

C4.2.1 DESCRIPTION AND PURPOSE

CATEGORY B: BUFFER AREAS		
B.a	Non-Statutory Conservation Areas	Areas voluntarily set aside by land owners and managed for conservation purposes in terms of the legislation applicable to the current zoning of such land and not in terms of dedicated conservation legislation.
B.a.1	<u>Contractual Conservation Areas</u> Areas designated for conservation purposes in terms of an agreement with a conservation agency, or between landowners, a lease agreement, or a servitude. This category includes conservancies and biodiversity stewardship sites.	
B.a.2	<u>Private Conservation Areas</u> Areas zoned as private open space[31] for the primary use of conservation. Also areas unofficially designated and managed for conservation purposes by the relevant land owner.	
B.b	Ecological Corridors	Linkages between natural habitats or ecosystems that contribute to the connectivity of the latter and to the maintenance of associated natural processes.
B.b.1	<u>Freshwater Ecosystem Priority Areas (FEPA)</u> (in terms of National Freshwater Ecosystem Priority Areas Project)	
	Identified river and wetland FEPAs and fish support areas, including a generic buffer of 100m, measured from the top of bank of the river or the delineated riparian areas, whichever is larger, and measured from the outside edge of the wetland (Driver *et al*, Aug 2011).	
B.b.2	<u>Rivers or riverbeds (incl. 32 m buffer)</u> (in terms of NEMA) All other perennial and non-perennial rivers and wetlands, including a buffer of 32m based on the generic buffer width used for aquatic features in the Listing Notices of the Environmental Impact Assessment Regulations, 2010 (GN R544, GN R545 and GN R546).	
B.b.3	<u>Critical Biodiversity Areas and High Biodiversity Areas</u>: Areas identified through systematic biodiversity plans as irreplaceable in terms of meeting representation and/or pattern targets. These areas are known to support high biodiversity or recognised as being important for more than one taxonomic group (e.g. plants and birds). These areas do not necessarily have statutory conservation status. This category includes Critical Biodiversity Areas.	
B.b.4	<u>Other Natural Areas</u> a) Tracts of natural vegetation that form part of, or link ecosystem components (i.e. tracts of natural vegetation acting as a buffer zone between rivers located in FEPA Fish Support Areas and Fish Sanctuaries, and Category C and D areas). b) Any other natural areas that are conservation-worthy and which form linkages to natural areas within Category C and D areas. c) <u>Ecological Support Areas</u>: Areas identified through systematic biodiversity plans as areas not yet exhibiting high levels of biodiversity loss, but which should be protected and restored in order to ensure biodiversity patterns and that ecological process targets can be met.	

[31] Private Open Space refers to any land which has been set aside for utilisation primarily as a private site for sports, play, rest or recreational facilities or as an ornamental garden or pleasure garden and includes public land which is or will be leased on a long-term basis and a cemetery, whether public or private.

B.c	Urban Green Areas	Municipal open spaces that form in integral part of the urban structure.
B.c.1	Public Parks	
B.c.2	Landscaped Areas	

C4.2.2 OBJECTIVES

a) Create appropriate buffer areas around or adjacent to SPC A areas that protect the latter against consumptive or habitat-fragmenting land-use impacts.
b) Create a continuous network of natural resources areas throughout the Municipality that maintain ecological processes and provide ecosystem services (e.g. benefits that people derive from ecosystems. In Stellenbosch Municipality, these include the provision of water, arable soil, disaster amelioration, recreational opportunities, etc.).
c) Develop a strategy, coherent and equitable approach to managing SPC B areas on private land in a manner that ensures sustainability and enhances sustainable development.
d) Ensure efficient management of the atmospheric resources and associated circumstances.

C4.2.3 POLICY

SPC B designation illustrates the extent of the area that contains conservation-worthy habitats or habitat units and the extent of land which should, ideally, be rehabilitated to improve the quality of the natural landscape and/or to promote biodiversity conservation. The following policy principles apply:

a) When considering a change of land-use (i.e. amendment of the designated SPC):
   (i) SPC B.c and SPC B.d areas are primarily private property. The designation of SPC B.c and B.d areas does not imply that it is necessarily undesirable to undertake any development within such areas. Such designation is rather an indication that one must proceed with caution.
   (ii) SPC B.c and B.d provide an explanation of the nature and extent of the landscape characteristics of the particular area and present a basis for the evaluation of development proposals in proper context. SPC B.c designation, therefore, essentially represents an ideal.
   (iii) SPC B.c designation does not take away any of the landowner's rights, nor does it grant any rights. It merely indicates that the particular tract of land is of importance to biodiversity conservation and, consequently, to the well-being of the people of the area and that due care should be taken in the management of the land.
   (iv) Only activities that have an acceptable ecological footprint are permitted in SPC B. Where applications are made for such developments the onus is on the applicant to prove the desirability and sustainability of the proposed development and to suggest an appropriate *quid pro quo*. The latter could be in the form of:
      - Setting aside and rezoning an appropriate portion of conservation-worthy land for permanent conservation purposes (such portion could be considered for re-designation to SPC A).
      - Establishing an SMA over the property together with a trust fund earmarked for environmental conservation.

b) River bank development must be behind the ecological setback lines including flood and storm surge lines (1:100 year floodline for building footprint).
c) Tourism-related development outside the urban edge must be nodal, and restricted to less sensitive areas.
d) No development is permitted on river banks that are susceptible to flooding and below the 1:100 year floodline.
e) Aesthetically prominent natural features or areas should be declared Protected Natural Environments if such declaration would promote natural scenic beauty or biodiversity.
f) Any modification of an SPC B area is subject to an appropriate environmental off-set or *quid pro quo*. Such off-set could be in the form of other SPC B land being formally designated as SPC A.

C4.2.4 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C4.2.4(a)	Ensure appropriate management of SPC B areas through ongoing application of the relevant legation e.g. CARA[32] and NEMA.	High/On-going
C4.2.4(b)	Obtain statutory conservation status (SPC A) for designated SPC B areas (refer in particular to CBAs in private ownership) through the implementation of innovative strategies, such as the establishment of SMAs (refer to Toolkit D3).	"
C4.2.4(c)	Implement and maintain environmental education, awareness and voluntary activism.	"
C4.2.4(d)	Establish Special Management Areas (SMAs) to promote sustainable land-use over a group of land units in terms of the following principles: a) Both public and private land can be declared an SMA (natural, cultivated and inhabited land can be included into an SMA). b) The establishment of an SMA can be required as a condition of approval where new or additional land-use rights or subdivision have been granted. An SMA is to be managed in accordance with an Environmental Management System (EMS) or an Environmental Management Plan (EMP) that conforms to international standards for environmental management (e.g. ISO[33]14001). c) The owner of the SMA must establish a trust fund to provide financial resources for effective long-term management of the Special Management Area.	"
C4.2.4(e)	Conservation of resources for sustained ecosystem services to support the Municipality's development path. Preference will be given to projects that explore innovative institutional or market arrangements that promote natural resource	"

[32] Conservation of Agricultural Resources Act 43 of 1983.
[33] ISO (the International Organisation for Standardisation) is a world-wide federation of national standard bodies (ISO member bodies).

	management or the mainstreaming of sustainable initiatives.	
C4.2.4(f)	Institute a community-based approach to addressing environmental challenges.	"
C4.2.4(g)	Designate an Air Quality Officer, draft and include an Air Quality Management Plan (AQMP) in the IDP, monitor and record progress regarding performance on an annual basis.	High

C4.3 PUBLIC-PRIVATE-COMMUNITY PARTNERSHIPS AS A KEY REQUIREMENT FOR EFFECTIVE ENVIRONMENTAL MANAGEMENT

The Municipality recognises that the establishment of partnerships between different institutions and stakeholders in the design and implementation of community-based environmental management is essential for project sustainability (refer to Toolkit D2). As stated by Culpan (1987) partnerships need to be promoted because without coincidence of interests and joint action to achieve common goals institutions will not co-operate and undermine each other. The relationship between institutions will, to a very large extent, govern the nature of the project and impact heavily on its success or failure. The development of a successful community-based environmental management system requires a sound institutional framework based on a constructive partnership between the local community, state, the private sector and NGOs.

C4.3.1 PARTNERSHIP TYPES SUPPORTED BY THE MUNICIPALITY

The farming community and the conservation fraternity have taken innovative steps to mitigate the impacts of the consumptive agricultural practices. These include:

- Stewardship Program promoted by CapeNature
- Conservancy program
- Special Management Areas
- Land-Care Program advocated by the Department of Agriculture

a) Stewardship Program

Integral to the provincial conservancy strategy is the Stewardship Program initiated by CapeNature. This program makes provision for the conservation of specific areas in terms of various options and formal agreements (refer to the figure below).

CapeNature supports areas under a Sterwardship agreement by means of logistical contributions in the form of management planning, monitoring and auditing services, and general scientific and technological support. Options of the Stewardship Program require that specifications be noted on the title(s) of the relevant property. It is still uncertain whether this requirement holds any meaningful benefit for the relevant property owner.

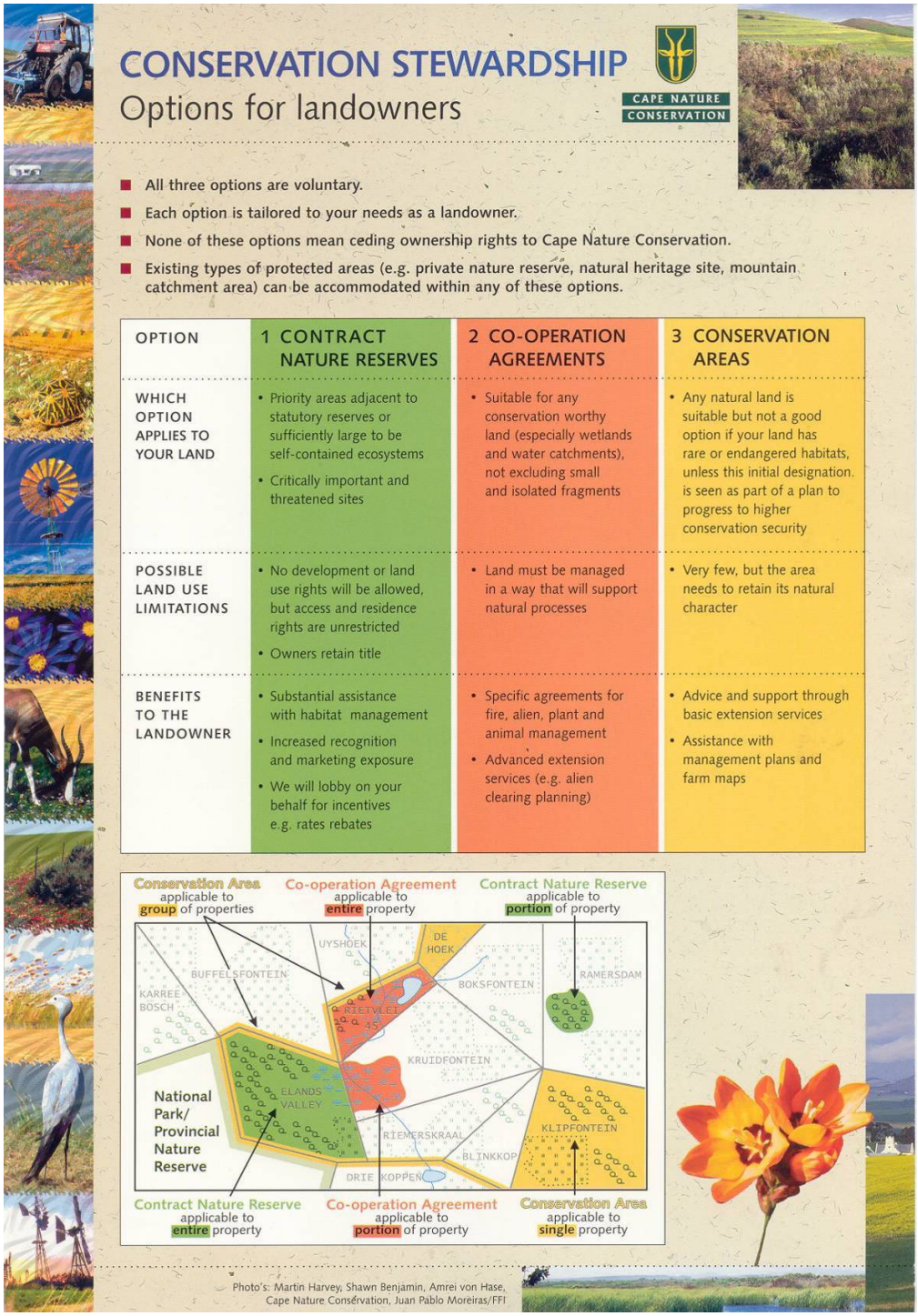


Figure C9: Stewardship Options of CapeNature (Source: CapeNature).

b) Conservancies

Various groups of private properties have been incorporated into conservancies which are based on voluntary agreements between the relevant land owners. A conservancy consists of a group of farms where owners have combined resources for the improved conservation of plants and animals inhabiting the area. CapeNature assists landowners in the training of staff and technical advice on management planning. Conservancies do not have any legal conservation status and are run and financed entirely by farmers themselves. Integrated management plans must be drafted for ensuring the sustainable environmental management and development (that may be granted on a collective basis). The stated objectives for the establishment of conservancies are as follows:

(i) Creating a system of protected nature areas.
(ii) Conserving natural resources on private land and for promoting integrated land management on a broad scale. A conservancy can include statutory conservation areas and other forms of protected land.
(iii) Providing a framework for collective decision-making in respect of *inter alia* rezoning applications, density and nature of proposed development, and placement of potentially detrimental infrastructure and facilities.
(iv) Ensuring, by means of a combined effort extending across the boundaries of individual farms, more extensive areas under conservation management.
(v) Enabling the conservation of a wider diversity of natural habitats and promoting integrated environmental management practices on a broad scale.
(vi) Providing a broader and more viable basis for economic benefits for landowners within the conservancy.
(vii) Encouraging effective application of conservation objectives on land that is marginal for agriculture, thereby enabling large areas of land to remain in a pristine condition or to recover to such a condition.

The Conservancy: A Voluntary Partnership Model

A conservancy is broadly defined as a group of farms, or natural areas, on which the landowners have pooled some (or all) of their resources for the purpose of conserving natural resources on the combined properties. These resources include wildlife and their habitats, indigenous vegetation, forests, catchments, sites of geological and archaeological importance, and generally undisturbed natural and scenic landscapes. In conservancies, the actual landowners become involved (at community level) in the conservation of their resources. The conservancy model, thus, implies that the conservation of resources is in the hands of the people who are directly affected by the condition of those resources and who care about them (or should be caring about them).

c) Special Management Areas

A partnership model that has been very successfull as it relates to achieving the objectives of integrated land-use management that aims to give effect to sustainability is the Special Management Area (SMA). This model is supported by *inter alia* the Department of Agriculture, DEA&DP, SANBI, South African National Parks and CapeNature.

The SMA model is premised on the overarching goal of the bioregional planning approach namely to improve the general status and sustainability of both the natural and the human-made environment. In this regard, the aim is to create positive precedents through the implementation of innovative mechanisms or strategies. The establishment of a SMA is considered by PGWC as a fundamentally important mechanism in this regard, which is of relevance to land owners, authorities, planners and developers.

An SMA is defined as '*an area of excellence and good practice*' where the ethos of sustainable development is served in practice. It is a cadastral geographical unit which is formally recognised and managed as an area where environmental sustainability is promoted in practice and in accordance with international standards for environmental sustainability. Both public and private land can be declared an SMA and both natural, cultivated (i.e. farmland) and inhabited land can be included into an SMA. Privately-owned land can be declared an SMA by establishing a contractual agreement between the landowner and the relevant municipality.

The SMA can be required as a condition of approval where new or additional land-use rights or rezoning have been granted. In such instance the contractual agreement would *inter alia* ensure compliance with the conditions of approval. As such the establishment of an SMA could be a viable mechanism for ensuring long-term environmental sustainability on the relevant property, presenting a positive precedent as is promoted by PGWC.

In an SMA the landowner will manage the environment and its resources in accordance with an Environmental Management System (EMS) or an Environmental Management Plan (EMP) that conforms to international standards for environmental management (e.g. ISO[34]14001). An important aspect of the establishment of an SMA is that the landowner will be required to establish a trust fund, which will ensure that the necessary financial resources are available for effective long-term management of the SMA. In the case of a housing development that forms part of an SMA the Home Owner's Association (HOA) or some other constituted organisation (e.g. a Section 21 Company) will be responsible for the management of the SMA and its trust fund.

Where a farm has been declared an SMA by its owner a primary purpose of the SMA will be to provide a framework for undertaking sustainable agriculture[35]. In this regard the SMA and its EMS will facilitate adherence to the following principles of sustainable agriculture:

(i) Physical-biological productivity (maintain and/or improve production/services)
- Maintain existing fundamental values, technologies and structures supporting sustainable and viable agricultural enterprises.
- Develop and apply new technologies to improve the efficiency of farming practices.

(ii) Economic security (reduce production risk and uncertainty)
- Encourage local processing of farm products and the provision of local farm services to enhance the rural economy, increase the viability of agricultural production and reduce rural poverty.
- Retain all the productive agricultural land for agricultural use.

(iii) Environmental protection (protect production potential of natural resources)
- Integrate land-use planning and community participation to ensure optimum management and utilisation of natural resources.
- All farmers are responsible and accountable for the conservation of natural agricultural resources.
- Land-users causing unacceptable degradation of the natural environment are responsible for rehabilitation of mismanaged natural agricultural resources.
- Real cost of natural resources must be reflected in the pricing of these resources so as to discourage abuse.

(iv) Social acceptability and justice (promote/establish social acceptability)
- Ensure equitable access to resources to all communities.
- Provide access to agriculture via land reform in accordance with environmental requirements and with full participation and consent of all the affected communities.

[34] ISO (the International Organisation for Standardisation) is a world-wide federation of national standard bodies (ISO member bodies).

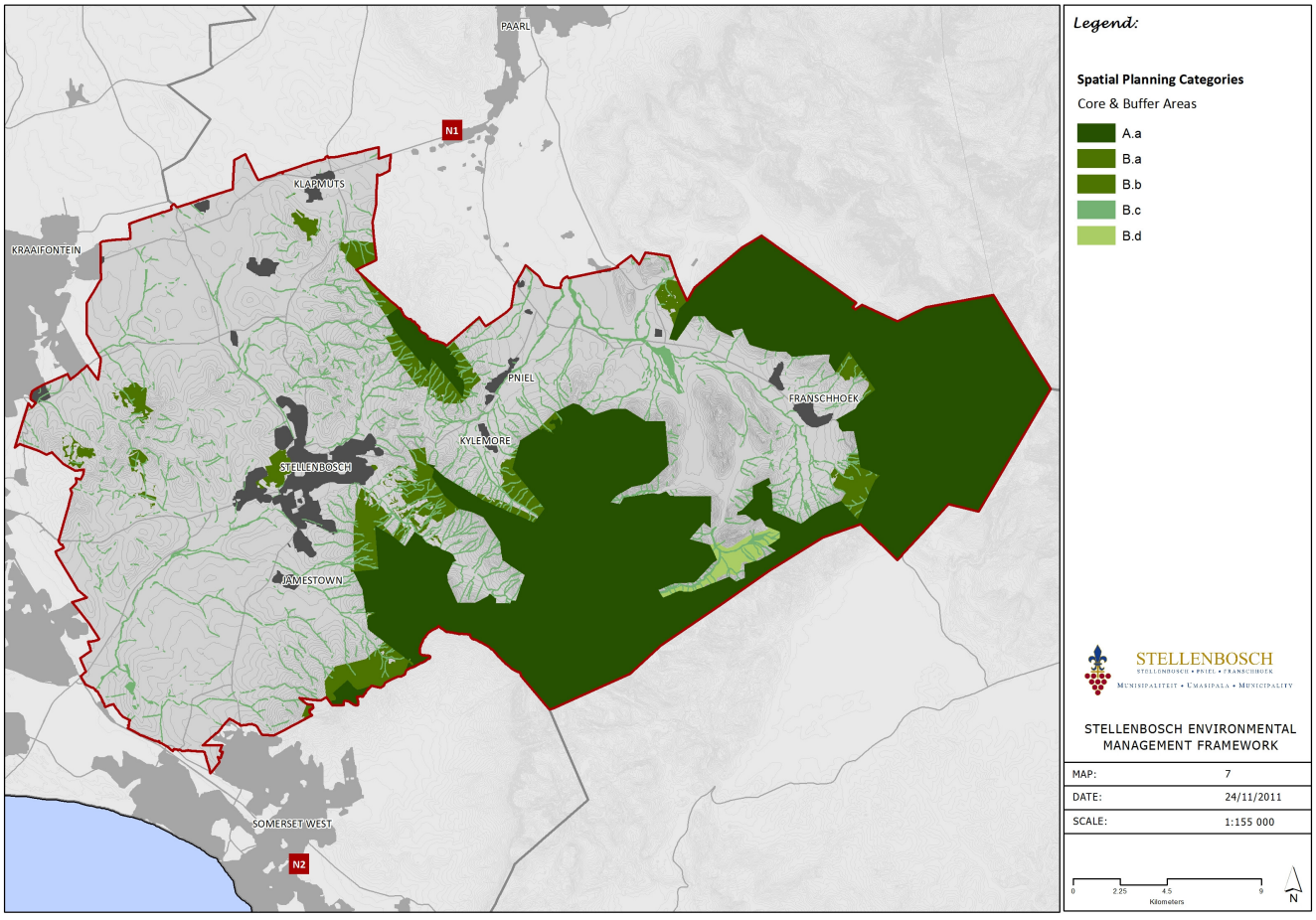
[35] Sustainable agriculture is an approach as well as a process through which different management and technological activities and socio-economic principles are reconciled with environmental requirements (Smyth and Dumanski, 1993).

d) Land-Care Program

The Directorate: Sustainable Resource Management of the Department of Agriculture initiated and facilitates an efficient partnership-based program referred to as the Land-Care Program. This program is based on models successfully applied in various countries across the world. The program is premised on the recognition that widespread land and natural resource degradation and rural poverty are integrally linked and that these cannot be resolved through regulation alone. The overarching goal of the Land-Care Program is to optimise productivity and sustainability of natural resources to achieve greater productivity, food security, job creation and a better quality of life for all. It is a community-based program, which is focused on the conservation of the natural resources (soil, water and vegetation) through sustainable utilisation and the creation of a conservation ethic through education and awareness. In addition it seeks to address rural poverty through sustainable job creation. The program targets farming groups (commercial and small, medium and communal farmers) with limited resources for implementing sustainable agricultural practices.

C4.4 SPATIAL PLAN FOR SPC A AND SPC B: CORE AND BUFFER NATURE AREAS

Plan C2 serves as the spatial plan and vision for both SPC A and SPC B areas as addressed in Chapter C4.



Plan C2: Spatial plan for SPC A and B: Core and Buffer nature areas.

Plan C2 is the first indicator or informant to be consulted when considering a change in land-use that has the potential to affect the integrity of the environment. The plan would also inform any EIA that may be required in terms of the NEMA. The principles cited in Chapter C4.2.3 serve as a procedural guide towards interpreting and implementing Plan C2.

CHAPTER C5 ENSURING SUSTAINABLE USE OF SPC C: AGRICULTURAL AREAS

The protection and appropriate use of high potential agricultural land is of critical importance for environmental health, sustainable economic growth and food security. High potential agricultural land in close proximity to settlements are often subjected to non-agricultural development pressure while negative social impacts associated with such settlements often have a significant detrimental impact on the production potential of such land. It is therefore imperative that the highest priority be given to the protection of high potential agricultural land and that measures be instituted to create and maintain circumstances conducive to sustainable agriculture.

Relevant NDP Directive

Agriculture is still one of the most labour-intensive goods-production sectors, with substantial employment linkages. This sector is one of the few remaining goods producers with strong direct and indirect economic and employment links to the rural poor. Increasingly, South African agriculture faces technical and structural challenges that require improved sector management, including adequate funding of research, investment in skills and training, effective communication strategies and agricultural extension. However, there are also underlying structural and policy issues that need to be addressed in order for a regeneration of rural communities to take place. The industrialisation of agriculture and the country's unique ecosystems also demand that attention be paid to advances in ecological approaches to sustainable agriculture. This includes greater attention to alternative energy, soil quality, minimum tillage and other forms of conservation farming.

C5.1 DESCRIPTION AND PURPOSE

CATEGORY C: AGRICULTURAL AREAS		
SUB-CATEGORY		**DESCRIPTION**
C.a	Extensive Agricultural Areas	Agricultural areas covered with natural vegetation, used for extensive agricultural enterprises, e.g. indigenous plant harvesting, extensive stock-farming, game-farming, eco-tourism.
C.a.1	Bona-fide Game Farms	
C.a.2	Extensive Stock Farms	
C.b	Intensive Agricultural Areas	Agricultural areas used for intensive agricultural practices, e.g. crop cultivation, citrus, lucerne, dates, vineyards, intensive stock farming on pastures.
C.b.1	Cultivated Areas	
C.b.2	Plantations and Woodlots Plantations, i.e. group of trees cultivated for exploitation of the wood, bark, leaves or essential oils in the trees; forest produce, i.e. anything which appears or grows in such plantation including any living organisms and any product of it.	

C5.2 OBJECTIVES

a) Support the ongoing development of the agricultural sector in the Municipality as a national and international asset.
b) Protect high potential agricultural land from non-agricultural development.
c) Expand and diversify sustainable agriculture production and food security.

C5.3 POLICY

The following policy pertaining to the protection and sustainable use of high potential agricultural land applies:

a) High potential agricultural land must be excluded from non-agricultural development and must be appropriately used in accordance with sustainable agriculture[36] principles.
b) Land-users causing unacceptable degradation of the natural environment are responsible for rehabilitation of mismanaged natural agricultural resources.
c) Agricultural activities must be monitored and regulated in terms of the Conservation of Agricultural Resources Act 43 of 1983. In particular, restoration and reclamation of eroded land, control of the number of stock kept and the control of weeds and invader plants.
d) Subdivision of agricultural land or changes in land-use must not lead to the creation of un-economical or sub-economical agricultural units.
e) Any enhanced development rights on SPC C areas must be subject to the establishment of a Special Management Area where the ethos of sustainable agriculture is served in practice.
f) Any non-agricultural development on a SPC C area is subject to an appropriate environmental off-set or *quid pro quo*. Such off-set could be in the form of designated SPC B land being formally designated as SPC A.

C5.4 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C5.4(a)	Consider the rezoning of low-potential agricultural land as a mechanism to promote sustainable economic development. The aim is to unlock the latent capital vested in non-agricultural uses. The outcomes of such development could include: a) Providing landowners with opportunities to establish on-farm tourism-related facilities and amenities and other enterprises supportive of IDP objectives. b) Cross-subsidising lower-income housing and amenities in Category D.d and D.f areas. c) Facilitating the establishment and management of SPC A and B areas (i.e. core conservation areas, buffer areas, ecological corridors and rehabilitation areas).	High/ On-going
C5.4(b)	Promote diversification and controlled experimenting as it relates to alternative practices and enterprises.	Medium/ On-going

[36] Agriculture that is socially just, humane, economically viable, and environmentally sound. Sustainable agriculture integrates three main goals namely environmental stewardship, farm profitability and prosperous farming communities.

C5.4(c)	Expand and diversify sustainable agriculture production and food security. a) Protect agricultural land for agricultural land use in line with SDF. b) Align all agricultural initiatives with SDF and SEMF. c) Increase labour intensive agricultural practices to improve employment rates. d) Expand and optimise the use of commonages. e) Implement urban agriculture to promote household food security.	High/ On-going
C5.4(d)	Undertake detailed farm planning in accordance with the standard SPC designation facilitating inter alia appropriate placement of infrastructure, protection of ecological corridors, and appropriate use of the various sections of the farm (refer to Figure C10). Submit such plans as a key input for the revision of the SDF.	Medium/ On-going

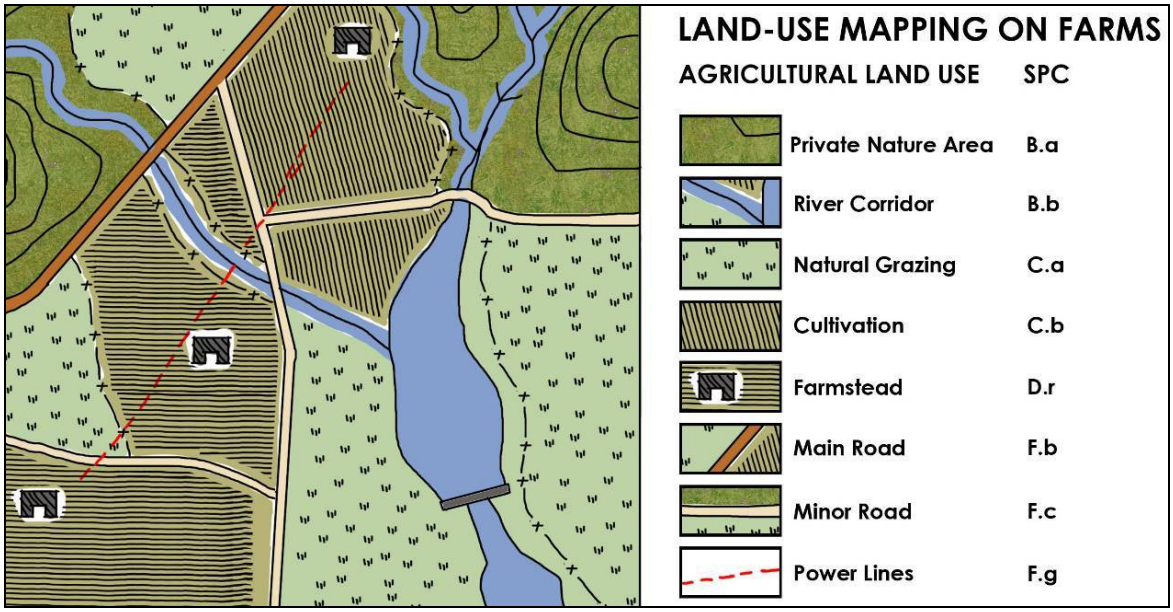


Figure C10: Model for detailed farm planning.

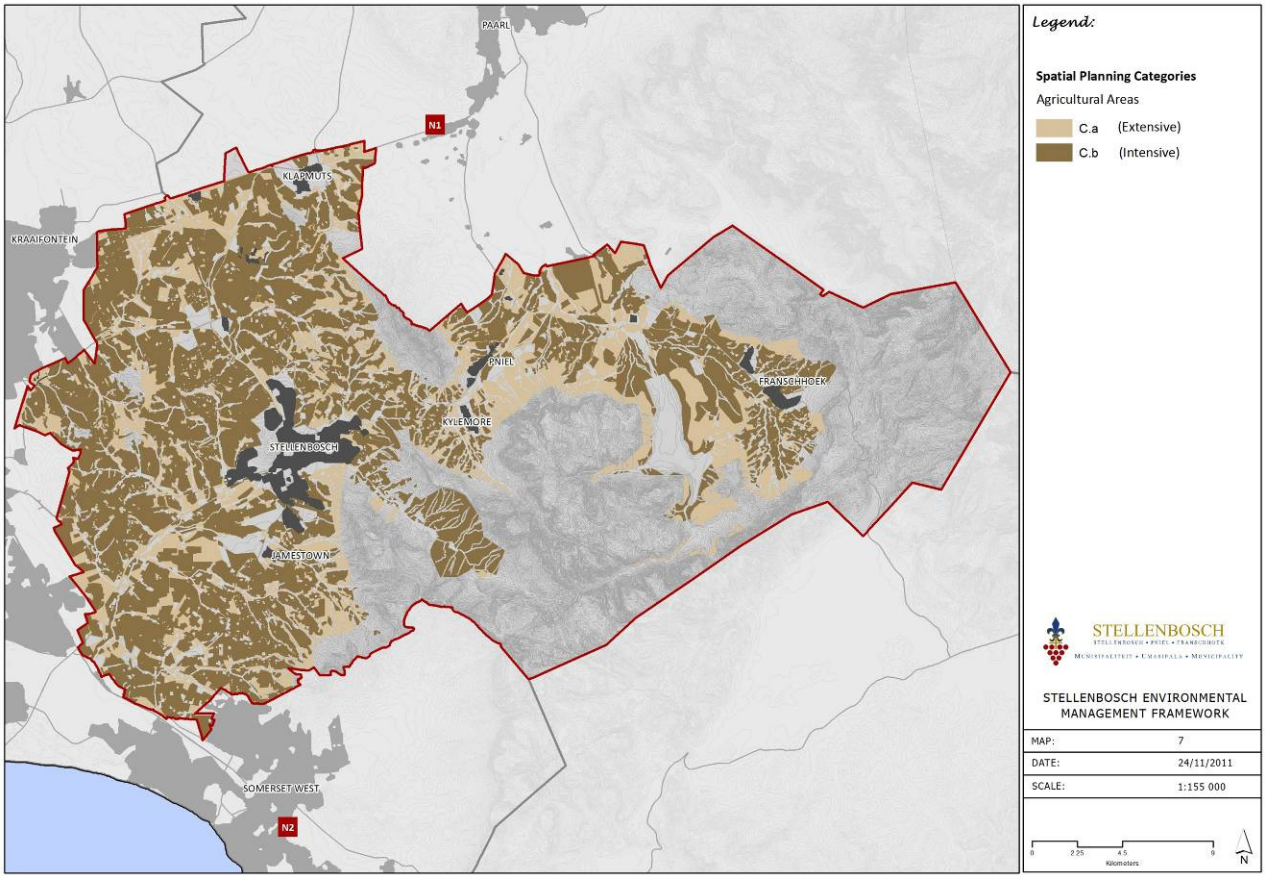
Plan C3 on the following page serves as the spatial plan and vision for SPC C: Agricultural areas addressed in Chapter C5.

C5.5 LANDCARE AS A STRATEGY TO ENSURE SUSTAINABLE AGRICULTURE

Land degradation and water scarcity are serious issues influencing agricultural production and the sustainability of natural resources. Land degradation is costing millions of Rand each year in production losses alone. Furthermore, the treatment of degraded land, nutrient loss, research and costs related to the silting up of the waterways, eventually add up to several billion Rand a year.

The SEMF promotes the adoption of the Land-Care Program as a strategy to ensure the long-term sustainability of the rich agricultural resources of the Municipality. Land-Care is a community-based program supported by both the public and private sector through a series of partnerships.

The overall objective is to optimise productivity and the sustainability of natural resources, leading to greater productivity, food security, job creation and a better quality of life for all[37].



Plan C3: Spatial plan for SPC C: Agricultural Areas.

The eight immediate objectives of the Land-Care program are to:

a) Provide a framework for individuals, community organisation and the public and private sector, through partnerships to optimise productivity and sustainability of the natural resources through management, protection and rehabilitation.
b) Develop the capacity and skills of land users through education, knowledge sharing, information, participatory interaction for better access and management of resources.
c) Support institutional building at all levels of governance for improved communication, networking, financial and other support services.
d) Empower all people through knowledge and understanding to take the responsibility for the care of the environment.
e) Ensure as far as is practicable that resources are used at a rate within their capacity for renewal.
f) Maintain and enhance the ecological integrity of natural systems.
g) Minimise or avoid risks that lead to irreversible damage.
h) Maintain biodiversity (contribute towards the maintenance of biodiversity).

[37] Landcare: National Landcare Secretariat. Department of Agriculture.

C5.6 URBAN AGRICULTURE

The SEMF promotes the establishment of urban agriculture as a mechanism to enhance the sustainable use of resources with the aim to promote the well-being of, in particular, the poor.

Urban agriculture is the growing of plants and the raising of animals within and around cities. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system: urban agriculture is embedded in -and interacting with - the urban ecosystem (RUAF Foundation, 2006). It is also an industry that produces, processes and markets food and fuel, largely in response to the daily demand of consumers within a town, city, or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock (Smit, 1996).

Urban land can be used for income generation purposes, for example, through providing space for home-based micro-enterprises, for providing the opportunity for generating income through the rental of accommodation, through the renting out of rooms/backyard accommodation, and for providing space for urban agriculture (vegetables, maize, livestock, etc.). Urban land can play an important role in 'livelihood diversification', i.e. where a household has more than one livelihood strategy in order to reduce vulnerability (Urban Sector Network, 2003).

The lead feature of urban agriculture is its integration into the urban economic and ecological system. It is not its urban location that distinguishes urban agriculture from rural agriculture, but that it is embedded in and interacting with the urban ecosystem.

Urban agriculture is an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, (re-)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area (Mougeot, 1999).

C5.6.1 POTENTIAL IMPACTS OF URBAN AGRICULTURE

a) Positive Impacts

Urban agriculture can, in a conducive environment, make a meaningful contribution towards the following (Visser, 2003):

(i) Household food security – the self-production of food insures availability, affordability and accessibility to food, which also improved nutrition. This releases cash for other needs which would otherwise have been spent on purchasing food. The improvement of households food security and nutrition can contribute towards the fight against HIV/AIDS because people tend to be physically stronger.

(ii) Income generation – surplus production can be sold or traded for other much needed items. Urban agriculture activities can serve as a supplement to income or can become a primary source of income depending on the scale of activities.

(iii) Affordability of food to the poor – these micro-food growers can produce food at the doorstep of their communities and through low input costs and the elimination of intermediaries they can subsequently deliver produce at a price lower than the formal market price.

(iv) Human resource development – the execution of urban agricultural activities can coincide with technical, business and social skills development through training and practice – leadership, project management, etc.

(v) Increased social status and dignity – a garden is symbolic of the women's important role in society as wives and as mothers. Food gardens, although small, is important because it contributes to the well-being of the family. Women gain pride and a sense of self-worth when their produce is consumed by her family. Also, gardens provide solace and comfort.

(vi) Nature conservation – because the yield from urban agricultural activities impacts positively on their survival, people recognise the real value of land and are prepared to maintain it.

(vii) Reversal of the migration pattern (back to rural areas) – the acquired agricultural and business skills will prepare and empower people to farm commercially, i.e. they can now meaningfully participate in the Land Redistribution for Agricultural Development program and can move back to the rural areas as commercial farmers (Visser, 2003).

(viii) Improved urban cleansing. Biomass develops an economic value – grass cuttings, paper, etc. can now be used for composting

(ix) Improved environmental awareness - There is a realisation that caring for the environment can create material benefit – good quality water is needed for vegetable production which should encourage people not to pollute water.

(x) Enhanced environmental restoration and urban greening. This can enhance the Metropolitan Open Spaces System (MOSS) of a city (Visser, 2003).

(xi) Improved environmental health. Unsightly lots can be turned into neatly cultivated areas, i.e. clean and maintain it in an orderly fashion with very little cost to the municipality.

(xii) Safer living environment - Overgrown areas can serve as hiding places for criminals can be transformed into productive agricultural plots.

b) Negative Impacts

Urban agriculture has various negative impacts (Visser, 2003). Various reviews highlights health risks associated with urban agriculture. This serves to reinforce perceptions of many governments and local authorities that urban agriculture is a marginal activity with substantial risks. The following are some of the main health risks associated with urban agricultural activities.

(i) Contamination of crops with pathogenic organisms (e.g. bacteria, protozoa, viruses or helminthes) due to irrigation by water from polluted streams or inadequately treated wastewater or organic solid waste.

(ii) Human diseases transferred from disease vectors.

(iii) Contamination of crops and/or drinking water by residues of agro-chemicals.

(iv) Contamination of crops by uptake of heavy metals from contaminated soils, air or water.

(v) Human diseases associated with unsanitary post harvest processing, marketing and preparation of locally produced food.

Negative effects on the natural environment relates to air and water pollution, soil erosion and degradation and insufficient waste management. The following are some of the additional negative impacts: a nuisance in terms of smells, dust and noise, competition for space and subsequent conflict, stray animals, not enough space, food or veterinary care and informal slaughtering of animals which results in the unhygienic preparation of meat and disposal of waste.

C5.6.2 OPPORTUNITIES FOR URBAN AGRICULTURE IN STELLENBOSCH MUNICIPALITY

Urban producers could achieve real efficiencies by making productive use of under-utilised resources such as vacant land, treated wastewater, recycled waste and unemployed labour. In addition, urban farmers often use low-input processing and storage techniques, including:

a) Opportunities around state-owned land: There are public facilities which present excellent opportunities for access to land for urban agricultural activities. These include underutilised land around clinics, libraries, schools, hospitals and many more. Most of these facilities are fenced off, water and electricity are available and are easily accessible in terms of location and roads.

b) Other municipal-linked opportunities: Sufficiently treated wastewater are used worldwide for, *inter alia*, irrigation of sport fields and urban agricultural activities. This water resource can make a valuable contribution towards the availability and affordability of water for urban agricultural activities.

c) Business opportunities around urban agriculture: Urban agriculture presents a niche for sub-cluster development, because there is a wide range of SMME business opportunities available in the urban agricultural activity chain, both on the supply and demand sides. This includes, the following (Visser, 2003):
   (i) Nurseries to supply seed and seedlings to food growers.
   (ii) Agricultural supply stores – to supply food growers and farmers with tools, equipment, fertiliser, pesticides and irrigation systems, etc.
   (iii) Maintenance services such as repairs of water pumps and irrigation systems, tools and equipment, fences, etc.
   (iv) Garden services to maintain gardens in terms of pruning of trees, weed and pest control and refuse removal.
   (v) Extension and management services to give advice with regard to production, harvesting and marketing as well as business administration and project management.
   (vi) Auction facilities for speculation in livestock.
   (vii) Production services such as renting out of equipment and tools, ploughing of fields, vaccination of animals, etc.
   (viii) Market agents to facilitate the scale of surplus produce at the right place at the right time (e.g. street vendors).
   (ix) Construction of e.g. chicken sheds and fencing.
   (x) Agri-processing businesses (e.g. packaging facilities and neighbourhood abattoirs and processing of dairy products).
   (xi) Security services to protect infrastructure, equipment and produce.
   (xii) Professional service providers such as bookkeepers, managers, and bankers.

Urban agriculture is not the sole solution to poverty alleviation and economic empowerment but is rather part of a cumulative impact, i.e. impacts that individually are relatively insignificant, but collectively could become significant on a micro and macro level. According to Jaröv (2000) strategies that encourage and facilitate small-scale farming and provide services in small towns in the countryside of South Africa have not been tested sufficiently. Urban agriculture is a necessary means to help unemployed people survive in cities, although it is not always the most desirable situation.

CHAPTER C6 DIRECTING DEVELOPMENT OF SPC D: URBAN AREAS

C6.1 ESTABLISHING SUSTAINABLE SETTLEMENTS

The human-made (cultural) place is defined as *the environment that has been created or modified by humans to the extent that its primary ecosystem functions and natural aesthetic appeal are lost or diminished* (Schmithusen, 1964).

It is often overlooked that the inhabited landscapes are the works of humankind and that a general understanding of what constitutes qualitative inhabited landscapes, and what to do to maintain such landscapes, are of decisive importance for long-term sustainable development. Furthermore, inhabited landscapes are contained by natural landscapes and the relationship between the inhabited and natural landscapes is a fragile one.

To ensure the sustainability of urban development it is important to achieve a balance between the conflicting interests of land-use planning. In this regard a key objective of the SEMF is to promote rehabilitation of existing settlements and to ensure that any future developments are sustainable (i.e. supportive of environmental integrity, human well-being and economic efficiency). Standard town planning criteria applicable in the evaluation and assessment of development applications, building plan approval, change of land-use, etc. are still relevant and will not be replaced by this policy. These criteria relate to *inter alia* taking due cognisance of natural and/or unique resources, prevention of urban sprawl, preference for strengthening and densification of existing nodes and taking into consideration the cumulative impact of development.

C6.1.1 DESCRIPTION AND PURPOSE

CATEGORY D: URBAN-RELATED AREAS		
SUB-CATEGORY		**DESCRIPTION**
D.a	Main Town	Towns accommodating Category A Municipalities (i.e. metropolitan areas) and the seat (capital town) of Category C Municipalities (District Municipalities).
D.b	Local Town	Towns accommodating the seat (capital town) of Category B Municipalities (Local Municipalities).
D.c	Rural Settlements	Smaller towns and rural settlements that fall under the jurisdiction of Category B Municipalities (i.e. towns and rural settlements forming part of a Local Municipality).
D.d	Tribal Authority Settlements	Formal and informal residential areas under the ownership of tribal authorities.
D.e	Communal Settlements	Settlements that have been planned, classified and subdivided in terms of the former Rural Areas Act 9 of 1987 and which, in terms of the Transformation of Certain Rural Areas Act 94 of 1998, can be transferred to a legal entity of the community's choice, e.g. Pella, Concordia, Richtersveld, Steinkopf and Leliefontein.
D.f	Institutional Areas	Areas designated for schools, colleges, churches and mosques and other institutional purposes.
D.f.1	Place of Instruction	

D.f.2	Place of Worship	
D.f.3	Institution	
D.g	Authority Areas	Areas designated for governmental purposes and other official uses, e.g. municipal offices, offices of parastatals (Telkom, Eskom) (areas zoned for authority purposes).
D.g.1	Government Uses	
D.g.2	Municipal Uses	
D.h	Residential Areas	Areas designated for residential purposes, e.g. single title erven, group housing, estates, 'GAP housing'[38] and residential smallholdings.
D.h.1	Single Residential House	
D.h.2	Group Housing	
D.h.3	Guest House	
D.h.4	Flats/Residential Building	
D.h.5	Mixed Density Residential Area	
D.h.6	GAP Housing	
D.h.7	Subsidised Housing	
D.h.8	Informal Housing	
D.h.9	Small Holdings	
D.h.10	Residential Estate	
D.i	Business Areas	Areas designated for activities associated with retail and service industries, e.g. shops, restaurants, professional offices (areas zoned for business purposes).
D.i.1	Business Premise	
D.i.2	Shop	
D.j	Service-Related Business	Areas designated for other business activities associated with service trade industries, e.g. launderettes and light manufacturing industries; and industries associated with motor vehicle sales and repairs.
D.j.1	Service Trade Industry	
D.j.2	Service Station	
D.k	Special Business	Areas designated for special business activities associated with casinos and gambling houses and areas identified for adult entertainment.
D.k.1	Casino	
D.k.2	Adult Entertainment	
D.l	SMME Incubators	Areas designated for Small Medium and Micro Enterprises (SMMEs) and associated infrastructure and services focused on community-based service trade and retail.
D.m	Mixed-Use Development Areas	Areas designated for innovative combinations of land-use, e.g. residential/light business; light industry/light business (in terms of various municipal zonings).
D.n	Cemeteries	Cemeteries and formal burial parks, excluding crematoriums.
D.o	Sports Fields &	Dedicated sports fields together with the associated infrastructure,

[38] 'GAP housing' refers to a category of residential units that falls between the housing units provided by the state (< R100 000) and those provided by the private sector (>R250 000). The GAP housing market typically caters for people earning between R3 500 and R10 000 per month, which is too little to enable them to enter the private property market, yet too much to qualify for state assistance.

	Infrastructure	parking areas, and services.
D.p	Airport and Infrastructure	Area designated as airport together with the infrastructure and services associated with the airport and its activities.
D.q	Tourism Related Areas	Tourism-related nodes and amenities that form part of a designated Hospitality Corridor.
D.r	Farmsteads & Outbuildings	Main farmsteads, including on-farm infrastructure required for farm logistics, e.g. houses, sheds, packing facilities, etc.

C6.1.2 OBJECTIVES

a) Develop sustainable settlements that would promote the well-being of the people of Stellenbosch Municipality, i.e. where they can live with dignity and pride.
   (i) Prohibit further outward expansion of urban settlements that results in urban sprawl.
   (ii) Use socio-economic gradients based on walking distance to create a higher level of integration than currently exists while remaining sensitive to community social norms and levels of living.
   (iii) Use publicly-owned land and premises to spatially integrate urban areas and to give access for second economy operators into first economy spaces.

b) Promote sustainable urban activities and public- and non-motorised transport.
   (i) Use walking distance as the primary measure of accessibility.
   (ii) Develop walking and cycling routes.
   (iii) Densify urban settlements, especially along main transport routes, at nodal interchanges etc.
   (iv) Identify areas of highest accessibility that can be designed to maximise safe social and economic activity, especially for participants in the second economy.
   (v) Restructure road networks to promote economic activity in appropriate locations.
   (vi) Cluster community facilities together with commercial, transport, informal sector and other activities so as to maximise their convenience, safety and social economic potential.

C6.1.3 POLICY

a) Densification of urban settlements must occur with due regard for ecological and heritage concerns as identified in EIAs/HIAs. Ecological concerns include impacts on biodiversity, flora/fauna in general, soil, and water quality and quantity, and heritage concerns include cultural landscapes, historic buildings and precincts, and artefacts of memory.

b) Municipal urban plans must make provision for non-motorised transport, bicycles and pedestrians along major routes.

c) Institutional buildings that accommodate community activities, educational and health services, and entrepreneurial development and skills training, should be located at points of highest access in urban settlements.

d) Planning, design and development guidelines must reflect an understanding of places and the values, norms and principles that provide meaning and identity for the communities of such places and society at large.

e) The aesthetic qualities of an area must be a determinant of the scale and format of development in that area.

f) Development within natural areas must blend in or harmonise with the biophysical characteristics of the environment. This implies the following:
   (i) Developmental components must be discretely sited within the environment.
   (ii) Development must blend in with the natural surroundings in terms of colour, use of locally occurring natural building materials and architectural style.
   (iii) Development must conform to the local vernacular in terms of scale and design, of that particular region or bioregion.
   (iv) Where necessary existing unsightly development must be screened through effective landscaping.

g) To ensure that buildings of tourism-related developments are in harmony with the surrounding landscape and local vernacular, thus maintaining the character and aesthetic quality of the area, the planning and design process must address, *inter alia*, the following:
   (i) Architectural vernacular.
   (ii) Architectural design (cast shadows, break bulk of buildings).
   (iii) Urban design to maintain space.
   (iv) Materials to be used (natural stone, thatch, wood).
   (v) Fencing (if any).
   (vi) Height and coverage of units.
   (vii) Landscaping proposals for the site.
   (viii) Extent of units and erven.

h) Landscaping must be undertaken simultaneously with construction. Such landscaping could include the following:
   (i) Indigenous vegetation could be used to break the harsh, straight lines of buildings, i.e. for screening, water-saving measures, etc.
   (ii) As far as possible, only indigenous plants are to be used in the landscaping of the property.
   (iii) Earthworks, such as earth berms and mounds, to add topographical interest, provide wind-shelter and screen structures, must be encouraged in the landscaping of the development.

i) The proponent of a large-scale development must submit financial assurances for long-term environmental management and rehabilitation of the development site and the surrounding environment.

j) In terms of the concept of critical regionalism, all development should reflect a sense of limits. There is a need for physical and temporal boundaries to frame and limit human places and activities. Limits need to be considered over the full spectrum of environmental management practices and issues, including the following:
   (i) Scale of urban expansion.
   (ii) Scale of natural resource utilization.
   (iii) Architectural styles, scale and visual impacts of surface infrastructure and roads.

k) The scale of urban development must be within the carrying capacity of water reserves, capacity for waste absorption, use of recreational amenities, etc.

l) All future buildings, roads and infrastructure (including powerlines) must be sited and designed according to the relevant SPCs and guidelines and are subject to heritage, environmental and visual impact analyses.

m) The Municipality must apply appropriate Spatial Structuring Elements in the development of new urban areas or the restructuring of existing urban areas. This includes defining and delineating, as part of the SDF, the outer limit of urban expansion (i.e. an urban edge) to contain lateral growth of urban areas.

n) As a general rule, non-agricultural development may not be permitted outside the urban edge except for bona-fide holiday/tourism accommodation; bona fide agri-industry development; agri-settlements, and social facilities and infrastructure necessary for rural development. However, this guideline is subject to the principle that *each proposed land development area should be judged on its own merits and no particular use of land, such as residential, commercial, conservational, industrial, community facility, mining, agricultural or public use, should in advance or in general be regarded as being less important or desirable than any other land-use*.

o) The SDF must make provision for appropriate *Restructuring Zones*[39] in terms of the Social Housing Act 16 of 2008.

C6.1.4 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

The settlements of Stellenbosch Municipality were generally structured through the application of standards and regulations pertaining to, amongst others, street widths, building guidelines in respect of lines and heights, erf dimensions, and minimum densities. These standards and regulations serve an important purpose in regulating development. However, due to the fact that the regulations do not take sufficient cognisance of site-specific requirements and the existential dimensions of people's lives, they often contribute to the development of 'nowhere' places. Such 'nowhere places' are generally characterised by a lack of structure and character, urban sprawl and extensive road and electricity networks that have negative ecological and aesthetical impacts. In order to provide an antithesis for the rules-based decision-making process referred to above, the SEMF promotes a process based on a thorough understanding of the environment and its processes and functions (i.e. critical regionalism). This implies that any considerations regarding the desirability and scale of development must be primarily based on site-specific environmental criteria. It is imperative that consideration also be given to the broader environmental context and the potential cumulative impact of the development, as well as innovative town planning and urban design criteria. The following strategies and guidelines are to be adopted:

NUMBER	DESCRIPTION	PRIORITY
C6.1.4(a)	Ensure that development scale and design are determined by the carrying capacity of the environment, including the following: a) Biophysical characteristics (i.e. the *intrinsic* value of the site). b) Sensitivity and/or irreplaceability of natural habitats that may be affected by the proposed development (i.e. the	High/On-going

[39] A *geographic area which has been:*
- *identified by the municipality, with the concurrence of the provincial government, for purposes of social housing; and*
- *designated by the Minister in the Gazette for approved projects.*

Restructuring is about moving away from housing interventions that entrench/enforce or in any way maintain the spatial status quo, which reinforces certain social and economic disparities. '*Restructuring is thus intimately linked to interventions in the land market: either to protect lower income (and often Black) people from displacement or to bring lower income (often Black) into areas of economic and other forms of opportunity from which they would otherwise be excluded. This is perhaps the most important meaning of restructuring*'. The logic of restructuring is clearly not the same as the logic of urban regeneration and urban renewal but there are some overlaps (Social Housing Regulatory Authority http://www.shra.org.za/resource-centre/shf-archives/90-urban-development-zones).

	systemic value of the site). c) Aesthetic qualities of the subjectsite. d) Availability of natural resources such as water. e) Potential aesthetic impact of the proposed development. f) Potential of the site for sustainable agriculture or other productive land-use (i.e. the *instrumental* value of the site). g) Density and scale required in order to establish an appropriate sense of place within the proposed development. h) Extent of the property.	
C6.1.4(b)	The Municipality must promote the sustainability of settlements by means of adequate by-laws, and the provision of guidance and quality spatial data. These aspects are to be addressed in the SDF.	"
C6.1.4(c)	Address the following in the SDF: a) The availability of vacant land that could be used to address the needs of the settlement. b) Environmental constraints that impact upon the future use of any such vacant land. c) Potential opportunities on vacant land for development or any other appropriate forms of land-use that address the needs of the relevant settlement and its inhabitants. d) Appropriate land-use classification of the relevant settlement with the objective to ensure the sustainability of such land-uses and the compliance thereof with the vision, goals, and objectives set for the area.	High
C6.1.4(d)	Include in the SDF guidelines pertaining to tree planting projects, including appropriate indigenous, ornamental and fruit trees, urban greening (landscaping) and food gardens along streets and in open spaces as part of urban restructuring programs. Successful tree planting programs are recognised as having a huge aesthetic impact.	High
C6.1.4(e)	Improve the quality of subsidised housing settlements through innovative urban planning and design and cross-subsidising.	"
C6.1.4(f)	Provide basic services to all settlements.	High/ On-going
C6.1.4(g)	Implement urban agriculture as a strategy to promote the sustainability of settlements and enhance food security.	"

C6.2 TOWARDS CREATING 'GOOD SETTLEMENTS'

The planning approach adopted and advocated by the SEMF is place-specific, pro-active, and value based. This implies that in the planning, design and implementation of development projects, the core values, norms and principles for each are to be identified and recorded and then it is to be demonstrated how to give practical effect to such principles.

Consistant with the SPLUMA and NDP, the SEMF requires that decision-making regarding resource-use should be normative. The key normative principles that have to inform decision making are described in the SPLUMA (Chapter 7 and 8) and the NDP (Chapter 4).

The SEMF subscribes to the notion that ethical values[6] from the basis of decision-making and the subsequent action in accordance with ideals accepted in any given moral system (as is required by the Constitution of South Africa). The SEMF recognises that, if the imperative (or must do) that flows from ethical values is denied then the value itself is denied. The ethical domain is circumscribed not only by the value-choices made by humans, but also the critical weighing of the expected consequences of the choices made.

It is on the settlement scale where normative theories that address the connections between human values and settlement form manifest themselves most profoundly, and where the challenge to give practical effect to the normative principles of the SPLUMA and the NDP, is most acute. In pursuing the ideal of good place-making it should be recognised that the human understanding of place and settlement**,** as well as the applicable statutory context (in particular SPLUMA Chapter 7 and 8), are not two-dimensional concepts but three-dimensional.

The relevant normative principles in Chapter 8 of the SPLUMA require that norms and standards be prescribed to promote social inclusion, spatial equity, desirable settlement patterns, rural revitalization and urban regeneration. This requires that the planning and design of settlements are to be undertaken by competent professional urban and settlement planners (as is directed by the NDP), and with due recognition of best-practice design theories and principles. Toolkit D6 serves as a guideline in this regard. This implies that planning and design of settlements needs to be steered away from the current almost purely efficiency-focussed approach to a holistic approach where the integrity of the future settlement and the associated well-being of its inhabitants receive equal prominence. Recent history has confirmed that the current, primarily IT-driven settlement planning is not conducive to creating sustainable communities.

C6.3 FUNDING OF AND INVESTMENT IN LARGE-SCALE INFRASTRUCTURAL DEVELOPMENT

The SEMF supports the NDP strategic priority which states that *new large-scale infrastructure should be prioritised in settlements with high economic growth potential. A strategic approach to investment should be taken and fixed infrastructure should be located in urban settlements likely to experience population and economic growth rather than decline. Therefore, as a general principle, fixed investment should be directed towards urban settlements that exhibit high economic growth potential in the first instance and high human need in the second. Settlements with low human need and low economic growth potential would have a lower fixed investment priority. This policy implies that settlements with large numbers of people would take precedence over those with only a few residents.*

While the idea of focusing government spending on fixed infrastructure in areas with potential for economic development may seem to exclude other areas/settlements from development, this is, in fact, not the case. Different settlements have different economic potential and significance, and the spatial variations in the incidence of poverty are also vastly different. According to the NDP *these diverse and disparate spatial contexts suggest a policy approach that, in itself, should be differentiated and conducive to the requirements of the different contexts.*

Hence, in areas of low or no economic potential, the path of development and poverty reduction should be through a focus on investment in social capital (e.g. education, training, social welfare, rural development planning, land and agrarian reform, expansion of agricultural extension services, etc). This means that each individual settlement should discover its real development potential and then take steps to grow to the maximum of that potential. It is important to stress that the NDP and the SEMF do not in any way rule out investment in small settlements *per se.*

C6.3.1 OBJECTIVES

a) Strategically invest public resources where they will generate the highest returns in the form of monetary, infrastructural, environmental, and, in particular, social capital.
b) Prioritise government spending and public investment to the best benefit of Municipality as a whole.
c) Assist national and provincial government departments in allocating their budgets (including identification of towns that can qualify for projects under the CRDP).
d) Provide a rationale for decisions regarding the location, scale and nature of urban and rural development.

C6.3.2 POLICY

a) Settlements which show high economic growth potential and have high population thresholds are to be prioritised as locations for fixed infrastructure.
b) Settlements with high levels of human need (including settlements with high as well as low economic growth potential) are to be prioritised for state funding as it relates to the delivery of human resource development and minimum basic services.

CHAPTER C7 REGULATING THE DEVELOPMENT OF SPC E: INDUSTRIAL AREAS

As stated in Section B economic development opportunities are the key determinant of the settlement pattern and also the distribution pattern of industrial areas in the Municipality. Economic development typically responds to the availability of *environmental capital* (e.g. water, suitable agricultural soil, mining resources, etc.) and *infrastructural capital* (e.g. roads, electricity, bulk engineering services, etc.).

Whilst being imperative for economic development of the Municipality, agriculture, urban development, bulk infrastructure installations, etc. generally have a detrimental impact on the environment which, in turn, often manifests in a negative impact on human-well-being and on the tourism product.

C7.1 DESCRIPTION AND PURPOSE

CATEGORY E: INDUSTRIAL AREAS		
E.a	**Agricultural Industry**	Agriculture-related industrial development, e.g. silos, wine cellars, packing facilities, excluding abattoirs.
E.b	**Industrial Development Zone**	Dedicated industrial estate ideally linked to an international, or national, port that leverages fixed direct investments in value-added and export-orientated manufacturing industries.
E.c	**Light Industry**	Areas designated for light industrial activities associated with the

		service industry (e.g. repair of motor vehicles) including warehouses and service stations.
E.d	**Heavy Industry**	Areas designated for robust industrial activities, e.g. chemical works, brewery, processing of hides, abattoirs, stone crushing, crematoriums.
E.e	**Extractive Industry**	Settlements and infrastructure associated with multiple consumptive resource extraction, e.g. mining.

The sustainable use of the resources (capital) of the Municipality is a primary objective. A key aim of the SEMF is to ensure that any such use of resources unlocks meaningful and lasting benefit for both the people of the Municipality (i.e. enhancing human well-being) and the environment (i.e. enhancing the integrity of the environment). This means that any resource use must, on balance, '*improve the state of*' the conditions or circumstances prevalent in the area to be affect by the resource use. The objective is to provide the infrastructure and other requirements to enable the above.

The climate change issue

Climate change refers to the rise in the global average atmosphere temperatures, followed by an increased frequency of climatic abnormalities, intensified heat and cold waves, droughts, storms, floods, as well as rising ocean level. The accelerated climate change is believed to be a result of human activities that increase the concentration of greenhouse gases (GHG) in the atmosphere – to which carbon dioxide (CO_2) is the largest contributor. CO_2 is naturally stored on Earth in 'carbon sinks' such as fossil fuels (oil, gas, coal, etc) and green biomass. Human activities release this CO_2 by the burning of fossil fuels for energy and the reduction of forests, grassland and peatland. Key mechanisms to limit GHG emissions (and thus to slowdown climate change) include switching to low-carbon energies, reducing energy demands and preventing deforestation; these measures are known as mitigation. However, adaptation measures to the already inevitable adverse impacts of climate change are also needed.

C7.2 OBJECTIVES

a) Ensure that the larger economic sectors contributes to an appropriate off-set or *quid pro quo* for the detrimental impacts associated therewith.
b) Ensure that the planning, design and construction of industrial areas comply with the principles of sustainability with specific reference to climate-neutrality.
c) Explore alternative and emerging technologies to improve quality and quantity within the manufacturing sector.
d) Ensure the sustainable use and protection of the environmental capital.
e) Offset direct detrimental impacts of resource use.
f) Provide measures to cater for indirect impacts or impacts that may in the long-term emerge as a result of resource use.
g) Give effect to the vision, mission and goals of the Municipality as it relates to air quality management.

C7.3 POLICY

a) Green House Gas emissions are to be reduced.
b) Electricity consumption is to be reduced.
c) Solar thermal water heating and photo-voltaic energy generation are to be compulsory, linked to main electricity sources as backup, on all new residential, commercial, industrial and community buildings, and should be progressively phased in as appropriate.

d) In order to protect the unique natural characteristics of the Municipality, the objective is to ensure that all industrial development is sustainable. In this regard, the following needs to be instituted:
   (i) Constant assessment of the environmental impact of industrial activities.
   (ii) Implementation of 'low, or no waste, technologies'.
   (iii) Modification of the industrial system itself, with the view to optimise resource use and minimise waste and ecological damage.

e) Industrial mechanisms are to be designed to prevent the generation of pollution throughout the production process.

f) Industrial development must be clustered in close proximity to the product source, in close proximity to major transport linkages and bulk infrastructure.

g) Where industrial development is proposed in remote areas that do not comply with the requirements set in (f) above the proponent has to provide conclusive evidence regarding the desirability and sustainability of the proposed development and must fund the provision of the required access and services.

h) Industrial development in settlements is subject to the defined guidelines to be provided in the SDF.

i) All large-scale resource use activities must, on an on-going basis and in a balanced manner, give effect to the imperatives for sustainable development namely, *human well-being*, *environmental integrity* and *economic efficiency* (refer to Chapter A5.6).

j) All large-scale resource use activities must be managed in accordance with a best-practice Environmental Management System (EMS) that provides for on-going monitoring, auditing and continual improvement as it relates to environmental performance and compliance with (a) above.

k) Where tracts of agricultural land are to be used for non-agricultural uses such as renewable energy generation, etc., such activities must create sustainable multipliers in the local economy and synergies that would unlock meaningful benefit through implementation programs.

l) Proponents of resource exploration projects must provide assurance pertaining to the existence of an adequate mitigation fund that could be used to off-set unforeseen detrimental impacts associated with the project.

m) Effect must be given to the following policy:
   - *C4.2.3(n): Any modification of an SPC B area is subject to an appropriate environmental off-set or quid pro quo. Such off-set could be in the form of other SPC B land being formally designated as SPC A.*
   - *C5.3(f): Any non-agricultural development on a SPC C area is subject to an appropriate environmental off-set or quid pro quo. Such off-set could be in the form of designated SPC B land being formally designated as SPC A.*

n) Legislation and policy pertaining to air quality management will be complied with.

C7.4 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

Energy efficiency in housing

The generation of energy is the main contributor to CO_2 emissions and climate change and it also results in many other forms of environmental pollution. Housing is responsible for as much as a quarter of the global operational energy demand (embodied energy used in construction notwithstanding). This energy is used for space and water heating and cooling, cooking, lighting, and operation of other energy-consuming activities within homes. The use of this energy is in fact a necessary condition to support life and social activities in houses. Yet, a large percentage of

Stellenbosch Municipality's rural communities do not have access to clean energy or struggle to afford it in sufficient quantities because of the cost (leading to the phenomenon of 'energy poverty').

Improving energy efficiency and using renewable energy is a way to address this complex knot of environmental and social problems. It is widely acknowledged that the cost of investing in the hosing energy efficiency is commonly smaller than gains achieved over a medium-term period from resultant energy savings. Energy savings also mean avoided energy and CO_2 generation. This also makes the residential sector one of the most cost-effective (in fact, profitable) mechanisms for the reduction of CO_2 emissions.

NUMBER	DESCRIPTION	PRIORITY
C7.4(a)	Prepare a municipal climate-neutrality strategy that would be mandatory on all industrial development.	High
C7.4(b)	Actively promote 'clustering' of activities. The overall economic impact of industrial projects depends on the extent of 'cluster' of activities that form and agglomerate around it.	"
C7.4(c)	To reduce energy demand and carbon footprint from residential buildings a range of solutions are to be considered: a) Planning and optimising the orientation and interrelation of buildings in space, as well as unlocking the potential of walls and roofs contribute to passive heating and lighting. b) Improving ventilation and isulation. c) Installing energy efficient appliances for heating, cooling, cooking and lighting and ventilation. d) Equipping houses with renewable electricity or heat generating installations. e) Reducing energy-intensive building materials and technologies used in home-building. f) Capacity building activities to raise awareness of the importance of energy savings and how it can be achieved.	High

CHAPTER C8 DEVELOPMENT OF EFFICIENT SPC F: SURFACE INFRASTRUCTURE

Economic development typically responds to the availability of *Environmental Capital* (e.g. water, suitable agricultural soil, mining resources, etc.) and *Infrastructural Capital* (e.g. roads, electricity, bulk engineering services, etc.). It follows logically that the provision of surface infrastructure would respond to the economic realities associated with the distribution of economic sectors across the Municipality. A further key element, however, is the equitably provision of basic household services and amenities.

C8.1 DESCRIPTION AND PURPOSE

CATEGORY F: SURFACE INFRASTRUCTURE & BUILDINGS		
F.a	**National roads**	National roads proclaimed in terms of the National Roads Act 7 of 1998.
F.b	**Main roads**	Provincial and regional roads proclaimed in terms of the Roads Ordinance 19 of 1976.
F.c	**Minor roads**	Regional and local roads proclaimed in terms of the Roads Ordinance 19 of 1976.
F.d	**Public Streets**	Public streets and parking areas within main town and rural settlements.
F.e	**Heavy Vehicle Overnight**	Areas designated for heavy vehicle parking and overnight facilities.

	Facilities	
F.f	**Railway lines**	Railway lines and associated infrastructure.
F.g	**Power lines**	Power lines and associated sub-stations and infrastructure.
F.h	**Tele-communication infrastructure**	Any part of the infrastructure of a telecommunication network for radio/wireless communication including, voice, data and video telecommunications, which may include antennae, any support structure, equipment room, radio equipment and optical communications equipment provided by cellular network operators, or any other telecommunication providers, and all ancillary structures needed for the operation of telecommunication infrastructure.
F.i	**Renewable energy structures**	Any wind turbine or solar voltaic apparatus, or grouping thereof, which captures and converts wind or solar radiation into energy for commercial gain irrespective of whether it feeds onto an electricity grid or not. It includes any appurtenant[40] structure or any test facility for energy generation.
F.j	**Dams & Reservoirs**	Major dams and reservoirs.
F.k	**Canals**	Constructed permanent waterways, e.g. irrigation canals, stormwater trenches.
F.l	**Sewerage Plants and Refuse Areas**	Areas designated as municipal and private sewerage treatment plants and refuse areas.
F.m	**Science and Technology Structures**	Any areas associated with the science and technology sector, with specific reference to the SKA and the designated astronomy reserve.

C8.2 OBJECTIVES

C8.2.1 TRANSPORT OBJECTIVES

Transport is a supportive sector which plays a key role in meeting objectives of economic growth, access to employment opportunities and social integration. Transport, both public and private, is a primary spatial structuring element providing access and mobility to both urban and rural communities. One of the underlying success factors of any regional economy relates to the movement of goods, people and services. It is important that the role and functioning of the different modes of transport and the impact on the infrastructure are clearly understood in order to focus different investment on the areas of opportunity and need.

Relevant NDP Directive

It is envisaged that by 2030, investments in the transport sector will:

- Bridge geographic distances affordably, foster reliability and safety, so that all South Africans can access previously inaccessible economic opportunities, social spaces and services.
- Support economic development by allowing the transport of goods from points of production to where they are consumed. This will also facilitate regional and international trade.
- Promote a low-carbon economy by offering transport alternatives that minimise environmental harm.

[40] Appurtenant structure means any structure or accessory necessary for, or directly associated with generation of renewable energy.

C8.2.2 WATER OBJECTIVES

The Municipality recognises the vital importance of its water resources. The availability of water is a most critical factor in the sustained development of the Municipality. Subsequently, a key objective of the SEMF is to conserve the water resources of the Municipality.

The mountains of the Municipality constitute the primary *mountain catchment areas*[41] of a number of rivers, the most notable of which is the Berg River. These mountains fall within the Fynbos Biome. Fynbos has unique intrinsic water conservation capabilities and subsequently plays a critical role in the maintenance of the natural *water cycle*[42].

The overriding objective of water conservation is the management of the catchment areas so as to maintain an optimal sustainable yield of high quality water. Maintenance of water yield entails ensuring the capacity of a catchment area to yield water at historical flow rates. This can only be achieved through the maintenance of a vigorous cover of indigenous vegetation.

Relevant NDP Directive

Water supply and sanitation services, which depend on adequate management, are a priority for most South African communities. Their effective and sustainable management is essential for community health development and cohesion, and continued economic activity. By 2030, it is envisaged that effective management of water and the services derived from it will support a strong economy and a healthy environment. It is envisaged that before 2030, all South Africans will have affordable, reliable access to sufficient safe water and hygienic sanitation.

Land-use patterns largely influence the maintenance of water yield. Interference with the natural conditions in mountain catchment areas, e.g. draining, canalising or cultivating areas such as vleis, seepage areas, riparian areas and stream-bed alluvium, is detrimental to the proper functioning of a catchment system. In addition, the quantity of water draining to river systems of the area is increasingly being threatened by alien plant invasions in the catchments. It is therefore paramount for all development in catchment areas to be regulated appropriately and that catchment areas be efficiently managed. Accordingly, the key objectives for water management are as follows:

a) Facilitate water conservation and water demand management in the Municipality.
b) Curb unlawful water use.
c) Ensure a reliable supply of water from bulk water resources infrastructure within acceptable risk parameters to meet the sustainable demand for the Municipality.
d) Ensure the development, implementation, monitoring and review of regulations across the water value chain in accordance with the provisions of the National Water Act 38 of 1998 and the Water Services Act 108 of 1997.

Key water pollution areas

In the River Health Program report on the Greater Cape Town's Rivers (2005) it is indicated that urban runoff, especially from informal settlements (e.g. Kayamandi), impacts negatively on river water quality. Urban rivers are also

[41] Mountain catchment area is defined as 'the main mass of mountain or range, together with any spurs or connected outliers, above the general level of surrounding plains, comprising the crest or watershed, plateaux, slopes foothills and connecting valleys' (Soil Conservation Board, 1958).

[42] The water (hydrological) cycle describes the natural process of moving water out of the oceans, into the atmosphere, and back to the land and oceans.

polluted by inadequately treated wastewater, sewer overflows or collapsed sewers, as well as from agricultural and industrial runoff. Such wastewater and runoff carries waterborne human pathogens (including bacteria, viruses, fungi and parasites) into rivers. These disease-causing micro-organisms are of great concern as they pose a threat to public health.

Concerns have been raised on the serious pollution level of the Plankenbrug River which flows through Stellenbosch and the dense settlement of Kayamandi and eventually drains into the Eerste River. The water is used by some downstream farmers for irrigation purposes and the rivers meander alongside popular tourist attractions. According to an epidemiologist, Dr. Jo Barnes, the river is so polluted with faecal matter that it poses a serious health hazard. The river that runs below Kayamandi is choked with sewage, household waste and rubble (Thom, 2002).

In February 2002, Barnes did extensive sampling of the river as part of an internationally-funded project and concluded that the river's coliform bacteria count, used worldwide to indicate faecal pollution, had a worst result of 13 million a 100 ml. Counts of above 2 000 a 100 ml are considered a health risk. In February 2004 a coliform bacterial level of 700 a 100ml was tested above Kayamandi.

Downstream of Kayamandi showed a count of 560 million on a hot day and 34 million on a cool day two weeks later (Gosling, 2004). Pathogens like ß haemolytic streptococcus Group A, were an unusual find in free-flowing water. A number of the organisms in the water and in the biofilms on stones in the river, exhibited signs of antibiotic resistance to some commonly used antibiotics and also resistance to chlorination.

C8.2.3 ENERGY OBJECTIVES

a) Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.
b) Develop and institute innovative new energy technologies to improve access to reliable, sustainable and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution and reaching sustainable development in the Municipality offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector.

C8.2.4 TELECOMMUNICATION OBJECTIVES

a) Ensure the ongoing development of international best-practice telecommunication systems for the Municipality as a whole.
b) Increase infrastructure deployment in the Municipality by exploring cheaper and affordable broadband technologies which will enhance the accessing of information and knowledge.

Relevant NDP Directive

The Information and Communications Infrastructure sector is a critical enabler of economic activity in an increasingly networked world. As a sector, ICT may provide important direct opportunities for manufacturing, service provision, and job creation, but their main contribution to economic development is to enhance communication and information flows that improve productivity and efficiency. It is envisaged that by 2030, ICT will underpin the development of a dynamic and connected information society and a vibrant knowledge economy that is more inclusive and prosperous. A seamless information infrastructure will be universally available and accessible and will meet the needs of citizens, business and the public sector, providing access to the creation and consumption of a wide range of converged

services required for effective economic and social participation – at a cost and quality at least equal to South Africa's main peers and competitors.

C8.2.5 HOUSEHOLD SERVICES OBJECTIVES

a) Ensure the ongoing development of bulk services required to promote the well-being of all the people of Stellenbosch Municipality.
b) Implement household services in accordance with constitutional imperatives and basic human rights.

C8.2.6 AIR QUALITY OBJECTIVES

Air quality management is a key focal area of the Municipality. Sources of air pollution include motor vehicle emissions, industrial and manufacturing emissions, agricultural emissions, residential fuel burning emissions and biomass burning emissions and emissions from landfill and wastewater treatment plants. The brown haze which forms over Cape Town during the winter months is largely attributed to motor vehicle emissions. It often extends northwards and affects air quality over the southern parts of the Stellenbosch Municipality. These sources are relatively small and air quality in Stellenbosch Municipality is generally good with respect to the typical pollutants. However, agricultural activities, including seasonal burning and the use of pesticides present challenges for air quality management.

The vision for air quality management in Stellenbosch Municipality is *air in the Stellenbosch Municipality must be clean and health.*

The three goals for the Stellenbosch Municipality to achieve the mission are:

Goal 1: Air quality governance meets requirements to effectively meet set standards. This goal addresses the regulatory framework and the institutional capacity required in the Stellenbosch Municipality to carry out the air quality function. This links directly to the goal of the Western Cape Government to '*ensure effective and consistent air quality management*' and the goal of the Cape Winelands District Municipality of '*effective air quality management*'.

Goal 2: Reduce atmospheric emissions of harmful pollutants. This goal aims to manage activities that impact on air quality to reduce the emissions of harmful pollutants and associated impacts on human health and well-being. This links directly to the goals of the Western Cape Government to '*ensure effective and consistent compliance monitoring and enforcement*' and *'to ensure that health-based air quality standards are attained and continually met*'. It also links to the goal of the Cape Winelands District Municipality of '*effective air quality management*' through an '*emission reduction strategy*'.

Goal 3: Systems and tools are established to effectively implement an AQMP. This goal refers to the systems and tools required for effective air quality management. This links directly to the provincial goal to '*ensure effective and consistent air quality management*' through the development and implementation of efficient systems.

C8.3 POLICY

C8.3.1 TRANSPORT POLICY

a) Transport infrastructure will be constructed, operated and maintained in terms of the principles of sustainability.
b) Urban development must comply with the principles of *Transport Orientated Development* (TOD).

C8.3.2 WATER POLICY

a) Water is the most vital natural form of capital (resource) of Stellenbosch Municipality and must be invested in the most efficient and equitable manner.
b) The basic water needs of all people in the Municipality must be met.
c) Pollution and degradation of the water resources must be prevented.
d) The ecological integrity of the natural systems in the Municipality must be restored and protected.
e) Water quality and water quantity are interdependent and shall be managed in an integrated manner consistent with other broader environmental management approaches.
f) A Water Demand Management Plan must be included into SDF.
g) The private sector must fulfil an ongoing function as the *de facto* custodians of the water resources of the Municipality through the relevant legal mechanisms, including Water Use Associations, Irrigation Boards, the Municipality and Agricultural Associations.

C8.3.3 ENERGY POLICY

a) The construction of energy infrastructure must be strictly regulated in terms of the SDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible.
b) EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above.
c) The following key policy principles for renewable energy apply:
    (i) Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation.
    (ii) Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being.
    (iii) Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements.
e) Public awareness of the benefits and opportunities of renewable energy must be promoted.
f) Renewable energy must first and foremost be used to address the needs of the Municipality before being exported.

C8.3.4 TELECOMMUNICATION POLICY

a) The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines presented in the SDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment as far as possible.
b) EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above.

C8.3.5 HOUSEHOLD SERVICES POLICY

Efficient sanitation as an imperative for human well-being

Good sanitation is essential for the dignity, health and well-being of the people of the Municipality. Good sanitation extends far beyond access to an acceptable toilet and the safe disposal of human waste, it includes practices that support good hygiene and a healthy living environment. Sanitation improvement is about more than providing a toilet infrastructure. It has a major public and primary health component, and calls for close co-ordination between technical, health and social development personnel.

a) The Municipality must follow an integrated hierarchical approach to waste management consisting of avoidance/reduction, reuse, recycling, composting, treatment and final disposal.
b) Recycling of waste is a priority with material recovery facilities to be established at all transfer stations.
c) Waste management plans addressing separation, recycling, collection, disposal, publicity and incentives are to drawn up. An Integrated Waste Management Plan must be developed and implemented by the Municipality. These plans need to be revised every five years together with the IDP and SDF.
d) Existing waste water treatment works must be progressively improved by means of regulatory measures and thereafter maintained so that the water quality of the rivers and water bodies with which they are associated would be of minimum potable, contact and phosphate, nitrate and *E.coli* standards.
e) All wetland ecosystems must be protected in such a manner that their inherent ecological and stormwater purification function is maintained.
f) The Municipality and its various local administrations must comply with the Green Drop Status requirements of the Department of Water and Sanitation.
g) Where urban development proposals exceed infrastructure capacity, such applications would be put on hold until provision is made for the additional needs.

C8.3.6 AIR QUALITY POLICY

The National Environmental Management Air Quality Act requires local municipalities to designate an Air Quality Officer, include an Air Quality Management Plan (AQMP) in the IDP and monitor and record progress regarding performance on an annual basis. AQMP in the IDP must, in particular, enable the municipality to manage or reduce the negative effects of air pollution, including waste and agricultural burning and the application of pesticides. The AQMP must also help to develop an understanding of the state of air quality and the ability to report with confidence requires access to reliable and accurate emissions and ambient air quality data. A key function of the AQMP would

be to establish and maintain a comprehensive emission inventory[43]. The AQMP must serve as a basis for transparent and inclusive communication, and the establishment of a multi-stakeholder forum (uMoya-NILU, 2013[44]).

C8.4 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

C8.4.1 TRANSPORT STRATEGIES AND GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C8.4.1(a)	Develop and maintain an efficient road, rail and public transport network a) Improve road infrastructure. b) Identify and address road safety hotspots. c) Improve the public transport facilities.	High / On-going

C8.4.2 WATER STRATEGIES AND GUIDELINES

The National Water Act, 1998 (Act 36 of 1998) stipulates that water is essentially a tool to transform society towards social and environmental justice and poverty eradication. The National Water Act, inter alia, include the following pro-poor components: Water Reserve and drinking water supply services, compulsory licensing, Schedule 1, which stipulates which water uses are permissible under any condition, co-operative governance, and Establishment of Catchment Management Agencies (CMAs)[45] and Water User Associations (WUAs)[46].

The following community-based options can be implemented to improve the way water is utilised by and for the poor, and produce positive effects on the environment:

a) Facilitate access to water for the poor — Consider and experiment with turning irrigation systems over to the water users, either in whole or in part (refer to WUAs above). The basic logic behind turnover is that by placing irrigation under farmer control, farmers will mobilize more resources for its management and use water more efficiently. Management turnover to the whole group of water users, when structured properly, holds out the possibility of bringing more water to poorer farmers in the periphery

[43] Ambient air quality monitoring is currently conducted in Stellenbosch by the DEA&DP, who also undertake campaign measurements. It is necessary that Stellenbosch Municipality participate in these monitoring activities and have access to the information, as well as expand the scope of monitoring. This will provide an understanding of sources, pollutants and ambient air quality in the Municipality and facilitate accurate reporting.

[44] uMoya-NILU (2013): Air Quality Management Plan for the Stellenbosch Municipality, Report No uMN013-2013.

[45] Catchment Management Agencies are statutory bodies established for each water management area. They aim to seek co-operation and agreement on water-related matters from the various stakeholds and interested parties. A CMA manages water resources within a defined water management area. Such management is carried out in accordance with a catchment management strategy. The CMA must give effect to the catchment management strategy, which is underpinned by the principles of equity, efficiency, sustainability and representivity.

[46] Water User Associations are co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit. The board role of a WUA is to enable people within a community to pool their resources (financial, human power and expertise) to more effectively carry out water-related activities. WUAs enable members to benefit from addressing local needs in terms of local priorities and resources. They provide a mechanism through which a CMA can devolve the implementation of aspects of the Catchment Management Strategy to the local level.

of the irrigation system, who usually operate under rainfed or near-rainfed conditions. At a water basin live, more efficient use of irrigation water is often an important source of additional water supply for downstream urban areas. The management and use of groundwater is a particularly difficult sector of water management. The creation of new aquifer management institutions in which people's institutions are given extensive powers in conjunction with a strong monitoring and supervisory role for the state should be a high priority (Ambler, 1999).

b) Co-invest in the water — Instead of the State transferring ownership or management authority over water, they can co-invest with the poor on the lands they already control to improve their ability to capture and distribute water. One key to the success is that farmers retain control of the authority and responsibility to manage their irrigation systems, and that investment form the State catalyses the mobilisation of additional resources from the farmers themselves. Another area in which external agencies can co-invest with local resources is in the area of microwatershed development. This could include projects such as building water harvesting structures and keeping animal from free grazing in the catchment area (Ambler, 1999).

c) Employ the poor in water resources projects — The poor and landless can be hired to work in eco-restoration projects in their area. Rather than hiring landless people in food-for-work projects that merely beautify roads, work out arrangements with local government to invest in desilting tanks, or restoring catchment areas (Ambler, 1999).

As water demands and environmental needs grow, water recycling will play a greater role in our overall water supply. By working together to overcome obstacles, water recycling, along with water conservation, can help us to conserve and sustainably manage our vital water resources.

NUMBER	DESCRIPTION	PRIORITY
C8.4.2(a)	Implement low cost water supply options to supplement conventional systems, such as rain water harvesting.	High/ On-going
C8.4.2(b)	Promote the sustainable use of water resources.	High
C8.4.2(c)	Improve the Blue Drop[47] status of drinking water throughout the Municipality.	High/ On-going
C8.4.2(d)	Implement a water demand management techniques such as minimizing leaks by reducing water pressure and a stepped tariff system that effectively addresses excessive water consumption.	"
C8.4.2(e)	Implement innovative water conservation measures. The following innovated water conservation measures are mandatory on all new residential, commercial and community projects:	"

[47] The Blue Drop Certification system is a campaign by the Department of Water Affairs that encourages local municipalities to improve their water quality management while empowering consumers with information regarding what is coming out of their taps. Water Services Authorities that are to be awarded Blue Drop Status are required to comply with 95% of the weighted criteria in bi-annual assessments as prepared by the Department of Water Affairs.

	a) Re-use of grey water. b) Low-flow shower heads. c) Water-wise gardens. d) Dual flush toilet systems. e) Re-use of sewerage water.	
C8.4.2(f)	Implement an invasive alien species control plan for the Municipality with particular focus on stressed catchments – a coordinated approach, long-term plan and sustained effort is required.	High/ On-going

C8.4.3 ENERGY STRATEGIES AND GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C8.4.3(b)	Strictly apply the South African National Standard (SANS 10400-XA:2011) in the planning and design of all infrastructural development. The following aspects are to be addressed, in particular: a) Installing no-cost energy efficiency measures in housing, including passive solar design. b) Heat insulation in homes. c) Replacement of electric geysers with solar water heaters. d) Energy efficient lighting.	High/ On-going
C8.4.3(c)	Align renewable energy initiatives with the Department of Energy's Global Village Energy Partnership, and the Renewable Energy and Energy Efficiency Partnership.	"
C8.4.3(d)	Energy efficiency and renewable energy initiatives are vital to maintain the energy supply and demand balance in Stellenbosch Municipality and in South Africa as a whole. Energy efficiency must be a strategic priority for companies and enterprises, as South Africa and Stellenbosch Municipality moves to higher, cost-effective electricity pricing. The Industrial Development Corporation (IDC) and the German Development Bank (KfW) have partnered to make a financial facility available for energy-efficiency and self-use renewable energy projects called the *Green Energy Efficiency Fund*[48].	"

The renewable energy issue

There is only so much carbon that the atmosphere can absorb. To stop the earth's climate spinning out of control most of the world's fossil fuel reserves - coal, oil and gas - must remain in the ground. The goal for all humans should be to live within earth's natural limits.

[48] The Green Energy Efficiency Fund supports the Industrial Development Corporation's alignment to the Industrial Policy Action Plan, the New Growth Path and the National Development Plan.

C8.4.4 TELECOMMUNICATION STRATEGIES AND GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C8.4.4(a)	Develop and institute a system that provides universal service access at reasonable cost, connecting all rural areas of the Municipality. Create best-practice telecommunication infrastructure to meet the communication requirements of IT, media and other IT based industry.	High/ On-going

C8.4.5 HOUSEHOLD SERVICES STRATEGIES AND GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C8.4.5(a)	Enforce new building codes that require the reduction of water and energy consumption, and the use of renewable building material wherever possible (refer to the South African National Standard {SANS 10400-XA:2011}).	High/ On-going
C8.4.5(b)	Restructure urban settlements so as to minimise the need to travel.	"
C8.4.5(c)	Apply alternative forms of sewage treatment including enviro-loos, urine-diversion toilets, package plants and artificial wetlands should be implemented in new areas, if they do not impact on groundwater.	"

C8.4.6 AIR QUALITY STRATEGIES AND GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C8.4.6(a)	Give effect to efficient air quality management by means of: a) Designating an Air Quality Officer. b) Drafting and including an Air Quality Management Plan (AQMP) in the IDP. c) Monitoring and recording progress regarding performance. d) Establishing and maintaining a comprehensive emission inventory.	High

CHAPTER C9 ENABLING IT ALL BY MEANS OF EFFICIENT GOVERNANCE

Olowu and Sako (2002) define governance as *a system of values, policies, and institutions by which society manage its economic, political and social affairs through interaction within and among the state, civil society and private sector.*

SALGA (South African Local Government Association [2014[49]]) states that *good governance, in simplistic terms, is about achieving the desired results in the right way. Good governance reflects effective management and effective stewardship of public resources. This involves improving institutional performance and mechanisms such as leadership, quality control and accountability.* Good governance is furthermore about taking the correct decisions to protect the environment

[49] SALGA, 2014. *Good Environmental Governance In Local Government: A Practice Brief on Environmental and Climate Change Governance for South African Municipalities*. Issue 1 of 3, March 2014

and our service offerings in a sustainable manner. It is also about understanding and complying with legislative and policy requirements.

The key principles of good governance are:

a) Accountability
b) Transparency
c) Participatory
d) Compliance with the rule of law
e) Effective and efficient
f) Equitable and inclusive
g) Responsive

Relevant NDP Directive

Poor governance can critically undermine national development. For a more effective state, there must be accountability. Accountability refers to institutionalized practices of giving account of how assigned responsibilities are carried out and public resources used. In a democracy it is crucial for political leaders and public officials to account to the citizens for their actions. Building integrity is an essential component of achieving good governance.

In the NFSD (2008), it is stated that *'a systems approach to sustainability is one where the economic system, the socio-political system and the ecosystem are imbedded within each other, and then integrated through the governance system that holds all together in a legitimate regulatory framework'*.

Environmental governance is the means by which society determines and acts on goals and priorities relating to the management of natural resources. This includes the rules, both formal and informal, that govern human behaviour in decision-making processes as well as the decisions themselves. The guiding principles in this regard are:

- Appropriate legal frameworks on the global, regional, national and local level are a prerequisite for good environmental governance.
- Environmental governance advocates sustainability (sustainable development) as a core consideration for managing and balancing all human activities – political, social and economic.
- Good environmental governance includes multiple actors – government, business, and civil society; and emphasises 'whole-system management'

C9.1 A GOOD ENVIRONMENTAL GOVERNANCE MODEL FOR STELLENBOSCH MUNICIPALITY

C9.1.1 WHAT THE MUNICIPALITY NEEDS TO KNOW AND DO

Good corporate or organisational governance forms the core of good environmental governance. However, the difference is that environmental governance requires that policy-makers, decision-makers and practitioners (i.e. municipal officials) have a full knowledge of the environmental factors within and around the Municipality.

In the model for environmental management and governance adopted by the Municipality, knowledge of the international, regional, national and local environmental priorities is critical (refer to Figure C11). Coupled with an in-depth understanding of the legislative requirements (i.e. the Constitution, National Environmental Management Act, Disaster Management Act, National

Health Act, Municipal Systems Act, SPLUMA, etc.), the Municipality must be able to translate national policy tools at a local level, and put them into practice by designing environmental sector plans, by-laws and management systems for implementation, compliance monitoring and enforcement. Finally, these tools are to be implemented in practise by means of a best-practise (e.g ISO14001) adaptive environmental management strategy.

Figure C11: Environmental governanace model for Stellenbosch Municipality.

C9.1.2 FOCAL AREAS OF THE MUNICIPALITY AND REQUIRED MANAGEMENT TOOLS

The functions and key focal areas of the Municipality and the mechanisms required to manage these are summarised as follows:

MUNICIPAL KEY FOCAL AREA	REQUIRED PLANNING FRAMEWORKS /TOOLS)
a) Environmental Management	a) SEMF
b) Waste Management	b) Integrated Waste Management Plan
c) Biodiversity Management	c) SANBI Biodiversity Index and CBA Plan
d) Climate Change and Disaster Risk Management	d) Climate Change Response Strategies, Disaster and Risk Management Plan (refer to Toolkit D5[50])
e) Air Quality Control/Management	e) Air Quality Management Plan
f) Land-Use Management	f) SDF incorporating Bioregional Policy

Figure C12 summarises the overarching goals, aims and objectives, application process, and supporting documentation and information base that collectively constitute the SEMF.

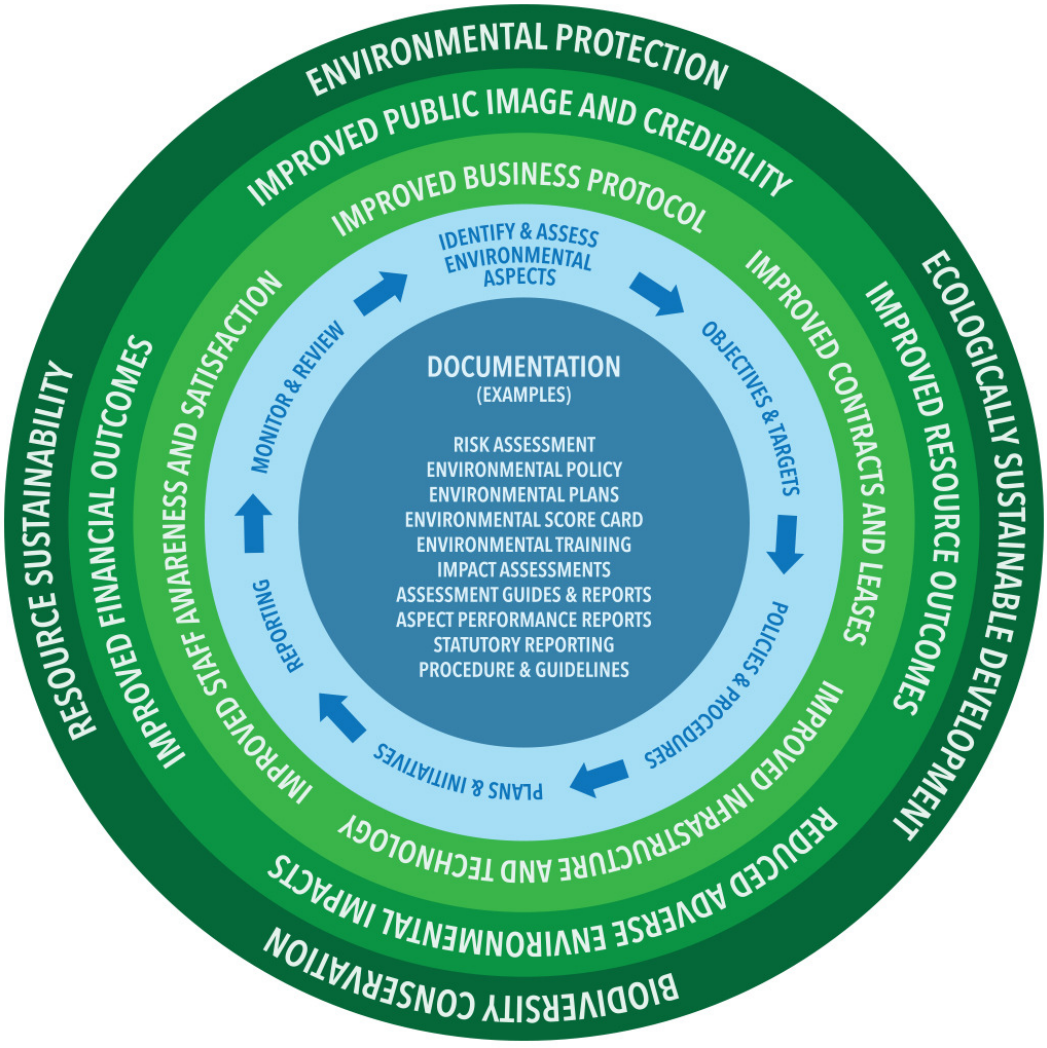


Figure C12: SEMF in a nutshell.

[50] Toolkit D5 provides guidelines for disaster management planning and implementation.

C9.1.3 GOVERNANCE TOWARDS CONTINUAL IMPROVEMENT

The concept of continual improvement is embodied in and is a fundamentally important governance intervention advocated by the SEMF. Continual improvement is achieved by continually evaluating the relevance and performance of the SEMF (and the associated 'package' of municipal SDFs), and the sectoral strategies against the municipal vision, and goals and objectives for sustainability (refer to Chapter A5) with the purpose of identifying opportunities for improvement. It also refers to continually assessing and enhancing the efficiency, effectiveness and accountability of institutions and social partners to deliver against desired outcomes and mandates granted.

The required evaluation is achieved through efficient performance auditing, which is defined as *a systematic, documented verification process of objectively obtaining and evaluating audit evidence (verifiable information, records or statements of fact) to determine whether specified environmental activities, events, conditions, management systems, or information about these matters conform with audit criteria (policies, practices, procedures or requirements against which the auditor compares collected audit evidence about the subject matter), and communicating the results of this process to the client (organisation commissioning the audit)* (International Standards Organisation {ISO} definition cited in the Integrated Environmental Management Series: IEMS Sub Series No.1.7 (2004a).

Environmental auditing is an essential tool in the governance of Stellenbosch Municipality, in particular, as it relates to the management and monitoring of the performance of all spheres of government and their sectoral programs. The information generated from audit exercises provides important information to many different stakeholders. Although seen primarily as a tool in commerce and industry, creative application of environmental auditing techniques can improve transparency and communication in many areas of society where there is a need for greater understanding of environmental and ecosystem interactions (DEAT, 2004).

The imperative of 'knowing'

A clear-sighted understanding of the challenges South Africa faces is crucial for knowing which alliances to establish and maintain over the next 20 to 30 years (NDP, 2012). This requires that we strengthen appropriate monitoring, evaluation and reporting systems, including principles and a set of indicators, to monitor and evaluate performance in order to be able to determine success or failure and determine what corrective or adaptive measures are needed (National Framework for Sustainable Development {NFSD}, 2008).

At all levels, we need to enhance capacity for cross-sectoral coordination and trans-disciplinary thinking, as well as the mechanisms for integrating sustainable development considerations into sectoral policy and activities. Performance in respect of integrated planning and coordinated action needs to be strengthened within and across all spheres and requires particular capacity building interventions. Monitoring and evaluation systems need to be consolidated and fine-tuned so that they can better measure progress towards sustainability (NFSD, 2008). Monitoring and review are both necessary to provide government with the management information it needs to conduct quality assurance on its performance in respect of sustainable development; measure the nation's progress towards developing in a more sustainable direction against targets; and to ensure real transparency (NFSD, 2008). Monitoring and evaluation are key areas requiring urgent attention at all levels, in order to improve the governance for sustainable development. The need for regular, systematic policy assessments in the public sector to measure progress towards good governance has been explicitly accepted in principle by the South African government (NFSD, 2008).

The environmental auditing advocated by the SEMF is characterised by the following (DEAT, 2004):

a) Systematic*:* It is a systematic process that must be carefully planned, structured and organised. As it is part of a long-term process of evaluation and checking, it needs to be a repeatable process which can be readily replicated by (if necessary) different teams of people (also spheres of government) in such a way that the results are comparable and can reflect change in both a quantifiable and quantifiable manner.
b) Coherent documentation*:* The premise of the audit is that its findings are supported by documents and verifiable information. The audit will seek, on a sampled basis, to track past government actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.
c) Periodic*:* The audits of the various spheres of government are individual events. However, the real value of the audits is that they are carried out at defined intervals and their results can illustrate improvement or change over time.
d) Objective evaluation*:* Although environmental audits are carried out using governmental policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. This flexibility reflects the fact that different auditors have different life and professional skills and experience and they may bring different interpretations to site situations and circumstances.
e) Governmental performance: The essence of the audits is to find out how well the relevant sphere of government or institution is performing.
f) Facilitating appropriate control of governance practices: Governance practices can happen with or without direct or specific instructions. The key to good performance is to ensure that these practices happen according to procedure, guidelines, training and systems requirements (e.g. the SEMF).
g) Compliance with policies and regulatory requirements: Compliance with all applicable statutes, policy and other directives is of fundamental importance.

C9.1.4 OBJECTIVES

The overarching objective of audits is to test the adequacy of existing governance systems. Depending on the need of the relevant institution or enterprise audits can address one topic, or a whole range of issues. The scope of an audit can vary from compliance testing to a rigorous examination and assessment. It not only applies to operational environmental, health and safety management, but also to product safety and product quality management, and to aspects such as loss prevention (refer to Toolkit D10).

The key objectives of the mandatory environmental performance auditing are to:
a) Demonstrate the commitment of the Municipality to ensuring continual improvement of activities and sustainability programs to all concerned.
b) Assess the efficiency and appropriateness of land-use management and provide an objective premise for continual improvement.
c) Verify and ensure institutional compliance with the applicable legislation, policy and other directives.
d) Safeguard the environment.
e) Evaluate the extent to which climate neutrality is achieved and determine and implement mitigatory measures as required.
f) Indicate current or potential future problems that need to be addressed.
g) Assess training programs and provide data to assist in training.
h) Enable land-users to build on good environmental performance, learn from positive precedents and rectify deficiencies.

i) Identify potential cost savings, such as from waste minimisation.

C9.1.5 POLICY

The following policy applies as it relates to environmental performance auditing:

a) The Municipality is to develop and implement an efficient environmental performance auditing system.
b) The Municipality is to undertake a bi-annual comprehensive environmental performance audit.
c) In order to ensure continual improvement, findings of the integrated auditing process and rectification recommendations are to be implemented through the process of adaptive management.

C9.1.6 PRIORITISED STRATEGIES AND IMPLEMENTATION GUIDELINES

NUMBER	DESCRIPTION	PRIORITY
C9.1.6(a)	Implement an integrated development orientation and planning approach in governance. Key interventions are to: a) Implement the SEMF as an integrated planning framework for the Municipality. b) Establish appropriate integrating and inter-governmental relations planning structures at all levels.	High/ Ongoing
C9.1.6(b)	Implement, as part of the SDF, an efficient environmental performance auditing system (refer to Toolkit D6).	"

C9.2 ADAPTIVE MANAGEMENT AS A FUNDEMENTAL COMPONENT OF THE SEMF

Adaptive management[51] is a process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring and auditing of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process.

Adaptive management also recognises the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasises learning while doing. Adaptive management does not represent an end in itself, but rather a mechanism towards more effective decisions and enhanced performance. Its true measure is in how well it helps meet environmental, social and economic goals, increases scientific knowledge, and reduces tensions among stakeholders. Adaptive management involves ongoing, real-time learning and knowledge creation, both in a substantive sense and in terms of the adaptive process itself (Williams *et al*, 2009).

The concept of learning is central to adaptive management, with learning seen as a means to good governance (refer to the key principles of efficient spatial planning in Chapter A6). Learning within the context of adaptive management derives from evaluation of previous management actions, the results of which are used to inform subsequent actions (Williams *et al*, 2009). Adaptive

[51] For the purposes of the SEMF, 'management' includes governance actions and functions of the three spheres of government (i.e. provincial, district and local).

government management procedures and strategies specify what actions are to be taken and how and when they should be adjusted.

These strategies are, in turn, based on an explicit articulation of the management problem, what is known (and not known) about the resource system being managed, and the objectives of management (Williams *et al*, 2009). This explicitness makes it possible for stakeholders to focus on the key attributes involved in learning-based resource management, while avoiding the confusion and controversy that typically results when key management elements are not open to discussion and negotiation.

Figure C13 illustrates the steps of the adaptive management process to be implemented through *inter alia* the IDP and SDF and the EMSs of public and private enterprises. The aim of the process is to serve as a mechanism to give effect to continual improvement of governance and environmental management performance based upon the findings efficient auditing. The efficient implementation of the SEMF depends on the following key requirements:

C9.3 KEY REQUIREMENT FOR EFFICIENT IMPLEMENTATION OF THE SEMF

The NDP states that there are two main reasons for the failure to deliver on the development expectations and slow progress in South Africa since 1994, namely a *failure to implement policies* and an *absence of broad partnerships*.

The NDP promotes a plan-led system to bring focus and allow long-term public interests to guide the development process. It acknowledges that it will take time to create this capability and that it is necessary to *draw on a fuller understanding of the limitation of current arrangements and incorporate the lessons of good international practice*.

The above shortcomings manifest into a major stumbling block to efficient implementation of governmental strategies and plans, namely a lack of co-ordination and co-operation among the relevant institutions. In order to meet this challenge, the following imperatives have to be addressed throughout the three spheres of government in Stellenbosch Municipality and beyond:

a) Institutional integration: Alliances between institutions are to be forged to close gaps, minimise overlap and make management and investment in the Municipality more efficient.

b) Integrated development planning: This is defined as *a participatory approach to integrate economic, sectoral, spatial, social, institutional, environmental and fiscal strategies in order to support the optimal allocation of scarce resources between sectors and geographical areas and across the population in a manner that provides sustainable growth, equity, and the empowerment of the poor and the marginalised.* (Forum for Effective Planning and Development, 1995).

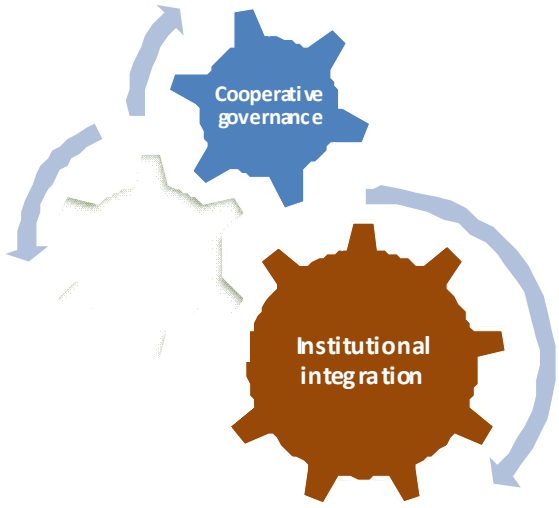


Figure C13: Imperatives for efficient implementation of environmental planning and land-use policy.

Integrated planning is intended to strike a balance between the SEMF strategic intents and the desired outcomes. It seeks to harness the strength of multiple service delivery capabilities through convergence in provincial imperatives and operations. This is about fostering cohesion across a broad continuum of planning, implementation, monitoring and evaluation mechanisms through shared actions.

c) Cooperative governance: 'Inter-governmental relations' refer to the relationships between the three spheres of government, i.e. national, provincial and municipal. The South African Constitution states, 'the three spheres of government are distinctive, interdependent and interrelated'. Local government is a sphere of government in its own right, and is not an administrative implementing arm of national or provincial government. Although the three spheres of government are autonomous, they exist in a unitary South Africa and they have to work together on decision-making and must co-ordinate budgets, policies and activities. Compliance with the latter is a legal obligation in terms of the Intergovernmental Relations Framework Act 13 of 2005. The Act aims to *establish a framework for the national government, provincial governments and local governments to promote and facilitate intergovernmental relations; to provide for mechanisms and procedures to facilitate the settlement of intergovernmental disputes; and to provide for matters connected therewith.*

The Act seeks to set up mechanisms to coordinate the work of all spheres of government in providing services, alleviating poverty and promoting development. The Act also establishes a line of communication that goes from municipalities to the provinces and directly to the Presidency. The Act advocates the establishment of intergovernmental forums as well as implementation protocols whereby the participation of organs of state in different governments co-ordinate their activities or actions by entering into such protocols. This may include issues such as the implementation of policies, the exercise of a power, and the performing of a function or the provision of a service.

Chapter 3 of the Constitution gives credence to integrated governance. It stresses cooperation between the national, provincial and local spheres of government which are interdependent and interrelated. The Constitution also affords value to participatory governance as the substance of our democracy. Chapter 6, 7 and 10 of the Constitution create a space for people to participate in influencing the decisions that affects their everyday life. The Local Government Municipal Structures Act of 1998 and Local Government Municipal Systems Act of 2000 present the parameters for cooperation within the framework of the provisions of the Constitution between the local, provincial and national spheres of government.

The efficiency of the SEMF depends on the extent to which the above imperatives are addressed. This necessitates the deliberate creation of an interconnected web of municipal and private sector institutions with integrated objectives focussed on sustainable service delivery.

The SEMF serves as a spatial and principle framework (i.e. 'common ground') within which the imperatives of *institutional integration*, *integrated development planning* and *co-operative governance* can be achieved.

A key function in this regard is to enhance intra- and inter-institutional convergence and give effect to the ideals of integrated governance and coordination. The defining features of the latter

are common purpose and commitment. As implementing agents, the municipal departments are expected to deliver on identified policy objectives through integrated governance and coordination. Accordingly, the following directives apply to all sectors and stakeholders with regard to the above imperatives:

(i) *Institutional integration*, *integrated development planning* and *co-operative governance* shall be given effect.

(ii) HODs are responsible for *institutional integration*, *integrated development planning* and *co-operative governance.*

(iii) Compliance with the directives pertaining to *institutional integration*, *integrated development planning* and *co-operative governance* is subject to annually auditing.

C9.4 PERFORMANCE MONITORING AND AUDITING

The long-term performance and relevance of the SEMF is subject to on-going monitoring and evaluation in terms of a dedicated procedure. The latter procedure together with the assessment criteria and rectification measures are addressed in Section C and Section D of the SEMF. The concept of continual improvement is embodied in and is a fundamentally important governance responsibility advocated by the SEMF. Continual improvement is to be achieved by continually evaluating the relevance and performance of the SEMF, and the relevant package of municipal policies against the general municipal vision, the Stellenbosch Environmental Vision, and goals and objectives for sustainability (refer to Chapter A5) with the purpose of identifying opportunities for improvement.

The required evaluation is to be achieved through efficient performance auditing, which is defined as *a systematic, documented verification process of objectively obtaining and evaluating audit evidence (verifiable information, records or statements of fact) to determine whether specified environmental activities, events, conditions, management systems, or information about these matters conform with audit criteria (policies, practices, procedures or requirements against which the auditor compares collected audit evidence about the subject matter), and communicating the results of this process to the client (organisation commissioning the audit)* (International Standards Organisation {ISO} definition cited in the Integrated Environmental Management Series: IEMS Sub Series No.1.7, 2004).

Performance auditing is an essential tool in the governance of Stellenbosch Municipality, in particular, as it relates to the management and monitoring of the performance of all spheres of government and the sectoral programs. The information generated from audit exercises provides important information to many different stakeholders.

Creative application of performance auditing techniques can improve transparency and communication in many areas of society where there is a need for greater understanding of governance in general. The SEMF serves as a basis for measuring the performance of all spheres of government in the Municipality, rectification of performance where required, and continual improvement in terms of the principles of adaptive management and the principles of good governance.

SECTION D
USER'S TOOLKITS TO INFORM IMPLEMENTATION AND USE

SECTION D: USER'S TOOLKITS TO INFORM THE IMPLEMENTATION AND USE OF THE SEMF

SECTION SYNOPSIS

Section D comprises a host of procedural directives or 'toolkits' that provide guidance pertaining to the planning and implementation of the key concepts, approaches and strategies presented in Sections C. Section D is dynamic in that it is subject to on-going updating and supplementation as new information becomes available. Figure D1 indicates the toolkits presented in this section. Toolkit D7 caters for additional tools that may be added as the SEMF implementation process unfolds.

TOOL KIT	DESCRIPTION
D1	LAND-USE PLANNING BY MEANS OF THE SPCS
D2	COMMUNITY-BASED ENVIRONMENTAL GOVERNANCE
D3	THE SPECIAL MANAGEMENT AREA (SMA) MODEL
D4	PLANNING & IMPLEMENTING SUSTAINABLE DEVELOPMENT
D5	RISK AND DISASTER MANAGEMENT
D6	ENVIRONMENTAL AUDITING INDICATORS
D7	GENERAL TOOLS TO BE ADDED

Figure D1: Structure of Section D.

TOOLKIT D1 LAND-USE PLANNING BY MEANS OF SPCs

TOOLKIT SYNOPSIS

The purpose of this toolkit is to inform the land-use classification to be undertaken throughout Stellenbosch Municipality in terms of the principles and process presented in Chapter C1. This applies, in particular, to the preparation of the following:

a) SDF of the Municipality.
b) Bioregional plan of the Municipality (refer to Chapter C2).
c) Tourism plans to be prepared for the Municipality.
d) Detailed farm plans to be prepared by landowners (refer to Chapter C5).

The key objective of the land-use methodology is to create a standard land-use framework for the municipality as a whole which cascades from broad, generic guidelines on the municipal level to detailed farm (or landscape) planning level.

D1.1 LAND-USE CLASSIFICATION

As described in Chapter C1 a fundamental phase of spatial planning is to undertake appropriate land-use classification throughout the planning area in accordance with a classification system that is based upon a structure of interrelated cores, corridors and matrices.

In terms of this model the classification system includes core nature areas that feature representative samples of the region's characteristic biodiversity. Ideally such sites, which may already be designated as protected areas, should be linked by corridors of natural or restored natural plant cover to permit migration and adaptation to global change. Both the core sites and corridors should be nested within a matrix of mixed land-uses and ownership patterns (refer to Chapter C1).

D1.2 SPATIAL PLANNING CATEGORIES: A MECHANISM FOR LAND-USE CLASSIFICATION

As described in Chapter C1, a comprehensive set of *Spatial Planning Categories* (SPCs) was developed. These SPCs include all land zonings that are provided for under the existing Zoning Scheme Regulations.

The SPCs are not a blueprint for land-use classification, or a zoning scheme. The SPCs provide a framework to guide decision-making regarding land-use at all levels of planning, and they have been articulated in a spirit of creating and fostering an organised process that enables people to work together to achieve sustainable development in a coherent manner.

The designation of SPCs does not change existing zoning or land-use regulations or legislation. SPCs merely help to clarify and facilitate coherent decision-making that can lead to better zoning, laws and regulations. The SPCs, furthermore, provide a framework in terms of which land-use decisions can be standardised throughout the municipality. It is advisable that all zoning scheme regulations be aligned with the SPCs. The SPCs are to be applied in land-use classification at all levels of planning in Stellenbosch Municipality (refer specifically to the preparation of IDPs and SDFs).

D1.3 GENERAL ASPECTS OF SPC DESIGNATION

The primary applications of the SPCs include the following:

a) The SPCs provide a system in terms of which all land units or entities within the municipality will eventually be recorded, facilitating effective administration of land-use issues.
b) The SPCs can be used to indicate both the *status quo* of official land-use and the desired land-use of all land within a planning area. In addition they identify specific types of land-uses that are not included in the existing Zoning Scheme Regulations, providing for a non-statutory and more detailed land-use classification.
c) The SPCs indicate desired land usage which might in certain instances be aligned with the current zoning of properties and in other instances differ from that.
d) Existing Zoning Scheme Regulations are to be amended/upgraded in order to include these new concepts.
e) The SPCs facilitate decision-making regarding applications for a change in land-use. In this regard it is important to note that an SPC designation which differs from the current zoning, implies that any new development will be considered a diversion from the *status quo*, requiring that applications will have to be considered by the relevant authorities in accordance with specific guidelines. For example, an application for the construction of new farm buildings within a tract of natural vegetation on the farm implies a change in land-use from Category C.a (Extensive Agriculture) to Category D.r (Farmstead). Consequently the applicant will be required to ensure that the application conforms to the relevant place-specific planning and design principles. This implies that the relevant authority will then be able to evaluate the application objectively and make an appropriate decision.

D1.4 APPLICATION OF SPCs IN NATURAL LANDSCAPES

SPC A and SPC B and, to an extent, SPC C.a areas primarily relate to the *natural landscape* which contains the *inhabited (human-made) landscape* (SPC C.b, D, E, and F).

Natural and human-made places are not homogeneous. A classification is required to describe the different characteristics and functions of different types of natural landscapes in order to develop a common language that can be used for spatial planning purposes throughout the municipality. Differentiation is, for example, made between Category B.a and B.b describing a higher and lower order status. Well mapped SPCs enable both the applicant and the officials involved in evaluating the application, to make objective decisions at an early stage of planning.

SPC B designation illustrates the following:

a) Extent of the area that contains conservation-worthy habitats or habitat units.
b) Extent of land, which should, ideally, be rehabilitated to improve the quality of the natural landscape and/or to promote biodiversity conservation.

SPC B.a and SPC B.b areas are primarily private property. The designation of SPC B.a and B.b areas does not imply that it is necessarily undesirable to undertake any development within such areas. Such designation is rather an indication that one must proceed with caution. SPC B.a and B.b provide an explanation of the nature and extent of the landscape characteristics of the particular area and present a basis for the evaluation of development proposals in proper context. SPC B.b designation, therefore, essentially represents an ideal, the achievement of which represents a challenge to the authorities, planners, developers and landowners. SPC B.b designation does not

take away any of the landowner's rights, nor does it grant any rights. It merely indicates that the particular tract of land is of importance to biodiversity conservation and, consequently, to the well-being of the people of the area, and that due care should be taken in the management of the land. The above ideal could be achieved through the implementation of innovative strategies, such as the establishment of a *Special Management Area* (refer to Toolkit D3), which could be required as a condition of approval for rezoning or development rights on a property.

D1.5 APPLICATION OF SPCs IN HUMAN-MADE LANDSCAPES

As stated previously, the human-made landscape is contained within the natural landscape. The symbiotic relationships between the two landscape types need to be understood and managed. SPC C (Agriculture), SPC D (Urban), SPC E (Industry), and SPC F (Surface Infrastructure) are land-use types that form part of the human-made landscape.

The classification of the landscape in accordance with the SPCs will assist decision-making regarding which type of land-use is considered desirable, or undesirable, in a particular place and what the reasons are for such a decision. For example, it is quite clear that it would be undesirable (in fact it should be impossible) to approve the establishment of an SPC E.c (Light Industry) within an SPC A.a (Statutory Conservation Area). Under exceptional circumstances it may, however, be permissible to establish SPC E.c in an SPC B.b area (Ecological Corridor/Area).

On the other hand, the establishment of an SPC E.a area (Agricultural Industry) within an SPC C (Agricultural Area) will not have to be approached with the same caution as the latter example, because the proposed alternative land-use (agriculture-related) will not be foreign to its setting. Similarly, an application to establish an SPC D.q (Resorts and Tourism-related areas) within an SPC B.a area would be more acceptable than the establish of a SPC E.d (Extractive Industry) within an SPC B.a area.

In accordance with the SPCs, aspects of the above nature can now be considered by road engineers more objectively than was previously the case. In addition, such decisions can be taken in accordance with the requirements of bioregions, *neighbourhood areas* and biosphere reserves, and in collaboration with the authorities and communities of such entities.

It is important to recognise that SPCs can facilitate a better understanding of the nature and quality of our landscapes and should serve as an important instrument in the preparation of IDPs and in environmental education. However, SPCs do not provide a quick-fix, blueprint planning type of solution which requires little judgement and thought.

D1.6 PREMISE FOR SPC DESIGNATION: A SYSTEM OF VALUES AND ETHICS

A primary aim of the SEMF is to provide guidance to officials, developers, land owners and individuals to help preserve the qualities of the places where they live and work, to restore degraded places, and to create high quality places within the context of sustainable development. The SPCs incorporate both normative (qualitative value) and biophysical considerations.

Whilst it is recognised that the preparation of such guidelines and standards is a complex task, which cannot be fully described in a toolkit of this nature, it is nevertheless considered important to provide some rule of thumb principles, which can assist municipalities to prepare coherent SDFs. In

this regard, the SPCs are to be the basis of land-use designation that would, in addition to functional considerations, also reflect the qualitative dimension of places.

The above objective can be achieved through the classification of landscapes in accordance with specific values and ethics, and the application of a phenomenological approach to describe landscape characteristics. Environmental integrity is of fundamental importance for sustainable development and is largely influenced by land-use decisions. In turn, land-use decisions are influenced by specific values, norms and ethics.

A general problem in this regard, is that the strong moral values, norms and ethics required for coherent decision-making are often not given the necessary priority, or are over-ruled by rules-based systems, resulting in, amongst others, non-sustainable land-use, development of low quality settlements, uncontrolled and rural sprawl, etc. These phenomena are evident throughout Stellenbosch Municipality.

Therefore, in order to reverse the cycle of environmental degradation and non-sustainable development, it is imperative that a system of agreed-upon values, norms, and ethics be applied as the premise for all land-use decisions. A good SDF should build on a strong value system, which recognises that each place and the things that collectively shape the environmental character of such a place have intrinsic, instrumental and systemic values. These values need to be carefully considered when contemplating the current and future use of any particular place.
UNESCO's MaB Programme subscribes to the notion that *ethical values form the basis of decision-making and action in accordance with an ideal accepted in a given moral system. It is accepted that, what makes ethical values different from all other values, is their overriding character. They articulate an imperative or a 'must' that cannot be escaped by anyone who subscribes to them and they are converted into practice through principles and rules* (UNESCO, 2010).

The promotion of human well-being and the enhancement of the integrity of the natural environment are encapsulated in a global moral system and sound ethical values. The principles and rules through which these values should be given effect, include the just and efficient use of resources (capital) in accordance with legislative and official policy frameworks.

UNESCO (2010) and the UN (2010) state that *if the imperative or 'must do' that flows from an ethical value is denied, then that value and its importance itself is denied*. Such a denial is therefore not a matter of arbitrary choice. Accordingly, as is stated in the latter publication, the ethical domain is circumscribed not only by the value choices made by humans, but also by the critical weighing of the expected consequences of their choices**.**

The approach advocated by the MaB Programme is, in essence, a strategic value-based and pro-active one. In accordance with this approach the core interests and objectives, required to attain sustainable development, are identified and it is demonstrated how best to achieve it. Such objectives should include the role that innovation, technology and design can play in improving efficiency and, in so doing, improving the quality of the environment and human well-being.

In order to achieve the above, it is important that each place within the municipality be evaluated in accordance with a coherent value system that takes into consideration the unique mixture of values of that particular place, and a code of environmental, social, cultural and economic ethics. Environmental, social, cultural, and economic ethics appropriate to Stellenbosch Municipality

should allocate an equally important place to the conservation of nature on the one hand, and the improvement of the quality of life of people living in the environment on the other hand.

Since the dawn of culture, humans have modified the natural environment because no civilised humans can live in pure, pristine nature. However, due to *among others* explosive population growth and human greed, things changed and nature has come under severe pressure of inappropriate land-use and over-exploitation of resources.

Thus, it is clear that all existing and future land-use should be regulated in accordance with a code of ethics that recognises that we have a moral obligation towards the conservation of the environment and that our very existence depends on our decisions pertaining to the use of our environment and its resources.

The ultimate challenge of ethics is the conservation of life on Earth. However, life is not the only criterion of value. A 'mere thing' can also be something to be respected. There is value wherever there is creativity (Rolston, 1994:174). The World Heritage Convention recognises the importance and value of natural environments and manifestations, and cultural (human-made) features that are of global conservation-worthiness, and makes provision for their protection. Accordingly, the following three values are to be used to categorise landscapes:

D1.6.1 INTRINSIC, INSTRUMENTAL AND SYSTEMIC VALUE

The United Nations World Charter for Nature states that '*every form of life is unique, warranting respect regardless of its worth to man'* (Rolston, 1994). Natural ecosystems thus have intrinsic and systemic value that is independent of human use (i.e. instrumental value) and that are worthy of protection. The above values are to be determined for each planning area in accordance with the following basic questions:

a)	Intrinsic Value:	What is the good of the place or thing?
b)	Instrumental Value:	What is the place or thing good for?
c)	Systemic Value:	What is the contribution of the place or thing to the health of the system that contains it?
d)	Current Status:	What is the current status of the place or thing?
e)	Vision:	What could the place or thing look like, or be good for, if it was restored to pristine form?

These values are to be determined during the municipal SDF processes in a collaborative, participative process with all relevant stakeholders, representing an adequate mix of local, indigenous and scientific knowledge. The significance of the unique mix of current and potential values of a place should be duly recorded and properly translated into concrete, practical guidelines for the different stages of planning, design, decision-making, implementation and management of projects and plans. It is also envisaged that the determination of the value of places will not be a once-off event, but rather an on-going process. In practice, places are categorised in accordance with a continuum ranging from the 'least modified' to the 'most modified' (refer to Figure D2).

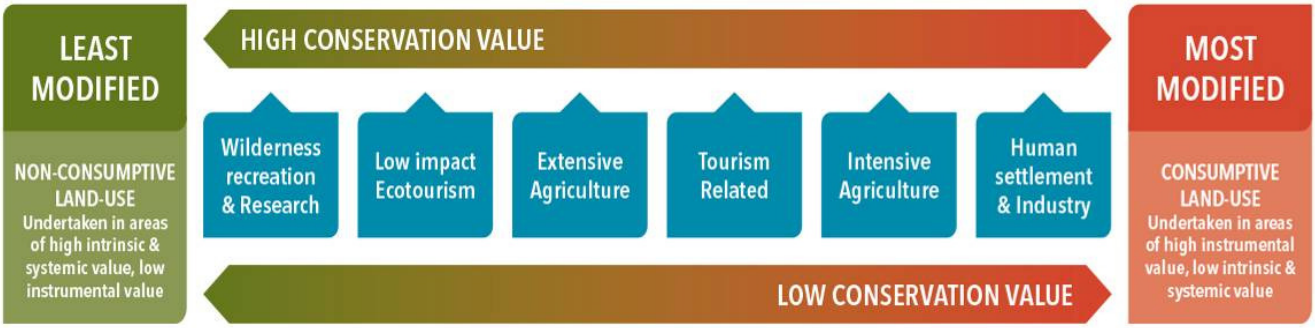


Figure D2: Land-use continuum.

By organising land-use in terms of a continuum, a simple geometry generally emerges, namely compact settlements, encircled by productive rural landscapes, and a connected matrix of nature areas stretching across the planning area. With this geometry, human populations can exist side-by-side with productive rural areas and fully functional ecosystems.

The biosphere designation model provides an ideal mechanism for the spatial delimitation of core areas (least modified areas), buffer areas, and transition areas (most modified areas). As illustrated by Figure D2, the concept implies the following:

- Least Modified Areas

This category is generally represented by pristine wilderness and natural areas that have high intrinsic and systemic value, with relatively low instrumental value (considering their low-impact and non-consumptive land-uses). Such areas have the following functions and value:

a) Representing benchmarks for environmental health and self-sustaining ecosystems.
b) Providing secure refugia for source populations and biodiversity.
c) Allowing natural processes to continue without human interference (unlike management of other protected areas, wilderness management is essentially the management of human use and influences to preserve naturalness and solitude, not the management, alteration or control of the natural processes themselves).
d) Providing opportunities for solitude or primitive and unconfined types of recreation.
e) Containing ecological, geological, or other features of scientific, educational, scenic, historical or cultural value.
f) Providing ecosystem functions, e.g. the provision of clean water from catchments, etc.

The intrinsic and systemic value of any natural environment is largely dependent upon the collective value of its components, and that any habitat fragmentation will have a negative effect on the value of the system as a whole.

- Most Modified Areas

This category represents the most modified end of the continuum referred to above, and generally represents the most intensively developed cultural landscape, accommodating dense urban settlements and consumptive human activities.

In such areas little of the natural environment remains and the intrinsic and systemic natural value is generally low. However, the instrumental value of such areas may be high due to their direct

contributions to the industries and industry-related developments that form a part of the economic base of the area. A most important aspect is that even the most modified cultural landscapes can have environmental integrity, and that this integrity is influenced *among others* by the manner in which people settle and use the environment.

In this regard, it is important to recognise that the *spirit of place* is manifested in *location, spatial configuration,* and *settlement boundaries* (Norberg-Schulz, 1984). Primary *structural properties,* such as the way buildings are constructed, etc. must be preserved in order to retain a particular *local quality* and protect the *atmosphere* of a place (Norberg-Schulz, 1984). In order to ensure that the intrinsic and systemic value of the human-made environment of Stellenbosch Municipality is restored and conserved in the long-term, it is suggested that the five principles of critical regionalism, namely sense of place, sense of history, sense of craft, sense of nature and sense of limits (Kelbaugh, 1997) be used to guide all future development and restoration.

TOOLKIT D2 COMMUNITY-BASED ENVIRONMENTAL GOVERNANCE

TOOLKIT SYNOPSIS

The SEMF aims to serve as a basis for an open and enthusiastic participatory partnership among all concerned. This toolkit provides guidelines for community-based environmental governance in terms of the principles of community consultation and involvement advocated by *inter alia* the SPLUMA and the NSSD1. The guidelines presented comply with the bioregional planning approach which recognises people as an integral part and the primary custodians of the environment.

The SEMF builds on the principle that community-based environmental processes contribute to the solution of intractable environmental problems in a manner that generates community buy-in and commitment. By bringing stakeholders together these processes introduce a total systems-perspective to problem-solving, making for better and more considered decisions. Through the dialogue process they also raise the awareness of the public regarding environmental matters. Participants learn the importance of the environmental protection, understand community perspectives and assess environmental alternatives (www.impact-llc.com/cemp.html).

D2.1 GENERAL BACKGROUND

Effective community-based environmental management processes depend on a number of critical success factors, including the following:

a) The need for strong leadership and sponsorship of the initiative that supports the process, to set the parameters clearly and to communicate the willingness to accept participant judgments in a credible manner.
b) The identification of stakeholders and analysis of their interests, a thorough scoping process that gets all views on the table to establish the legitimacy of the process.
c) The issues to be resolved by the process must have substance, i.e. really matter and be well-defined. Otherwise it will appear that the purpose is manipulation rather than participation.
d) Taking steps to ensure equitable participation is important to the credibility of the outcomes.
e) The willingness to devote the resources and time (shortcuts demonstrate lack of commitment to community resolution).

It is generally accepted that the causes and pressures of current environmental problems can be traced back, directly or indirectly, to the local level - and to the lifestyles, choices and values of local communities. Environmental challenges that become apparent at the global level are being tackled internationally through a variety of multilateral norms, conventions and agreements. While co-ordination mechanisms and information sharing systems are being set up on the international level it is obvious that the long-term success of such mechanisms and systems can be ensured only if it is accompanied with strong local action, and involvement of local stakeholders. It is widely accepted, particularly since the Rio Summit in 1992, that sustainable development requires community participation in principle and in practice.

Thus, the success of implementation of national and international policies largely depends on how well they are understood, interpreted and implemented at the local level. Therefore, real environmental actions must take place at the local level. It will be micro-action, taken by individuals

and communities, on a daily basis, that will cumulatively be able to reduce and mitigate the impacts of global and local environmental problems. A fundamental aspect of community-based environmental management is that is aims to involve the members of the affected community in a manner that will ensure their voluntary long-term commitment and co-operation. In this regard, it is imperative that tourism development should mesh with the values, opinions, and ideas of local community residents who ultimately must live with the positive and negative changes to their environment and quality of life.

An overarching goal of the SEMF is to contribute to ensuring that environmental management in the municipal area becomes truly community-based (i.e. that communities are meaningfully involved in the planning and management, and reap direct and indirect benefits from the conservation and management of the environment). The above goals build on the recognition that communities have immense impacts on the environment in general, and *vice versa*. In the latter regard, one of the greatest challenges facing planning authorities is to ensure that planning frameworks (e.g. the IDP and SDF) are designed and managed in a manner, which promotes enthusiastic and effective community participation.

The neighbourhood area planning and management procedure advocated in the Bioregional Planning Framework and further refined in the WIDF and the *Policy Framework for Bioregional Planning and Management and Biosphere Reserve of Stellenbosch Municipality* is an ideal mechanism through which the above can be achieved. Neighbourhood area planning and management will ensure that the physical scale of the planning area is such that the residents of that area would identify with it to the extent that they are encouraged to actively take part in its planning and management.

A community-based approach to environmental management integrates environmental management with human needs, considers long-term ecosystem health, and highlights the positive correlations between economic prosperity and environmental well-being (U.S. Environmental Protection Agency).

Community-based environmental management is therefore a creative approach to solve environmental problems using consensus based solutions through the collaboration of communities and governments in order to identify needs and take actions that will improve quality of life. Diverse stakeholders also work together to build the problem-solving capacity of the municipal area, towns, rural settlements and communities (U.S. Environmental Protection Agency).

As stated above, it includes the community's participation in the design and decision-making process, in the management and administration of environmental and related activities and operations. It ensures a degree of ownership by the community in the development process and operations. Central to an understanding of community participation is a realisation of the variety of meanings and interpretations that people attribute to the management of the environment. Cernea (1991) describes community participation as giving people more opportunities to participate effectively in development and management activities. This includes empowering people to mobilise their own capacities, be social actors rather than passive subjects, manage the resources, make decisions and control the activities, which affect their lives. The terms 'people's participation' and 'popular participation' are now part of the normal language of many development agencies including NGOs, government departments, and banks (Pimberg and Pretty, 1997).
The most relevant resource that can be utilised by a community to participate in the management of the environment is local knowledge. Each community adopts intellectual resources that are

accumulated and built over many decades and centuries, which includes cultural traditions and norms, economic and social systems, and ethical/religious customs. These aspects are developed based on the experiences of the local residents, and their co-existence and experiences with the local natural environment. It is vital that communities are made aware of the dimensions of the knowledge that they already possess, and how rich these resources are. This will lead to responsibility and a sense of ownership being attached to their local environment, with solutions, methods, and systems being developed and utilised within the community, which ultimately contribute to long-term sustainability (Innovative Communities Project Team). Local knowledge also is critical in identifying and defining issues that are important to the community, without which development of pertinent and feasible solutions cannot and should not be attempted.

Community-based environmental management contributes to the solution of intractable environmental problems in a manner that generates community buy-in and commitment. These processes, by bringing all stakeholders together, introduce a total systems perspective to problem-solving, making for better, more considered decisions. Through the dialogue process, they also raise the awareness of the public regarding environmental matters. Participants learn the importance of environmental protection, understand community perspectives and assess environmental alternatives (www.impact-llc.com/cemp.html).

The establishment of partnerships between different institutions and stakeholders in the design and implementation of community-based environmental management projects is therefore essential for project sustainability. This argument is based on the assumption that community-based environmental projects cannot be designed and implemented by one institution or organisation acting in isolation. As stated by Culpan (1987), partnerships need to be promoted because without coincidence of interests, and joint action to achieve common goals, institutions will not co-operate, and will undermine each other. The relationship between institutions will, to a very large extent, govern the nature of the project and impact heavily on its success or failure. The development of a successful community-based environmental management strategy will require a sound institutional framework based on a constructive partnership between the local community, Municipality, the private sector and NGOs.

D2.2 GIVING EFFECT TO COMMUNITY-BASED ENVIRONMENTAL MANAGEMENT IN STELLENBOSCH MUNICIPALITY

Community-based environmental processes contribute to the solution of intractable environmental problems in a manner that generates community buy-in and commitment. These processes, by bringing all stakeholders together, introduce a total systems perspective to problem-solving, making for better, more considered decisions. Through the dialogue process, they also raise the awareness of the public regarding environmental matters. Participants learn the importance of the environmental protection, understand community perspectives and assess environmental alternatives. Effective community-based environmental management processes depend, however, on a number of critical success factors, including (www.impact-llc.com/cemp.html):

a) The need for strong leadership and sponsorship of the initiative that supports the process, to set the parameters clearly, and to communicate credibly the willingness to accept participant judgments.
b) The identification of stakeholders and analysis of their interests, a thorough scooping process that gets all views on the table to establish the legitimacy of the process.

c) The issues to be resolved by the process must have substance, i.e. really matter, and be well-defined. Otherwise, it will appear that the purpose is manipulation, rather than participation.

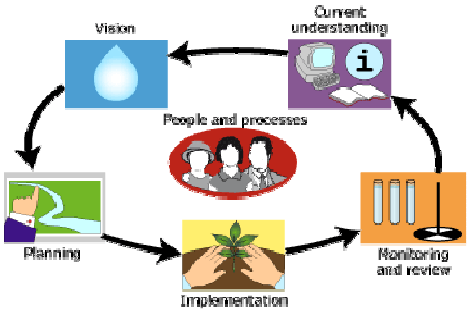
d) Taking steps to ensure equitable participation is important to the credibility of the outcomes.

e) The willingness to devote the resources and time: shortcuts demonstrate lack of commitment to community resolution.

There are many guides or models for community-based initiatives. However, there is a common framework that underlies all these models. Some of the key principles are summarised below.

D2.2.1 SCOPING AND PREPARATION

Community-based environmental management is issue specific and issues must be thoroughly understood by sponsors before initiating any participative process. It can help to have multiple stakeholders involved in the definition of the issue, as perspectives will differ. Boundaries must be clearly established for what is, and what is not within the purview of stakeholders. There must be a clear purpose and honest intent of the sponsor to involve people in the decision-making process.



It is important that all stakeholders be involved in the process. The mechanism for doing so may vary. A successful outcome, one that will be supported by the community, requires that stakeholder interests be anticipated and accommodated in the process. The participants in any community-based process need to be provided with information that enables them to engage knowledgeably. Good outcomes are predicated on establishing an environment conducive to effective dialogue and interchange. Facilities, materials and services need to be well thought out to support the process.

D2.2.2 PROBLEM-SOLVING AND DECISION-MAKING

The sponsor plays a key role in the ultimate outcome by outlining the issues, defining the boundaries, and empowering participants to make recommendations or decisions within the framework he or she establishes. Any community-based process should begin with agreement on the operating practices. Structuring the process to force alternately, divergent and then convergent thinking allows stakeholders to get their thoughts out, and permits the group to then focus on the bringing those thoughts down to something that all can support. All are heard in the process of reaching consensus. When actions are proposed and decisions are reached, people in the group should publicly commit to be responsible for their implementation.

D2.2.3 IMPLEMENTATION

Feedback on results is important to reinforce the benefits to stakeholders of their contributions. Appreciation for people's efforts is a critical, and too often unexpressed, factor in success over time. Most importantly, sponsors and decision-makers should visibly support the actions committed; they must provide the support necessary and actively monitor progress to see that the outcomes of the stakeholder process are implemented.

D2.3 FRAMEWORK FOR COMMUNITY-BASED ENVIRONMENTAL MANAGEMENT

The development of a successful environmental management strategy depends on a number of crucial elements, which must be incorporated into a well-planned strategy. This is best done within a conceptual framework for environmental management.

Diagram 5 below illustrates the management framework proposed for Stellenbosch Municipality, which builds on an integrated approach to the design and implementation of community-based environmental management projects.

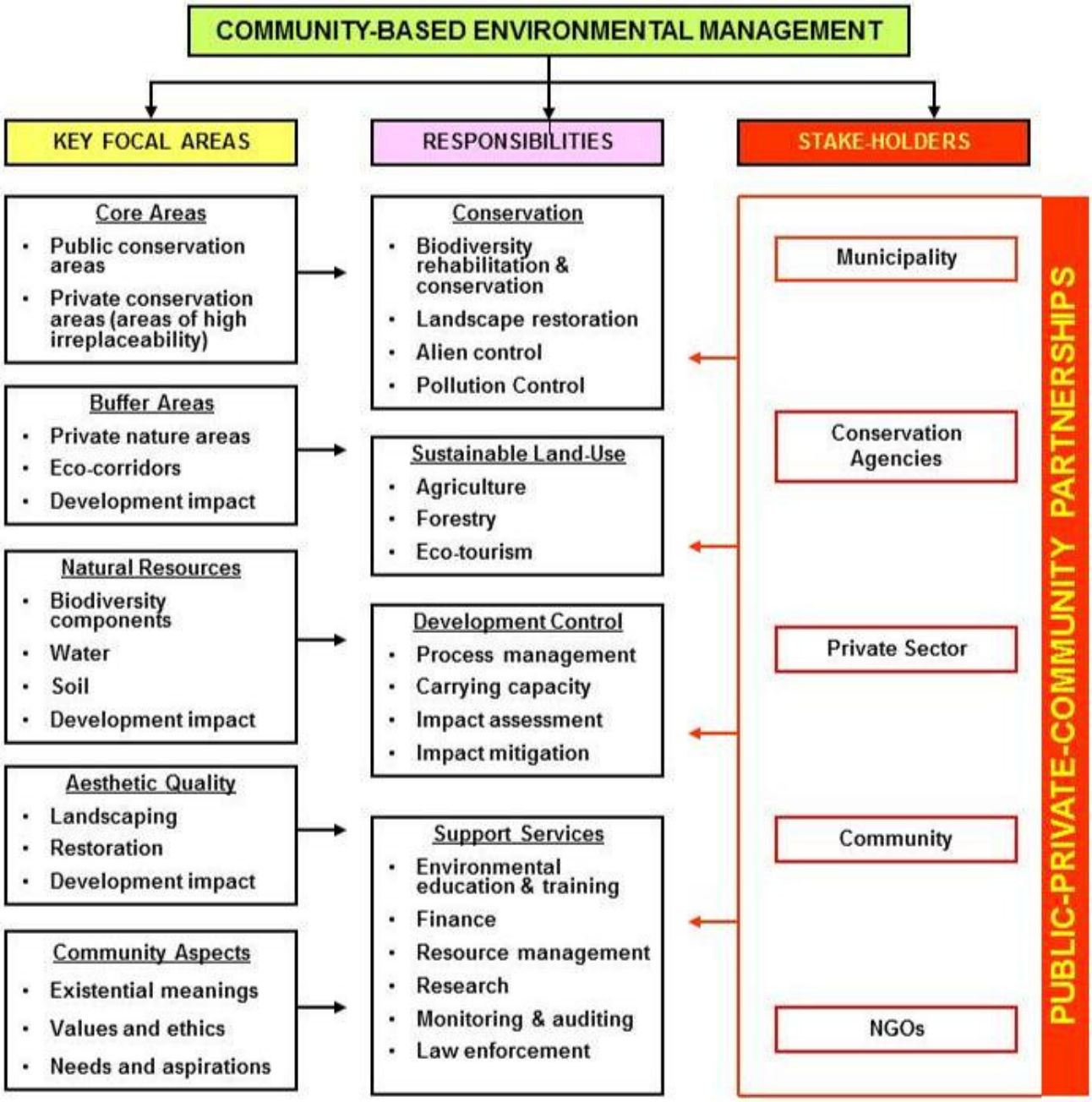


Figure D3: A conceptual framework for community-based environmental management.

The roles and functions of the various stake-holders are summarized as follows:

D2.3.1 THE MUNICIPALITY

The primary function of the *Municipality* as the key stake-holder is to provide the policy context and promote effective environmental planning and management as a primary requirement for achieving its sustainable development objectives.

In addition, the *Municipalit*y should support effective environmental management through the implementation of the Municipality's strategies for sustainable development described in its *Policy Framework for Bioregional Planning and Management and Biosphere Reserve*. These strategies are based on the following principles:

- Eradication of poverty is an indispensable requirement for environmental sustainability.
- Eradication of poverty requires environmentally sustainable solutions.
- Sustainable development requires a balance between economic growth, social development and environmental sustainability, but with the emphasis on economic growth until such time as large-scale poverty has been successfully eradicated[73].

The strategies for sustainable development focus on the following:

a) Providing a mechanism for integrating environmental and poverty concerns into municipal decision-making.
b) Providing a strategic and participatory process of analysis, debate, capacity strengthening, planning and action towards sustainable development.
c) Integrating both poverty eradication and environmental sustainability perspectives with municipal economic policies and programs.
d) Serving as a catalyst to analise economic, social and environmental development trends, taking stock of inter-related policies and plans, and identifying key problems – with the objective to achieve economic efficiency, social justice and environmental sustainability simultaneously.
e) Integrating sustainable development strategies and strategy processes into municipal development planning frameworks.
f) Mobilizing communities to promote continuous democratic dialogue and debate amongst broad sections of society.
g) Participation, representation, ownership and involvement of all relevant stake-holders promoting broad-based policy learning and capacity development.
h) Giving effect to government commitment and political will through negotiation and conflict management and balancing technical analysis with participatory planning process.
i) Transparency and awareness of choices and dilemma.
j) Implementation of initiatives for consolidating local ownership.

[73] The Municipality recognises that there is an increasing global awareness against economic growth at the expense of the natural environment. United Nations organisations such as UNEP (United Nations Environmental Programme); UNESCO (United Nations Economic, Scientific and Cultural Organisation); and international conservation bodies such as the IUCN (International Union for Conservation of Nature); the WRI (World Resource Institute); and the WWF (World Wide Fund for Nature); plead for national and regional development policy, and strategies that can facilitate sustainable development.

D2.3.2 CONSERVATION AGENCIES

Conservation agencies such as CapeNature have the responsibility to manage the various nature reserves and proclaimed catchment areas in the region (i.e. most of the core conservation areas). In addition they fulfill an important role in the conservation of privately-owned nature areas through promoting and supporting the establishment of conservancies.

CapeNature, furthermore, fulfils various additional functions that are essential for community-based conservation, namely research, law enforcement and extension services, and environmental education. In this regard, it is noted that community-based environmental management will never be sustainable without adequate support services. It is the task of all the stakeholders (in particular the Municipality and CapeNature) to see to it that such services are put into place. Areas that need special attention are education and training, capacity building, access to finance, natural resource management, and monitoring and evaluation of the management projects.

D2.3.3 PRIVATE SECTOR

In terms of the bioregional planning approach adopted by Stellenbosch Municipality sustainable development and holistic environmental restoration will not be achieved by only conserving statutorily protected areas. Areas of immense conservation importance are located on private land. The private sector is therefore a key stake-holder in integrated community-based conservation through, *inter alia*, the establishment of conservancies[74], managing conservation-worthy habitats as part of the system of protected nature areas to be established throughout Stellenbosch Municipality, and adopting and giving effect to the principles of sustainable agriculture[75].

In Stellenbosch Municipality the private sector has a further fundamentally important function, namely to give effect to public-private-community partnerships that *inter alia* promote community-based environmental restoration and development. A primary implementation mechanism and/or result of public-private-community partnerships is the establishment of a Special Management Area (SMA) over private and/or public land unit and the management of such SMA in accordance with an ISO[76]14001 Environmental Management System (EMS). A further key element of an SMA is that it includes a trust fund, the purpose of which is to support environmental rehabilitation and protection, and socio-economic development projects.

Communities do not have the institutional or the financial capacity to undertake environmental management projects on their own. Private sector involvement in community-based environmental projects is essential. The private sector must be encouraged to involve itself in environmental management as operators, suppliers of services, developers or financiers. Private sector developers possess sound business acumen and access to capital. Their business drive, combined with the

[74] An example of a conservancy that has been established by private land-owners with the support of the Municipality and the CapeNature is the Bottelary Hills Renosterveld Conservancy, which covers some 660 ha of the Bottelary Hills. The primary objective for this conservancy is the rehabilitation and protection of the indigenous fauna and flora of the Bottelary Hills.

[75] **Sustainable agriculture** is an approach as well as a process through which different management and technological activities and socio-economic principles are reconciled with environmental requirements (Smyth and Dumanski, 1993).

[76] International Standards Organisation.

conservation organisation's ecological and conservation expertise and the community's resources, will optimise the balance between wise land use and economical development of resources.

D2.3.4 THE COMMUNITY

The communities of Stellenbosch Municipality, as the *custodians* of the environment, are a key role-player in the process of community-based environmental management. The effective implementation of the latter is, therefore, largely dependent on the involvement and co-operation of the communities. Community members should be fully involved in its planning and management. In this regard, a fundamentally important requirement is to enable the communities to undertake or meaningfully participate in environmental planning and management. This will require building the capacity to participate, negotiate, and perform the various tasks involved.

Without a strong sense of community, sustainable community-based environmental management will not be achieved. Kelbaugh (1997) states that without a strong sense of community people are doomed to private worlds that are ultimately selfish and loveless and where constructive participation is impossible.

Working from the community perspective is important due to the fact that allot can be accomplished by a group of people who feel a certain degree of association with or responsibility for other members in the community. It is thus important to foster and extend the sense of association and responsibility from the smallest form of community out to the largest. In this way, an individual may feel a certain sense of association with his particular club, which is a small community, then a sense of belonging at the work place, an even greater sense of ties to his neighbourhood area, and then to Stellenbosch Municipality. Ultimately, he/she may come to regard all his fellow members in the community of humanity as somehow related to him, and from there see all of nature as being part of the same community by virtue of sharing the same air, sun and planet (UNEP, 1996).

Considering the community as competent and resourceful implies an assumption that they have access to information and resources, which enable them to make informed decisions. This is not always the case. Initially, due to a lack of experience, the community may not be competent to undertake most of the tasks required of it.

In order to achieve the primary goal of the SEMF, namely to contribute to ensuring that environmental management becomes truly community-based (i.e. that communities are meaningfully involved in the planning and management, and reap direct and indirect benefits from the conservation and management of the environment), it is important to ensure that planning frameworks (e.g. the IDP and SDF) are designed and managed in a manner, which promotes enthusiastic and effective community participation and that institution arrangements be adopted to facilitate such participation.

In this regard, it suggested that the neighbourhood area concept be adopted as a supplement to the ward system to provide the basis for local community participation, and that specific programs be implemented on the neighbourhood area level to strengthen a sense of community and address the difficulties of creating a sense of association and responsibility in a coherent manner. An important program that should be implemented on the neighbourhood area level is integrated environmental education, which is an effective 'subtle' strategy for implementing change by changing knowledge, attitudes and awareness.

D2.3.5 NON-GOVERNMENTAL ORGANISATIONS

NGOs working in the fields of conservation and development can play a significant role in facilitating the development of community-based environmental management. A large measure of support must be given to those who lack economic and political power against local and outside vested interests - not in the patronising sense of 'speaking for them, but giving them the means to speak for themselves' (Jones and Wiggle, 1987).

NGOs are seen as more neutral than government officials and therefore have the capacity to induce trust among members of a community. They are less subject to political controls and intervention. NGOs could provide a range of support services which include capacity and institutional buildings, bringing stakeholders together, arbitration for conflict resolution, access to funding, and the facilitation of negotiations between local communities, the private sector and government.

D2.4 PARTNERSHIP MODELS FOR ENVIRONMENTAL MANAGEMENT

Various models designed to facilitate local participation in environmental projects in South Africa have been proposed (De Beer and Elliffe, 1997). These models vary significantly among communities according to local conditions, needs and interests.

As stated by De Beer and Elliffe (1997), a partnership agreement between the community and one or more of the other stakeholders may often be more suitable than a community attempting to do everything entirely with its own human, physical and financial resources. The following models have been proposed for promoting local participation in environmental management projects in the Municipality (De Beer and Elliffe, 1997).

D2.4.1 COMMUNITY OWNED VENTURE

In this model, the community can own and development all infrastructure services and facilities relating to environmental management. They would be responsible for mobilising the necessary capital and expertise to plan, construct, operate and maintain the necessary infrastructure, facilities and services, as well as be responsible for the physical management of the environment. This model, though potentially very empowering, would in the short-term, constitute an extremely high risk for the community because they may lack the institutional capacity to apply it.

D2.4.2 PARTNERSHIP BETWEEN COMMUNITY AND MUNICIPALITY

This model represents a partnership between the community and the municipality in terms of which the state would manage the environment, tourism and SMME development and support functions, on behalf of the community. The municipality then assumes, on an agency/management contract basis, responsibility for the operation and maintenance of infrastructure and services, environmental management and regulatory function, SMME development and support and the mobilising of needed funding. According to the terms of this model, the community would receive profits minus the costs associated with the role played by the municipality.

D2.4.3 LEASE AGREEMENT BETWEEN COMMUNITY AND PRIVATE SECTOR

In this model, the private sector is mobilised by a lease agreement or a management contract to operate facilities that have been developed by the community on communal land. The community is responsible for building and maintaining the infrastructure, including mobilising the necessary funds.

The private sector is responsible for environmental management and for facilitating SMME development and support. Two options exist for benefits that flow to the community. If there is a lease agreement, a lease fee would be paid to the community on a regular basis. In the case of a management contract, all returns minus costs would be paid to the community.

D2.4.4 JOINT VENTURE BETWEEN COMMUNITY AND PRIVATE SECTOR

In this model, the community enters into a partnership with the private sector to enhance the condition of the environment of the area. The private developer would be responsible for developing, operating and maintaining all environmental management infrastructure and facilities, as well as SMME development and support functions.

The advantage of this model is its offsets of the constraints facing the community. These include obtaining necessary financing and addressing the need for institutional capacity to perform environmental management and SMME development and support functions. The benefits that flow to the community include short-term concession fee payments based on a percentage of turn-over. It also offers the community a genuine equity share in the operations.

The long-term vision in this scenario should be to create jobs, support equity holding and entrepreneurial opportunities associated with environmental rehabilitation and management, and create a sense of ownership and accountability among local communities for the environment.

When entering into a partnership, it is necessary to ask who represents the community. A mechanism is needed to represent the community's interests in terms of an equity share in the management and decision-making of various operations, as well as in terms of the distribution of benefits flowing to the community. It is proposed that a community trust be elected to represent the community.

TOOLKIT D3 THE SPECIAL MANAGEMENT AREA (SMA) MODEL

TOOLKIT SYNOPSIS

A primary overarching goal of the SEMF is to improve the general status and sustainability of both the natural and the human-made environment throughout the municipality. In this regard the aim is to create positive precedents through the implementation of innovative mechanisms or strategies. The establishment of a Special Management Area (SMA) is considered as a fundamentally important mechanism in this regard, which is of relevance to landowners, authorities, planners and developers.

An SMA provides an ideal spatial framework for the implementation of programmes such as LandCare and Conservation Stewardship. It is primarily an approach that is implemented voluntarily by landowners. However, it can be required as a condition of approval where new or additional land-use rights or rezoning have been granted. In such instance the contractual agreement would *among others* ensure compliance with the conditions of approval. As such, the establishment of an SMA could be a viable mechanism for ensuring long-term environmental sustainability on the relevant property (or group of properties), presenting a positive precedent as is promoted by the SEMF. This toolkit addresses the key aspects of the SMA concept and provides guidelines pertaining to its establishment and management.

D3.1 WHAT IS AN SMA?

An SMA is defined as 'an area of excellence and good practice', where the ethos of sustainable development is served in practice. It is also a cadastral geographical unit, which is formally recognised and managed as an area where environmental sustainability is promoted in practice and in accordance with international standards for environmental sustainability. Both public and private land can be declared an SMA, and both natural, cultivated (i.e. farmland) and inhabited land can be included into an SMA.

In an SMA, the landowner(s) will manage the environment and its resources in accordance with an Environmental Management System (EMS) or an Environmental Management Plan (EMP) that conforms to international standards for environmental management (e.g. ISODDD[77] 14001).

An important aspect of the establishment of an SMA is that the landowner(s) will be required to establish a trust fund, which will ensure that the necessary financial resources are available for effective long-term management of the SMA.

Where a farm has been declared an SMA by its owner, a primary purpose of the SMA will be to provide a framework for undertaking sustainable agriculture[78]. In this regard, the SMA and its EMS will facilitate adherence to the following principles of sustainable agriculture:

a) Physical-biological productivity (maintain and/or improve production/services)

[77] ISO (the International Organisation for Standardisation) is a world-wide federation of national standard bodies (ISO member bodies).

[78] Sustainable agriculture is an approach as well as a process through which different management and technological activities and socio-economic principles are reconciled with environmental requirements (Smyth and Dumanski, 1993).

(i) Maintain existing fundamental values, technologies and structures supporting sustainable and viable agricultural enterprises.
(ii) Develop and apply new technologies to improve the efficiency of farming practices.

b) Economic security (reduce production risk and uncertainty)
(i) Encourage local processing of farm products and the provision of local farm services to enhance the rural economy, increase the viability of agricultural production and reduce rural poverty.
(ii) Retain all the productive agricultural land for agricultural use.

c) Environmental protection (protect production potential of natural resources)
(i) Integrate land-use planning and community participation to ensure optimum management and utilisation of natural resources.
(ii) All farmers are responsible and accountable for the conservation of natural agricultural resources.
(iii) Land-users causing unacceptable degradation of the natural environment are responsible for rehabilitation of mismanaged natural agricultural resources.
(iv) Real cost of natural resources must be reflected in the pricing of these resources so as to discourage abuse.

d) Social acceptability and justice (promote/establish social acceptability)
(i) Ensure equitable access to resources to all communities.
(ii) Provide access to agriculture via land reform in accordance with environmental requirements and with full participation and consent of all the affected communities.

D3.2 ESTABLISHING A SPECIAL MANAGEMENT AREA

D3.2.1 PUBLIC SECTOR

It is incumbent upon government to show commitment to the promotion of IDP and SDF policy and to demonstrate, in an exemplary manner, how policy can be successfully implemented. The SMA mechanism presents the ideal opportunity for government to achieve this. Local may, by formal resolution, or inter-governmental agreement, establish and manage an SMA on own accord. The public sector can establish an SMA over a specific demarcated area (such as an area around a town, i.e. commonage land). This should be undertaken in accordance with agreements with the relevant stakeholders. Such agreements could, for example, be established through the IDP process. The establishment of an SMA provides an ideal vehicle through which public-private partnerships can be arranged in order to promote environmental sustainability in general, or to facilitate a specific project.

D3.2.2 PRIVATE SECTOR

In the private sector, an SMA can be established in accordance with the following guidelines:

a) It can give effect to the statutory conditions of approval for rezoning, or the granting of new land-use rights.
b) The establishment of an SMA can be ratified through a contractual agreement between the owner of a fixed property and the relevant municipality.
c) The contractual agreement will constitute the legal framework determining the obligations of the parties involved.

d) The contractual agreement must always provide for the SMA to be managed in accordance with an appropriate EMS, which must incorporate the landowner's obligations pertaining to the preparation and execution of all relevant requirements.

D3.3 PLANNING OF A SPECIAL MANAGEMENT AREA

In the required EMS, the following fundamental aspects need to be addressed appropriately:

D3.3.1 ENVIRONMENTAL POLICY

The EMS must put forward a specific environmental policy that complements existing IDP policy and addresses local environmental requirements. Such environmental policy for a specific SMA (or group of SMAs) should be consistent with, amongst others, the following principles:

a) Being appropriate to the nature, scale, and environmental impacts of development activities, local products, and available services. Implementation policies for a large resort complex would, for example, be different to a policy for a small landholding on which a single tourist facility (e.g. a small hotel) is located. In this regard, the criteria and purpose of the applicable SPC must be considered.
b) Ensuring the commitment of all stakeholders to continual prevention of all forms of environmental pollution.
c) Complying with relevant environmental legislation and regulations.
d) Providing a framework for determining and reviewing environmental objectives.
e) Being appropriately documented, implemented, maintained, and communicated by all concerned.

D3.3.2 PREPARING A SPECIAL MANAGEMENT AREA PLAN

Specific steps must be taken to translate the environmental policy into a working plan that incorporates, amongst others, the following:

a) Identifying the aspects of activities, products, and services that can impact on the environment and evaluating the significance of the potential environmental impacts.[79]
b) Determining and incorporating any legal and statutory requirements that are applicable to the relevant environment.
c) Establishing and incorporating any environmental objectives put forward by, amongst others, the relevant IDP and lower sphere planning frameworks.
d) Establishing and implementing an effective Environmental Management Plan.

D3.3.3 IMPLEMENTATION AND OPERATION

Provision must be made for the implementation of appropriate environmental management standards, including the following:

a) Defining roles, responsibilities and authorities to facilitate sustainable environmental management.
b) Identifying training needs, and awareness and competence limitations.
c) Providing effective communication channels between all stakeholders.
d) Ensuring effective implementation of all EMS requirements.

[79] ISO 14001 defines an environmental impact as being *'any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services'*.

e) Providing effective control over operations.
f) Ensuring appropriate project management and documentation control.
g) Identifying emergency needs and providing appropriate contingency measures.

D3.3.4 MONITORING AND CORRECTIVE ACTIONS

It is of fundamental importance to implement procedures for regulating operational performance and for ensuring that objectives are being achieved. This could be achieved through the following:

a) Monitoring and measuring all impacts of development and management actions on the environment.
b) Establishing and implementing procedures for handling incidents of non-conformance with the EMS.
c) Managing environmental records, including, amongst others, the results of audits and reviews and the evaluation of educational programmes.
d) Undertaking periodic environmental audits in accordance with a formal auditing procedure.

D3.3.5 MANAGEMENT REVIEW

The EMS needs to be reviewed at set intervals to ensure its continuing appropriateness and effectiveness. Such reviewing needs to take note of the results of the environmental audits that are to be undertaken and submitted to the relevant authorities on a scheduled basis.

TOOLKIT D4 IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT

TOOLKIT SYNOPSIS

The NSSD1 considers sustainable development as *the process that is followed to achieve the goal of sustainability. Sustainable development constitutes the selection and implementation of development options which allow for appropriate and justifiable social and economic goals to be achieved, based on the meeting of basic needs and equity, and without compromising the natural system on which it is based*.

The SEMF regards sustainable development as a long-term commitment, which combines environmental protection, social equity and economic efficiency within the vision and values of the country. Accordingly sustainable development, as advocated in the SEMF, must create economic drivers beyond the ambit of the development and its productive life cycle (where applicable). These economic drivers are to be self-sustaining and capable of sustaining the local economy after the project life of the initial development. The SEMF is premised upon and gives effect to the following five strategic objectives related to sustainable development:

a) Enhancing systems for integrated planning and implementation.
b) Sustaining our ecosystems and using natural resources efficiently.
c) Towards a green economy.
d) Building sustainable communities.
e) Responding effectively to climate change.

In order to give effect to the above requirements, principles and objectives, the SEMF supports a plan-led and coherent approach to sustainable development. Development in the municipality is to comply with this approach summarised in this toolkit.

D4.1 A SUSTAINABLE DEVELOPMENT APPROACH

The NDP promotes a plan-led system to bring focus and allow long-term public interests to guide the development process. It acknowledges that it will take time to create this capability and that it is necessary to *draw on a fuller understanding of the limitation of current arrangements and incorporate the lessons of good international practice*. The NDP furthermore requires that spatial planning and development be guided by normative principles and that policy and plans should explicitly indicate how they would meet the requirements of such principles.

In order to give effect to the NDP and NSSD1 directives and principles it is recommended that development in Stellenbosch Municipality in the future be planned, designed, implemented and managed in accordance with a coherent methodology which addresses all dimensions of the planning and development process in an integrated and holistic manner and which complies with all applicable protocols, conventions, legislation and policy, from the international to the local level.

TOOLKIT D5 RISK AND DISASTER MANAGEMENT

TOOLKIT SYNOPSIS

This toolkit provides broad guidelines for the planning and implementation of disaster management as a key function of Stellenbosch Municipality and the Cape Winelands District Municipality. These guidelines have been drawn from the Disaster Management Act 57 of 2002 and the Municipal Infrastructure and Disaster Management Protocol of the Western Cape Government.

D5.1 DEFINITIONS

The following definitions apply (Municipal Infrastructure and Disaster Management, Western Cape Government):

a) Hazard: A hazard can be defined as a potentially damaging physical event, social and economic disruption or environmental degradation. Typical examples of hazards can be absence of rain (leading to drought) or the abundance thereof (leading to floods). Chemical manufacturing plants near settlements and incorrect agricultural techniques, can also been seen as hazards which could lead to possible disasters. Hazards can be the creation of man or the environment.

b) Risk: Risk is usually associated with the human inability to cope with a particular situation. In terms of disaster management it can be defined as the probability of harmful consequences, or expected losses death, injury, damage to property and the environment, jobs, disruption of economic activity or social systems. Hazards will affect communities differently in terms of ability and resources with which to cope. Poorer communities will be more at risk than others.

c) Vulnerability: Vulnerability can be seen as, the ability a person or community has to predict, cope with, or avoid and recover from, the consequences of a hazard or disaster. Marginalised, poorer and over-populated communities are more vulnerable and less able to cope with disasters.

d) Natural Phenomena: Natural phenomena are extreme weather, water or geological (earth) processes that do not pose a threat to people or properties. When they occur in a deserted place, they are merely natural phenomena and nothing else. However once they affect human beings, due to location or poor planning by the human beings, they are a potential hazard and could become a disaster.

e) Disaster: A disaster is the serious disruption of the functioning of a society, causing or threatening to cause, widespread human, material or environmental losses which render the affected community unable to cope using its own resources. Disasters are only disasters because they impact and affect the way in which we live. They can be caused by the impact of a natural occurrence on human beings or by human beings themselves. From the above definitions, it becomes apparent that it is incorrect to refer to "natural disasters", since natural phenomena in themselves are not disasters unless they impact negatively on populated areas.

f) Emergency: An emergency can be seen as a local event within a community that affects a limited number of people or property. An emergency could require extreme measures to correct and cope with, but can usually be managed by the community itself, using its own resources.

g) Disaster Risk Reduction: Disaster risk reduction can be seen as the systematic development and application of policies, strategies and practices to minimize vulnerabilities and disaster risks throughout a society to prevent and limit negative impacts of hazards, within the broad

context of sustainable development. In South Africa, disaster risk reduction is an integral and important part of disaster management.

h) Disaster Mitigation: Disaster mitigation refers to structural and non-structural measures that are undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards on vulnerable areas, communities and households. These efforts can target the hazard or threat itself (for example, the positioning of firebreaks on the urban/rural interface). This is often referred to as 'structural mitigation', since it requires infrastructure or engineering measures to keep the hazard away from those at risk. Disaster mitigation efforts can also target people who are at risk, by reducing their vulnerability to a specific threat (for instance, promoting community responsibility for controlling fire risk in an informal settlement). This is often called 'non-structural mitigation', as it promotes risk-avoidance behaviours and attitudes.

i) Preparedness: Preparedness contributes to disaster risk reduction through measures taken in advance to ensure effective response to the impact of hazards, including timely and effective early warnings and the temporary evacuation of people and property from threatened locations. Preparedness enables organs of state and other institutions involved in disaster risk management, the private sector, communities and individuals to mobilise, organise, and provide relief measures to deal with an impending or current disaster, or the effects of a disaster. Preparedness differs from prevention and mitigation, as it focuses on activities and measures taken in advance of a specific threat or disaster.

j) Disaster Response**:** Disaster response refers to the provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term or protracted duration.

k) Disaster Recovery: Disaster recovery (including rehabilitation and reconstruction) focuses on the decisions and actions taken after a disaster to restore lives and livelihoods, services, infrastructure and the natural environment. In addition, by developing and applying risk reduction measures at the same time, the likelihood of a repeated disaster event is reduced. Disaster recovery includes:

- rehabilitation of the affected areas, communities and households
- reconstruction of damaged and destroyed infrastructure
- recovery of losses sustained during the disaster event, combined with the development of increased resistance to future similar occurrences.

l) Distinguishing between Hazards and Disasters: A natural phenomenon like a veldfire, or a person using a primus stove are not hazards until they pose a threat to human life, property, infrastructure or the environment. If the veldfire gets out of hand and rages into a populated area, or the primus falls over and causes a fire in the home, then each becomes a hazard. The veldfire or primus fire could then spread uncontrollably and burn down many houses and buildings and the environment could be seriously damaged. Many lives could be lost and people could end up in hospital having sustained serious burns. The economy and livelihoods of people could be adversely affected and if resources are not within the means of the people to manage the situation, then a disaster has occurred. Hazards do not necessarily become disasters. It depends on the extent to which damage is done and how all the people concerned can cope with the situation.

D5.2 DISASTER MANAGEMENT

Areas of the Municipality are subject to periodic disasters caused by *inter alia* drought and flooding and, in particular, wildfires, which periodically occur in the Fynbos areas and plantations.

The management of disasters in general is regulated by the Disaster Management Act, 2002 (Act 57 of 2002). The purpose of this Act is to provide an integrated and co-ordinated disaster management policy that focuses on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disaster and post-disaster recovery.

The Act makes provision for the drafting of a disaster management framework for the district municipality after consultation with the local municipalities. The disaster management framework of the municipality must set out –

- The way in which the concept and principles of disaster management are to be applied in its functional area,
- Its role and responsibilities in terms of the national, provincial or municipal disaster management frameworks,
- Its role and responsibilities regarding emergency response and post-disaster recovery and rehabilitation
- Its capacity to fulfil its role and responsibilities,
- Particulars of its disaster management strategies, and
- Contingency strategies and emergency procedures in the event of a disaster, including measures to finance these strategies.

D5.2.1 DISASTER MANAGEMENT PLAN

In terms of the Act the district municipality must, within the applicable municipal disaster management framework and after consultation with the local municipalities, prepare a disaster management plan for its area. A disaster management plan for a municipal area must –

a) Form an integral part of the municipality's integrated development plan.
b) Anticipate the types of disaster that are likely to occur in the municipal area and their possible effects.
c) Place emphasis on measures that reduce the vulnerability of disaster-prone areas, communities and households.
d) Seek to develop a system of incentives that will promote disaster management in the municipality.
e) Identify the areas, communities or households at risk.
f) Take into account indigenous knowledge relating to disaster management.
g) Promote disaster management research.
h) Identify and address weaknesses in capacity to deal with possible disasters.
i) Provide for appropriate prevention and mitigation strategies.
j) Facilitate maximum emergency preparedness.
k) Contain contingency plans and emergency procedures in the event of a disaster, providing for-
    (i) the allocation of responsibilities to the various role-players and co-ordination in the carrying of out of those responsibilities,
    (ii) prompt disaster response and relief,

(iii) the procurement of essential goods and services,
(iv) the establishment of strategic communication links,
(v) the dissemination of information, and
(vi) matters that may be prescribed.

D5.2.2 DISASTER MANAGEMENT CENTRE

It also provides for the establishment of a disaster management centre for its municipal area by the district municipality. The municipal disaster management centre, to the extent that it has capacity, must give guidance regarding, *inter alia*, the assessment and prevention or reduction the risk of disasters, through the following:

a) Proposing ways and means of -
   (i) determining levels of risk;
   (ii) assessing the vulnerability of communities and households to disasters that may occur;
   (iii) increasing the capacity of communities and households to minimise the risk and impact of disasters that may occur; and
   (iv) monitoring the likelihood of, and the state of alertness to, disasters that may occur,
b) The development and implementation of appropriate prevention and mitigation methodologies,
c) The integration of prevention and mitigation methodologies with development plans, programs and initiatives, and
d) The management of high-risk developments.

D5.3 VELD FIRE PREVENTION AND MANAGEMENT

Fire plays an important role in the maintenance of the structure and species diversity of fynbos. Due to its role in respect of the ecology of fynbos, fire also has a dynamic impact on the dynamics of water catchment areas. Streamflow and water quality can be modified through burning. The basic premise of catchment management is that the maintenance of a healthy, natural plant cover is the most cost effective way of protecting catchment areas, ensuring high water quality and sustainable streamflow.

However, uncontrolled fire also represents a major disaster potential, especially on farms close to fynbos-clad mountains. Appropriate fire management within such natural areas is therefore of fundamental importance as it could have significant financial implications.

The management of veld fires is regulated by the National Veld and Forest Fire Act, 1998 (Act 101 of 1998). The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic and provide for a variety of institutions, methods and practices for achieving the purpose. The Act makes provision for the establishment of fire protection associations, *'which may be formed in respect of an area which has:*

- *Regular wildfires; or*
- *A relatively uniform risk of veldfire; or*
- *Relatively uniform climatic conditions, or*
- *Relatively uniform types of forest or vegetation.'*

In terms of the Act, a fire protection association must at least:

a) Develop and apply a veldfire management strategy for its area.
b) Provide in the strategy for agreed mechanisms for the co-ordination of actions with adjoining fire protection associations in the event of a fire crossing boundaries.
c) Make rules, which bind its members.
d) Identify the ecological conditions that affect the fire danger.
e) Regularly communicate the fire danger rating to its members.
f) Organise and train its members in fighting, management and prevention of wildfires.
g) Inform its members of equipment and technology available for preventing and fighting wildfires.
h) Provide management services, training and support for communities in their efforts to manage and control wildfires.
i) Supply the Minister at least once every 12 months with statistics about wildfires in its area.
j) Furnish any information requested by the Minister in order to prepare or maintain the fire danger rating system.
k) Exercise the powers and perform the duties delegated to it by the Minister.
l) Appoint a fire protection office, unless a municipality is a member.

D5.3.1 COMPULSORY FIRE BREAKS

Act 101 places a duty on owners to prepare and maintain firebreaks. The Act states that *'every owner on whose land a veldfire may start or burn or from whose land it may spread must prepare and maintain a firebreak on his or her side of the boundary between his or her land and any adjoining land'.*

In terms of the Act landowners must also ensure that the firebreaks are:
- Wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land.
- Reasonable free of inflammable material capable of carrying a veldfire across it.
- Constructed and maintained in a manner that will minimize erosion.

The Act prescribes procedures pertaining to the maintenance of firebreaks and the role of adjoining owners and the fire protection association. In addition, the Act places an obligation on all owners to acquire equipment and have access to personnel for fire fighting. According to Section 17(1) of Act 101 *'every owner on whose land a veldfire may start or burn or from whose land it may spread must:*

a) Have such equipment, protective clothing and trained personnel for extinguishing fires as are
  (i) Prescribed; or
  (ii) In the absence of prescribed requirements, reasonably required in the circumstances;
b) Ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will:
  (i) Extinguish the fire or assist in doing so; and
  (ii) Take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any'.

The management of potential disaster situations such as wildfires is the function of the Cape Winelands District Municipality. It is however imperative that the local municipalities, together with organised agriculture and landowners contribute towards the prevention and/or management of wildfires through the implementation of the above stipulations of Act 101.

TOOLKIT D6 ENVIRONMENTAL AUDITING INDICATORS

TOOLKIT SYNOPSIS

This toolkit should be read together with Chapter C9. It provides a set of *Environmental Performance Indicators* for local level reporting in Stellenbosch Municipality – and proposes an initial set of environmental performance indicators for local level reporting. This is by no means a definitive final set of indicators, but rather a first step towards recognition and agreement of a core set of such indicators which can be adopted and used as a tool by government and the private sector. The intention is that the SDF and the Environmental Management Systems (EMSs) of private sector enterprises should refine the Environmental Performance Indicators to suit their site-specific requirements and enable local level auditing and reporting as described in Chapter C9.

In essence, this toolkit addresses the responsibility of 'local level reporting' within the municipal area. The indicators presented can also be adopted in the auditing systems of private sector enterprises en the various economic sectors operational in Stellenbosch Municipality.

D6.1 PERFORMANCE INDICATORS

Performance Indicators are defined as *pieces of information that reveal conditions, and over time, trends. Indicators can be used to make policy and planning decisions, to identify whether policy goals and targets are being met, and sometimes to predict change. Indicators can also be used to compare conditions of different localities or progress towards policy targets* (IDRC, 1998).

Stellenbosch Municipality and its ecological footprint

Ecological footprint is '*an accounting tool that enables us to estimate the resource consumption and waste assimilation requirements of a defined human population or economy in terms of corresponding productive land area*'. It is also referred to as 'the measure of the load imposed by a given population on the environment'. It represents the land area necessary to maintain the current levels of resource consumption and waste discharge by that population (Wackernagel *et al*, 1997). The ecological footprint of a population is estimated by calculating how much land and water area is required on a continuous basis to produce all the goods consumed, and to assimilate all the wastes generated, by that population. It is expressed in hectares per capita, namely hectares per capita consumed and hectares per capita available. One key aspect is that today, humanity as a whole, uses over one third more resources and eco-services than what nature can regenerate. In 1992, this ecological deficit was only one quarter.

South Africa and its people are under the obligation to promote more sustainable living (as contemplated by *among others* Agenda 21, Local Agenda 21, and the Constitution). In order to comply with this obligation, the implication is that, in practice, the ecological footprint of both communities and individuals needs to be improved. It is therefore imperative that the ecological footprint of municipalities and private enterprises be determined and that management strategies be implemented to address non-sustainable land-use and management aspects that have a detrimental impact on the ecological footprint. Land-use management should then be constantly monitored and the management approach(es) be adapted to ensure continual improvement and achievement of goals and objectives.

Environmental Performance Indicators (EPIs) are increasingly being used to identify what effect land-use projects are having on the environment. The defining characteristic of EPIs is *that they quantify and simplify information in a manner that facilitates understanding of environmental problems by both decision-makers and the public. The goal is to assess how project activities affect*

the direction of change in environmental performance and to measure the magnitude of that change (Segnestam, 1999[80]).

There may be some overlap with general environmental indicators, such as those used within State of Environment (SOE) reports. These are designed to describe the general state or condition of a particular environment and the factors influencing it. To measure environmental performance of, for example a municipality or one of its policies or activities, it may be necessary to identify the condition of the environment and to track how it changes over time. This toolkit addresses indicators not only for local level SOE reporting, but also for the measurement of performance of different spheres of government in delivering their responsibilities for environmental care. In the latter regard, the focus shifts towards indicators which specifically relate to the measurement of response by government.

D6.1.1 WHAT IS TO BE MEASURED?

There are four types of indicators, namely those related to input, process, output and outcome/impact respectively. Each of these measures a different aspect of performance. In the case of a government entity, such as a municipality, the various types constitute the following:

a) Input indicators are typically cost-related and are most relevant to the day-to-day operations of a municipality.

b) Process indicators describe how well a municipality uses its resources to produce services. These cover the activities and operations that convert inputs into outputs. It is essentially an internal type of indicator that is most relevant to the municipality concerned and is therefore of limited relevance to a national set of performance indicators, unless there is a particular reason for their measurement. A sub-group of process indicators are indicators that measure compliance with regard to existing standards and requirements.

c) Output indicators refer to the 'products' produced by processing inputs – i.e. the immediate or short-term results. For example, the number of protected areas established, the number of pollution licences granted and so on. In general output indicators should only be used for those functions for which municipalities are directly responsible. Where responsibility for provision is clear, output indicators can be used to hold the municipality accountable for provision – they measure how well municipalities are performing in terms of their service delivery mandate.

d) Outcome/impact indicators measure the extent to which goals and objectives are being met. For example, number of endemic species found in a local area. They are usually based on the results of different variables acting together (for example, not just on the number of protected areas created, but also climatic changed, agricultural practices and so on) and they tend to lag behind output indicators because the outcomes of various outputs can only be measured after the outputs have been produced. They are also more difficult to measure and are usually influenced by factors external to the municipality's control, so it is difficult to hold a municipality solely responsible for performance in this regard. Many 'State of Environment' indicators are of this type.

[80] Segnestam, L., 1999: Environmental Performance Indicators: A Second Edition note. *Environmental Economics Series*. Paper No.71. The World Bank.

D6.1.2 PERFORMANCE MANAGEMENT INDICATORS

In order to supplement the performance management of the municipalities it is suggested that the *Environmental Indicators for National State of the Environment Reporting* published by the Department of Environmental Affairs and Tourism (DEAT) during 2002 be adopted by the municipalities. These indicators address distinct themes, namely:

a) Climate and air.
b) Waste management.
c) Water and sanitation.
d) Environmental management.
e) Environmental governance.

D6.2 LOCAL ENVIRONMENTAL PERFORMANCE INDICATOR FRAMEWORK

There is little clarity within government (across all spheres and sectors) about where responsibility for the various components of the local environment lies. There is confusion within and between the different tiers of local government – and between the different spheres, as to who is responsible for doing what. Guidance in this regard is provided by the following:

a) Core mandates of municipalities are defined in Schedules 4b and 5b of the Constitution.
b) Core mandates of the other spheres defined in Schedules 4a and 5a.
c) Objects of municipalities in the Constitution (which must be adhered to by all municipalities) including the following:
    - Providing a 'safe and healthy environment'.
    - Ensuring the provision of services to communities in a sustainable manner (the Municipal Systems Act expands this requirement to 'environmentally sustainable').
d) Biodiversity Act states that *all EIPs /EMPs and municipal IDPs must be aligned to the national biodiversity framework and any applicable spatial plan*. In terms of invasive species, all organs of state must produce a plan for Invasive Species Monitoring, Control and Eradication for land under their control. This must be integrated into the EIPs/EMPs, IDPs and SDFs.
e) NEMA (Chapter 1{2}) contains a set of environmental principles which are applicable to all organs of state. Municipalities must incorporate these into all planning and policy making activities.
f) Protected Areas Act states that municipalities must prepare management plans for all 'local protected areas' as defined under the act. These must be submitted to the relevant MEC for approval.

All municipalities must strive within their financial and administrative capacity to achieve these objects. It is assumed that in order to achieve these, a municipality will be obliged to implement any relevant national legislation that relates to a 'safe and healthy environment' or the delivery of 'environmentally sustainable' services. All municipalities are also bound to respect, protect, promote and fulfil the environmental rights of an individual, as defined within the Bill of Rights:

(i) To have an environment that is not harmful to their health or well-being;
(ii) To have an environment protected for the benefits of present and future generations through legislative and other measures that:
    - Prevents pollution and ecological degradation.
    - Promotes conservation.
    - Secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

D6.3 CORE MANDATES AND FUNCTIONS OF THE VARIOUS SPHERES OF GOVERNMENT

Figure D5 summarises the environmental responsibilities of municipalities and of the other spheres of government.

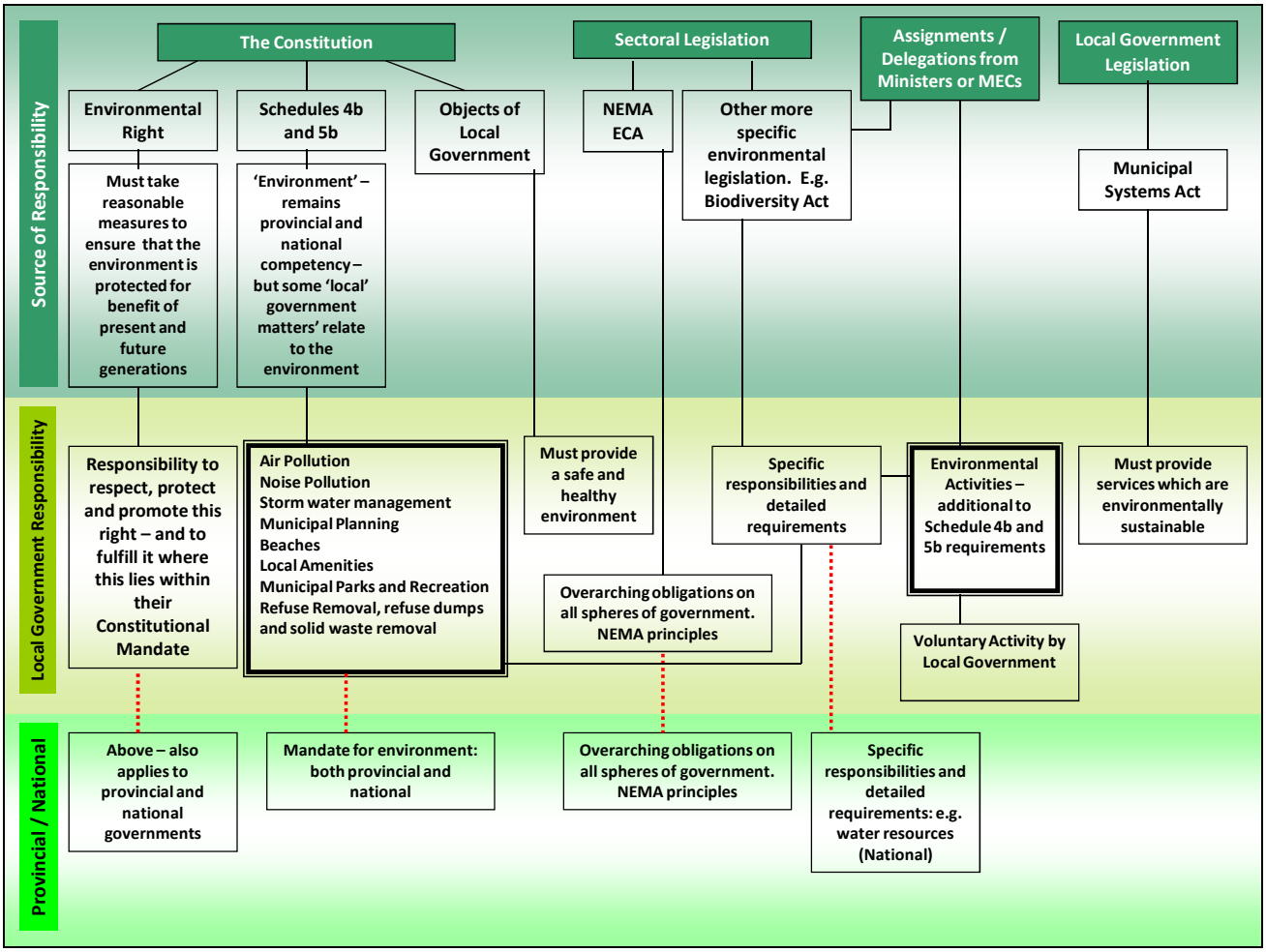


Figure D4: Source of local responsibility for the environment.

The core mandates of the various spheres of government for specific elements of 'the environment' as stipulated under Schedules 4b and 5b of the Constitution include the following:

D6.3.1 LOCAL GOVERNMENT

a) Air pollution.
b) Noise pollution.
c) Refuse removal, refuse dumps and solid waste disposal.
d) Water and sanitation services.
e) Beaches.
f) Municipal parks and recreation.
g) Local amenities (can be interpreted to include local protected areas).
h) Storm water management in built up areas.
i) Municipal planning.

D6.3.2 PROVINCIAL GOVERNMENT

a) Elements of general waste management.
b) Hazardous waste.
c) Environmental impact assessment authorisations.
d) Agriculture and soil conservation.
e) Estuaries and some coastal areas.
f) Water resource protection (including wetlands).
g) Areas of land within provincial parks.

D6.3.3 NATIONAL GOVERNMENT

a) Water services and water resource protection (Department of Water Affairs).
b) Areas of land within South African National Parks (SANParks).

D6.4 INDICATORS

The indicators for each broad 'performance area' of municipalities are presented in the tables below together with the following information:
a) Performance area (or in some cases, sub-performance area).
b) Indicator code.
c) Responsible institution which refers to who will be responsible for reporting the indicator in terms of the sphere of government.
d) Indicator.

D6.4.1 CLIMATE AND AIR

a) Air Quality

PERFORMANCE AREA	CODE	WHO	INDICATOR
Air Quality	AQ1	Local A, B	Is there an adopted Air Quality Management Plan?
	AQ2a AQ2b	Local A, B	% of licensed industries which did not comply with licence conditions. % of these for which there was enforcement action by the authority.
	AQ3	Local A, B	% of key pollutants (as identified for the local areas) monitored according to the specifications in the National Air Quality Framework.
	AQ4a AQ4b	Local A, B	Ambient concentrations of key pollutants. Degree of exceeding the national standards for ambient concentrations of key pollutant.
	AQ5a AQ5b	Local A, B	Number of air quality related complaints received by local authorities (number of complaints/year). % of these for which there was an enforcement action.
	AQ6	Local A, B	Number of staff responsible for monitoring air quality.

Air quality is an extension of the mandate for 'air pollution' given to municipalities under Schedule 4b and 5b of the Constitution. Specific requirements of municipalities for reporting on air quality, emissions and other air pollution related indicators are specified in the Air Quality Act 39 of 2004. Thus the indicators below are only provisional suggestions and may have to be modified once the air quality legislation and accompanying norms and standards are published. Indicators for municipalities mostly apply to Category A and B municipalities. This is a key priority area of environmental management for all municipalities.

b) Climate Change/Greenhouse Gases

This is an issue of concern for many municipalities, but it was not identified as an area which was core for them to measure. Nor, in many cases would it be possible for municipalities to provide such information. A climate-neutrality strategy is to be developed for the province as a whole. The implementation of this strategy would be mandatory on all municipalities and the private sector.

c) Noise Pollution

This is a local government matter under Schedules 4b and 5b of the Constitution and is also covered under the Air Quality Act. Indicators were developed for this issue – but these were not considered 'core' indicators as information on noise pollution was not considered important for aggregation to the national level.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Noise Pollution	NP1a	Local A, B	Number of noise pollution related complaints received by the local authority.
	NP1b		% of these complaints for which there was enforcement action.

D6.4.2 WASTE MANAGEMENT

Waste and waste management in general is seen as one of the core mandates of municipalities under Schedules 4b and 5b of the Constitution (this makes refuse removal, refuse dumps and solid waste removal a local government matter) and under the White Paper on Integrated Pollution and Waste Management and the Environmental Conservation Act. Provincial government also has responsibility for certain waste issues and therefore indicators to be reported on by the province have also been included. This performance area has been divided into three sub-areas, namely waste generation (data on amount of waste generated in an area), waste services (performance indicators for provision of services), and waste/reduction and management.

a) Waste Generation

PERFORMANCE AREA	CODE	WHO	INDICATOR
Waste Generation	WG1	Local	General waste produced per capita per year.
	WG2	Local	Hazardous waste produced per sector per year.

b) Waste Services

PERFORMANCE AREA	CODE	WHO	INDICATOR
Waste Services	WS1	Local	% of households eligible for kerbside refuse removal which receive this service weekly.

c) Waste Reduction and Management

PERFORMANCE AREA	CODE	WHO	INDICATOR
Waste Reduction and Management	WRM1a WRM1b	Local	Number of incidents of illegal dumping. % of incidents for which enforcement action was taken.
	WRM2	Local	Amount (tonnes) of illegal dumping cleared by local authority.
	WRM3	Local	Recycling: % of general waste recycled on an annual basis (mass or volume?).
	WRM4	Local	Landfill Sites: % of municipal landfill sites licensed according to the Environmental Conservation Act.
	WRM5	Local	Available landfill lifespan.
	WRM6	Province, DWA and locals.	% of licensed landfill sites that are being monitored for compliance (according to specification in the license).

D6.4.3 WATER AND SANITATION

a) Storm water management

This is a local government matter under Schedules 4b and 5b of the Constitution but data on the provision of storm water management was not considered of interest to DEA on a national level.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Storm Water Management	SWM1 SWM2	Local Local	% of storm water drains that are maintained annually. Number of dwellings located within the 1:50-year flood line.

b) Water and Sanitation Services

Reporting on the provision of water supply and sanitation services is a core performance area of those municipalities (Category A, B and C) who are water service authorities. This information is of primary interest to DWA but is also collated by DPLG. The first two indicators below are already key performance indicators for municipalities. The third is an outcome indicator for provision of clean water and sanitation – but this may be accompanied by other indicators of population health related to water and sanitation which are collected by the Department of Health.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Water and Sanitation Services	WSS1	Local water services authority.	% of households with access to potable water within 200m of dwelling (or on site).
	WSS2	Local water services authority	% of households with at least a basic levels of service as determined by the WSA service levels policy.
	WSS3	Local	Number of reported cases of cholera (per year).
	WSS4	Local	Number of reported cases of sewage spillage into water courses.

c) Water Quality

Monitoring of water quality in a local area is the responsibility of DWA regional offices and water utilities. However, during consultation processes for this project, it was suggested that local authorities should be aware of information on water quality and request this from DWA. A limited number of suitable water quality indicators have thus been included below.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Water Quality	WQ1	DWA	% of exceeding of DWA guidelines for selected groundwater quality variables (total nitrogen, total phosphorus, conductivity and faecal coliforms).
	WQ2	DWA	% exceeding of DWA guidelines for selected surface water quality variables (total nitrogen, total phosphorus, conductivity and faecal coliforms).

D6.4.4 ENVIRONMENTAL MANAGEMENT

a) Parks and open space

This is a local government matter under Schedules 4b and 5b of the Constitution – where local government is responsible for the provision and maintenance of municipal parks and recreational areas, which are forms of open space. However, the provision and maintenance of these areas is not a core environmental activity – but is a planning and amenity issue, unless the open space is of value for conservation.

Thus the indicators developed for this area are not considered core environmental indicators apart from those which relate to spaces with conservation value. For areas with conservation value the greatest issue seems to be 'infilling' of such areas by development and so an indicator has been included to assess this. To make this distinction, municipal parks and open spaces will have to be 'categorized' into those with conservation value and those without.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Municipal Parks and Open Spaces.	POS1a POS1b	Local	Extent of municipal parks, recreation areas or other open spaces within the municipal area with conservation value. % of this area in-filled by development on an annual basis.
	POS2	Local	% of dwellings which fall within a 2 km radius of a municipal park or recreational area.
	POS3	Local	Extent of municipal parks, recreational area or other open space per capita within the municipal area.
	POS4	Local	Level of community satisfaction with access to and quality of municipal parks and recreation areas (survey generated data).
	POS5	Local	% of municipal budget allocated to provision and maintenance of municipal parks and recreation areas.

b) Nature conservation

Biodiversity is not mentioned as a local government matter under the Schedules 4b and 5b of the Constitution. The Biodiversity Act, however, does confer some responsibility for management of biodiversity, control of invasive alien species, etc. to local government. Officially-designated local protected areas are, per definition, 'local amenities', which are a local government matter under Schedules 4b and 5b. In addition to the obligation to provide, preserve, manage and maintain such areas under the relevant Schedules, the Protected Areas Act provides specific responsibilities to local government for the local protected areas within their boundaries. National and provincial protected areas which lie within a municipality remain the responsibility of national and provincial parks institutions.

c) Protected Areas

The purpose of the relevant indicators is to allow DEA to aggregate information in order to produce figures for the total area under formal protection across the country – and for the area of land indicated as of 'conservation importance'. The relevant indicators can be used to monitor performance of municipalities as it relates to recognising and officially protecting locally important areas by tracking the change in area of protected area, or the percentage cover of protected areas, within the municipal area over time.

As mentioned previously, specific indicators for this may be produced under the Protected Areas Act. The Protected Areas Act contains a requirement that all local authorities should facilitate the drafting (or address in their SDF) management guidelines for officially-designated protected areas within their jurisdiction area. This stipulation has been included as a simple compliance indicator.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Protected Areas	PA1	Local (all)	Extent of municipal area under 'local protected area' status.
	PA2	Local (all) Conservation departmens	% of municipal area under local protected area status.
	PA3	"	% of land of 'conservation importance' in the municipal area under local protected area status.
	PA4	"	% of local protected areas with a current / adopted management plan and associated authorised budget.
	PA5	Local	Level of user satisfaction with access to and quality of local protected areas.

d) Invasive Alien Species

The Biodiversity Act confers a responsibility on local government to draw up plans for the monitoring, control and eradication of invasive alien species on municipal land. Thus, the performance indicators here are related to municipal land – and are not related to the invaded area in a municipality as a whole, or the clearing activity being carried out across a municipality as this will be taking place on land owned by many different people. Composite figures for this information will have to be obtained by DEA directly from Working for Water (WfW) (although in some cases, municipalities may keep such information).

PERFORMANCE AREA	CODE	WHO	INDICATOR
Invasive Alien Species	IAS1a IAS1b	WfW Local (all)	Extent of municipal land currently invaded by alien species. % of municipal land currently invaded by alien species.
	IAS2a IAS2b	WfW Local (all)	Extent of IAS cleared from municipal land (in the reporting year). % of municipal land currently invaded by alien species which has been cleared.
	IAS3	Local (all) Planning Department	Is there an adopted plan for invasive plant monitoring, control and eradication that is integrated and aligned with the IDP and SDF?

e) Species and ecosystem management and change

It is not within the core mandate of municipalities to report information on the extent, management and change in species and ecosystems found within a municipal area. This responsibility falls to the relevant province. The indicators are all outcome-related and, as such, are useful benchmark indicators that can help to identify serious trends and species or ecosystems under threat.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Species and Ecosystem Management and Change.	SEMC1	Province	Threatened and extinct species per taxonomic group.
	SEMC2	Province	Endemic species per taxonomic group.
	SEMC3	Province	Population trends of selected species.
	SEMC4a SEMC4b	Province	Extent of sensitive, vulnerable, highly dynamic and stressed ecosystems in the municipal area - by ecosystem type (e.g. wetland, dunes, etc.). % of each of the above which is degraded or transformed on an annual basis.

D6.4.5 ENVIRONMENTAL GOVERNANCE

This is one of the most important areas of environmental performance to measure. Local government has a series of obligations under the Bill of Rights, the Constitution, environmental framework legislation (such as NEMA) and sectoral legislation, to ensure that it protects the environment and that its activities and those of others are not detrimental to the environment or the environmental right of its citizens.

The IDP process identifies the environment as a 'cross-cutting issue' that must be incorporated into all elements of municipal planning. This should typically be achieved through an efficient SDF process. Indicators in this regard are divided into the sub-performance areas, namely NEMA principles, environmental planning, Agenda 21 (and other international obligations), environmental reporting; environmental education and awareness raising.

a) NEMA Principles

A set of indicators is required to monitor performance (of all spheres of government) in adhering to the NEMA principles. This was identified as an area of work outside the scope of this project. However, it should be possible at this stage to ask municipalities whether they have carried out an internal audit of their plans, policies and programmes in this regard.

PERFORMANCE AREA	CODE	WHO	INDICATOR
NEMA Principles	NEMA1	Local	Has the municipality audited its plans, policies and programmes for adherence to the NEMA principles?

b) Environmental Planning

The following are simple compliance indicators, which measure simply whether a municipality has carried out a requirement of legislation. No indicators were developed to assess the quality of planning carried out or whether plans were implemented satisfactorily.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Environmental Planning	EP1	Local (all)	Has a strategic environmental assessment of the impact of the Spatial Development Framework for the municipality been carried out?
	EP2	Local (all)	For each of the following is there a current, adopted plan that is integrated and aligned with the IDP and SDF? a) Air Quality Plan. b) Integrated Waste Management Plan. c) Oil Spill Contingency Plan. d) Water Services Development Plan. e) Plan to provide access to basic water services. f) Invasive species monitoring, control, and eradication plan.
	EP3	Local (all)	Is the IDP and SDF aligned with the National Biodiversity Strategy and the Critical Biodiversity Area plan?

c) Agenda 21 and other international obligations

Chapter A4 summarises the international agreements, conventions and protocols to which South Africa is a signatory and which are to be given effect by all spheres of government. These contain many principles of participation, sustainability and so on, which if implemented, contribute to good environmental governance.

PERFORMANCE AREA	CODE	WHO	INDICATOR
Relevant agreements, conventions and protocols	A1	Local (all)	Has the municipality officially adopted the relevant agreements, conventions and protocols (
	A2	Local (all)	Is there an approved implementation plan for the agreements, conventions and protocols (refer to Chapter A4) ?

d) Environmental reporting

PERFORMANCE AREA	CODE	WHO	INDICATOR
Environmental Reporting.	EP1	Local (all)	Has the municipality produced a current State of Environment Report?

e) Environmental education and awareness raising

PERFORMANCE AREA	CODE	WHO	INDICATOR
Environmental Education.	EEd1	Local (all)	What is the budgetary allocation (%) for environmental education and awareness raising per capita?

D6.5 SUMMARY OF INDICATORS

These are all 'pragmatic' indicators – unless otherwise marked (shaded box = ideal indicators) and are all relevant to local authorities unless otherwise marked with a P* (provincial responsibility) or DWA* (DWA regional responsibility).

CORE INDICATORS
Air/Climate
Is there an adopted Air Quality Management Plan?
% of licensed industries which did not comply with licence conditions % of these for which there was an enforcement response by the authority
% of key pollutants monitored according to the specifications in the National Air Quality Framework
Ambient Concentrations of key pollutants Degree of exceeding national standards for ambient concentrations of key pollutants
Number of air quality related complaints received by the local authority (no. per year) % of these for which there was an enforcement action
Number of staff (FTEs) responsible for monitoring air quality in the municipality
Waste Management
General waste produced per capita per year
Hazardous waste produced per sector per year
% of households eligible for kerbside refuse removal which receive this on a weekly basis
Number of incidents of illegal dumping % of these incidents for which enforcement action was taken
Amount (tonnes) of illegal dumping cleared by the local authority
% of general waste recycled on an annual basis
% of municipal landfill sites licensed according to the terms of the Environmental Conservation Act
Available landfill lifespan
% of licensed landfill sites that are being monitored for compliance (according to specification in license)
Water, Sanitation and Water Quality
% of households with access to potable water within 200 m of dwelling (or on site)
% of households with at least a basic level of service as determined by the WSA service levels policy
Number of recorded cases of cholera
% of exceeding DWA guidelines for selected groundwater quality variables **(*DWA)**
% of exceeding DWA guidelines for selected surface water quality variables **(*DWA)**
Parks and Open Spaces
Area (hectares) of municipal parks, recreation areas or other open spaces within the municipal area with conservation value. % of this area infilled by development on an annual basis

Protected Areas
Area (hectares) of municipal area under 'local protected area' status
% of municipal area under local protected area status
% of land of 'conservation importance' in the municipal area under protected area status
% of local protected areas with a current/adopted management plan and authorised budget
Invasive Alien Species
Area (hectares) of municipal land currently invaded by alien species % of municipal land currently invaded by alien species
Areas of IAS cleared from municipal land (this reporting year) % of municipal land currently invaded by alien species which has been cleared (this reporting year)
Is there an adopted Invasive Species Monitoring, Control and Eradication Plan that is integrated and aligned to the IDP?
Species and Ecosystem Management and Change
Threatened and extinct species per taxonomic group **P***
Endemic Species per taxonomic group **P***
Population trends of selected species **P***
Area (hectares) of sensitive, vulnerable, highly dynamic and stressed ecosystems in the municipal area (by ecosystem type) **P***
% of each of the above which is degraded or transformed on an annual basis **P***
Environmental Governance
Has the municipality audited its plans, policies, and programmes for adherence to the NEMA principles?
Has a strategic environmental assessment of the impact of the SDF for the municipality been carried out?
For each of the following, is there a current, adopted plan that is integrated and aligned to the IDP: Air Quality Plan, Integrated Waste Management Plan; Oil Spill Contingency Plan; Water Services Development Plan; Plan to provide access to basic water services; Invasive Species monitoring, control and eradication plan
Is the IDP aligned to the National Biodiversity Strategy?
Has the municipality officially adopted Agenda 21 and is there an approved implementation plan ?

PERIPHERAL INDICATORS
Noise Pollution
Number of noise pollution related complaints received by the local authority % of these complaints for which there was enforcement action
Storm Water Management
% of storm water drains that are maintained annually
Number of dwellings within the 50-year flood line
Municipal Parks and Open Spaces
% of dwellings that fall within a 2 km radius of a municipal park or recreation area
Area (hectares) of parks, recreation areas and other open space per capital in the municipal area
Level of community satisfaction with access to and quality of municipal parks and recreation areas
% of budget allocated to the provision of and maintenance of municipal parks and recreation areas
Protected Areas
Level of user satisfaction with access to and quality of local protected areas

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