Western Cape Government

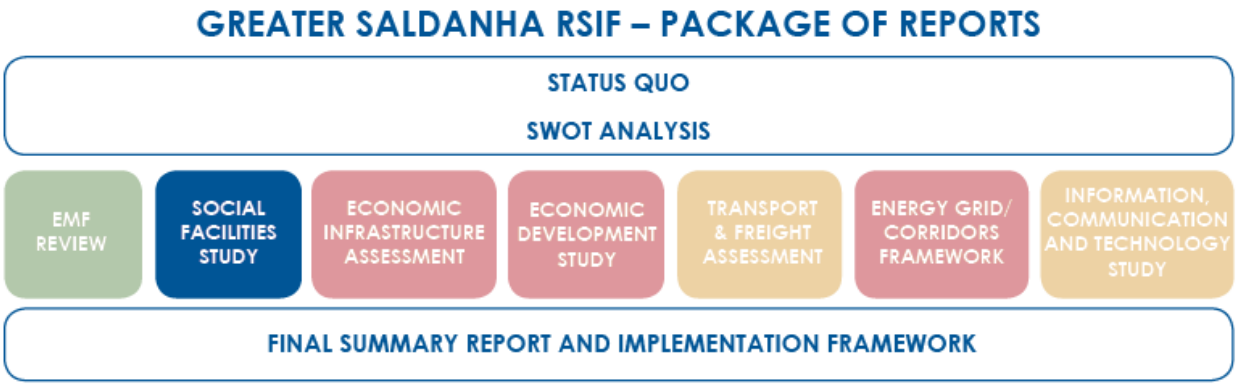
BETTER TOGETHER.

Draft Environmental Management Framework for the Greater Saldanha Area

Completed as part of the
Greater Saldanha Regional Implementation Framework (GS RSIF)
April 2017

DOCUMENT DESCRIPTION

Document Title and Version:
Environmental Management Framework for The Greater Saldanha Area covers the Saldanha Bay municipal area and a portion of the Berg River Municipality.



Client:
Western Cape Government - Department of Environmental Affairs & Development Planning

Reference Number:
Report J-649D-13
J35462

Authority Reference:
16/4/3/5

Initial Project Team:
Morris Environmental & Groundwater Alliances (MEGA)
DeVilliers Brownlie Associates
Chand Environmental
MCA – Planning and GIS
EnAct International

Revision Project Team:
GIBB (Pty) Ltd

Acknowledgements:
Western Cape Government – Department of Environmental Affairs & Development Planning

Date:
April 2017

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

ACRONYMS AND INITIALISMS

AEL	Atmospheric Emissions License
AQMP	Air Quality Management Plan
BA	Basic Assessment
C.A.P.E.	Cape Action for People and Environment
CBA	Critical Biodiversity Area
Cd	Cadmium
CESA	Critical Ecological Support Area
CFR	Cape Floristic Region
Cr	Chromium
CR	Critically endangered
CSIR	Council for Scientific and Industrial Research
Cu	Copper
DAFF	Department of Agriculture Forestry and Fisheries
DEA	Department of Environmental Affairs (formerly DEAT)
DEADP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DWA	Department of Water Affairs (formerly DWAF)

DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation (formerly DWA)
E. coli	Escherichia coli
EAP	Environmental Assessment Practitioner
EIA Regulations	Environmental Impact Assessment Regulations
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMZ	Environmental Management Zone
EN	Endangered
ESA	Ecological Support Areas
Fe	Iron
FEPA	Freshwater Ecosystem Priority Area
FSP	Fine Scale Plan
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GNR	Government Notice
HDI	Human Development Index
HWM	High water mark
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IUCN	International Union for Conservation of Nature
IWMP	Integrated Waste Management Plan
kl	Kilolitres, a measurement of volume
LEDS	Local Economic Development Strategy
LIDAR	Light Detecting and Ranging
MA	Megaannus (one million years)

MASL		metres above sea level
MDG		Millennium Development Goal
MEC		Member of the Executive Council
MPA		Marine Protected Area
MSA		Local Government: Municipal Systems Act, Act 32 of 2000 as amended
NEMA		National Environmental Management Act, Act 107 of 1998 (as amended)
NEMAQA		National Environmental Management: Air Quality Act (39 of 2004)
NEMBA	-	National Environmental Management: Biodiversity Act, Act 10 of 2004
NEMICMA		National Environmental Management: Integrated Coastal Marine Act 24 of 2008
NEMPAA		National Environmental Management: Protected Areas Act 57 of 2003
NEMWA		National Environmental Management: Waste Act (59 of 2008)
NFSD		National Framework for Sustainable Development
NHRA		National Heritage Resources Act (15 of 1999)
Ni		Nickel
NO		Nitrogen
NO_2		Nitrogen Oxide
NOX		Oxides of Nitrogen
NSSD		National Strategy for Sustainable Development
NWA		National Water Act (36 of 1998)
O_3		Ozone
OESA		Other Ecological Support Areas
ONA		Other National Areas
Pb		Lead
PM10		Particulate Matter 10 micrometres or less in diameter
PM2.5		Particulate Matter 2.5 micrometers or less in diameter
PSDF		Provincial Spatial Development Framework
PSG		Provincial Strategic Goals

PSO	Provincial Strategic Objective
PSP	The Provincial Strategic Plan
S&EIR	Scoping and Environmental Impact Reporting
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SANS	South African National Standards
SAS Saldanha	Land owned by the South African Navy
SBIDZ	Saldanha Bay Industrial Development Zone
SBWQT	Saldanha Bay Water Quality Trust
SDF	Spatial Development Framework
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SO_2	Sulphur Dioxide
SoER	State of Environment Report
StatsSA	Statistics South Africa
SWOT	Strengths, weaknesses, opportunities and threats
Ti	Titanium
VOC	Dutch East India Company
WCDM	West Coast District Municipality
WCIF	Western Cape Infrastructure Framework
WCNP	West Coast National Park
WDF	Waste Disposal Facilities
Zn	Zinc

deVilliers Brownlie Associates

Morris Environmental & Groundwater Alliances

mca

CHAND
Specialists in Environmental Management and Research

EnAct International
Governance for a sustainable future

GIBB
ENGINEERING & ARCHITECTURE
People • Expertise • Excellence

ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF) FOR THE GREATER SALDANHA BAY AREA

I Introduction and Background

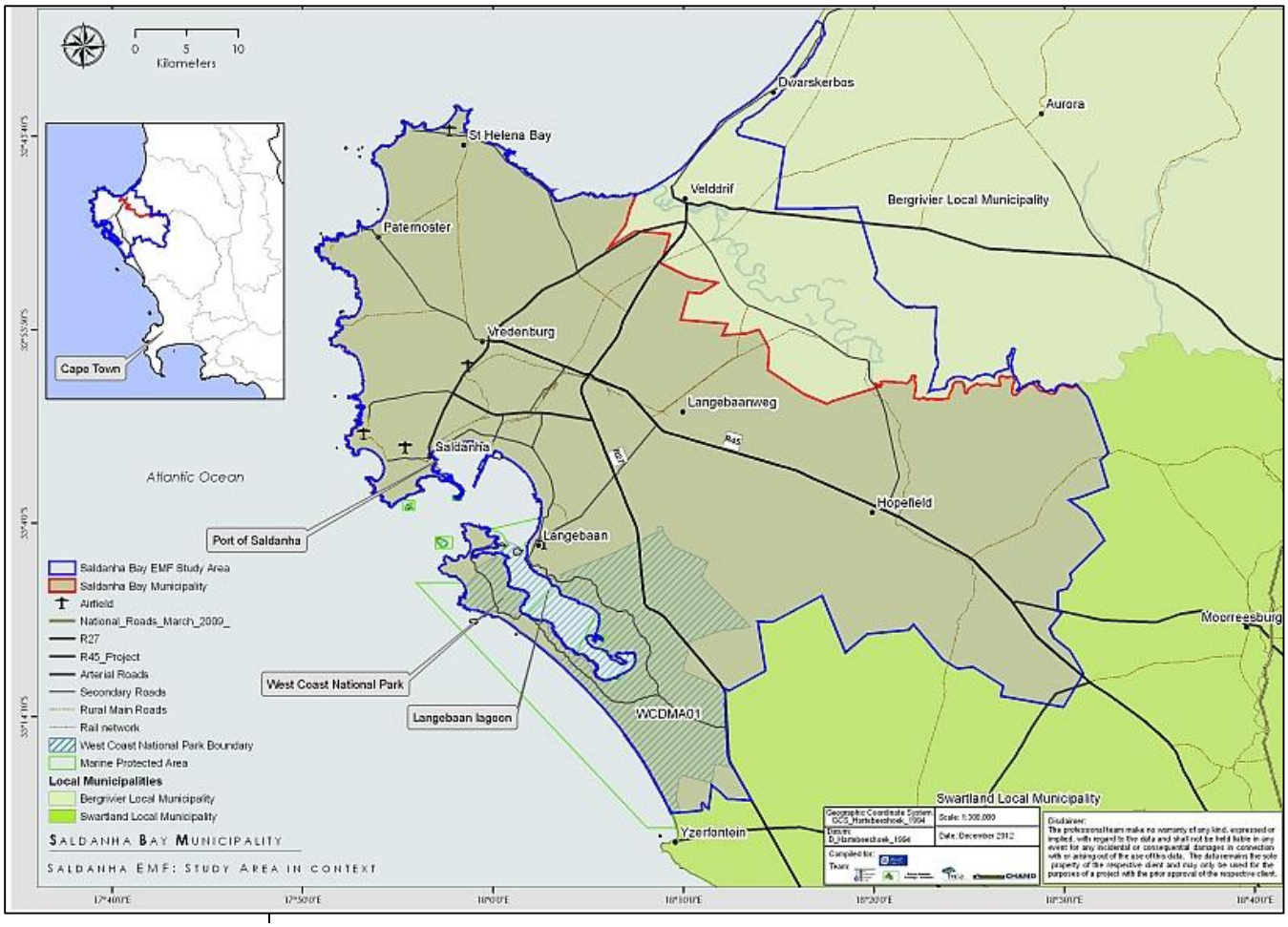
Saldanha Bay is located on the west coast of South Africa, some 140 kilometres north of Cape Town. The two major routes that link the area to Cape Town are the R27 and the N7. There are several settlements along the coastline, with the largest towns being Saldanha and Vredenburg. The region is well known for its natural beauty, in particular the Langebaan lagoon, the Berg River estuary, the coastline and the spring flower season. There are also important cultural resources in the area, which include paleontological and archaeological features (e.g. Eve's Footprint). Archaeological evidence suggests that human habitation occurred even prior to that of the Khoi people. The West Coast National Park (WCNP) is located in the southern part of the Environmental Management Framework (EMF) study area and is within Saldanha Bay Municipality.

The EMF for the Greater Saldanha Area covers the Saldanha Bay municipal area and a portion of the Bergrivier Municipality. Environmental factors were applied in determining the extent of the area that should be encompassed in the EMF. It was originally envisaged that the EMF would cover the Saldanha bay municipal area. Since the Saldanha Bay Municipality's northern boundary is partially located on the southern bank of the Berg River, the study area was expanded to include this river and estuarine system as it should logically fall under one environmental planning domain. The study area is shown in Map 1.

Both the Saldanha Bay and the Bergrivier municipalities fall within the West Coast District Municipality. The Swartland Local Municipality is located to the south of the study area. Towns, settlements and rural nodes that are located within the EMF study area include:

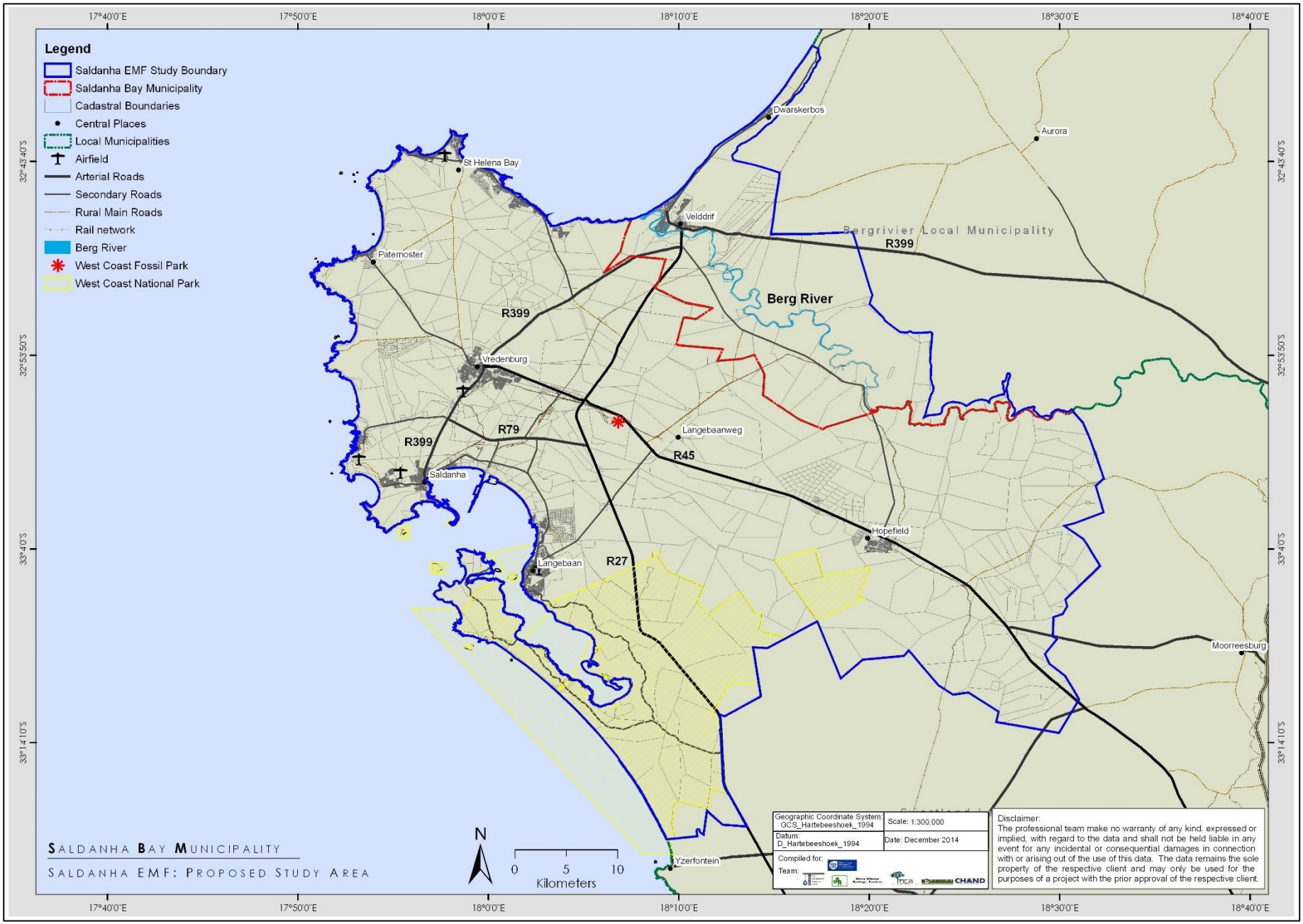
- Vredenburg,

- Saldanha,
- Paternoster,
- Hopefield,
- St Helena Bay,
- Langebaan,
- Jacobsbaai,
- Green Village,
- Koperfontein
- Velddrif



Map 1: General Locality Map

Saldanha-Vredenburg-Langebaan is the most populated and developed part of the region. The Port of Saldanha, which is equipped to deal with the import and export of bulk materials such as oil and iron ore, is an important economic driver in the region. As a result, an Industrial Development Zone (IDZ) focused on the port area has been declared (Saldanha Bay Industrial Development Zone (SBIDZ) Gazette Document, November 2012). Traditionally, the fishing industry has been a key sector in the area, particularly in St Helena Bay and Saldanha Bay. Tourism has become an increasingly important economic sector in recent years and is largely based on the natural and cultural resources of the area.



Map 2: Study Area for the Greater Saldanha EMF

1.1 Environmental Management Frameworks – An Overview

The Department of Environmental Affairs & Development Planning (DEADP) initiated a project to compile an EMF for the Saldanha Bay municipal area. This project was also supported by the national Department of Environmental Affairs (DEA). Subsequent to the commencement of the project, it was decided to include a portion of the Bergrivier Municipality in the EMF, as explained in the introduction to this report. This decision was made in consultation with the relevant municipalities, the DEADP and the DEA.

The National Environmental Management Act (Act 107 of 1998, as amended) commonly referred to as NEMA is a framework law that gives effect to the environmental right in the Constitution[1]. Chapter 5 of NEMA sets out the objectives of integrated environmental management and provides, among other things, for the listing of activities that may not commence without an environmental authorisation. Section 24 (which forms part of Chapter 5) of NEMA states that in order to give effect to the objectives of integrated environmental management, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority charged with granting environmental authorisations[2]. The process of doing so is commonly referred to as environmental impact assessment (EIA). Section 24 also allows the Minister of Environmental Affairs and every Member of the Executive Council (MEC), to compile "information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes…[3]"

The Environmental Impact Assessment Regulations (EIA Regulations) to give further effect to section 24, came into effect on 3 July 2006 (Government Notice (GN) R.385, R.386 and R.387 of 21 April 2006). These Regulations replaced those promulgated in 1997 under the Environment Conservation Act (Act 73 of 1989). The "information and maps" referred to in section 24(3) of the Act were defined in the 2006 EIA Regulations as an EMF. Chapter 8 in the 2006 EIA Regulations dealt with EMFs. The 2006 EIA Regulations were repealed and replaced with the 2010 EIA Regulations, which came into effect on 3 July 2010 (GN R.543, R.544, R.545 and R.546 of 18 June 2010). These Regulations included, for the first time, a Listing Notice 3 which outlined various activities in sensitive locations as specified by the respective provinces. In addition to Regulations relating to EIAs, EMF Regulations were also promulgated (GN 547 of 18 June 2010).

The 2010 EIA Regulations have been repealed and replaced with the 2014 EIA Regulations (GN R.982, R.983, R.984 and R.985 of 4 December 2014). These new regulations came into effect on 8 December 2014. In addition, Exemption Regulations (GN R.994 of 8 December 2014) and Appeal Regulations (GN R.993 of 8 December 2014) were also published. The EMF Regulations as published in 2010 remain in place.

1 See section 24 of the Constitution of the Republic of South Africa, 1996.

2 Section 24(1) – This is typically the environmental authority (provincial or national) or any other Minister as specified in the EIA Regulations published in terms of section 24 of NEMA.

3 Section 24(3) of NEMA.

1.1.1 What is the legal standing of an EMF?

This section deals with the question of whether there is a legal obligation to implement and adhere to an EMF. The legislation states the following:

- *Section 24(3) of NEMA*: "The Minister, or an MEC with the concurrence of the Minister, may compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority"[4].

- *Section 24(4)(b)(vi) of NEMA*: Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must include, with respect to every application for environmental authorisation, the "consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3)". This creates an obligation for an applicant to take into account any applicable EMF when investigating, assessing and communicating to the competent authority the potential impacts of activities on the environment. The draft guideline on EMFs prepared by DEA (formerly DEAT) in 2005[5] states that "EMFs provide applicants with an early indication of the areas in which it would be potentially appropriate to undertake an activity".

- *Section 24O(b)(v) of NEMA*: In terms of this section the competent authority must take into account all relevant factors, which may include "any information and maps compiled in terms of section 24(3), including any prescribed environmental management frame-works, to the extent that such information, maps and frame-works are relevant to the application". Arguably, where an EMF has been drafted, this should be considered to be a "relevant factor" and must accordingly be considered.

- *Regulation 2(1)(c) of the 2010 EMF Regulations*: When considering an application for an environmental authorisation the environmental authority is required to (i.e. must) take an EMF into consideration unless it is irrelevant to the decision being made.

- *Regulation 5 of the 2010 EMF Regulations*: An EMF may be adopted by the MEC in concurrence with the Minister[6]. Where an EMF has been adopted it must be taken into account in the consideration of applications for environmental authorisation in or affecting the geographical area to which the framework applies.[7] The Regulations also allow for EMFs to be taken into account even if

[4] "competent authority", in respect of a listed activity or specified activity, means the organ of state charged by this Act with evaluating the environmental impact of that activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity;

[5] DEA (2010): *Environmental Management Frameworks in terms of the EMF Regulations 2010,* Integrated Environmental Management Guideline Series 6, DEA, Pretoria.

[6] Regulation 5(1) of the 2010 EMF Regulations

[7] Regulation 5(2) of the 2010 EMF Regulations

not adopted by the MEC in concurrence with the Minister[8] but the terminology used in this case is less definitive, as follows: "may be taken into account in the consideration of environmental applications".

In summary, in the case of the environmental (competent) authority responsible for environmental obligations, the EMF must be considered provided that it is an adopted EMF in terms of regulation 5(1) of the 2010 EMF Regulations. Although there is no specific obligation placed on other organs of state to apply or use EMFs in their planning and decision-making processes, section 2(1) of NEMA does state that: "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." In instances where an EMF is in place, this should assist an organ of state in taking account of the NEMA principles in relation to actions that could have a significant environmental impact.

1.1.2 What is the purpose of an EMF?

Given the relatively broad definition of "environment" in NEMA as well as the growing recognition that the development path of the country needs to be shifted onto a more sustainable footing, it is clear that EMFs should be used to support the goal of sustainability. This is acknowledged in the EMF Regulations as follows (Regulation 2(3) where it is stated that EMFs are aimed at (a) promoting sustainability; (b) securing environmental protection; and (c) promoting cooperative environmental governance.

Furthermore, in terms of section 24(2)(b) and (c) EMFs are also intended to assist the environmental authorities in determining the following:

- Whether there are any activities within the geographical area that may not commence without environmental authorisation in light of environmental attributes (section 24(2)(b)), which are referred to as specified activities.
- Whether there are any activities within the geographical area that may be excluded from having to obtain environmental authorisation in light of environmental attributes (section 24(2)(c)), in which case such activities must meet required norms and standards (section 24(2)(d)).

In summary, therefore, the objectives of the EMF are to provide:

- A framework to facilitate the pursuit of a sustainable development path in the geographical area with which it is concerned, specifically in relation to land use and development.
- A comprehensive and integrated information base on the environmental attributes of an area and their sensitivity, together with management information in respect of the management zones into which these

[8] Regulation 5(3) of the 2010 EMF Regulations

environmental attributes occur (e.g. limits of acceptable change, thresholds, management objectives).

- A tool to support the identification of issues that require consideration/investigation in an EIA process through referring to the management objectives of the Environmental Management Zones (EMZs).

- The identification of activities that should be considered for either exclusions or restrictions, based on the significant impact and the sensitivity of the environmental attributes.

- A decision-support tool for environmental authorities when considering environmental applications in terms of section 24 of NEMA and the associated EIA Regulations.

- Guidance to applicants with respect to the appropriateness of development or land use proposals and to any professionals that are assisting in the application process, particularly in the environmental and planning fields.

- Assistance and support to other authorities in the consideration of environmental factors in their decision-making processes, especially where these are concerned with the use of land and resources.

- Support for cooperative governance, particularly with regard to land and resource use planning and development.

- A decision-support tool that will inform spatial development tools, specifically the Saldanha Bay and Bergriver Spatial Development Framework, for more effective land and resource use planning and development.

An EMF comprises a set or compilation of information maps showing the environmental attributes or characteristics of an area. These maps must show information that is important for planning of development and for decision-making purposes about land use and development. The main purpose of an EMF is to support the competent environmental authority, which in the Western Cape is the DEADP, in making their decisions in terms of the EIA Regulations. It must also be considered by the DEA or any other authority that may be designated as the competent authority for certain Listed Activities and where the application falls within an area for which an EMF has been prepared.

A primary objective of an EMF is to support environmental decision-making, not only for environmental authorities such as the DEADP, but also for other authorities whose decisions could have environmental implications. Ideally the EMF should also be used by other authorities, especially those that are involved in decisions about the use of land (e.g. municipal rezoning decisions, issuing of "plough permits" by the Department of Agriculture). Thus the authorities would then be using a common information base and goals, which in turn would support the obligation placed on them to give effect to co-operative governance principles.

It must be borne in mind that the EMF is a strategic-level document and thus it does not replace the need for EIAs to be undertaken for particular projects. However, the EMF does provide information that can be used to develop exclusions and restrictions as well as defining the urban setback line in NEMA. The EMF is also not a land use plan in the traditional sense meaning it does not fulfil the role of the Spatial Development Framework (SDF) or the former Structure Plans. Rather, the EMF is concerned with the environmental attributes of an area and the sensitivity of those attributes, with a view to promoting development that is responsive to the prevailing environmental conditions. It is in this sense that the EMF can contribute to the objectives of sustainable development.

From the perspective of projects that are subject to the EIA Regulations, the EMF can assist in:

- Assessing a project in the context of the area/region/landscape within which it is located.
- Screening a project proposal in terms of the environmental attributes applicable to its location to determine:
  - the likely environmental issues and thus specialist inputs required;
  - the appropriateness of the proposed project given the attributes of the site and its surroundings;
  - the alignment of the project with environmental management and sustainability objectives;
- Identifying the factors that need to be considered in formulating a development proposal sign a project proposal that is responsive to environmental conditions – proactive planning rather than reactive planning.
- Determining alternatives for assessment.
- Identifying sensitive areas or characteristics that need to be taken into account and to which the development proposal should respond in a manner that avoids or at least minimizes negative impacts in this regard.
- Establishing the need for environmental authorisation in respect of Listed Activities that are based on their location/position in the landscape. For example, many of the activities in Listing Notice 3 of the NEMA 2010 EIA Regulations fall into this category and the spatial information on environmental attributes in the EMF provides a reference point for determining whether an environmental application needs to be made or not.
- Establishing whether, once an exclusions process has been undertaken, if a Listed Activity is excluded from the need for environmental authorisation in respect of their location/position in the landscape.

In summary, the EMF is aimed at providing information that can be used by the authorities to support decision-making so as to take development in the "right direction." The idea is to find the best possible match between protecting resources (i.e. preventing depletion or degradation) on which humankind depends, whilst addressing the need for development to meet pressing social needs.

1.1.3 What must the EMF contain?

At the time that the EMF for the Greater Saldanha Area was initiated, it was envisaged that it would comprise three parts:

- Environmental Status Quo.
- Strategic Assessment.
- Strategic Environmental Management Plan (SEMP).

This structure readily addresses the requirements of the 2010 EMF Regulations. In accordance with Regulation 3(3), an EMF must include:

1. The status quo of the environment;
2. The desired state of the environment; and
3. The actions necessary to achieve the desired state.

Regulation 4 sets out the requirements for the content of an EMF. The links between the elements that make up this EMF and the content requirements of the EMF Regulations are shown in Table 1.

Table 1: Relationship between EMF content and requirements of EMF Regulations

EMF PART	CONTENT REQUIRED AS PER REGULATION 4	CORRESPONDING ELEMENTS IN THIS EMF
ENVIRONMENTAL STATUS QUO	• Identify by way of a map or otherwise the geographical area to which it applies.	• Provision of map and explanation of the boundaries of the study area.
	• Specify the attributes[9] of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes. • Identify any parts in the area to which those attributes relate.	• Synthesis of existing information on natural and heritage resources, and socio-economic characteristics. • Development of a spatial database (Geographical Information Systems - GIS) for natural and socio-cultural attributes where spatial data are available (spatial extent, location). • Explanation of attribute sensitivities/vulnerabilities. • Description of concerns, pressures and trends in respect of the attributes. • Determine whether there are any areas where thresholds indicating limits of acceptable environmental change may have been exceeded, or are at risk of being exceeded.
	• State the conservation status of the area and in those parts.	• Identification and mapping of public and private protected areas for conservation (terrestrial and marine) and priority areas for biodiversity conservation in terrestrial, marine and freshwater systems.
	• Indicate the parts of the area with specific socio-cultural values and the nature of those values.	• Description of socio-economic characteristics and heritage resources. • Assessment of sensitivities/vulnerabilities of heritage resources. • Description of development needs, priorities, pressures and trends.

[9] The EMF Regulations define an "environmental attribute" as an element in the environment that distinguishes it in character, form or nature from other elements in the environment.

	• Identify information gaps.	• Description of information gaps.
STRATEGIC ASSESSMENT	• State the environmental management priorities of the area.	• Formulation of a vision and objectives based on the Environmental Right in the Constitution, sustainability policy and the NEMA principles.
	• Specify the attributes of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes. • State the environmental management priorities of the area.	• Establishment of desired outcomes in respect of the attributes based on sensitivities and dependencies. • Establishment of Limits of Acceptable Change based on the current situation and the desired outcomes. • Determination of whether any thresholds of acceptable environmental change applicable to attributes have been exceeded or are at risk of being exceeded.

EMF PART	CONTENT REQUIRED AS PER REGULATION 4	CORRESPONDING ELEMENTS IN THIS EMF
STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN (SEMP)	• Specify the attributes of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes. • State the environmental management priorities of the area. • Indicate the kind of developments or land uses that would have a significant impact on those attributes and those that would not. • Indicate the kind of developments or land uses that would be undesirable in the area or in specific parts of the area. • Indicate Listed Activities that could be considered for exclusion.	• Determination of Environmental Management Zones (EMZs) based on environmental attributes and their sensitivities and vulnerabilities. • Provision of management guidelines for the EMZs. • Identification of appropriate and inappropriate developments or land uses per EMZ taking into account the typical impacts associated with these developments or land uses and the environmental attributes that would thus be impacted. • Formulation of decision-making criteria for the review of environmental applications. • Provision of a monitoring and evaluation framework.
	• Indicate a revision schedule for the environmental management framework.	• Provision of guidelines for the review and updating of the EMF.

1.1.4 What is the relationship between the EMF, IDP and SDF?

An Integrated Development Plan (IDP) "must reflect a spatial development framework which must include the provision of basic guidelines for a land use management system for the municipality."[10] Regulations made under the Local Government: Municipal Systems Act, No. 32 of 2000 (MSA)[11] set out the requirements for an SDF, including that it "must provide a visual representation of the desired spatial form of the municipality…which representation must indicate desired or undesired utilisation of space in a particular area"[12] and "must contain a strategic assessment of the environmental impact of the [SDF]".[13] An EMF could, therefore, be used to inform the Strategic Environmental Assessment (SEA) or to "determine the desired or undesired utilisation of space in a particular area."

The provisions of the MSA require that the compilers of IDPs and SDFs take into account any information contained in a relevant EMF. This conclusion is based on the general obligations of municipalities, as set out in this Act. Sections 23 and 24 respectively require that a municipality must undertake planning that gives effect to its development duties as set out in the Constitution and to its duties in terms of co-operative government. The constitutional duties of municipalities include:

- that development planning gives progressive effect to the environmental right in section 24 of the Constitution;[14]
- that sustainable development is promoted,
- that a clean and healthy environment is promoted;[15] and
- that municipalities participate in national and provincial development programmes.[16]

[10] Section 26(1)(e) of the Municipal Systems Act 32 of 2000.
[11] Municipal Systems Regulations (GNR 459 of 25 May 2001).
[12] Regulation 4(i)(ii) of the EMF Regulations.
[13] Regulation 4(f) of the EMF Regulations.
[14] Section 23(1)(c) of the LGMSA (Municipal Systems Act).
[15] Section 152(1)(d) of the Constitution.
[16] Section 153(b) of the Constitution.

As far as cooperative governance is concerned, the MSA requires that planning undertaken by a municipality must be aligned with, and complement, the development plans and strategies of other affected municipalities and other organs of state, which would include EMFs developed by an MEC or the National (DEA) Minister.[17]

The difference between an EMF and a SDF is that the EMF focuses on environmental attributes whereas the SDF reflects proposals or intentions in relation to land use and development. The EMF serves primarily as an environmental decision-making tool for the provincial authority, DEADP, but can be used by other decision-makers as well. In light of the general obligations to harmonise planning instruments and to take into account environmental considerations referred to above, a municipality that fails to consider an applicable EMF when compiling or reviewing an IDP or SDF fails to take into account a relevant consideration. Under these circumstances, the adoption of the SDF or IDP may well be reviewable in terms of the principles of administrative justice.

Thus the EMF should be used to inform the SDF since environmental resources are fundamental to development planning or determining how land should be used. Accordingly, the EMF could be incorporated into the SDF as an environmental "layer" or series of "layers" thereby informing the identification of areas suitable/unsuitable for particular land uses. The EMZs determined in the EMF should thus directly inform the spatial planning categories in the SDF. The relationship between the IDP, SDF and EMF is discussed in more detail in Part 3 – the SEMP.

It is not the role of the EMF to define the urban edge. The urban edge is a spatial planning tool and is defined or adopted by the competent authority[18] as part of the SDF approval process and the formulation of the SDF is the responsibility of local authorities. Where the EIA regulations refer to 'urban areas' this does not mean that the environmental authority has jurisdiction over the definition of urban edges; in this context, 'urban areas' means areas situated within the defined urban edge or within built up areas where an urban edge has not been defined. NEMA specifically defines the competent authority as being that authority responsible for issuing environmental authorisations in respect of listed activities. Determination of the urban edge is not a listed activity. Thus to determine an urban edge via the EMF would be impinging on the function of the municipality, namely that of municipal planning. In the Constitution, "municipal planning" is the sole competence of the municipal sphere of government. However, the EMF is able to aid, through alignment and incorporation into a spatial development tool, in providing information for the determining of the urban edge.

Another consideration is NEMA. This Act sets out principles that apply to the actions of all organs of state that may significantly affect the environment.[19] The

[17] Section 24(1) of the Municipal Systems Act 32 of 2000.
[18] Definitions in GNR 983, 984, 985 of NEMA 2014 EIA Regulations.
[19] Section 2 of NEMA.

principles include that "there must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment." Since the adoption of a development plan is an "action that may significantly affect the environment" the NEMA principles apply to the adoption of plans by organs of state. Thus, development plans such as the SDF should take into account any EMF in respect of the area concerned.

Whereas a SDF is concerned with spatial planning, the EMF is focused on the environmental attributes of an area. The EMF therefore:

- Recognises that there are important natural resources that need to be retained in order to provide for the needs and ensure the health and well-being of citizens in the municipality in the long-term. These natural resources are important because it is due to their existence that the citizens of the Greater Saldanha Area can have clean air, clean/drinkable water, and soil in which to grow crops and pollinators that are needed to produce food. Completely undisturbed natural areas such as wilderness areas and conservation areas are also important not only because of the role they play in keeping resources such as water clean, but also because of their role in human well-being (e.g. spiritual or cultural significance). The benefits that are provided to humankind by nature are often referred to as "ecosystem services."

- Recognises that there are important cultural and social resources that make an area what it is that are valued by citizens. These contribute to the "sense of place" and "sense of community." They may also play an important role in the local economy (e.g. tourist attractions).

1.2 Structure of the EMF

This EMF has been structured into three sections or parts:

- **PART 1: A situation analysis** (or 'environmental status quo report')**:** This comprises a synthesis of the existing information, taking account of environmental and land use issues, as well as any important trends. The focus of this section is the provision of a series of maps showing important natural and cultural/social resources and characteristics or attributes – where these resources occur and how sensitive or important they are.

- **PART 2: A strategy** (incorporating an SEA[20]) in which priorities are identified and opportunities and constraints explained. This will also set out a vision, goals or sustainability objectives, as well as criteria and indicators for the future. This section also includes the analysis of the EMZs, based on the

[20] 'SEA refers to a process that integrates sustainability considerations into the formulation, assessment and implementation of policies, plans and programmes. SEA is 'sustainability-led'. It focuses on the opportunities and constraints that the environment provides for future development, asking the question "what development can our environment sustain?" In the EMF context, the SEA relates to the specific geographical area covered by the EMF, although it must also take into account the relationship of that area to adjoining municipal areas. The purpose of the SEA is to formulate a framework for sustainable management and decision-making; the so-called Sustainability Framework Model (DEAT 2007 Integrated Environmental Assessment Guideline Series 4: Strategic Environmental Assessment. DEAT, Pretoria.).

situation analysis and taking account of the strategy, particularly the objectives which reflect the "desired future" for the area.

- **PART 3: A Strategic Environmental Management Plan** which will provide an action plan to achieve the strategy based within the context of the environmental attributes. This plan will cover:
  - Recommendations for the EMZs.
  - Recommendations relating to the integration of the EMF with land use and planning instruments (SDF/IDP, zoning schemes) and other environmental initiatives (State of Environment Report (SoER), Environmental Management Systems).
  - Recommendations in respect of a monitoring, evaluation and reporting framework.
  - Provision of a decision-making framework.
  - Recommendations regarding ongoing data gathering requirements.

I.3 Comments on information sources and gaps

An extensive range of documentation and spatial data has been reviewed. The information gathering process involved the following:

- Review of existing reports and documentation, such as the State of the Bay Reports for Saldanha Bay and St Helena Bay, technical reports relating to the biodiversity Fine Scale Plan (FSP), Rural Land Use Planning and Management Guidelines and documents such as the SDFs for the Saldanha Bay and the Bergrivier Municipalities.

- The obtaining of available spatial information so as to compile an integrated GIS database relating to environmental attributes. No primary research was undertaken to verify spatial data or to compile additional GIS information. GIS data was obtained from government departments or agencies, such as South African National Biodiversity Institute (SANBI). The only additional information that was incorporated into the GIS database from non-government sources was the following:
  - Important Bird Areas from Birdlife South Africa.
  - Heritage resources from specialists that have worked extensively in the area. This was done to augment the available spatial information in respect of heritage resources.
  - Bird flight paths based on discussion with relevant specialists within CapeNature and Birdlife South Africa, additional information that was considered essential due to the focus on wind energy development in the study area.
  - Important marine / surf zone areas based on specialist input from Anchor Environmental, based on the research undertaken both in Saldanha Bay and St Helena Bay (i.e. State of the Bay).

- A site reconnaissance of the study area.

- Meetings/discussions or correspondence with organisations with local knowledge and/or that hold useful data, including:
  - West Coast Biosphere Reserve
  - West Coast Fossil Park
  - South African National Parks (SANParks)
  - CapeNature
  - Department of Agriculture, Forestry and Fisheries (DAFF)
  - Department of Water and Sanitation - DWS (formerly Department of Water Affairs - DWA)
  - Transnet – Port of Saldanha
  - Saldanha Bay Water Quality Trust (SBWQT)
  - Saldanha Bay Municipality
  - Bergrivier Municipality
  - St Helena Bay Water Quality Trust

- The analysis of inputs from Interested and Affected Parties (I&APs) which were obtained through various activities. Key activities included:
  - A questionnaire relating to the values of, and vision for the area. This was circulated via the public workshops undertaken for the purposes of the SDF and various presentations, including to the municipalities (Saldanha and Bergrivier).
  - Discussions with various organisations such as the West Coast Biosphere Reserve, National Ports Authority and the SBWQT.
  - Authority presentations.
  - Presentations at the annual SBWQT feedback workshops.
  - Comments on the Discussion Document (December 2011) and the Draft EMF (February 2013).

The following comments are relevant to the existing information base:

- The biodiversity information is considered both reliable and comprehensive. There is a vast amount of biodiversity information that is available due to the various initiatives undertaken by Cape Action for People and Environment (C.A.P.E.) over the past several years. An FSP has been prepared, which covers the study area. This shows the Critical Biodiversity Areas (CBAs) and the Critical Ecological Support Areas (CESAs). It includes aquatic systems. Furthermore, updated CBA data was developed by CapeNature in 2016 which provides the most accurate and up-to-date terrestrial ecology within the study area, and acted as the key "point of departure" for developing the SEMP.

- Planning and land use information is also considered to be comprehensive and reliable by virtue of the fact that these data have been provided through the SDFs for the two municipalities. In addition, there are data available through the West Coast Biosphere Reserve.

- In addition to the FSP referred to above, information from the national project on Freshwater Ecosystem Priority Areas (FEPAs) was considered. This is a desk-top study. There is a high-level of correspondence between the FEPAs and the aquatic CBAs from the aforementioned FSP. The FSP is at a more detailed scale of mapping (1:10 000) than that of the national FEPA study, which is at a scale of 1:50 000.

- A Heritage and Scenic Resource: Inventory and Policy Framework study was conducted for the Western Cape as part of the Provincial Spatial Development Framework (PSDF). The study aimed at identifying broader regional scale resources rather than at a local landscape or individual site scale. The inventory was, therefore, used as an overview of the resources situated within the Greater Saldanha area, rather than a detailed inventory of all cultural and scenic resources. However, a phase one heritage resources survey was undertaken for the Saldanha Bay Municipality which provided a strategic survey of the significant heritage resources within the municipality. Furthermore, a reconnaissance of the study area was undertaken, by heritage specialists, which served to identify heritage landscapes, in addition to a list of Provincial Heritage Sites for the West Coast area that is available. Experts on archaeology and palaeontology were also consulted to further augment the heritage database on the basis of a desk-top study. As these are not detailed surveys or inventories, the database within the EMF cannot be regarded as being complete and additional resources may be present in the study area that is not identified within this EMF.

- Spatial groundwater information is available for South Africa, but the information available for Saldanha is problematic. This is a technical GIS issue that the DWS is attending to so that these data can be incorporated into the GIS database for the Saldanha EMF.

- No in-depth studies on the currents in the Bay and the Lagoon and the interaction between these systems have been undertaken.

- An ecological reserve determination study for the Berg River has been finalized and informed the status quo.

In considering the environmental attributes of the study area, the emphasis has been on synthesising information that is central to development planning. This means that the focus has been on environmental attributes that constitute resources critical to maintaining economic activity, human wellbeing, as well as those issues that may present risks to development (e.g. erosion potential, flood risk). Accordingly, factors such as climate and geology have not been mapped as individual attributes. Rather, cognisance has been taken of how these elements express themselves in the landscape. The landscape (or environment) is shaped by various factors and the interaction between them. For example, the influence of geology can be seen in topography, groundwater systems and the occurrence of mineral resources. In turn, topography is also influenced by rivers and streams, which in turn are affected by climatic conditions. As a result of this approach,

detailed descriptions of rock types, climate and the like are not included in the EMF document but are available in the GIS database. Rather the focus is on the critical indicators and the interaction between them.

PART ONE – A situational Analysis

2 Environmental attributes

Since the EMF is concerned with the environmental attributes of a particular area, this section is focused on information maps as provided for in section 24(3) of NEMA and Regulation 4 of the 2010 EMF Regulations. Brief descriptive information is given insofar as this is relevant to the interpretation of the maps.

Having researched the various information sources available and taking account of the environmental attributes that are central to development planning, the following environmental attributes are addressed:

a) Water resources
b) Biodiversity resources
c) Agricultural resources
d) Heritage and cultural resources.

The maps in this section are based on information that is available in the Greater Saldanha Area EMF GIS database. More detailed and larger scale views of the data are thus available. The GIS database is available from both the DEADP and the Saldanha Bay Municipality.

2.1 Water resources

The West Coast is known as a water scarce area, with rainfall averaging 300 mm per year. Probably the most important water resource in the area is the Berg River. Groundwater plays a lesser but still significant role as a water supply source. The area falls within the winter rainfall region of South Africa; thus most of the rain falls between April and September. Mean annual evaporation is relatively high with a total potential rate of some 1 300 mm. The study area is located in the Berg Water Management Area. Information on surface water resources is shown on Maps 3 and 4 and groundwater information is shown on Map 5. The surface water data originates from the FEPA project and groundwater information comes from a study conducted by GEOSS in 2006.

Currently, the West Coast District Municipality (WCDM) provides bulk potable water to the Saldanha Bay Municipality through the Misverstand Scheme which is part of the Berg River – Saldanha supply system. Water is obtained from both surface water (Berg River) and groundwater (Langebaan Road Aquifer) for the Misverstand Scheme. This scheme supplies the Saldanha Bay Municipality and some of the towns in the Bergrivier Municipality, including Velddrif and Dwarskersbos which fall within the EMF study area. There are also towns in the Swartland Municipality that obtain water from the Misverstand Scheme.

Water demand in the Saldanha Bay municipal area increased significantly due to the establishment of a number of industries in the 1980s and 1990s.[21] This is

[21] JA du Plessis (2008): Managing the unseen: Langebaan Road Aquifer System, Water SA Vol. 35 No. 2 (Special WISA 2008 edition) 2009Available on website http://www.wrc.org.za.

attributed to the development of the Port and associated infrastructure, such as the Sishen/Saldanha railway line. According to the IDP Review, industrial water users account for approximately 50% of potable water use within the Saldanha Bay municipal area.[22]

Based on the 2010 WCDM Draft Water Master Plan (WCDM, 2010)[23], it was estimated that demand would exceed supply (authorised allocations) around 2012. The WCDM reviews the Water master Plan every 3 years and based on the 2013 study undertaken by GLS Consulting Engineers[24], this timeframe was revised, with sufficient supply being adequate until at least 2015. Given the limited capacity for additional water to be drawn from the Berg River – Saldanha supply system, other water sources are under consideration including desalination. The potential for artificial recharge of the Langebaan Road Aquifer has also been investigated.

The Berg River Catchment covers an area of almost 9 000 km^2 and is subdivided into 12 quaternary catchments, with the estuary falling within that designated as G10M in the DWS classification system. A hydrological analysis of the Berg River has identified two key characteristics[25]:

- The Berg River shows considerable natural variability in all aspects of flow, including base flows and the range of different magnitudes (size classes) of floods.

- The relative importance of the contribution of the upper river to winter low flows and small floods in the lower river during the autumn – spring period is high. Summer flows in the river are highly altered relative to the natural state due to irrigation releases from Theewaterskloof and Voelvlei Dams.

The Berg River catchment is a significant source of water on a regional level. It is an integral part of the Western Cape Water Supply System[26], which is largely focused on ensuring an adequate water supply for the City of Cape Town Metropolitan Municipality (hereinafter referred to as the City of Cape Town). In 2009, 63% of the water in the system was being used for domestic and industrial purposes in the City of Cape Town, 5% in smaller towns and 32% in agriculture.[27] From initial specialist studies, the Berg River ecological reserve is approximately 31% of the mean annual run-off of 141 million cubic meters (Department of Water Affairs and Forestry - DWAF, 2009).

[22] IDP Review 2011/12 - Saldanha Bay Municipality – April 2011.

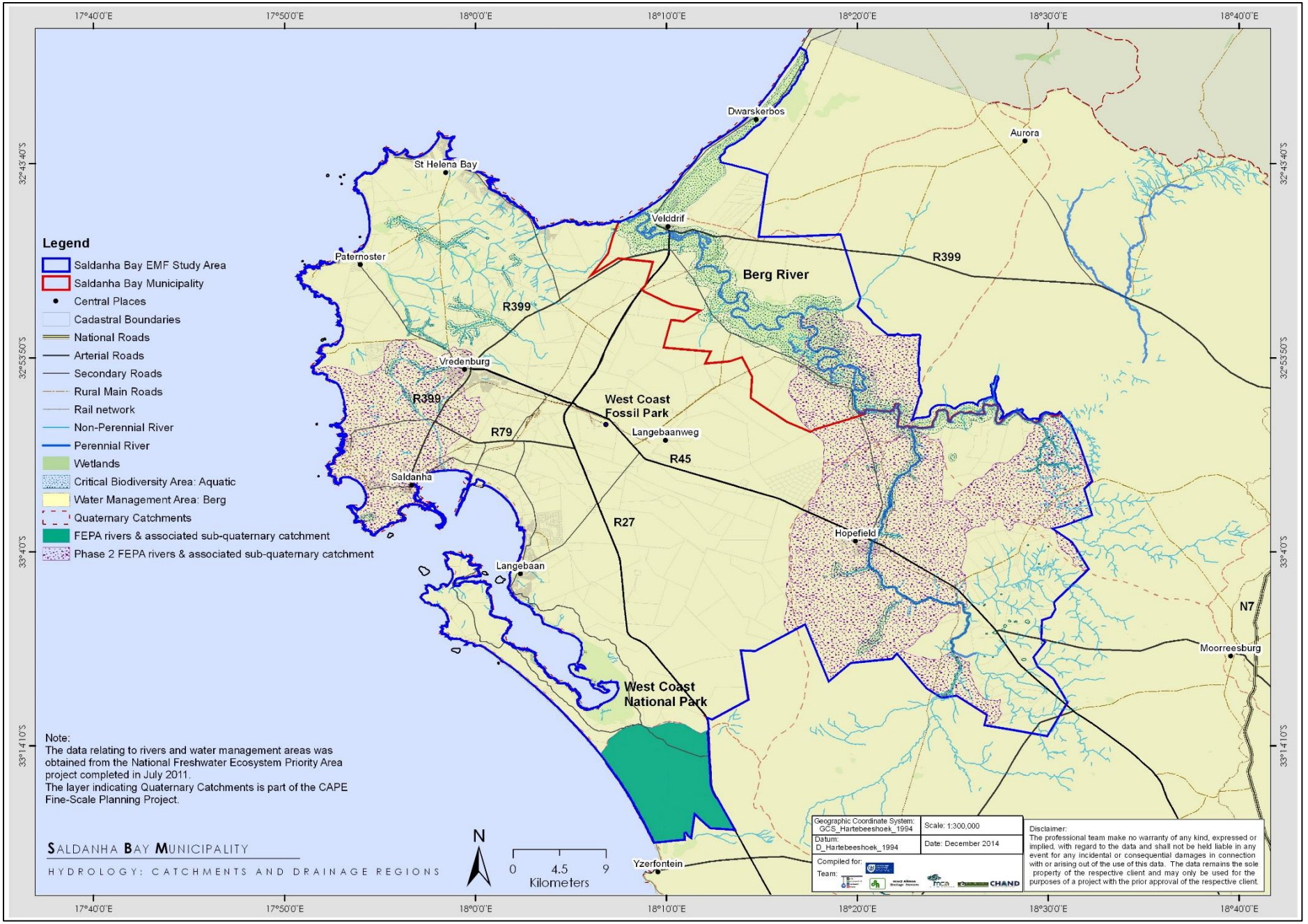
[23] Cited in the BKS Status Quo Report, IDZ Feasibility Study (2011) – Water Supply (Section 3).

[24] GLS Consulting Engineers (Pty) Ltd (2013): West Coast District Municipality Water Master Plan.

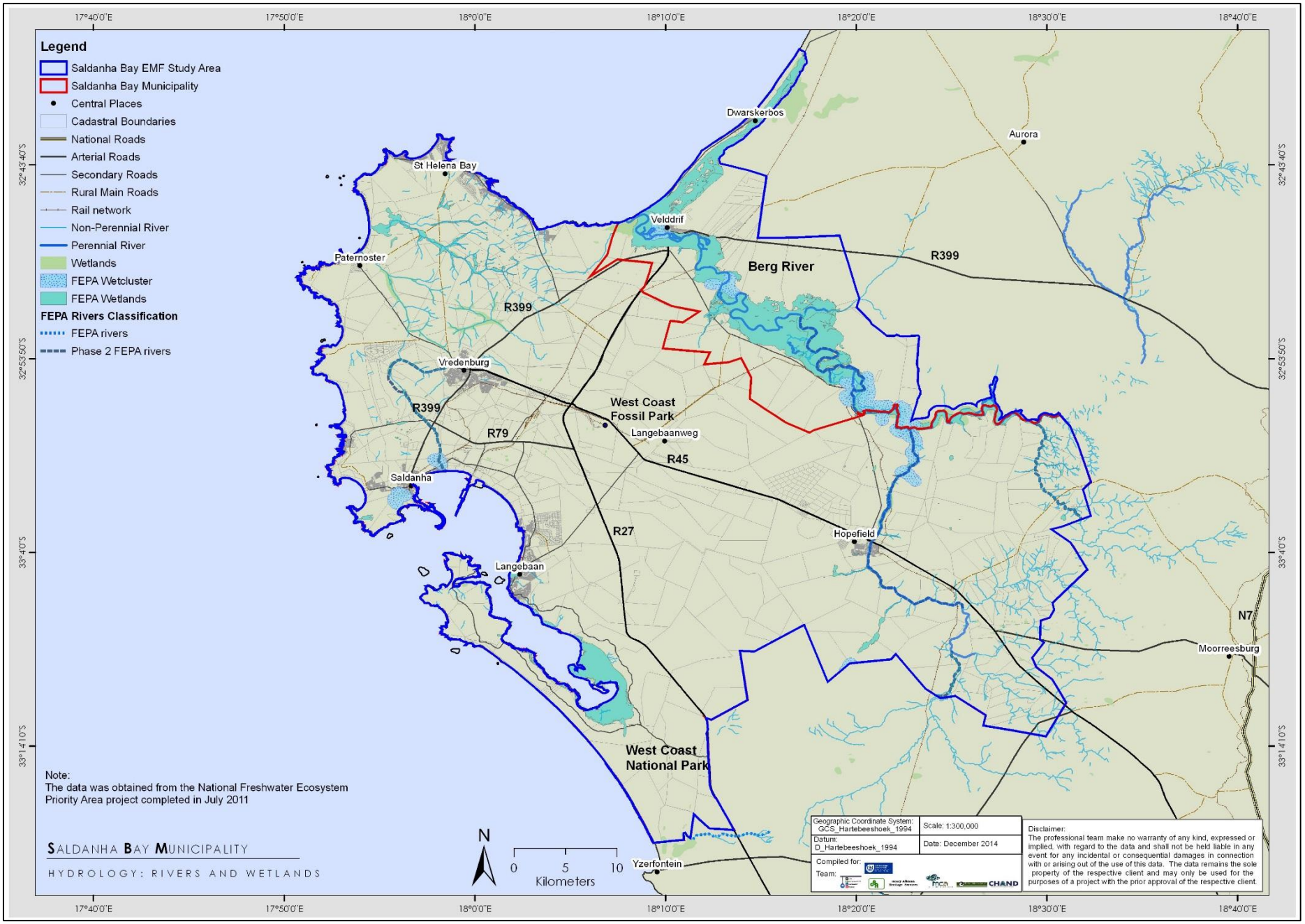
[25] Clark, B. and Ractliffe, G (Eds.) (2007): Berg River Baseline Monitoring Programme, Final Report – Volume 5: Synthesis, DWAF Report No. P WMA 19/G10/00/2107.

[26] The Western Cape Water Supply System (WCWSS) is a complex water supply system comprising an inter-linked system of six dams, pipelines, tunnels and distribution networks. Some elements of the system are owned and operated by the DWS and some by the City of Cape Town.

[27] Department of Water Affairs and Forestry (2009): Western Cape Water Reconciliation Strategy, Newsletter 5



Map 3: Catchments and drainage areas



Map 4: Rivers and wetlands

Whilst the study area is characterized by low rainfall, which in turn results in relatively low average river flows, there are significant aquifer systems. Groundwater and surface water system interactions are an important consideration and groundwater discharge plays a role in maintaining surface water systems. As noted earlier in this section, the Langebaan Road Aquifer is an important water source. It is bordered by the Berg River to the north, the Salt River to the east and the Elandsfontein Aquifer System to the south. The Elandsfontein Aquifer eventually seeps into the Langebaan Lagoon.

It is noted in the Berg River study[28] that groundwater contributes to base flow in the headwaters of the catchment and along its lower reaches. It is estimated that the contribution of groundwater to river base flow is in the order of 10-20% of mean annual rainfall. Similarly, the work undertaken by GEOSS (2006) indicates the importance of groundwater in maintaining surface water systems. The shallow depth to groundwater indicates that it is a source of water to river ecosystems in low-lying areas. Nodes of importance were defined by GEOSS which indicate locations where there is a high probability of groundwater contributing to surface water flow. Groundwater discharge zones were also identified, which show areas where surface water is supported by groundwater (refer to Map 5).

In the GEOSS 2006 study the following point is made (pg. 15): "…the health and maintenance of surface water systems are largely dependent on the protection of groundwater, both in terms of its depth below surface and quality. Within the study area there are also a number of non-riverine wetland systems that have important interactions with groundwater. Wetlands are regulators of water flow and water quality. When water moves from most types of wetlands into an aquifer, water is filtered and cleaned. Water is then transferred to alternate wetlands with more stable biological communities through the rising of the groundwater to the surface (Scialabba, 1999). Thus groundwater at discharge sites and discharge zones needs to be managed and protected to ensure the continued viability of freshwater systems."

Groundwater is also important for maintaining ecological functioning and biodiversity. GEOSS undertook a desk-top study in this regard in 2006,[29] which included the Saldanha Peninsula aquifer. The Saldanha Peninsula was identified as an area where groundwater plays a role in maintaining ecological functioning and biodiversity. The probability of occurrence of groundwater dependent ecosystems is shown on Map 6. It can be seen that groundwater dependent ecosystems are considered to have a high probability of occurrence on the eastern side of the study area, extending northwards of the Berg River.

The groundwater levels in the primary aquifers of the Berg Water management area near Langebaan are on a declining trend, as a groundwater reserve and allocation determination study carried out by SRK consulting indicated that the available groundwater resources in both the Langebaan Road Aquifer System and

[28] Clark, B. and Ractliffe, G (Eds.) (2007): Berg River Baseline Monitoring Programme, Final Report – Volume 5: Synthesis, DWAF Report No. P WMA 19/G10/00/2107

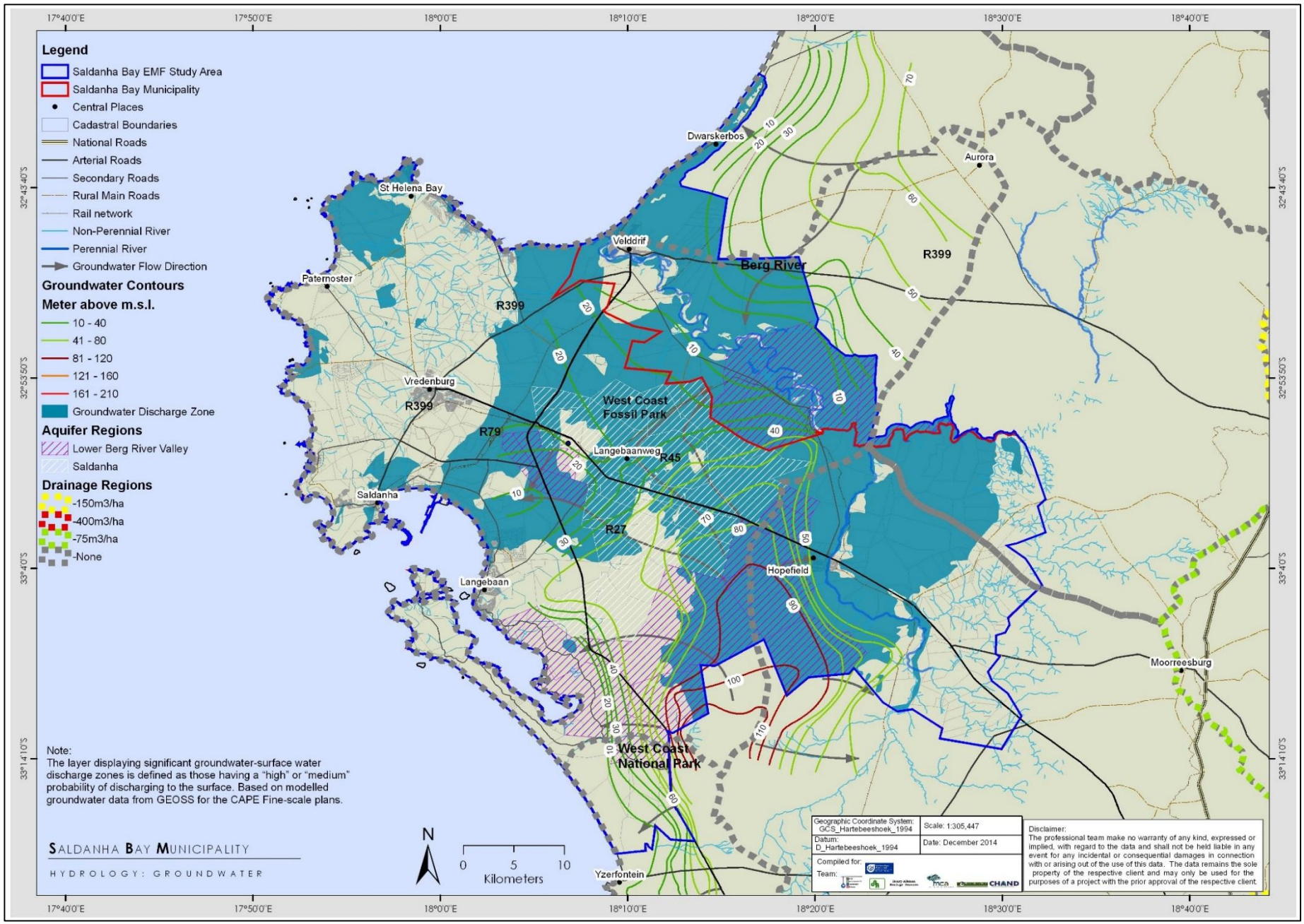
[29] GEOSS (2006): Groundwater Assessment of the North-West Sandveld and Saldanha Peninsula as an Integral Component of the of the Cape Fine Scale Biodiversity Project.

Elandsfontein Aquifer System are insufficient to meet the future water demand of the Port[30]. This may be a result of climatic changes and /or increasing abstraction. Better management of this aquifer is required to ensure that the aquifer is optimally used. The verification and validation of groundwater use in this area, and termination of any illegal groundwater use is recommended by the DWS[31]. Comprehensive Reserve determination, classification and development of a management plan for this aquifer has also been recommended to ensure that the aquifer is optimally used taking into account the societal and ecosystem needs.

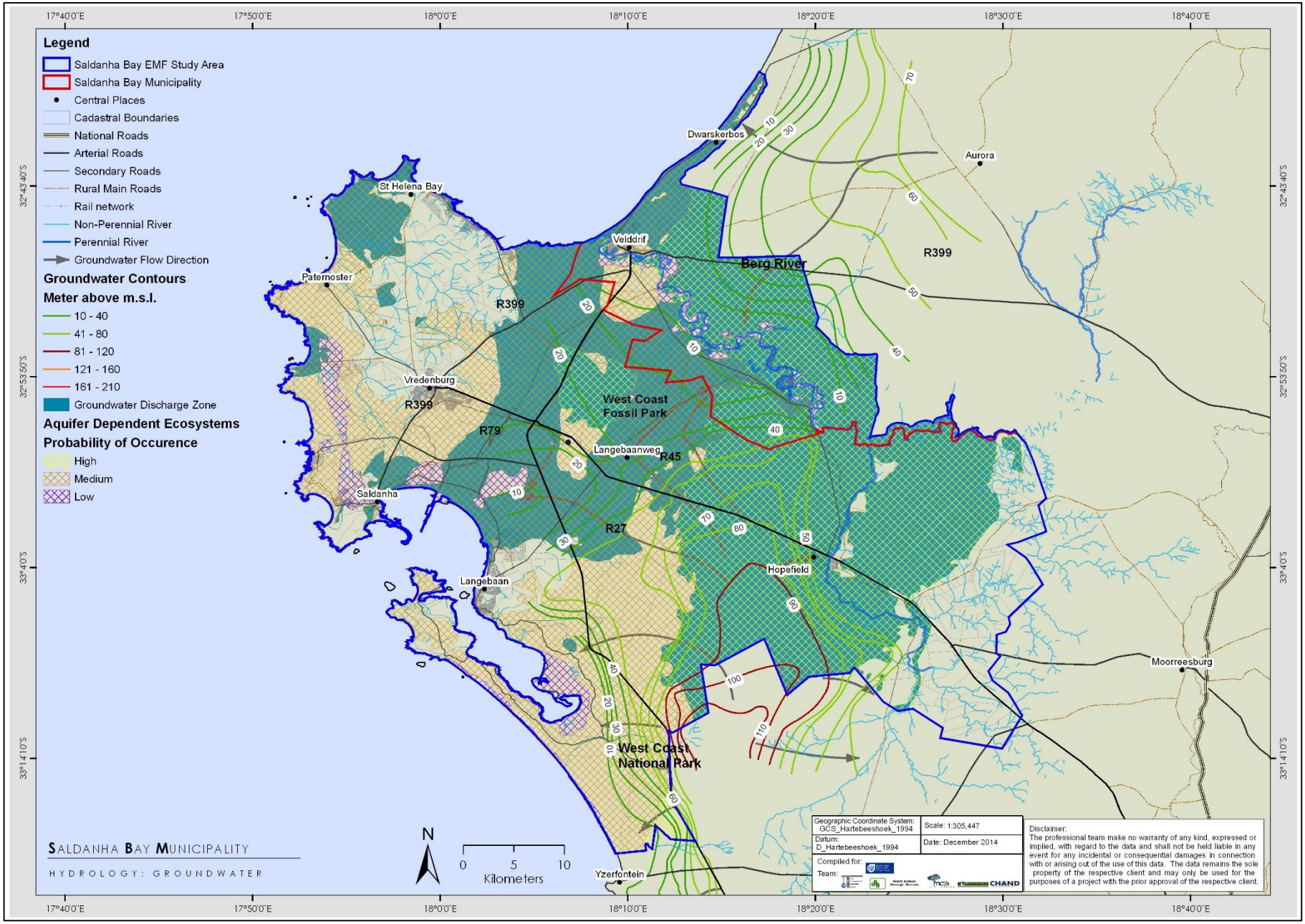
Expansion of monitoring networks has also been recommended, especially into new areas where groundwater development is expanding (e.g. Saldanha in the Berg WMA) and where aquifers may be stressed.

[30] SRK Consulting (2007). Port Of Saldanha Proposed Reverse Osmosis Water Desalination Plant - Groundwater Resources Impact Assessment

[31] Department of Water and Sanitation (2015): Groundwater Status Report-Western Cape Region



Map 5: Groundwater



Map 6: Groundwater and biodiversity interaction

2.2 Biodiversity

Information in this section is drawn primarily from the 2010 Biodiversity Sector Plan that has been prepared for the Saldanha Bay, Bergrivier, Cederberg and Matzikama municipalities.[32] This sector plan is based on the work conducted under the auspices of CapeNature's Fine-Scale Biodiversity Planning project which served to provide a map showing biodiversity priorities. This map and associated guidelines in the Sector Plan provide a framework for the compilation of a bioregional plan in terms of Chapter 3 of the National Environmental Management: Biodiversity Act (NEMBA), Act No. 10 of 2004 and, in so doing, supports the National Biodiversity Framework (2007). Accordingly, the Biodiversity Sector Plan has followed the requirements for the determination of bioregions and the preparation and publication of bioregional plans. The Biodiversity Sector Plan is currently under the 2016 revision. Although this report was not available for inclusion into the EMF, the most recent Western Cape Biodiversity Sector Plan: Spatial Assessment spatial datasets (Beta version) was available, containing Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and formed a point of departure for information on biodiversity.

The Biodiversity Sector Plan (2010) covered terrestrial and aquatic ecosystems. It served to identify priority areas from a biodiversity perspective, taking account of conservation targets, the condition of natural areas and the extent of biodiversity required to maintain functional ecosystems. The biodiversity priority areas were defined as:

- *Critical Biodiversity Areas (CBAs)*: Terrestrial biodiversity that is of high priority and that is required to maintain biodiversity pattern and process (i.e. functioning ecosystems)[33] and to meet conservation targets. CapeNature have indicated that significant loss of CBAs have occurred due to agricultural expansion (K Maree *pers. comm.*).

- *CBA aquatic*: As above, but for aquatic ecosystems (Refer to Section 2.2.2 for more information and maps).

- *Critical Ecological Support Areas (CESAs)*: These are zones or areas which must be safeguarded in order to prevent degradation of the CBAs and formal Protected Areas. CESAs in the study area are comprised of solely aquatic features.

[32] Maree, K.S. and Vromans, D.C., 2010. The Biodiversity Sector Plan for the Saldanha Bay, Bergrivier, Cederberg and Matzikama Municipalities: Supporting land-use planning and decision-making in Critical Biodiversity Areas and Ecological Support Areas. Produced by CapeNature as part of the C.A.P.E. Fine-scale Biodiversity Planning Project. Kirstenbosch.

[33] The way in which the components of biodiversity are arranged is referred to as biodiversity pattern, while the series of actions and interactions are termed ecological processes. Biodiversity pattern can be expressed as different vegetation types (such as forest, grassland, shrubland), or habitats (the natural home of a living organism, such as a wetland), or specific features (populations of rare plants which grow in a specific area and nowhere else). Ecological processes are those actions and interactions that enable natural systems to function and run as healthy, working systems. Evolutionary processes are a subset of ecological processes and are represented by those actions that enable new species to evolve in response to changing conditions over extended time periods.

- *Other Ecological Support Areas*: These are important areas but are not of the same priority as the CESAs, which are considered essential in supporting the maintenance and functioning of the CBAs and Protected Areas.

- *CBA buffer*: A buffer zone has been applied to aquatic CBAs. This is the critical management zone for maintaining the structure, ecological functions, and biological composition of the wetland or river with which it is associated. (NOTE: the CBA Buffer designation is not evident on the EMF maps in this report due the scale used for maps in this report. These buffers are however evident at a larger scale and are included in the EMF GIS database).

As previously mentioned, the 2016 Western Cape Biodiversity Sector Plan: Spatial Assessment[34] spatial datasets (Beta version) were available and defined the biodiversity priority areas as follows:

- *Critical Biodiversity Areas:* Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.

- *Ecological Support Areas:* Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.

- *Ecological Support Areas - Restore:* Restore and/or manage to minimize impact on ecological infrastructure (i.e. naturally functioning ecosystems that deliver valuable services) functioning; especially soil and water-related services.

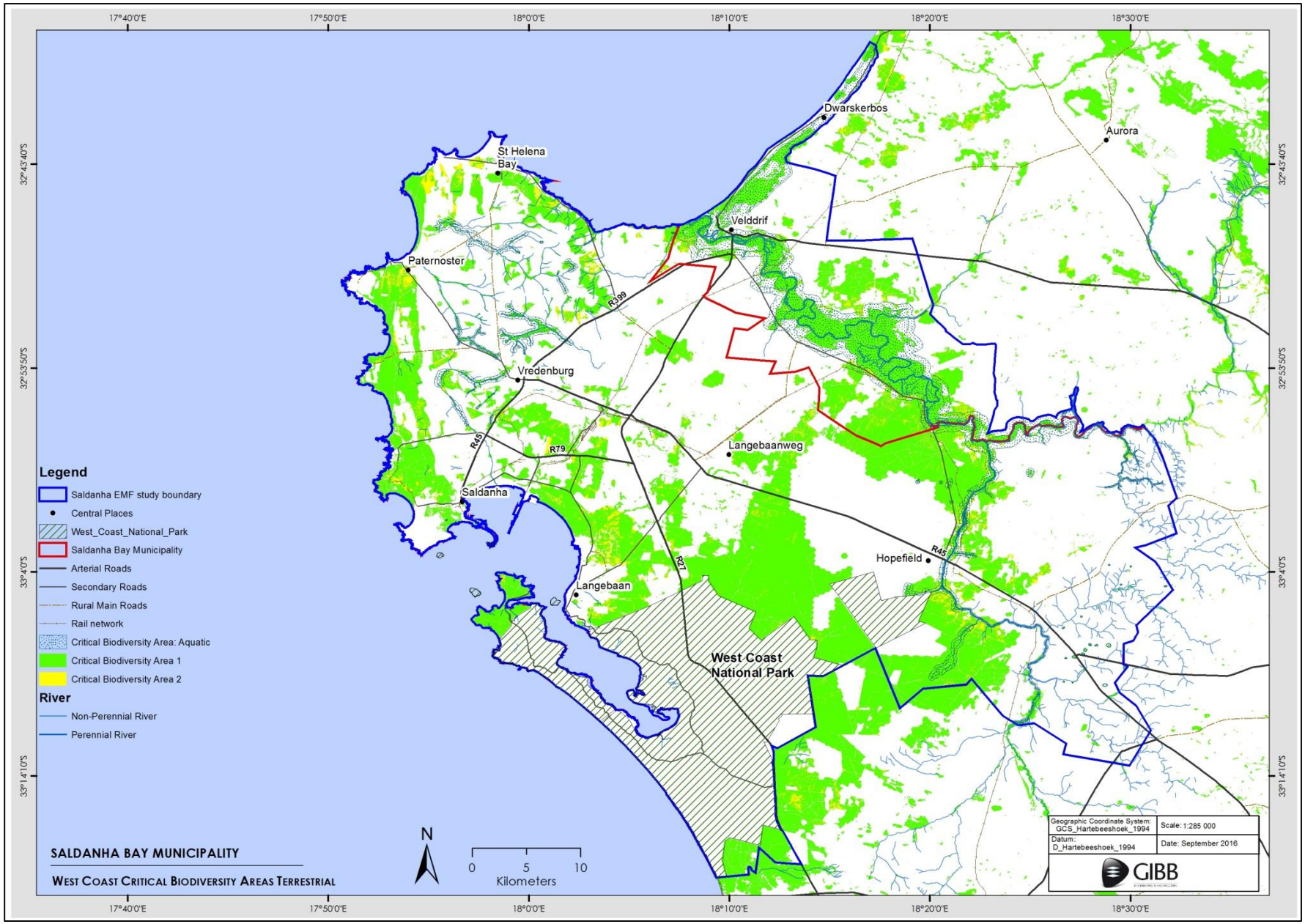
- *Ecological Support Areas – Plantation on Critical Vegetation / supporting CBA:* Restore and/or manage to improve ecosystem condition and functionality. Requires strategic landscape planning.

- *Other Natural Areas:* Minimize habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses.

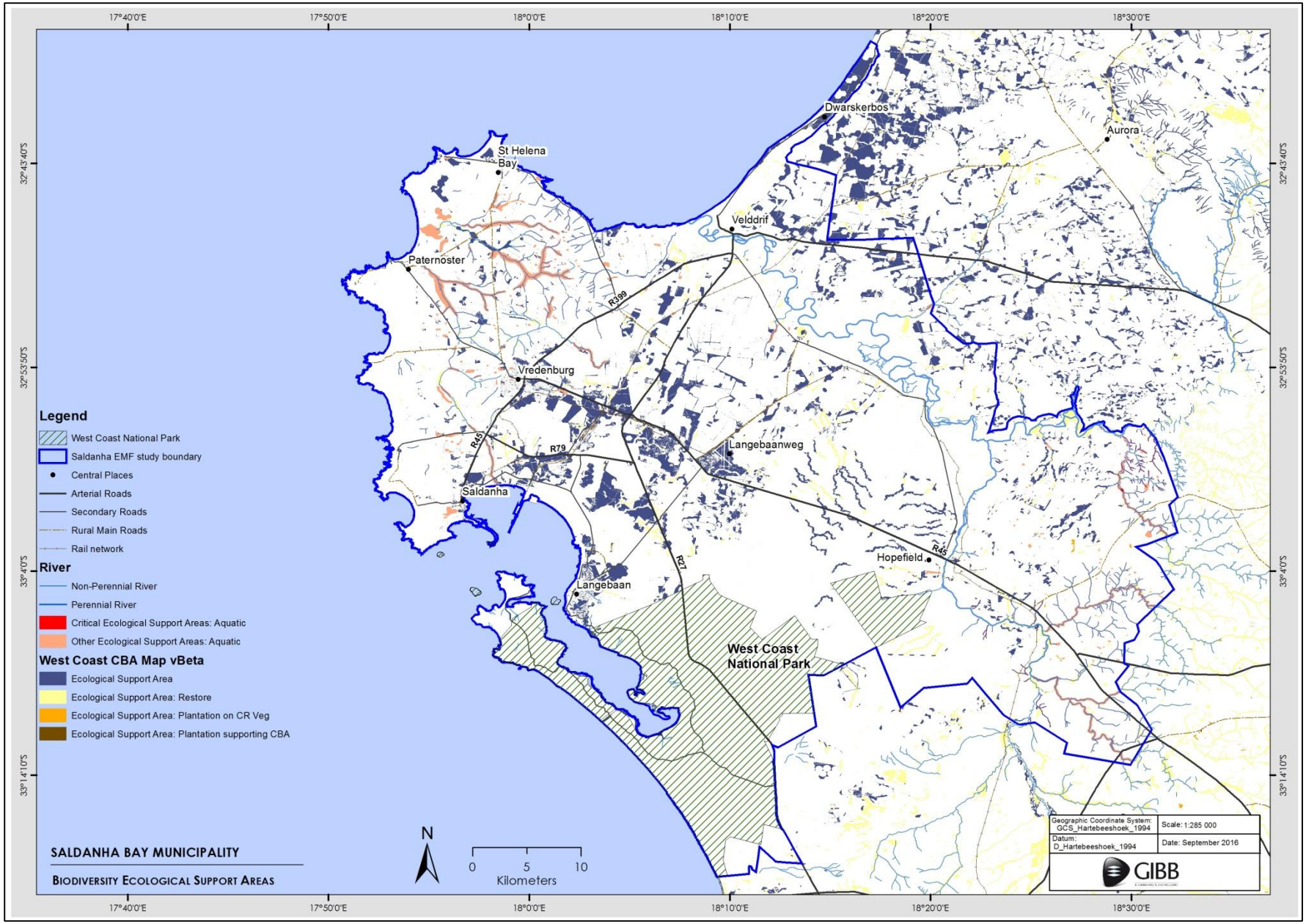
Map 7 illustrates the latest 2016 CBAs as well as the 2010 aquatic CBAs (as this is the most recent aquatic CBA data available, while Map 8 shows the aquatic (2010) and terrestrial (2016) ecological support areas within the Greater Saldanha area. Other natural areas (2016) are provided in Map 9 – these are areas that were identified as being natural at the time the mapping was done but were not classed in any of the other categories. Sensitive dune areas are also shown on this map. Although they are incorporated in the CBA mapping, due to their uniqueness and the particular ecological processes (e.g. moving sand etc.) it was considered useful to show these separately as well. These dune fields were mapped using aerial photography images.

[34] CapeNature (2016), Western Cape Biodiversity Sector Plan: Spatial Assessment (Beta version)

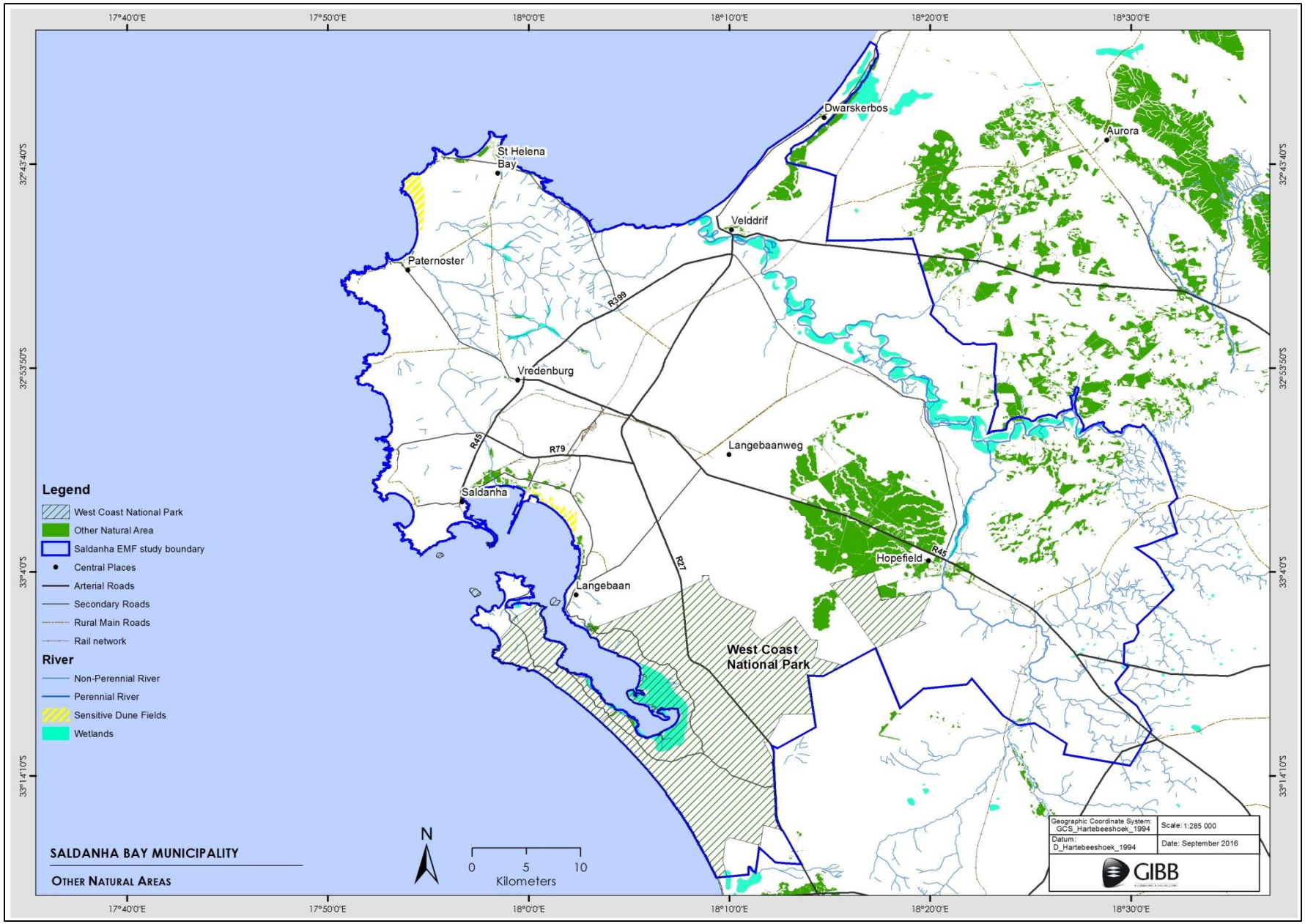
The Biodiversity Sector Plan and associated map provides the best available scientific information regarding the biodiversity resources that need to be retained in the long-term. This is to ensure the maintenance of healthy ecosystems which are fundamental to the wellbeing of people since nature provides human kind with food, clean water and many other tangible and intangible benefits (sometimes referred to as ecosystem services).



Map 7: CBA - Terrestrial



Map 8: Map showing Ecological Support Areas



Map 9: Other Natural Areas (including sensitive dunes)

2.2.1 Terrestrial ecosystems

The study area lies within the Cape Floristic Region (CFR), one of only six floristic regions in the world, and is the only one confined to a single country. It is the smallest floristic region and the most species diverse relative to its size. The CFR comprises some 9 000 species – almost half the plant species in South Africa. At least 70% of these species do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). The latest data from the Red Data Book listing process recently undertaken for South Africa is that 67% of the rare or threatened plant species in the country occur only in the south-western Cape, and these total over 1 800 species (Raimondo *et al* 2009). In addition, the CFR has been designated as a global "biodiversity hotspot" one of three such areas within South Africa. It is therefore clear that the south-western Cape is a major national and global conservation priority.

The biodiversity of the West Coast is high in terms of landscape and vegetation types, and also in terms of species of special concern[35] and genera. The ecosystem status of the vegetation types along the West Coast have been determined as the result of three previous assessments: the National Biodiversity Assessment; the National list of threatened terrestrial ecosystems and the C.A.P.E. Fine-scale Biodiversity Planning Project (Maree and Vromans 2010) and through the recent Western Cape Biodiversity Sector Plan: Spatial Assessment. Biodiversity priorities as derived through the aforementioned Fine-Scale Planning project are incorporated with the latest Western Cape Biodiversity Sector Plan: Spatial Assessment, which is shown in Map 8[36].

CBAs are those terrestrial (land) and aquatic (water) areas which must be safeguarded in their natural state as they are critical for conserving biodiversity pattern and maintaining ecosystem functioning. They are needed to meet national biodiversity thresholds, safeguard unique features or rare species, and/or to ensure the continued existence and functioning of species and ecosystems, including the delivery of what is termed "ecosystem services."[37,38] The Critical Ecological Support Areas must be conserved to prevent degradation of the CBAs and Protected Areas.

Many of the vegetation types that are present in the EMF area occur only along the West Coast and are thus endemic to this area. The study area is also home to

[35] Species of Special Concern are Red Data listed species, some of which are listed in the NEM Biodiversity Act as Threatened or Protected Species. All these species contribute to the biodiversity of the West Coast and should be safeguarded.

[36] Pence, G (2008): C.A.P.E. Fine-Scale Systematic Conservation Planning Assessment - Technical Report, CapeNature

[37] Ecosystems provide goods, services and attributes (ecosystem services) which contribute to human welfare (Barbier 1994):

- Goods are harvested resources, such as fish.
- Services are processes that contribute to economic production or save costs, such as water purification.
- Attributes related to the structure and organisation of biodiversity, such as beauty, rarity or diversity, and that generate less tangible benefits such as spiritual, educational, cultural and recreational value.

[38] According to the Millennium Ecosystem Assessment (2003) the services obtained from ecosystems are as follows:

- Provisioning services such as food and water;
- Regulating services such as flood and disease control;
- Cultural services such as spiritual, recreational, and cultural benefits; and
- Supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.

many endemic, rare or threatened plant species (Refer to Map 10). For example, the Leipoldtville Sand Fynbos has no less than 37 special plant species. Most of the lowland habitats within the CFR are under pressure from agriculture, urbanisation and alien invasive plant species. As a result many of the range-restricted species are under severe threat of extinction, as habitat is reduced to extremely small fragments. The EMF study area is characterised by lowland habitats of the CFR.

Priority areas and habitats identified in the Biodiversity Sector Plan (2010) for the study area are summarised below.

- **St. Helena Bay Koppies:** This chain of hills represents the last substantial expanse of the drier form of Saldanha Granite Strandveld which is closely aligned to renosterveld. Many rare species are found here but it is most notable as being the final stronghold for the critically endangered Blou viooltjie (*Lachenalia viridiflora*). This flower is found in pockets of humus and soil derived from the granite outcrops where it grows.

- **SAS Saldanha:** As a result of the limited access to this site due to it being military-owned, it is characterised by interesting examples of endemic habitats which are largely transformed and degraded elsewhere in the region. A large portion of the property is covered by the endangered Saldanha Granite Strandveld. The cool southern faces of the granite outcrops are covered by dwarf coastal forest which is characterized by species (such as *Erica tristis*) associated with cooler, wetter habitats (mainly found 150 km away). In addition to the pristine terrestrial habitats, the inland salt pans occurring within in the SAS Saldanha property are also among the best conserved on the entire peninsula.

- **Saldanha Limestone Strandveld** is restricted to the exposed limestone (calcrete) of the Saldanha Peninsula. This vegetation type is characterised by shallow soils and is rich in endemic plant species. Cracks and pockets in the rock provide micro-habitats which allow for specialist plants to colonise them. Prominent Limestone ridges adjacent to the coast are a familiar feature of this area, such as at Saldanha, Jacobsbaai and Paternoster. New species are constantly being discovered within the area with five new species being described by one volunteer (for SANBI's Custodians of Rare and Endangered Wildlife Programme) alone within the last four years.

- **Hopefield:** The acid sands of marine origins and the Malmesbury shale of the Swartland meet at Hopefield. Here, the interplay of soil types and the water permeability of these substrates as well as the climatic influence of the nearby Atlantic Ocean have resulted in unique habitats and many seasonal wetlands. Many endemic and threatened plant taxa are present.

The most important ecological process areas or landscape corridors are:

- SAS Saldanha, northwards along the coast towards Tietiesbaai;
- WCNP northwards towards the Berg River estuary;
- WCNP north-westerly towards Tietiesbaai via south Vredenburg;

- The Berg River corridor.
- The Berg River estuary northwards past Dwarskersbos.

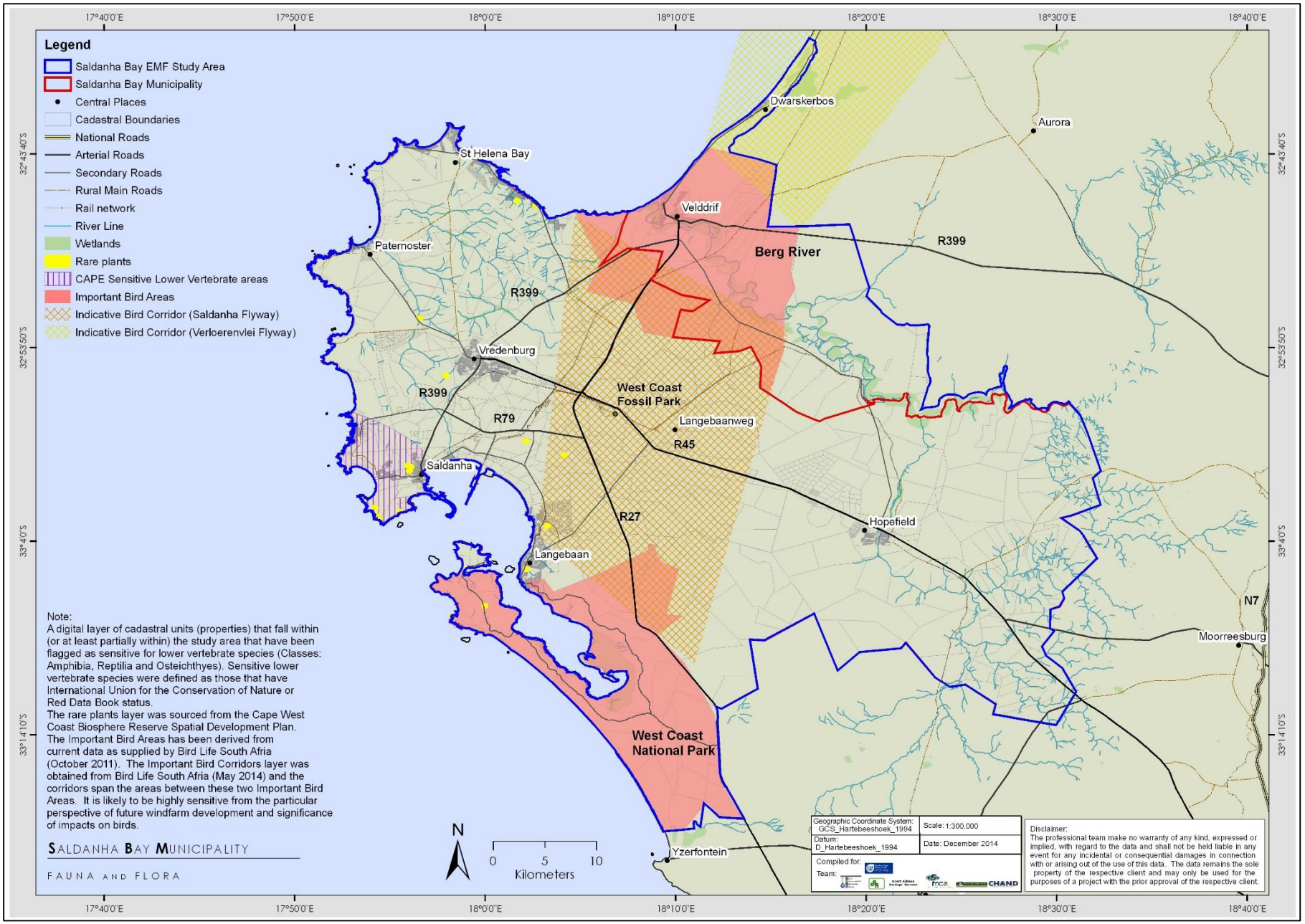
Faunal data has been taken into account in the Biodiversity Sector Plan, but specific spatial information is fairly limited (Map 10). Key points about fauna are:

- ***Birds:*** Various species occur in the region including the vulnerable black harrier (*Circus maurus*), the most restricted range of the world's 13 harrier species, Ludwig's bustard (*Neotis ludwigii*) and the Karoo chat (*Cercomela schlegelii*). The beaches and sheltered islands on the West Coast are particularly important for sea birds where thousands of birds roost or rest. In the 2012 State of the Bay Report it is noted that "Saldanha Bay, Langebaan Lagoon and the associated islands provide important shelter, feeding and breeding habitat for at least 53 species of seabirds, 11 of which are known to breed on the islands." Breeding populations of African Penguin (a red data species), Cape Gannet, four cormorant species, Swift Terns and Kelp and Hartlaub's Gulls occur on the islands of Malgas, Marcus, Jutten, Schaapen and Vondeling. These islands also support populations of the rare and endemic African Black Oystercatcher. Important bird areas as identified by BirdLife South Africa are centred on the Berg River Estuary and the WCNP. The most common flight path, based on research by BirdLife South Africa is shown on Map 10.

- ***Mammals***: A number of mammal species are threatened, endemic or near endemic to the area. The Van Zyl's Golden Mole *Cryptochloris zyli,* Cape Dune Molerat *Batyergus suillus*, Cape Gerbil *Tatera afra* and Grant's Golden Mole *Eremitalpa granti* (vulnerable) are endemic or near endemic. The Honey Badger *Mellivora capensis* is listed as near threatened, as is the Cape Horseshoe Bat *Rhinolophus capensis*. The White-tailed Mouse *Mystromys albicaudatus* is endangered, and the Sperm whale *Physeter macrocephalus* is listed as vulnerable.

- ***Reptiles***: The diversity of reptile species is relatively high in the drier areas along the West Coast. Seven species of girdled lizards of the genus *Cordylus*, including the armadillo girdled lizard (*Cordylus cataphractus*, Vulnerable) and the Cape Girdled Lizard *Cordylus cordylus niger* (endemic to Cape Peninsula and Saldanha Peninsula) are endemic to the area. The Geometric Tortoise[39] *Psammobatus geometricus* is Critically Endangered (CR). Remnant patches of lowland fynbos types still harbour populations of Cape sand snakes (*Psammophis leightoni*). The conservation status of this species is uncertain as taxonomic clarity regarding species and distribution boundaries are still unclear despite the revision by Broadley (2002).

[39] This tortoise has lost more than 90% of its natural habitat, and it only occurs in what is collectively known as shale renosterveld and the alluvium fynbos, most of which has been transformed



Map 10: Faunal information

- ***Insects***: The northern reaches of the West Coast constitute the southern-most tip of an area of endemism for darkling beetles (Tenebrionid family, which includes toktokkies). Another group, found almost exclusively in southern Africa, are the monkey beetles which are concentrated in this area. Along with many types of wasps and bees, these beetles pollinate the West Coast's immense range of plant species. Perhaps the most unusual invertebrates found here are the long-tongued flies (Memestrinidae), which can have mouthparts up to 50 mm long. The level of richness and endemism in insect species is likely to be similar to the extraordinary richness exhibited by the plant life. Preliminary studies show that more than half of the species in some insect groups are endemic to the area, occurring nowhere else in the world. At least one butterfly, the Atlantic Skolly *Thestor dicksoni malagas* (vulnerable) is endemic to the Langebaan/Saldanha area.

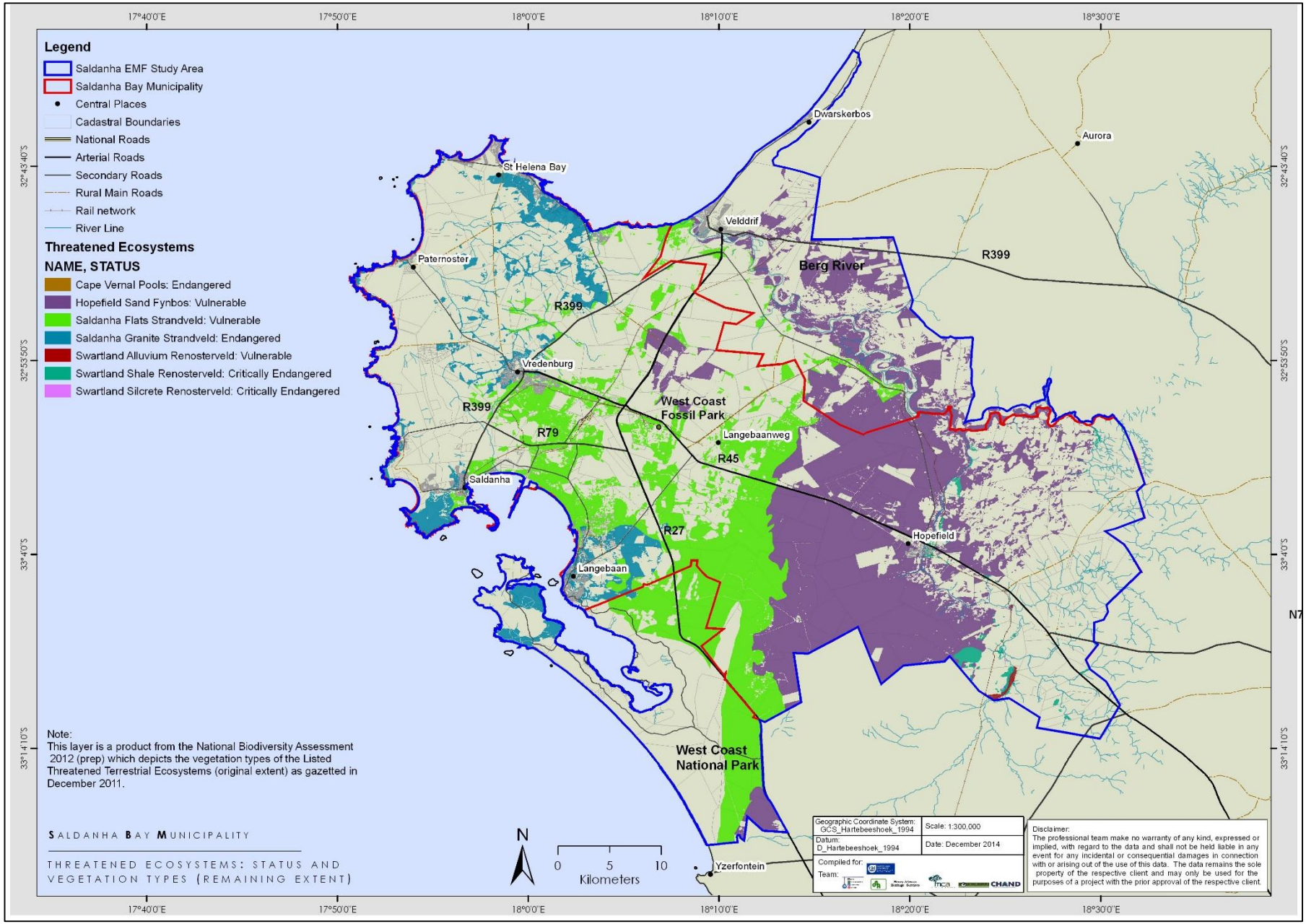
2.2.1.1 Threatened ecosystems

The National Environmental Management: Biodiversity Act (Act 10 of 2004) provides for the listing of threatened ecosystems. A list of threatened terrestrial ecosystems was published in December 2011. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. Map 11 shows the listed threatened ecosystems in the study area. Rare plants are shown on Map 10.

- ***Critically Endangered***: ongoing irreversible loss of natural habitat in the following two ecosystems **Swartland Silcrete Renosterveld** and **Swartland Shale Renosterveld** has resulted in the extent of remaining habitat being less than or equal to the biodiversity conservation targets. To meet the targets for the particular ecosystem, and to conserve threatened plant species, all remaining habitat must be protected. The ecosystem status of Swartland Shale Renosterveld is also informed by the fact that there are 80 or more threatened Red Data List plants associated with this ecosystem.

- ***Endangered***: ongoing irreversible loss of natural habitat in the following two ecosystems *Cape Vernal Pools* and *Saldanha Granite Strandveld* has resulted in the extent of remaining habitat being less than or equal to the biodiversity conservation targets plus 15%. There is thus a negligible 'safety margin' before the targets are reached and the utmost caution must be used to prevent targets from being undermined.

- ***Vulnerable***: ongoing irreversible loss of natural habitat in the following three ecosystems: **Hopefield Sand Fynbos**, **Saldanha Flats Strandveld** and **Swartland Alluvium Renosterveld** has resulted in 60% or less of the original area of ecosystem remaining. Particular attention must be paid to *Hopefield Sand Fynbos*, .where 40 or more threatened Red Data List plants are known to be associated with this vegetation type. Caution is thus needed in permitting transformation or degradation of these areas.



Map 11: Threatened ecosystems

2.2.2 Aquatic ecosystems

The importance of aquatic ecosystems has been alluded to in Section 2.1 in the context of water resources. Aquatic ecosystems in the study area include rivers, wetlands (or 'vleis') and estuaries/lagoons. In terms of riverine ecosystems, the study area falls within the Berg River Water Management Area which includes the lower Berg River and several short coastal drainages on the Saldanha Peninsula, such as the Bok River which flows from Vredenburg into Saldanha Bay. The Sout River is an important tributary to the Berg River. It has been highlighted for as being of ecological significance since it is a unique saline river type and it supports a fish species of Cape galaxid which is endemic to the area.

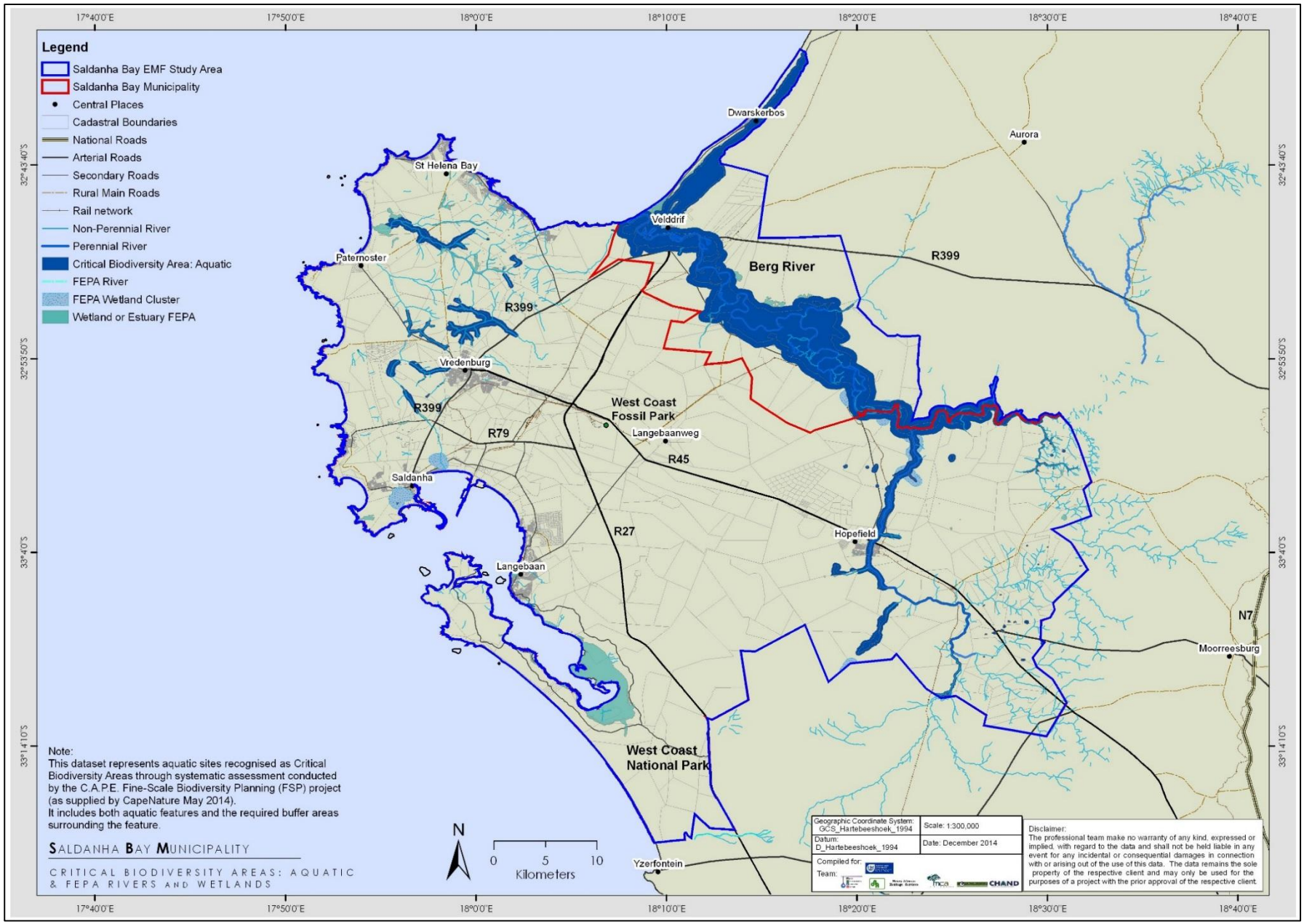
The healthy functioning of a river ecosystem is largely dependent on the condition of the adjacent natural or riparian vegetation, which filters pollutants, helps maintain natural water temperatures and contributes organic matter which supports aquatic life. Riparian vegetation is also important because it acts as a buffer from the effects of floods, preventing erosion and increasing water storage in the soil by slowing run-off during floods. In terms of the CBA mapping vegetated areas surrounding and supporting aquatic features have been recognised as buffers. There are different buffer widths, depending on the ecological importance of the river concerned. Accordingly, the buffer width for rivers designated as CBA- Aquatic is 100 m, for those categorised as CESAs it is 50 m and those classed as Other Ecological Support Areas have a buffer of 32 m.

There are more than 200 mapped wetlands in the area, most of which are defined as depression wetlands, often also called "pans". These are areas where water typically accumulates due to rainfall, ground water discharge, and/or overland flow. Valley bottom wetlands and seeps are also found in the study area. All types of wetlands can be regarded as important, which is why all the wetlands in the study area have been designated as "CBA Aquatic" or "Ecological Support Areas." In terms of the Biodiversity Sector Plan (2010) for the Saldanha Bay, Bergrivier, Witzenberg and Matzikama municipalities: "If an area supports several wetlands that together are greater than 500 ha in extent and no more than 1.5 km apart; and if more than 80% of the land cover is natural vegetation; then this should be recognized as a significant cluster to be prioritized for protection and proper management."

In addition to the CBA map and Biodiversity Sector Plan (2010), aquatic ecosystem information is also available from the National Freshwater Ecosystem Priority Area project. An atlas showing FEPAs has recently been published. The FEPA maps are supported by a Technical Report.[40] FEPAs within the study area largely correspond with the CBA – Aquatic areas or the CESAs. Generally, the CBA-Aquatic areas are more extensive. This is probably a consequence of the fact that the mapping scale of 1:10 000 is applied in the FSP whereas that applied for the FEPA project is 1:50 000. As the CBA mapping is at a more detailed scale, the

[40] Nel, J., *et. al* (2011): Technical Report for the National Freshwater Ecosystem Priority Areas project, WRC Report No. K5/1801

CBA-Aquatic areas are likely to be more accurate than that the FEPAs. CBA aquatic areas and FEPA information are shown on Map 12.



Map 12: Aquatic ecosystems

Different categories are shown on the FEPA maps, each with differing management implications:

- *River FEPA and associated sub-quaternary catchment*: River FEPAs achieve biodiversity targets for river ecosystems and threatened/near-threatened fish species, and were identified in rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicates that they should be retained in a good condition in order to contribute to the biodiversity goals of the country. For river FEPAs the whole sub-quaternary catchment is shown as a FEPA, although FEPA status applies to the actual river reach shown on the map within such a sub-quaternary catchment.
- *Wetland or estuary FEPA:* For wetlands and estuaries, only the actual mapped wetland or estuarine functional zone is shown on the map as a FEPA.
- *Wetland cluster:* Wetland clusters are groups of wetlands embedded in a relatively natural landscape. This allows for important ecological processes such as migration of frogs and insects between wetlands.
- *Phase 2 FEPA and associated sub-quaternary catchment*: Phase 2 FEPAs were identified in moderately modified (C) rivers. The condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once good condition FEPAs (in an A or B ecological category) are considered fully rehabilitated.

2.2.2.1 Ecological reserve – Berg River

A preliminary assessment of the water requirements of the Berg estuary was completed by Ninham Shand in 1994[41].as part of the Western Cape Systems Analysis. Later studies include the pre-feasibility and feasibility study for augmentation of the Western Cape Water Supply System undertaken by the Department of Water Affairs (2012). The Berg River Estuary is one of three permanently open estuaries on the west coast and is home to a variety of estuarine associated fish species and habitats. This makes the Berg River an important contributor to economic and social development; the rivers economic value is estimated to be R75.6 million which is comprised of the property sector, tourist activities and nurseries. Considering current water requirements, the ecological reserve for the Berg River is expected to be greatly impacted on. Current minimum freshwater requirements for individual components of the estuary were identified as follows[42]:

- *Microalgae*- Studies for microalgae found phytoplankton were found downstream of De Plaat, consisting of mostly flagellates and diatoms. Dinoflagellates were present in low densities from the mouth, and three months later the same study found dinoflagellates present throughout the

[41] Cited in Anchor Environmental (2008): Berg Estuary Situation Assessment, C.A.P.E. Estuaries Programme

[42] Department of Water Affairs, South Africa (2012). Report No.1 : Ecological Water Requirement Assessments, Volume 3 – Berg Estuary Environmental Water Requirements

estuary. Though these studies were conducted prior to the completion of the Berg Dam, the difference in flow is not indicative of microalga variances.

- *Macrophytes*- The Berg River consists of large areas occupied by halophytic floodplain, open pan, sedge pan and xeric floodplain. Approximately 26 % of the estuary has been lost to agricultural, urban and other activities. Dependent of flooding (tidal and riverine) as well as salinity, macrophytes can flourish.

- Perennial base flow and one to two floods per annum (between 15 and 30 × 10^6 m^3 each). Floods should occur between May and October with residual inundation enduring for three to five months during winter.

- *Invertebrates*- The biomass of invertebrates in the Berg River Estuary is very rich since the water column, intertidal and subtidal benthic habitats support biomass levels. Changes such as species reduction can be seen during high-flow winter periods. Regardless of seasonal activities, approximately 40 % of estuarine vegetation has been lost, which impacts invertebrate availability.

- *Fish*: The Berg River provides a habitat that is home to a variety of fish species. These habitats promote reduced fish mortality which invites a variety of marine species. Alien fish such as bass and banded tilapia are plentiful and have led to the indigenous fish species mortalities. In addition to alien species, farming practices have been noted to impact on habitat integrity and in inducing flow alterations. White stumpnose, white Steenbras, kob, leervis are four of the five remaining species that can be found in the Berg River, however in very low numbers. The witvis has been lost from the Berg River habitat. Sufficient regular flushing is required to keep salinity down (considered important for plankton production which is important for larval fish). An annual cueing flood is required in early winter, together with sufficient smaller floods that can inundate the floodplain until mid-August. A large flood every 3 to 5 years was also listed as being important to ensure detritus from the floodplain is incorporated into the estuary at semi-regular intervals.

- *Birds*: The Berg River Estuary is an important due to the larger number and variety of avifaunal species. Some of these are seasonal water bird species, with high summer compositions for herbivorous waterfowl and waders (invertebrate feeders). Flow required to meet requirements for vegetation and aquatic invertebrates was considered satisfactory for birds. Recommendations for a general persistence of water between mid-June and late August through an early small to medium flood followed by a small flood in August. It was also recommended that summer floods and hyper-salinity be avoided.

The above-mentioned aspects depict the present state of the Berg River Estuary (with Berg River Dam in place). From this it is evident that water requirements are heavily dependent on a number of factors operating within an intricate system. Conserving ecological reserves is considered a high priority for the Berg River Estuary, however, does require cooperation from the community where anthropogenic impacts are observed.

The Environmental Water Requirements for the Berg River Estuary reviewed various runoff scenarios in order to determine the recommended EWR. The recommended EWR essentially represents the runoff scenario that provides the highest reduction in river inflow that will keep the estuary in the recommended Ecological Reserve Category (which is dictated by the Present Ecological Status).

Given the extent of the existing water resources infrastructure in the catchment (e.g. Berg River Dam) and the extent of transformation, it would be impractical to improve the condition of the Berg River Estuary to a Category of A, or indeed a Category B, therefore, the Best Attainable State (BAS) for the estuary is a Category C (moderately modified). Based on the ECR, the study determined that Scenario 7, the Present inflow scenario with marginally reduced minimum summer low requirements of 0.6 x m^3s^{-1} was selected as the recommended EWR for the Berg River Estuary.

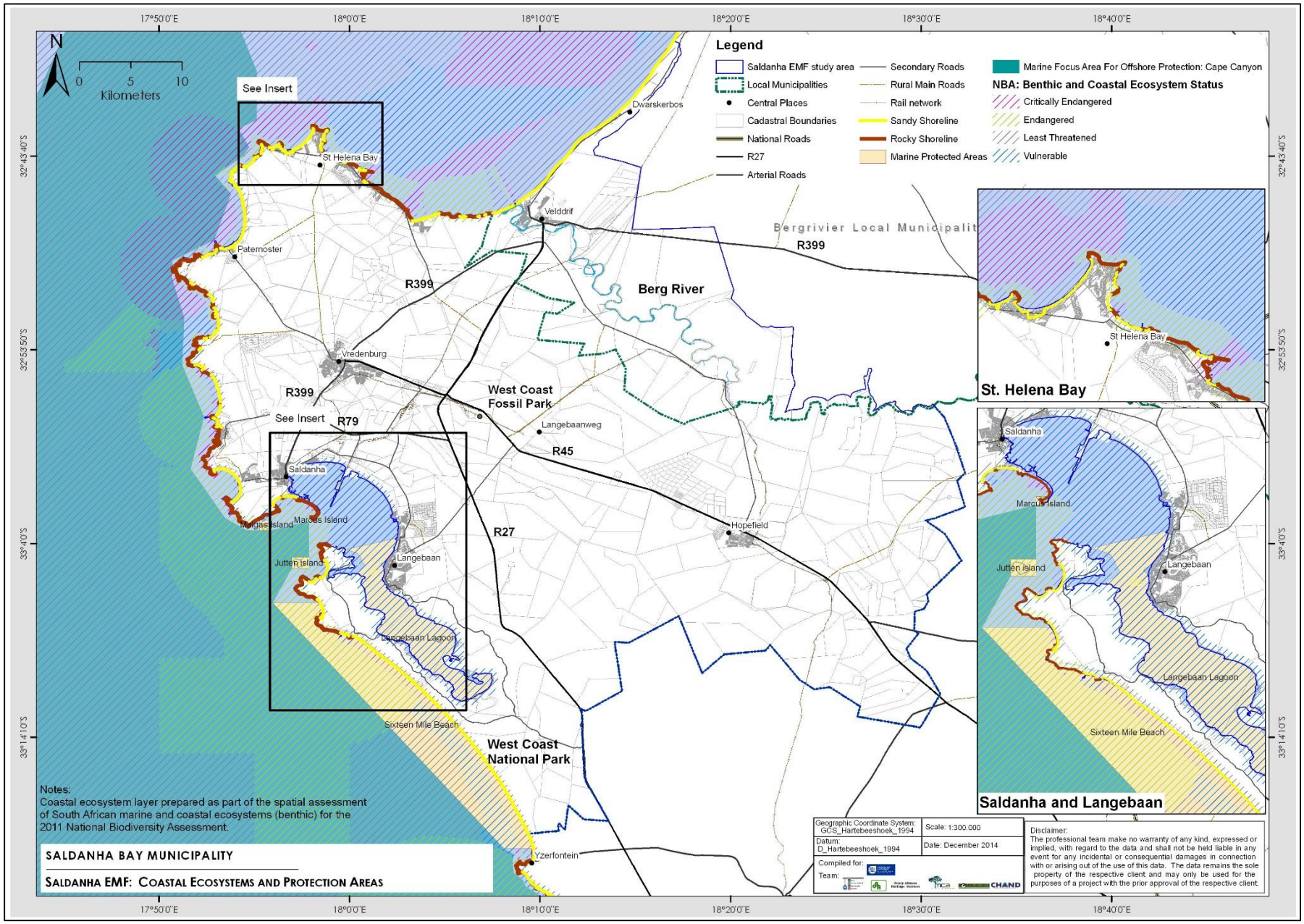
2.2.3 Marine and coastal ecosystems

The National Spatial Biodiversity Assessment 2004 defined five distinct marine bio-geographic zones in the country: Namaqua Bioregion, South-Western Cape Bioregion, Agulhas Bioregion, Natal Bioregion and the Delagoa Bioregion. The West Coast lies within the Namaqua Marine Bioregion (from Cape Columbine northwards) and the South-western Cape Bioregion (from Cape Columbine southwards to Cape Point). A key feature of the West Coast is the cold Benguela current with its nutrient-rich waters. This current supports one of the world's richest fishing grounds. About 90% of South Africa's fishing industry occurs off the Western Cape coast.

According to the National Spatial Biodiversity Assessment, marine ecosystems off the West Coast are regarded as being in a in a highly threatened state. This is attributed to human activities including diamond and petroleum mining, pollution from land-based sources, trawling, over-exploitation of marine resources, coastal developments and introduction of alien invasive species mainly through shipping activities and to a lesser degree the cultivation of marine organisms. The entire Saldanha Bay area (i.e. Big Bay, Small Bay and Langebaan Lagoon) is classed as vulnerable. Offshore areas are categorised as endangered with a critically endangered area off the Marcus Island Causeway (Refer to Map 13). Formal protection of marine resources is largely lacking. There are two Marine Protected Areas (MPAs): (i) a 12 km stretch in the southern part of the EMF study area and (ii) the Langebaan Lagoon.

Langebaan Lagoon (including the inshore islands Schaapen, Marcus, Malgas and Jutten) was declared a Ramsar site in 1988 (wetland of international importance, particularly to waterfowl). It supports thousands of Palaearctic migrant birds seasonally, is an International Bird Area, and has been identified as the most important wetland for waders on the west coast of Southern Africa. The near shore islands are important for Red Data listed seabirds. At least 11 species are known to breed there, including the African Penguin (a red data species), and the rare and endemic African Black Oystercatcher.

The Lagoon is fed by freshwater seepage and tidal exchange. It has a rich marine fauna of more than 400 species, of which six have been classified as vulnerable and seven as rare. The lagoon is one of the only two known habitats for South Africa's most endangered marine mollusc *Siphonaria compressa* which occurs in the eelgrass *Zostera capensis* beds. Both the lagoon and Big Bay provide habitat for white stumpnose (*Rhabdosargus globiceps*) which is endemic to southern Africa. This species is under significant fishing pressure.



Map 13: Coastal ecosystems and protected areas

The Berg River Estuary has been ranked 2nd as an Estuary of Conservation Importance within South Africa[43] (Turpie and Clark, 2007). The estuary and floodplain are of national conservation importance for estuarine birds, fish, invertebrates and vegetation. Salt marshes have been substantially transformed and threatened by anthropogenic disturbance and invasion by alien plant species has significantly altered habitats particularly in the upper reaches of the estuary. The estuary has also been subject to a long history of fishing pressure which has influenced fish fauna diversity and abundance. Fishing-related economic activities have dominated historically (fish processing, boat repairs, commercial fishing). There is a salt production facility located in the estuary. Tourism and recreation have become increasingly important in recent years.

Estuaries play a vital role in providing habitat, shelter and breeding areas for a range of fish species. Of the 35 fish species recorded, 17 are regarded as being either partially or totally dependent on the estuary for their survival. Recovery in fish populations have been observed since gill netting ceased in the Berg in 2003.[44] The Berg River estuary plays a particularly important role as a nursery area for commercial and recreational fisheries. It is estimated that the value of the estuary as a nursery area is some R9 million per year[45].

Birds are also an important element of the biodiversity of the Berg River Estuary. The area supports the highest density of recorded shorebirds on the West Coast. An average of 60 species may be observed at any one time which is indicative of constant bird activity. Waders, gulls and terns account for about 40% of the observed species. Understandably, the area is a popular for birding.

State of the Bay Studies

"State of the Bay" studies have been conducted for Saldanha Bay and St Helena Bay under the auspices of the Water Quality Trusts that have been established for each of these areas. In the case of Saldanha Bay reports on the results of physical and biological monitoring are generally published annually. Reports pertaining to St Helena Bay are published less frequently.[46] These studies are concerned with various water quality parameters, as well as physical and ecological characteristics. Key results extracted from these studies are summarised in Table 2.

[43] Turpie, J.K. & Clark, B.M. 2007b. The health status, conservation importance, and economic value of temperate South African estuaries and development of a regional conservation plan. Report to CapeNature.

[44] Anchor Environmental (2008): Berg River Estuary Situation Assessment, CAPE

[45] Ranger, K.S. & Du Plessis, C. (2010). Bergrivier Municipality Biodiversity Report.

[46] Anchor Environmental (2012) St Helena State of the Bay 2011 and Saldanha Bay and Langebaan Lagoon State of the Bay 2011 and 2012 Technical Report.

Table 2: Key ecological information – Saldanha and St Helena

SALDANHA BAY	ST HELENA BAY
• Of the 85 alien marine species known to occur in South Africa, 62 are present in Saldanha Bay. This is the highest number and density of alien marine species in the country. These species originated primarily from ballast water and cleaning of ships, and to a much lesser extent from mariculture operations.[47]	
• Biodiversity in Small Bay is in poor health/degraded. The situation in Big Bay is slightly better and there are some "hot spots" which show degradation in Langebaan Lagoon. Certain locations in Small Bay which have been severely impacted – primarily by pollution. These are the Yacht Club Basic and the base of the ore terminal. Benthic macrofauna has almost entirely disappeared at the Yacht Basin.	
BENTHIC MACROFAUNA	
• Evidence indicates a high likelihood that the ecology of Langebaan Lagoon is being influenced by human-induced impacts on Saldanha Bay. Trends in abundance, biomass and diversity of macrofauna in the lagoon follow those observed in Big and Small Bay. • Detritivores in Small Bay comprise mainly tongue worms (*Ochaetostoma capense*) and polychaetes belonging to the genera Polydora and Euclymene. These species are less sensitive to water quality and changes in wave movement patterns. Hence when conditions deteriorate they tend to increase in abundance or even dominate.	• Benthic macrofauna in the Berg River Estuary were found to be significantly different to those in the Bay. Macrofaunal abundance has decreased and there has been a shift in community structure. Whereas detritivores were dominant (based on the 2007 survey), 2012 data shows that filter feeders are most common/widespread.
• Although benthic macrofauna abundance showed an increase between 2008 and 2011, a significant decline was noted in 2012. Trends show that there have been significant changes in benthic communities in the Bay due to anthropogenic effects. The most dramatic changes have been observed in Small Bay where overall, species diversity has decreased. Dredging appears to be a major factor in reducing species abundance and diversity, both of which showed a decline following dredging events in 2008 and 2012. • The sea pen *Virgularia schultzei*, which is highly sensitive to disturbance and pollution, had not been found since an initial survey in the 1970's, until 2004. This is attributed to major changes caused by human activities, most notably the iron-ore terminal and the causeway linking Marcus Island to the mainland. Sea pen has been recorded in recent samples from Big Bay, suggesting an improvement in the health of the ecosystem. It has also been recorded in the lagoon. • Although improvement in the health of the ecosystem is indicated on the basis of data on benthic macrofauna, certain areas of Small Bay still have impoverished macrofauna communities. This is attributed to reduced water circulation (e.g. near the Small Craft Harbour and near mussel rafts) which results in the accumulation of fine sediment, organic material and trace metals.	• Fluctuations in macrofaunal species in terms of abundance and diversity have been observed since the surveys started in 2001. The overall abundance of macrofauna in the Bay decreased between 2001 and 2007, and has increased between 2007 and 2012. Diversity has shown the opposite trend. Variations in macrofauna are probably a response to large scale (bay wide) natural disturbances, such as low oxygen events associated with high levels of phytoplankton productivity. Benthic macrofauna show a naturally high variability of soft-bottom communities. • Effluent from fish factory operations is having a negative impact on benthic macrofauna at a localized level.

[47] The farmed oyster *Crassostrea gigas* appears not to pose an invasion risk in SA, and further culturing of the mussel *M. galloprovincialis* is unlikely to significantly affect the size or spread on the current populations.

SALDANHA BAY	ST HELENA BAY
AQUATIC MACROPHYTES	
• There are 3 distinct intertidal habitats in the Lagoon: – seagrass beds (e.g. eelgrass *Zostera capensis)*; – saltmarsh dominated by cordgrass (*Spartina maritime* and *Sarcocornia perennis)*; – unvegetated sandflats dominated by sand prawn (*Callianassa krausii*) and mudprawn (*Upogebia capensis*). • The spatial extent of sea grass beds in Langebaan Lagoon has declined by some 38% since the 1960s. Eelgrass and saltmarsh beds fulfil a range of ecological functions: contributing to habitat diversity; serving as a food source; stabilising sediment; providing protection to juvenile fish and invertebrates; providing roosting sites for water birds. • The loss of eelgrass beds from the lagoon is seen as a strong indicator that a shift in the ecosystem is occurring, most likely due to anthropogenic disturbances.	
INTERTIDAL ROCKY SHORE	
• Species in the intertidal rocky shore zone are readily impacted by environmental changes. Community composition is largely determined by wave action and shoreline topography. Intertidal communities are vulnerable to alien invasive species. For example, indigenous species have been displaced by the invasive Mediterranean mussel *Mytilus galloprovincialis,* thought to have been introduced via ballast water discharges. • Species composition and abundance has remained similar between years, with differences being attributed to natural seasonal and inter-annual factors. The exception is the alien barnacle *Balanus glandula*, which was recorded in 2012 but not in the 2005 baseline survey - it may have been misidentified as the native barnacle *Chthamalus dentatus*. • A second alien barnacle species *Menesiniella regalis* was identified at one of the sites in Small Bay (the Dive School) for the first time in 2012. This species originates from the Pacific coast of North America and was probably introduced in the same way as other alien species (ballast water or hull fouling). • Alien species are considered to represent one of the greatest threats to rocky shore communities in Saldanha Bay, owing to their potential to become invasive thereby displacing naturally occurring indigenous species.	
FISH	
• The state of fish and fisheries in the bay and lagoon is considered satisfactory, with the exception of white stumpnose. No statistically significant, negative trends are evident since sampling began in 1986-87. • Abundance of key fish species at sites in or close to the Langebaan MPA appear to be increasing over the long term. The MPA may be insufficient to sustain white stumpnose. Protection of harders from net fishing benefits this stock. • The abundance of key species such as blacktail, white stumpnose and silverside has shown a decreasing abundance in Small Bay since 2010/11. This is probably due to high levels of disturbance in this part of the Bay. Small Bay has always been the most significant nursery site for the more important recreational and commercial fish species.	

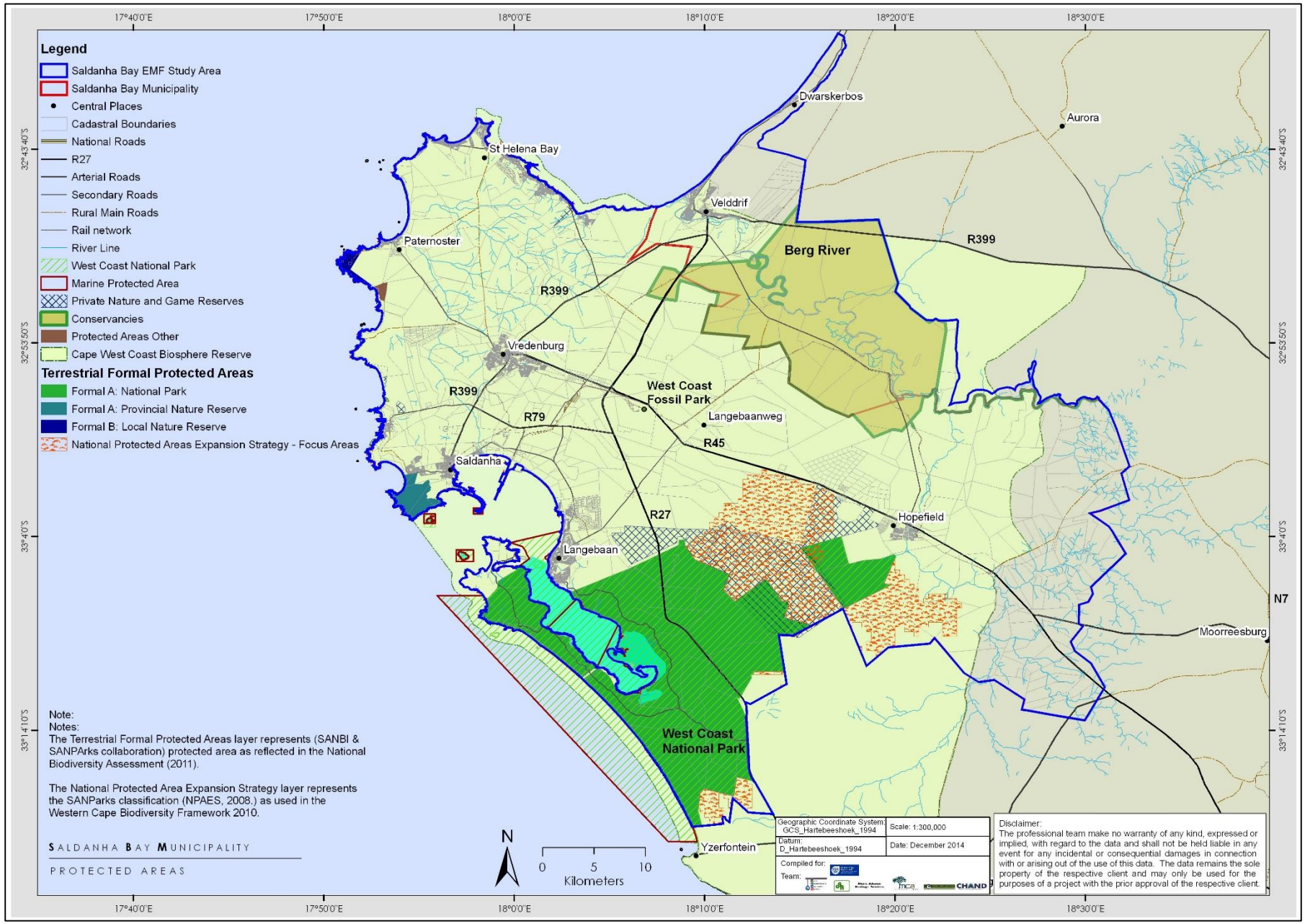
SALDANHA BAY	ST HELENA BAY
BIRDS	
• Data show a general downward trend in the occurrence many seabird species, with some exceptions: – In 2011 it was reported that Swift terns had not bred on any of the islands in the Bay for four years. This situation changed in 2012, with this species having bred on several of the islands in Saldanha Bay. – Populations of Cape Gannets and Cape Cormorants vary each year. – The African penguin population is declining. This is attributed to a reduction in its food source and the shift of these birds to other islands. – Oyster catchers and Kelp gull numbers have increased – probably due to the availability of food in the form of alien mussel species, which are abundant. • Langebaan Lagoon has been identified as the most important wetland for waders on the West Coast. It is provides valuable habitat for migrant water birds. Some 98% of water birds present during summer months are migrant species. A significant downward trend in Palaearctic wader numbers has been observed since 1980. This is attributed (in part) to disturbance of their breeding grounds. Limited recovery is indicated, based on data for 2013 and 2014 data, although the total estimate of 9 120 birds is still 74% less than the pre 1990 average of ~34 000 birds. • Resident wader numbers have shown a marked decline due to habitat changes and human disturbance. Fluctuations in the abundance of wading birds such as Terek Sandpiper, which feeds exclusively in *Zostera* beds have been linked to changes in eelgrass. Population crashes in this species coincide with periods of lowest seagrass. As with migrants, some recovery in resident wader number is evident from the 2013 and 2014 data.	

2.2.4 Protected areas and conservation initiatives

Approximately 5% of the area is formally protected including the following statutory protected areas (refer to Map 14):

- The WCNP.
- Langebaan Lagoon Ramsar Site (which is included in the WCNP).
- Cape Columbine Nature Reserve
- SAS Saldanha Nature Reserve.

There are also two MPAs. In addition to formal protected areas, a portion of the West Coast Biosphere Reserve falls within the EMF area.



Map 14: Protected Areas

2.2.4.1 The West Coast National Park (formerly the Langebaan National Park)

The Park comprises about 35 700 ha, and stretches from Yzerfontein in the south to Langebaan in the north and from the Atlantic Ocean in the west (approximately 30 km of coastline) across the West Coast road (R27) towards Hopefield in the east. It includes the Langebaan lagoon and the offshore islands of Marcus, Malgas, Schaapen and Jutten. The airspace above the park (to an altitude of 955 metres above sea level - MASL) is regulated by the National Environmental Management Protected Areas Act, No. 57 of 2003 (NEMPAA). The Park has a high level of protected conservation status: National Park; MPA, Ramsar status; Core Area of the Cape West Coast Biosphere Reserve.

There is a zoning plan for the Park to guide and co-ordinate conservation, tourism and visitor experience initiatives. The zoning plan plays an important role in minimizing conflicts between different users of a park by separating potentially conflicting activities. It also serves to ensure that visitor activities take place in a manner that does not conflict with the park's values and objectives relating to the conservation of the biodiversity. A zoning plan is also a legislated requirement of the NEMPAA, which stipulates that the management plan, which is to be approved by the Minister, must contain "a zoning of the area indicating what activities may take place in different sections of the area and the conservation objectives of those sections". The zonation of the park comprises (1) Visitor use zones covering the entire park; and (2) Special management overlays which designate specific areas of a park that require special management interventions. Visitor zones range from 'remote' and near-pristine through 'primitive' to 'quiet', 'low intensity tourism' and 'high intensity tourism' areas.

The National Park has two 'Special Conservation Areas' for Dune Protection (sensitive mobile dune field system requires management to minimize impacts on sediment transport processes) and Salt Marsh protection to reduce loss and minimize impacts on these sensitive habitats. It also has three marine zones; A (controlled, fishing and motorized vehicles allowed, enforcement of Marine Living Resources Act), B (controlled access, permit needed for fishing and use of motorized vessel) and C (exclusion zone where entry, the use of vessels and the catching or disturbance of fish being strictly prohibited).

The National Park has a buffer zone[48], namely the identified area within which land uses and activities have an influence on the park (current and future extent). Three categories of buffer are identified (Table 3 below). A full Conservation Development Framework will be developed for WCNP once key outstanding issues are settled, such as the consolidation of the eastern section of the park, and clarity on the continued contractual inclusion of Postberg. Additional special management overlays which designate specific areas of a park that require special management interventions (e.g. areas requiring rehabilitation) will also be identified.

[48] Aligned with the DEA Policy on Buffer Zones for National Parks (2009) and the SANParks Buffer Zone Policy

Table 3: WCNP Buffer Zones

CATEGORY OF BUFFER ZONE	LAND USE AND MANAGEMENT
Priority Natural Areas for conserving biodiversity pattern and process, on which the long term survival of the Park depends and which could be incorporated into an expanded Park	Ploughing of natural veld, development beyond existing transformation footprints, urban expansion, intensification of land use through golf estates etc.) should be opposed within this area. Dam construction, loss of riparian vegetation and excessive aquifer exploitation should be opposed. In addition, the control of alien vegetation, the control of soil erosion, and appropriate land care (e.g. appropriate stocking rates) should be promoted. Developments with site specific impacts (e.g. a lodge on a game farm) should be favourably viewed if they contribute to ensuring conservation friendly land use within a broader area
Catchment protection for hydrological processes	Dam construction, loss of riparian vegetation and excessive aquifer exploitation should be opposed. In addition, the control of alien vegetation, the control of soil erosion, and appropriate land care (e.g. appropriate stocking rates) should be promoted.
Viewshed protection (against visual and noise impacts)	Careful screening to ensure that development does not impact excessively on the aesthetics of the park

There are also a number of Private Nature Reserves in the study area, the largest of which is the Elandsfontein Private Nature Reserve.

2.2.4.2 Marine Protected Areas

The Langebaan Lagoon is also designated as an MPA, while the Park adjoins the Sixteen Mile Beach MPA on the Atlantic coast, the Saldanha Bay MPA north of the lagoon, and three MPAs surrounding Jutten, Malgas and Marcus islands (Refer Map 13).

2.2.4.3 West Coast Biosphere Reserve

The Cape West Coast Biosphere Reserve (CWCBR) stretches from Diep River, north of Cape Town, to the Berg River, and from the coast eastwards to a line through Malmesbury and Darling to a point north of the Berg River. It encompasses land and sea, but the extent of the marine section has not been finalised. The terrestrial component is approximately 378 000 ha in size, the interim marine component 50 000 ha, totalling approximately 428 000 ha.

A vision for the CWCBR has been developed which is "a biosphere reserve that is the pride and lifeblood of the community, with deep links to the wealth of the Atlantic Ocean and the wide landscapes of the Cape West Coast".

The issues and needs which informed the preparation of their SDF emphasise the need to focus on rural development, livelihoods and landscapes. Accordingly the CWCBR aims to:

- consolidate the biosphere reserve's core sites and significant vegetation remnants, and expand conservation areas;
- safeguard core marine areas, marine and coastal corridors and linkages;

- connect core habitats of the biodiversity network;
- retain productive agricultural landscapes, channel urban and industrial development away from the biodiversity network and the biosphere reserve's agricultural production areas;
- promote alternative land uses in areas of marginal agricultural potential (e.g. eco-tourism); and
- broaden the agricultural economic base through value-adding (e.g. agri-processing).

2.2.4.4 Industrial Biodiversity Corridor

The Cape West Coast Biosphere Reserve aimed to establish an Industrial Biodiversity Corridor within the major industrial areas of Saldanha, to secure highly threatened vegetation that should be conserved in areas that are currently in very high demand for development, with particular emphasis on industrial development[49]. The main properties that were under consideration as part of the industrial biodiversity corridor include Arcelor Mittal, Namakwa Sands and Transnet. In essence, the overall aim of the corridor is to maintain the natural processes by ensuring connectivity; therefore, the corridor would be required to include both natural and disturbed vegetation on multiple properties (i.e. a biodiversity corridor) rather than securing only the most important vegetation on single properties.

The primary objectives of the Industrial Biodiversity Corridor are:

- to create a corridor of formally conserved natural vegetation, supplemented by a buffer zone of best practice initiatives, through a major industrial area.
- to increase the area of land under formal conservation status within the CWCBR.
- to increase the amount of vegetation types classified as Endangered and Critically Endangered according to NBSA under formal conservation.
- create partnerships between industries and conservation agencies to facilitate the initiation of conservation initiatives in industry.

The general conditions[50] that can be associated with the various properties, which results in the subsequential need for these to be formally conserved, are as follows:

- generally large areas of good quality vegetation;
- properties hold various endangered and vulnerable vegetation types;
- presence of significant populations of endemic threatened Red Data species;
- some areas are considered important for the functionality of the coastal process of Saldanha Bay and contain important coastal habitat; and
- important linkages for areas that are currently in the process of being proclaimed as a nature reserve.

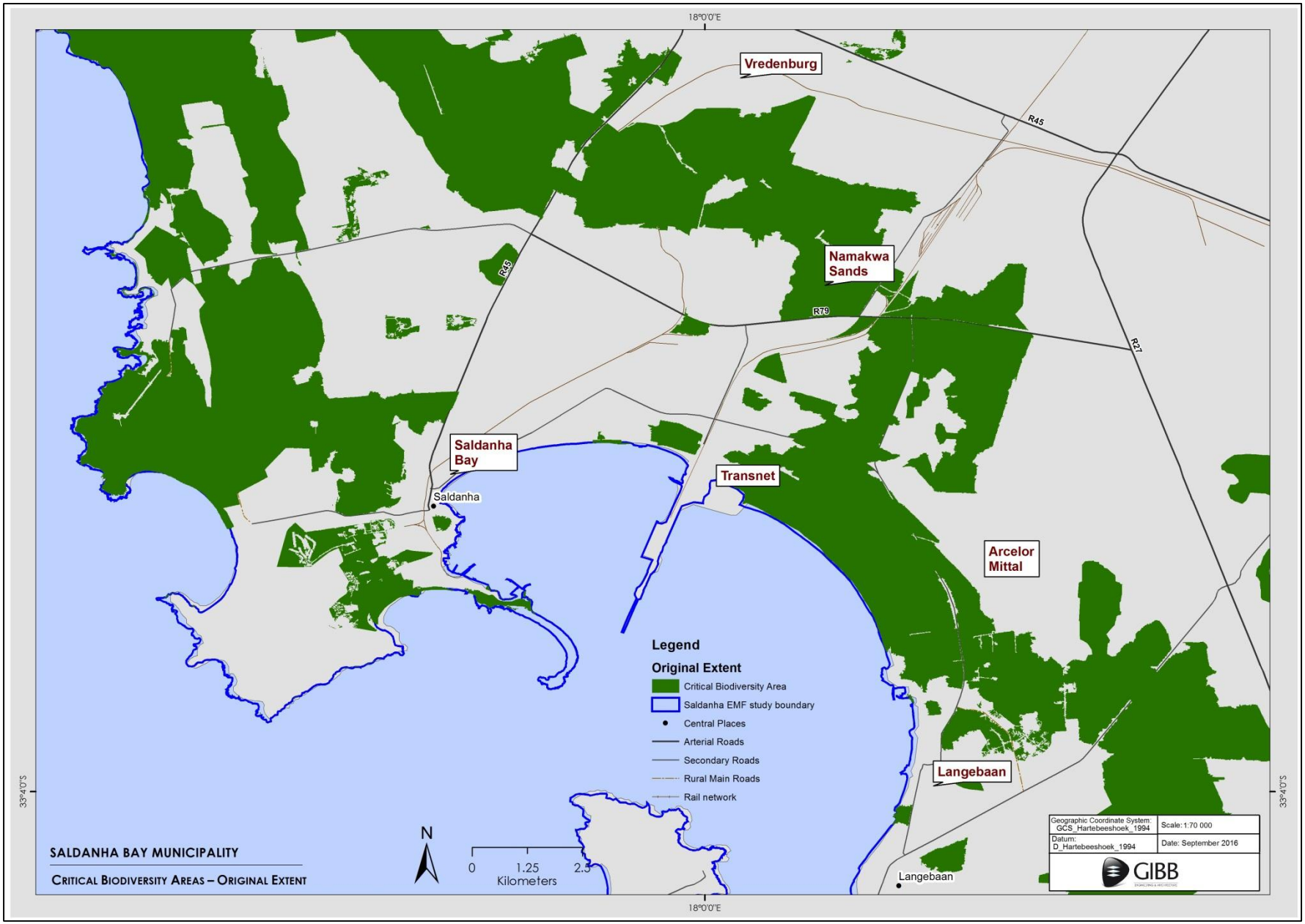
The need for the establishment and effective management of an industrial biodiversity corridor is further emphasised by the remaining CBAs within this area,

[49] Cape West Coast Biosphere Reserve (2012): ZA 5164 - Securing a Corridor of Endangered Vegetation through an Industrial Area within the Cape West Coast Biosphere Reserve

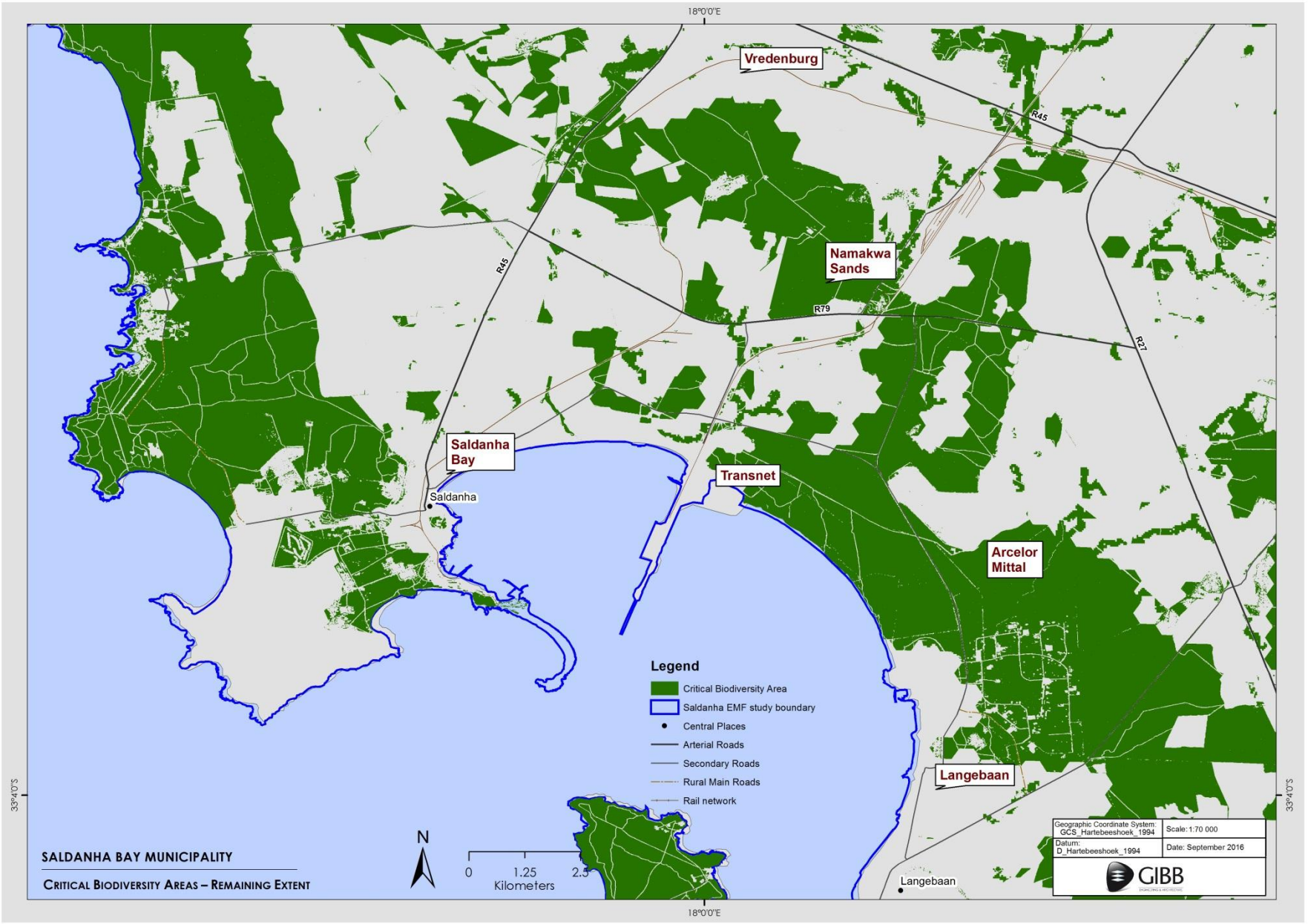
[50] Cape West Coast Biosphere Reserve (2011): Site Assessment Review

as illustrated on Map 16[51], which shows the extent of the loss of CBAs since 2010 (illustrated on Map 15). This is particularly relevant for the areas associated with Vredenburg and Namakwa Sands.

[51] The 2016 Beta version CBA dataset was used to develop this map, showing the remaining extent of natural vegetation available to the industrial corridor.



Map 15: Original CBA extent within industrial biodiversity corridor area



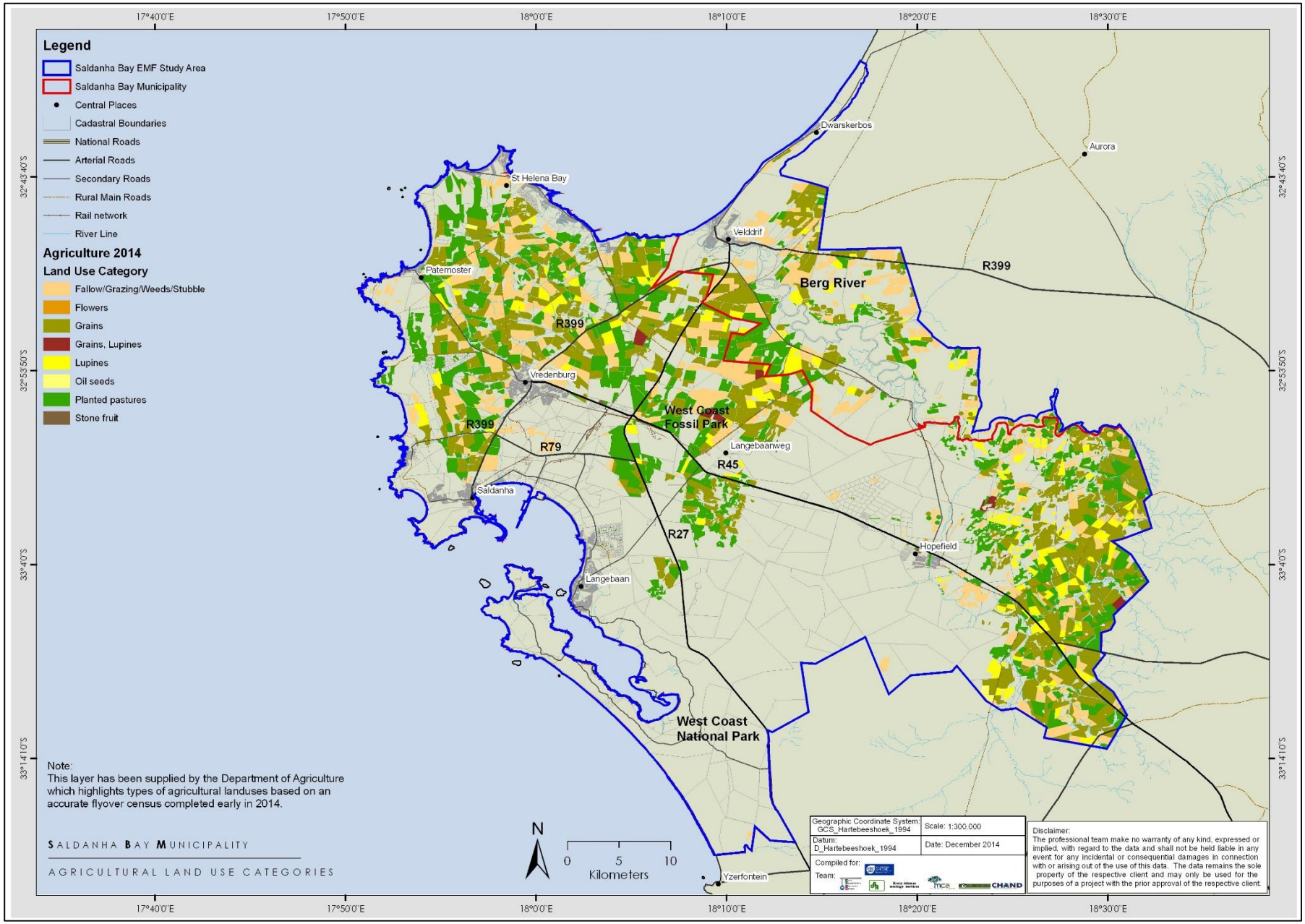
Map 16: Remaining CBA extent within industrial biodiversity corridor area

2.3 Agricultural production

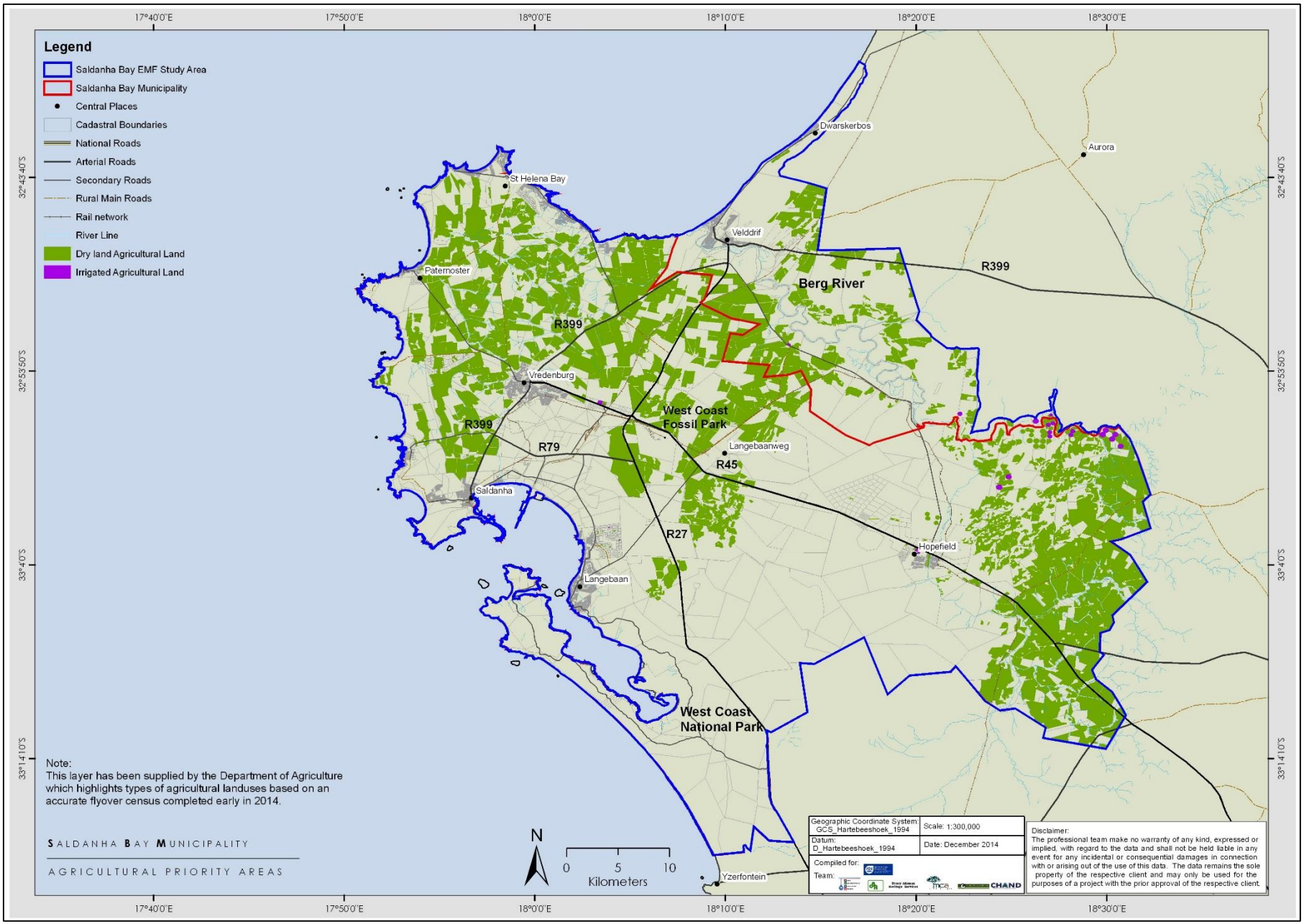
The West Coast is generally not regarded as being of high agricultural potential. Water availability in particular, combined with soils of relatively low fertility are the limiting factors in this regard. There is predominately grazing and mixed farming between Hopefield and Langebaanweg, and between the WCNP and Berg River in the north. Grain and mixed farming takes place in the Saldanha, Vredenburg and Velddrif area. Information from the Provincial Department of Agriculture on the various crops grown in the area is shown on Map 17. It can be seen that the areas of highest agricultural activity are located in a band between Saldanha Bay and St Helena Bay, along the Berg River and in the vicinity of Hopefield and southwards from this town. Agriculture has been identified as the largest employment sector in the Bergrivier Municipality, providing work for more than half the total labour force. [52]

From the perspective of the Provincial Department of Agriculture, a key indicator in determining the value of agricultural land is the availability of water. Irrigated land, namely agricultural land which has water rights attached to it, is considered of highest priority by the Provincial Department of Agriculture. Most crop farming in the study area comprises dryland agriculture. Irrigated lands occur in the vicinity of Hopefield, where farmers obtain water from the Berg River. It can be seen from Map 18 that irrigated agricultural land is limited to this vicinity of the study area.

[52] Berg River Municipality (2011): Local Economic Development Strategy.



Map 17: Agricultural land use and crops



Map 18: Agricultural Resources – Dryland and Irrigated Land

2.4 Cultural and Heritage Resources

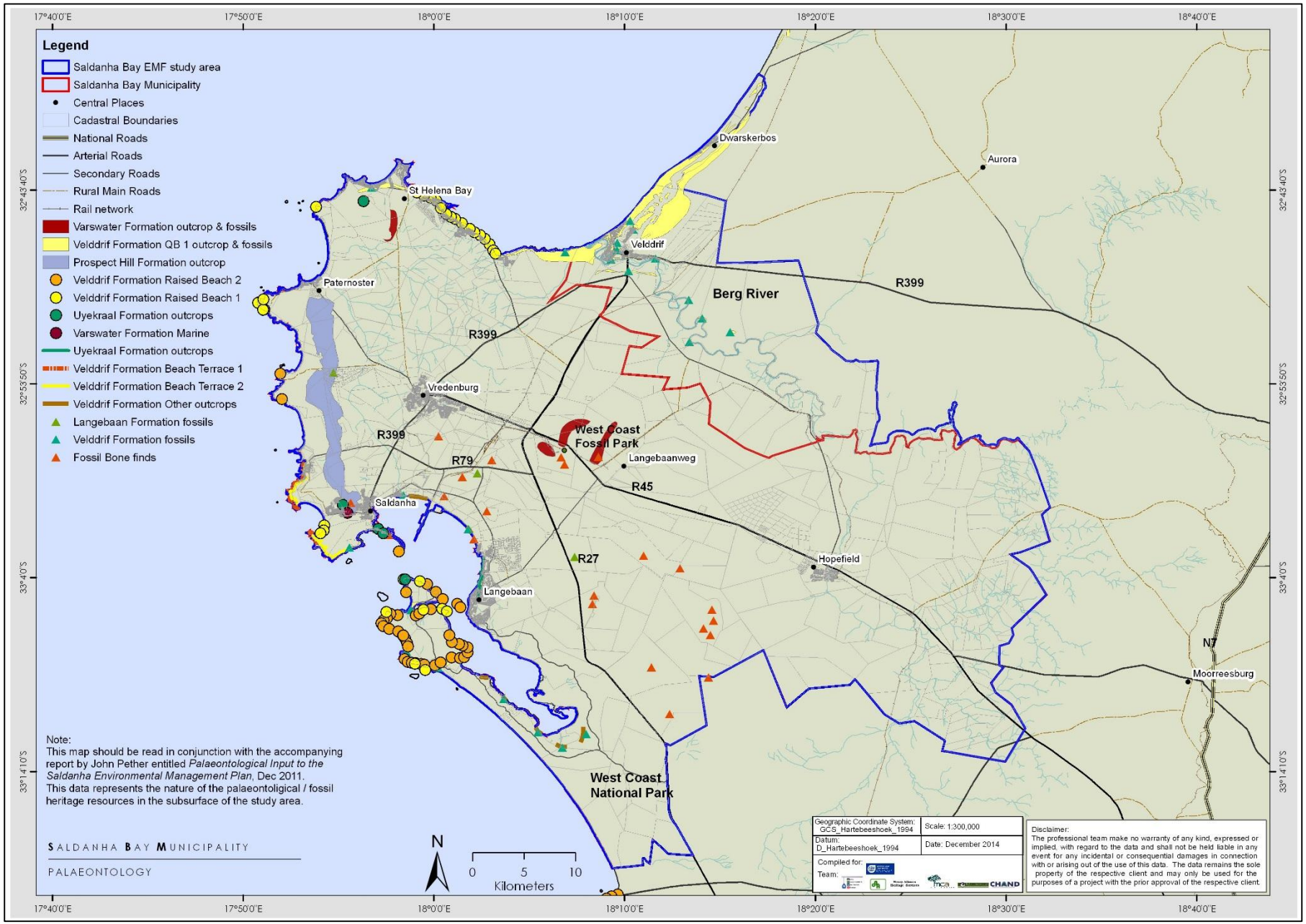
A detailed inventory of cultural and heritage resources has not been developed for the study area. Heritage input to the EMF was undertaken in two phases. Initial information was co-ordinated by Henry Aikman Heritage Consultant in association with Urban Design Services. This team obtained specialist input on archaeology and palaeontology from Agency for Cultural Resources and Dr J Pether, respectively. The second phase included information from recent studies conducted, namely the Heritage and Scenic Resource: Inventory and Policy Framework for the Western Cape and a phase one heritage resources survey was undertaken for the Saldanha Bay Municipality[53].

2.4.1 Palaeontology

The nature of palaeontological/fossil heritage resources in the subsurface was considered by Dr J Pether. Fossil types, their abundance and mode of occurrence are directly related to the nature of the sediments in which they occur. Thus a description of the fossil potential or sensitivity is closely related to the geology of the area under consideration. Visser & Schoch (1972) geological map (1:125 000 scale) formed the basis of the analysis. The following formations are considered to be important from a paleontological perspective (Refer to Map 19):

- *The Varswater Formation*: The Langeberg Quartz Sand Member is richly fossiliferous, with a diversity of bones, shells and microfossils reflecting river floodplain, salt marsh and tidal-flat environments. The Muishond Fontein Pelletal Phosphorite Member reflects further deepening, with deposition in an expanded estuarine system. An extensive vertebrate assemblage has been discovered in the vicinity of Langebaanweg (where the West Coast Fossil park is now located). The fossil bones are probably reworked from the upper MPPM, or more likely, are occurrences on the erosion surface on top of the MPPM. The "Varswater" phosphatic sediments of Soetlandskop near Stompneusbaai may be of Miocene age. A small fossil shell occurrence near Saldanha appears to be of early Pliocene age, but material is very limited. All of these areas are particularly sensitive.
- *The Uyekraal Formation*: Sea level rose in the middle Pliocene (~3.0 Ma) to a level now ~30 MASL, and the western part of the Varswater Formation was eroded away, although some pockets may be preserved locally in topographic lows. When sea level receded again, the Uyekraal Formation "Shelly Sands" were deposited as the shoreline to form the lower, outer part of the coastal plain. At the coast, outcrops with extinct and warm-water fossil shells occur at Leentjiesklip, Bomgat, Sea Harvest, Elandspunt and the lower quarry at Diazville. Another possible occurrence is the fossil oyster bed near Stompneusbaai. It is probable that there are other occurrences on the Vredenburg coast.

[53] Bridget O'donoghue (2016). Saldanha Bay Municipality: Heritage Resources Survey Phase One



Map 19: Paleontological Resources

- *The Velddrif Formation*: The Velddrif Formation. includes all Quaternary marine deposits below about 15 MASL that fringe the coast. Some fossil sites have been specifically noted by Visser & Schoch (1973) in this deposit. South of Jacobsbaai, a prominent, outer beach ridge is present and there are several shoreline exposures around Langebaan Lagoon and Saldanha Bay. Higher, older Velddrift Formation deposits are prevalent on the Posberg Peninsula. These deposits are represented by the inner beach ridge south of Jacobsbaai. The sensitivity of the younger (outer, 6 m) open-coast Velddrif Formation is moderate and of local significance overall. The exposures along the Berg River contain exotic warm-water fossil shells and extinct species. These are just a few sites and are sensitive. The older parts (higher, ~8 to15 MASL) are poorly exposed and practically unstudied.

- *The Prospect Hill Formation*: The inner aeolianite ridge between Saldanha Bay and Paternoster, previously in the Langebaan Fm., includes fossil eggshell of the extinct ostrich *Diamantornis wardi* dating it to between 12 to 9 Ma in the Miocene. Undiagnostic fragmentary mammal bones have also been found. However, marine microfossil content, strontium isotope stratigraphy and apparently underlying early Pliocene shell fauna suggest a younger age.

- *The Langebaan Formation – aeolianite*: These calcareous aeolianites are evident in the coastal landscape as the ridges, low hills and mounds beneath a capping calcrete crust, or "surface limestone" in old terminology. The considerable extent of the Langebaan Formation aeolianites attests to the persistence of strong southerly winds and the availability of calcareous sand on beaches. The main "bulk" of aeolianites is not very fossiliferous, but fossil bones from the Langebaan Formation have been a prime source of information on Quaternary faunas and archaeology. Common fossils include shells of land snails, fossil tortoises, ostrich including egg fragments, sparsely scattered bones etc. Bone and shell concentrations related to buried Early and Middle Stone Age archaeological sites may occur in the aeolianite, particularly in its upper part. "Blowout" erosional palaeosurfaces may carry fossils concentrated by the removal of sand by the wind. Hollows between dunes (interdune areas) are the sites of ponding of water seeping from the dunes, leading to the deposits of springs, marshes and vleis. Being waterholes, these are usually rich in fossils. The lairs of hyaenas with concentrations of bones of antelopes and small carnivores have proved a rich source of "stashed" bones of various ages.

- *The Springfontyn Formation*: This formation comprises the mainly non-calcareous, windblown sand sheets and dunes that have covered parts of the landscape during the Quaternary. The Springfontyn Formation has clearly accumulated episodically over a considerable time span and thus will include palaeosurfaces with bone fossils and other settings such as vlei deposits with considerable fossil potential.

- *The Spreeuwal*: This feature holds potential and known outstanding scientific significance. It is situated north of Saldanha Bay and consists of raised beds that contain extinct shellfish, fossil mammal bone and Middle Stone Age artefactual material.

2.4.2 Archaeology

The history of indigenous people is recorded in the landscape through artefacts and remnants which indicate their movement patterns and lifestyles. These need to be recorded, preserved and given recognition.

- Human occupation of the Langebaan/Saldanha Bay area extends from the Early Stone Age[54] , more than 1 million years ago. This is evidenced by the discovery of Early Stone Age tools at Elandsfontein (near Hopefield) and Anyskop (near Langebaanweg). The Saldanha skull from Elandsfontein is the oldest known human in the Cape dated between 700 000 and 400 000 years ago.

- There are shell middens with stone artefacts dating to the Middle Stone Age[55] both on, and to the north and south of the Vredenburg peninsula. The evidence from Sea Harvest in Saldanha Bay, for example, has provided some of the earliest evidence we have in the world for the human exploitation of coastal resources, more than 100 000 years ago. Beside evidence of well preserved bone, ostrich eggshell, ochre and Middle Stone Age stone implements, the Sea Harvest and Hoedjiespunt sediments also contains evidence of early modern human about 125 000 years ago.

- Hunter-gatherers living on the west coast of South Africa during the latter part of the Holocene[56] made use of the coastal resources. The rocky shoreline in the region attracted both Late Stone Age hunter-gatherers and later Khoekhoe herders as it offered opportunities for the exploitation of marine foods, particularly shellfish, while the local shales and granites provided vital nutrients for domestic stock. The archaeology of early Khoi Herders is also very well represented on the Vredenburg Peninsula; the most important pastoralist site on the Vredenburg peninsula is that of Kasteelberg, which is located on the farm Rooiheuwel, several kilometres inland from the coast[57]. Extensive scatters of shellfish, stone tools, pottery and reused colonial-era artefacts have also been found near Duyker Eiland in Britannia Bay, providing, for the first time, compelling evidence of near-coastal Herder sites. Other important archaeological sites in the vicinity of Kasteelberg include Witklip, a small shelter situated on the western outskirts of Vredenburg, near to the water tower. Excavations at this site suggest that this was a hunter-gather settlement dating to between 3 000 and 500 years ago. Nearly 100 archaeological sites have been identified on the Vredenburg Peninsula, most of which are centred round the large granite outcroppings that occur in Vredenburg, Paternoster and the St. Helena Bay.

- Paternoster and Jacobsbaai also have large numbers of shell midden sites, of which the majority date within the last 3 000 to 4 000 years and overlap the

[54] A term referring to the period between 2 million and about 200 000 years ago.
[55] A term referring to the period between 2000 and about 20 000 years ago.
[56] A term referring to the last 3-5000 years ago.
[57] Heritage Western Cape is in the process of declaring Kasteelberg complex and its surroundings as a Provincial Heritage Site

period both before and after the arrival of Khoekhoe pastoralists with domestic stock and pottery. In addition to the many shell middens sites, at least five pre-colonial human burials have also been uncovered and exposed during earthworks and excavations at Paternoster.

- There are many sites on the shores of Langebaan Lagoon. On the eastern shore, the late Holocene archaeology suggests that Late Stone Age people may have been scheduling their visits to the coast to collect lower tidal zone shellfish such as limpets and perlemoen. Excavations at Lentjiesklip show that some of the sites in the region date between 4 000 and 1 800 years ago. On the western shore of the Langebaan Lagoon, at Posberg, Kreefbaai, Preekstoel, Kraalbaai, Stofbergfontein and Geelbek (on the south eastern shore). These provide a picture of cultural and economic activities within the past 1 000 years in the area. Excavations at Oudepost I, a 17th century Dutch colonial outpost at Kraalbaai, has also provided evidence for interaction between soldiers at the small garrison and local Khoi pastoralists more than 300 years ago. Fossil footprints, 120 000 years old, were discovered in ancient fossil dunes at Kraalbaai. The reason for the abundance of fossil archaeological and palaeontological remains in the Langebaan area is largely due to the fact that bones and implements are readily preserved by the rapid carbonate cementation of the strata in which they become entombed.
- In Velddrif, where the shoreline is characterised by a long sandy beach, fewer shell middens occur due to the lack of exposed rocky reefs (where shellfish communities inhabit), but several Archaeological Impact Assessments inland of the town have documented scatters of Later Stone Age tools, ostrich eggshell, beads, pottery and colonial era artefacts in wind deflated hollows and agricultural lands north of the Berg River.

2.4.3 Cultural and historical elements

In 1497 Vasco Da Gama named St Helena Bay and a number of explorers visited the area from then onwards. The lack of available water resources resulted in the area being settled slowly up until the Second World War when the port gained strategic military importance and the fishing industry boomed.

Key historical elements are as follows:

- *The Dutch Colonial Period (1652 – 1806)*: During the 17th century sealing expeditions carried out by the Dutch East India Company (VOC) at Saldahna and Dassen Island were common. The French had exploited seal colonies in the area before the arrival of the VOC and were expected to return. Part of the VOC strategy to defend this territory was to grant fishing and sealing rights to free burghers and to establish small military posts at Saldanha and on the small islands. The Khoikhoi resisted the Dutch presence and low-level warfare occurred with attacks on the VOC posts and on the free burghers. Trade at the Cape during these early years were strictly administered and controlled by the VOC, this included trade with the local Khoi-khoi.

- *The British Colonial Period*: Under British rule agriculture expanded rapidly and a number of villages developed, initially around new churches but as the century progressed these centres became increasingly commercial. A network of railways was developed at the end of the 19th Century. The colonial government was responsible for introducing a great number of new tree species into the Cape, some of which contribute positively to the landscape and others of which have become invasive.

A summary of key historical and cultural elements related to settlements is given below and are shown on Map 20.

- *Hopefield:* The character of the village has been enhanced with the renovation of a number of old buildings but new development has not always been appropriate and architectural and conservation controls are undoubtedly needed.

- *Langebaan:* This town was founded as a whaling station in 1922. The historic core of the town has remained largely intact, as new residential and commercial development has taken place on the outskirts. The historic core will require more protection as there is ample evidence of poorly conceived alteration and additions to old buildings and inappropriately scaled new structures.

- *Saldanha:* The town is now industrial in character with the harbour and associated fish processing factories. A few buildings of character have survived such as the Provincial Heritage Site "Fishermens' Cottages" with the historic cemetery and church. This area should be given additional protection. There are some isolated buildings of significance in the town but they do not form part of a coherent zone.

- *Paternoster*: This historic settlement is under threat from the collapse of fishing which has led to unemployment and therefore neglect and new resort and residential development that is overwhelming and destroying its inherent character.

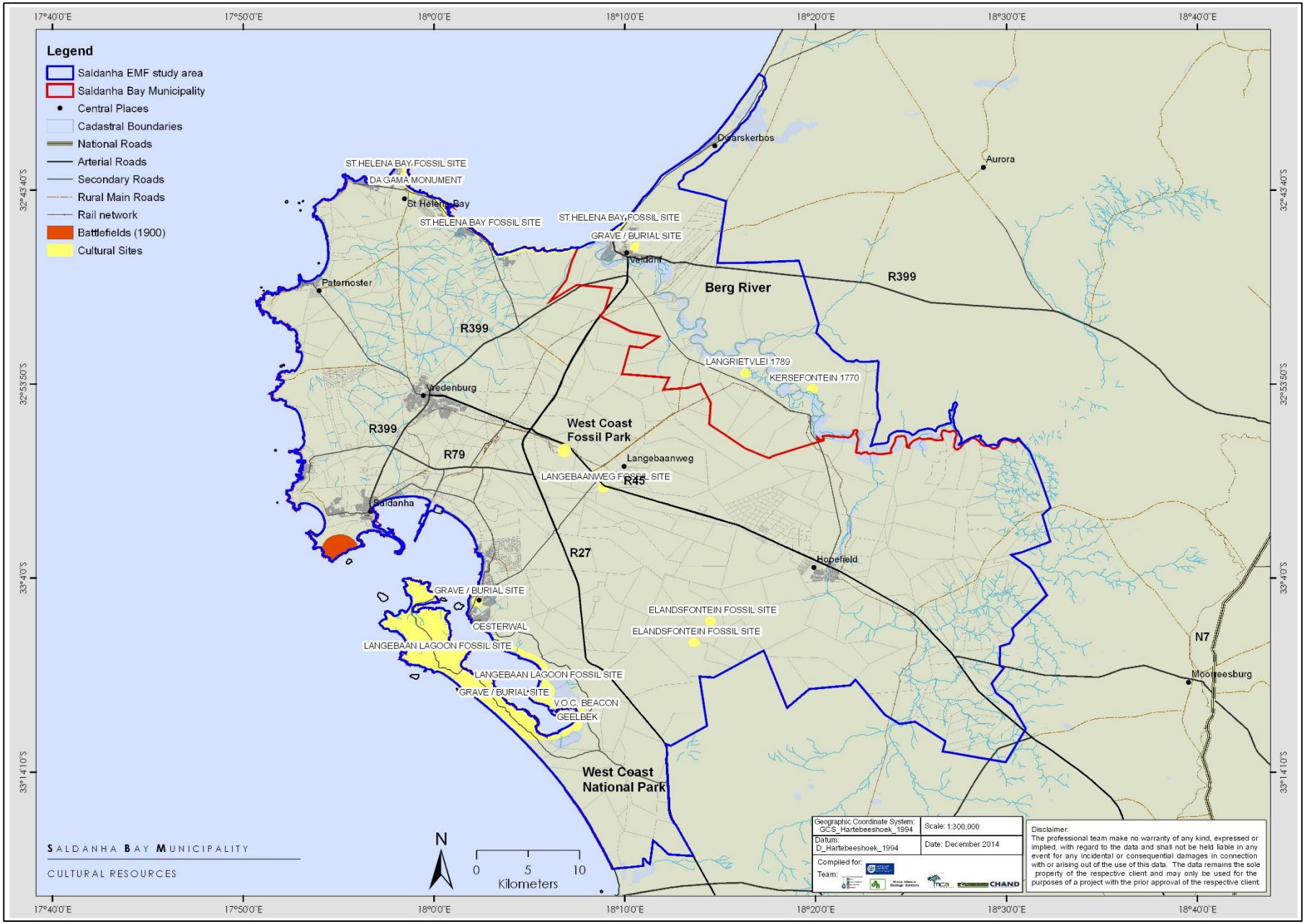
- *Vredenburg:* There are some isolated buildings of heritage significance but they are too scattered to form part of a coherent conservation area. Built historical cultural elements as heritage resources include historical homesteads, dwellings, structures, tree lanes and landscapes, etc. Historically, Vredenburg is the largest town in the municipal area.

Various specific sites have been identified, including:

- *Historical Homesteads*: Cloeteskraal, Oostewal, Waschklip, Patrysberg, Heuningsklip, Jacobsbaai, Oranjevlei, Kliprug, Coenradenberg Farm 307/4, Heuingklip Farm 101/24, Bottlery Homestead, Geelbek, VOC beacon and Swartriet.

- *Historical Dwellings*: fishermen's cottages (in Paternoster – Kliprug; in Saldanha – Hoedjieskop and Oorlogsvlei; in St Helena Bay, as well in Parkesdorp.

- *Historical Buildings/Structures*: Anglican Church in Saldanha, Dutch Reform Church in Langebaan, St. Andrew's Anglican Church Hoedjiesbaai Saldahna, Cape Columbine Lighthouse, Vasco da Gama Monument, Twisfontein Monument, Harpoon Gun, Westinghouse Light and Powerplant, Da Gama Memorial Cross in Stompneusbaai, Soldatenpost in St Helena Bay, Granite Formations in Witteklip/Kasteelberg, as well as the School building in Panorama.



Map 20: Cultural sites

The area as a whole is considered to have high heritage significance in terms of its scenic, botanical, cultural/historical, social and archaeological value. The landscape, and the heritage areas and sites embedded within it, thus have the ability to demonstrate a range of heritage values which differ from the nature and mix of other heritage resources in the broader region. They may be summarised as follows:

- Occupation dating from the Stone Age period, and marked by the extensive shell middens and artefacts located along the shoreline throughout the study area.

- The role of the place in reflecting a long history of fishing activity, from the Khoisan fish traps in the pre-colonial period to early fishing communities at Paternoster and Church Haven, to current and extensive use of the maritime resources of the area for a whole range of subsistence and recreational fishing. The historical harbours and landing places provide rich and distinctive markers to the physical and social context of these activities and the intensity and varied nature of fishing patterns along the West Coast.

The area has been utilised as a place for recreation over a long period of time. Inland farmers trekked to the coast for fishing and socialisation and these outspan areas are marked in the landscape. Although holiday homes began appearing at the beginning of the 20th century, the villages still reveal a strong sense of local identity. The range in character of the recreational experience (rocky shorelines and long sandy beaches) and the resultant settlement patterns differ significantly from other areas in the broader Western Cape region. The use of the area for a wide range of farming activities, from the seasonal activity related to Khoisan herders (cattle grazing), the introduction of sheep and grain farming. While the role of the region as a place of recreation, fishing and farming in which the natural landscape plays a dominant role, remains the major theme, other themes are reflected in the landscape. These relate to (1) the displacement of the Coloured communities in the 1960s and 2) a place of military significance.

2.4.4 Cultural and Scenic Resources

Arising from an assessment of the overall structure of the cultural-historical environment, various distinctive landscape zones, which are a combination of topography and settlement patterns, have been identified. These distinctive landscape zones are as follows and are shown on Map 21:

- Coastal edge;
- Wilderness;
- The Lagoon;
- Swartland;
- Wilderness
- Berg River floodplain;
- Sandveld;
- Koppiesveld

Cultural landscapes can be further subdivided into areas of significance such as the Potberg Peninsula and the Swartland agricultural landscape. Both of these areas offer high aesthetic and architectural value.

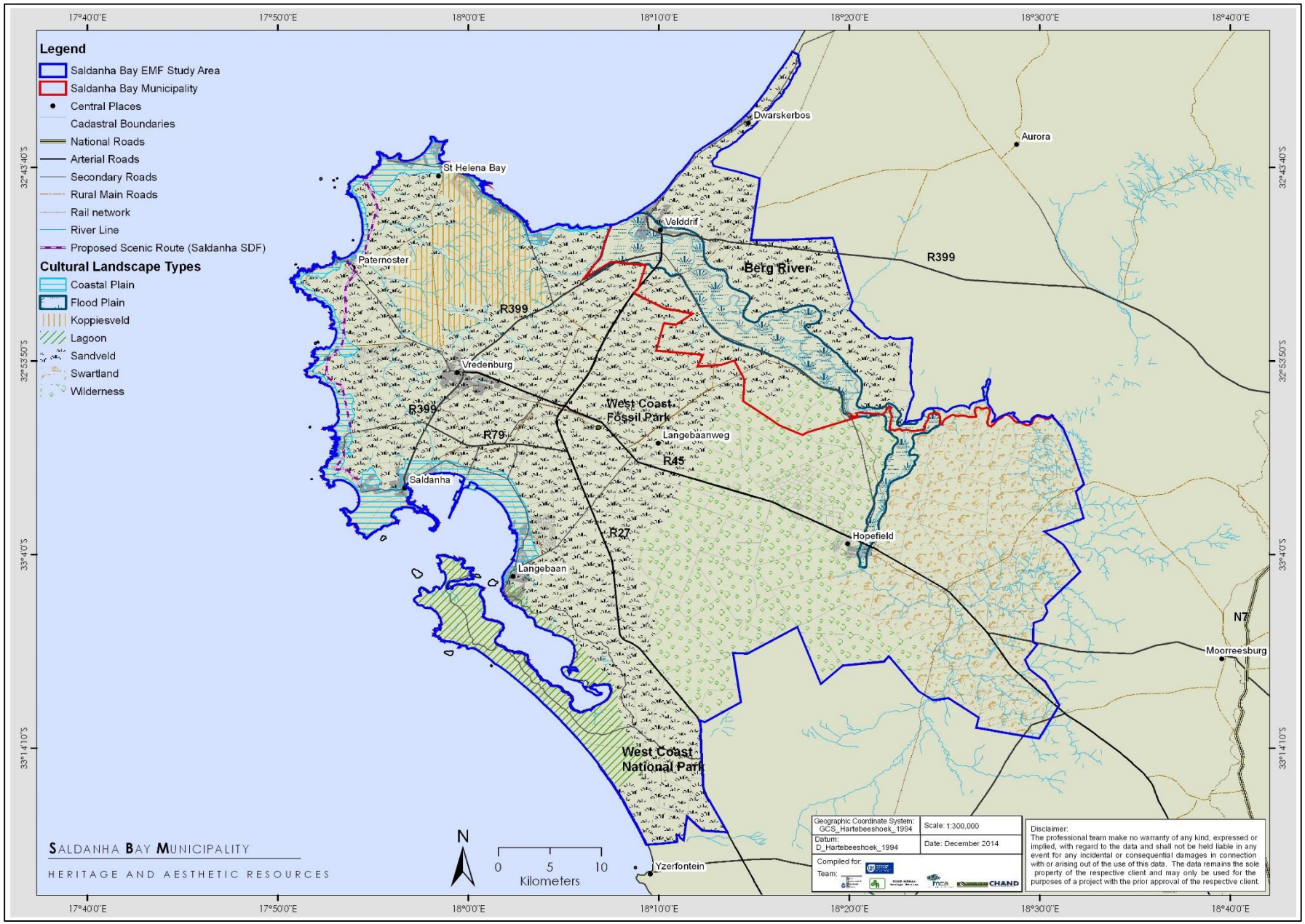
Significant natural landscapes, features and reserves in the Greater Saldanha area are generally owned by the municipality as well as both private and public entities. The West Coast National Park is comprised of approximately 32 000 hectares of land and offers a unique habitat to its wildlife. Moreover the Greater Saldanha area consists of smaller nature reserves[58], as seen in Map 22:

- Greater Paternoster Private Nature Reserve;
- Cape Columbine Nature Reserve;
- Varswaterbaai Private Nature Reserve;
- SAS Saldahna Nature Reserve;
- Hopefield Nature Reserve; and
- Sout River Estuary.

These provide a variety of highly scenic, aesthetic, cultural, recreational and social value. Other areas of aesthetic significance include the Langebaan Lagoon, Cape Columbine Coastal Landscape, Rocher Plan and the Eucalyptus trees located at Steenberg's Cove.

Scenic Routes also offer significant value in terms connectivity, destinations, scenic quality and spatial qualities. There are numerous routes that traverse through agricultural and natural landscapes which have either historic or aesthetic value. The R45 Route, R27 Route and Route 399 are scenic routes between major historical towns as well as between the West Coast National Park that are documented to provide scenic and aesthetic quality drives.

[58] Sarah Winter (2013). Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape



Map 21: Cultural Landscape Types

Map 22: Cultural Landscapes and Scenic Routes

3 Socio-Economic Conditions

According to the 2011 Census the Saldanha Bay Municipality has a total population of 99 193 persons living in 28 835 households. This indicates a substantial increase from 2001 when the total population was 70 261 and reflects a growth rate of 41% over the 10 year period (i.e. since the 2001 census). The West Coast District Municipality has emerged as the fastest growing district in South Africa with a 39% increase from 2001 till 2011.[59]

Population distribution in respect of the main settlements, based on Census 2011 is shown in the graph below. An estimated 95% of Saldanha Bay's population reside in urban areas.

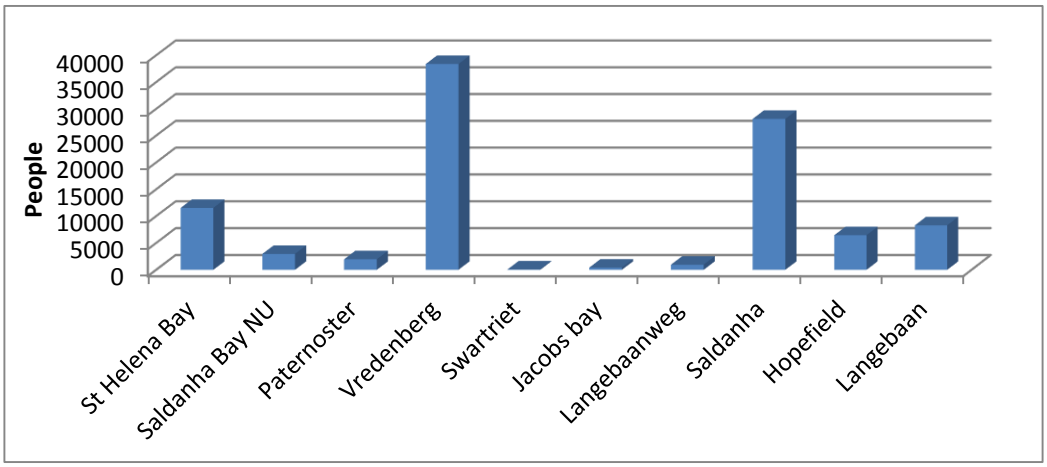


FIGURE 1: Population distribution – Census 2011

The population of the Saldanha Bay Municipality has grown beyond natural levels indicating high levels of in-migration. This may be a result of the expectation of employment created when industries such as Arceltor-Mittal (formerly Saldanha Steel) were established and a general trend of migration to coastal areas. Between 2001 and 2011 the change in the number of households was recorded to have increased by 55% from 18 663 in 2001 to 28 835 households in 2011 (National Census 2011). According to the 2011 National Census the population of Saldanha Bay Municipality is growing at a rate of 3.4% per annum.

In terms of the Bergrivier Municipality, the two towns that fall within the study area are Velddrif and Dwarskersbos. The population of Velddrif is reported as being 11 017 (including Laaiplek and Port Owen) and that of Dwarskersbos is 670[60], but rising to 8 000 during the holiday season.[61]

[59] http://www.saldanhabay.co.za/index.html
[60] National Census 2011
[61] Bergrivier IDP 2012 - 2017

3.1 Poverty and employment levels

Unemployment levels are a concern in both the Saldanha Bay Municipality and the Bergrivier Municipality. There are limited employment opportunities available in the West Coast region and payment levels are relatively low, with 79% of the West Coast's population older than 18 years receiving wages of less than R1 600[62]. Some 35% of the active workforce is considered to comprise 'seasonal' workers. This is probably linked to the agricultural sector being a major employer in the area. The Bergrivier, Cederberg and Swartland municipalities have the higher than average unemployment rates in the West Coast District.[63]

Saldanha Bay makes a high contribution to the West Coast Districts Gross Domestic Product (GDP). Saldanha Bay contributed 5.4 per cent of the cumulative growth of the Province's non-metro municipalities. The Saldanha Bay and Swartland municipalities are both larger and faster growing in the WCD regional economy[64].

According to the 2011 census data for the Saldanha Bay Local Municipality 44 829 people are economically active (i.e. employed or unemployed but looking for work), and of these, 23, 4% are unemployed. In comparison with the District labour force, Saldanha Bay's labour force represents 27.1 per cent of the West Coast District labour force (Saldanha Bay IDP 2012-2017). In terms of the youth, aged 15-34, the unemployment rate is 30, 4% among the 22 885 individuals who are economically active.

The Finance, insurance, real estate and business services sector employed the most people (6 487) in 2011, followed by Wholesale and retail trade, catering and accommodation (3 976), Agriculture, forestry and fishing (2 972) and Manufacturing (2 470). The Transport, storage and communication sector employed the least people (1 170) followed by Construction (1 184).

In relation to the net employment change for the dominant regional Broad sectors as per MERO 2014 (Agriculture, Manufacturing and Services), Saldanha Bay suffered net job losses in Agriculture (2 190) and Manufacturing (4 860). The net losses in the manufacturing sector had a severe impact on the entire West Coast region given the percentage share attributable to the Saldanha Bay component of this Broad sector (4860 losses of a total net loss of 7 600 jobs for the WCD). Services on the other hand displayed robust growth in job creation/labour absorption of skilled labour accounting for 9 380 jobs during 2000 – 2013[65].

The economic drivers of the region have recorded positive indices with Saldanha Bay and Swartland featuring prominently according to socio-economic index. For the year 2010, rural based municipalities such as Cederberg (42.7 per cent), Bergrivier (33.8 per cent) and Matzikama (31.7 per cent) recorded alarming levels of poverty. Saldanha Bay Municipality has consistently recorded low poverty rates

[62] StatsSA National Census 2011
[63] Bergrivier Municipality (2011): Local Economic Development Strategy.
[64] Western Cape Government Provincial Treasury (2014). Saldanha Bay Municipality Socio-economic Profile
[65] Saldnaha Bay Municipality (2012). IDP 2012 - 2017

relative to its neighbouring municipalities hovering around 22 per cent - 23 per cent for the 2001 - 2010 periods. Saldanha Bay's poverty rates compare better than West Coast District (30.4 per cent) but slightly lower than that of the Province (22.1 per cent).

The 2011 statistics show that 14% of households had no income, with 48% of the households having an income of less than R 38 200 a year (National Census, 2011).

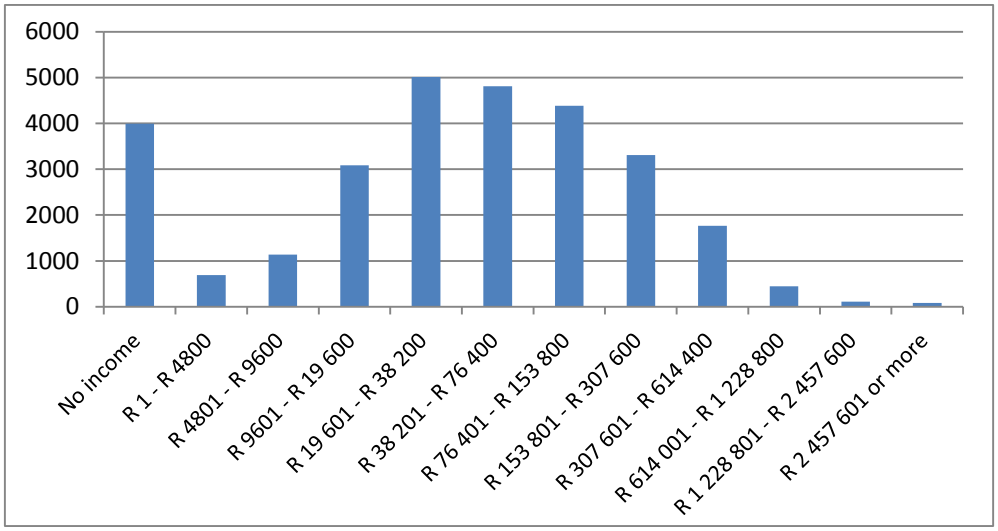


FIGURE 2: Household income in Census 2011

Employment in the agriculture, manufacturing, trade and construction sectors has decreased since 1995. There has been an increase in employment in other sectors, most notably in mining (IDP 2012-2017).

A total of 21 383 people are living in poverty with most being in the urban areas of Saldanha and Vredenburg. There were also 5 861 indigent households in the municipality in 2010/11 and 6 402 people receiving social grants in 2007.[66] The housing backlog was estimated to be 2 178 households, based on research undertaken for the Western Cape Provincial Government in 2010.

[66] Provincial Government of the Western Cape 2010. Saldanha Bay Local Municipality: Regional Development Profile.

The Human Development Index is (HDI) is a combined measure of life expectancy, income and literacy levels of a population in a given area. The Saldanha Bay HDI in 2012 was 0.71 which was equal to that of the Western Cape Province[67], and higher than the 2012 South African HDI of 0.63[68]. According to the 2012 Local Economic Development Strategy (LEDS) for the Bergrivier Municipality the HDI is 0.63. These HDI levels are considered standard when compared globally or internationally.

3.2 Skills and education

Three main skill categories are described in the Saldanha Bay IDP (2012-2017) namely, high skilled, skilled, and low skilled. The skilled and high skilled individuals respectively accounted for 49.3% and 28.5% of the labour force. This means there is a relatively skilled workforce available. Low skilled workers account for 22.2% of the labour force, based on 2007 data. In the case of Bergrivier, the LEDS 2010/2011 states that 30% of the population older than 14 years are illiterate and 59% are low skilled.

The Statistics South Africa (StatsSA) 2011 National Census reflected 1 958 people over the age of 5 who had no schooling in the study area in 2011. A further 24 635 people had a level of education that reflected that they have only attended primary school. A total of 25 922 had completed Matric and a total of 6 717 people had received higher skilled education in the form of a certificate diploma or degree since leaving school[69]. Approximately 86.7% of the population within the Saldanha Bay Municipal area are literate[70]. Literacy is defined on the basis of years of formal education by the Department of Social Development. A person is defined as literate if aged 14 years and older and he/she has successfully completed seven years of formal education (passed Grade 7/Standard 5).

3.3 Housing, infrastructure and services

While the majority of the population live in formal housing, in 2011 roughly 17% of households live in informal housing (including backyard shacks)[71], which effectively represents the housing backlog. Such households are likely to be living in impoverished conditions often with insecure tenure. In terms of the housing backlog, statistics from the IDP (2012-2017) of the municipalities are as follows:

- There is currently a housing waiting list of 7 855 households in the Saldanha Bay Municipality.

- In the Bergrivier Municipality, there is a housing backlog of close to 4 000 of which 830 are in Velddrif. Velddrif is therefore regarded as one of the towns with a high need for housing provision.

[67] WCG: Socio-economic Profile: Saldanha Bay Municipality 2014
[68] UNDP – Human Development Report 2013
[69] StatsSA National Census 2011
[70] WCG: Socio-economic Profile: Saldanha Bay Municipality 2014
[71] StatsSA National Census 2011

Key infrastructure and facilities are shown on Maps 23 and 24. In the case of the Saldanha Bay Municipality the following applies:

- *Water*: Water is supplied from the Saldanha-Berg River Scheme as described in Section 2.2. Demand is expected to at least equal or possibly exceed supply in 2012. In 2009 every household in the both the Saldanha Bay and the Bergrivier Municipality had sufficient access to clean drinking water. Water is a scarce resource and it is unlikely that additional water will be available from the Bergrivier supply systems. Water recycling and re-use systems are limited – some industries treat some of their industrial effluent for re-use, but treated sewage effluent is either discharged into the Bay or used for the irrigation of golf courses.

- *Transport*: The transport network is primarily geared towards cars and public transport is in the form of taxis for the most part. Buses are used primarily to transport learners from rural areas. The study area is well connected to the Cape Metropole via the R27 and the R45.

- *Sewerage*: Almost every household (96.2%) in the municipality has access to adequate sanitation[60]. However, in 2009, approximately 691 households were still using the bucket system (IDP 2009). In the case of the Bergrivier Municipality, it is noted that there is a need to upgrade sewerage infrastructure.

- *Electricity*: Approximately 97.1% of households within the Saldanha bay Municipal area have access to electricity[72]. Electricity is supplied from outside the municipality by Eskom. Some electricity is produced independently by local industries to support their needs. Independent electricity production is gas and coal based.

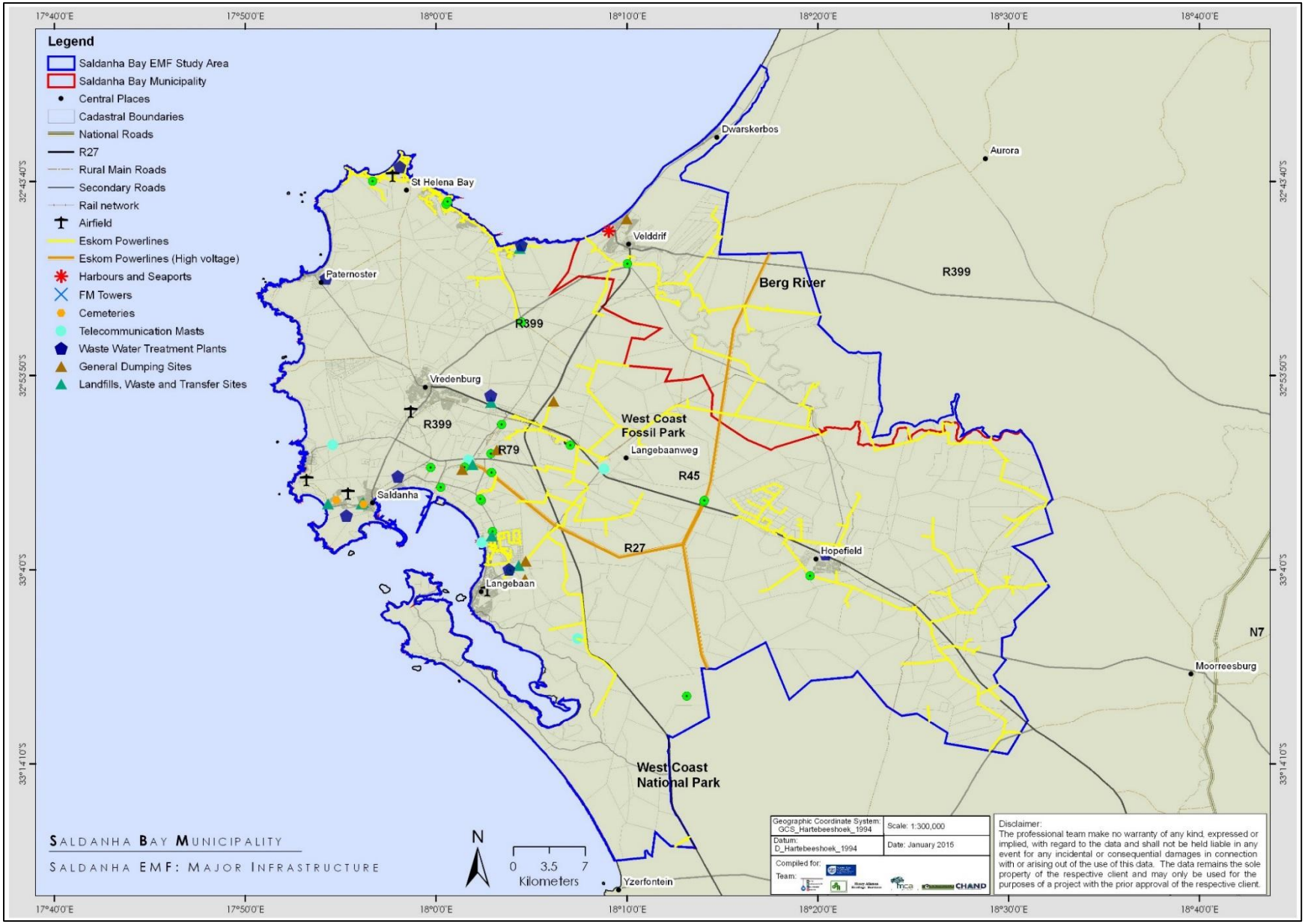
- *Community Facilities*: There are various community facilities including a provincial hospital, two technical colleges, a military academy, seven secondary and 11 primary schools and various recreational facilities.

- *Waste*: Saldanha Bay Municipality has waste management challenges including limited landfill air space and poor compliance with regard to landfill license conditions. Non-compliances include windblown litter, limited cover material for the waste and limited access control. Although the Vredenburg Landfill site does have an operating Material Recovery Facility, which assists in waste diversion from the landfill, much more would need to be done in terms of integrated waste management to cope with an increase in waste generation as more development takes place in the region e.g. the SBIDZ. The IDZ is also expected to produce additional hazardous waste as a result of the predominately oil, gas and heavy industries that will be established in the region. This will provide the municipality with the opportunity to partner industry with regard to the establishment of waste recovery or treatment facilities. The municipality is in the process of appointing a service provider to develop its 3rd generation Integrated Waste Management Plan (IWMP) that will be required to address the above-mentioned challenges.

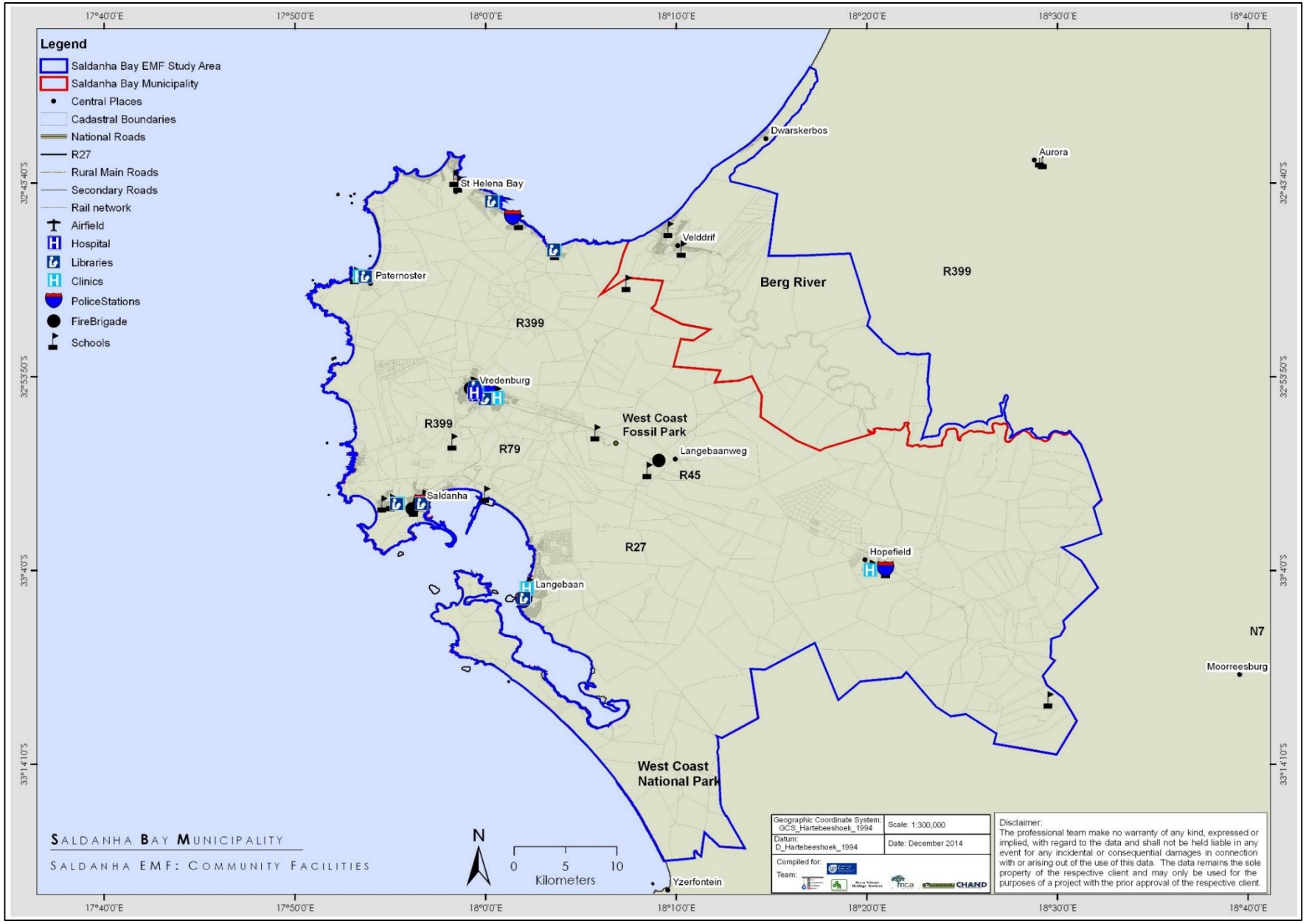
[72] Saldanha Bay IDP: Revision 3 2015/2016

The Bergrivier Municipality notes (IDP 2012-2017) that it faces a number of challenges pertaining to local economic development, one of the most critical being that the municipality has insufficient water and sanitation bulk and service infrastructure capacity to accommodate significant developments at this stage. Accordingly, one of the objectives set out in the IDP is to address this backlog and to improve maintenance of existing infrastructure.

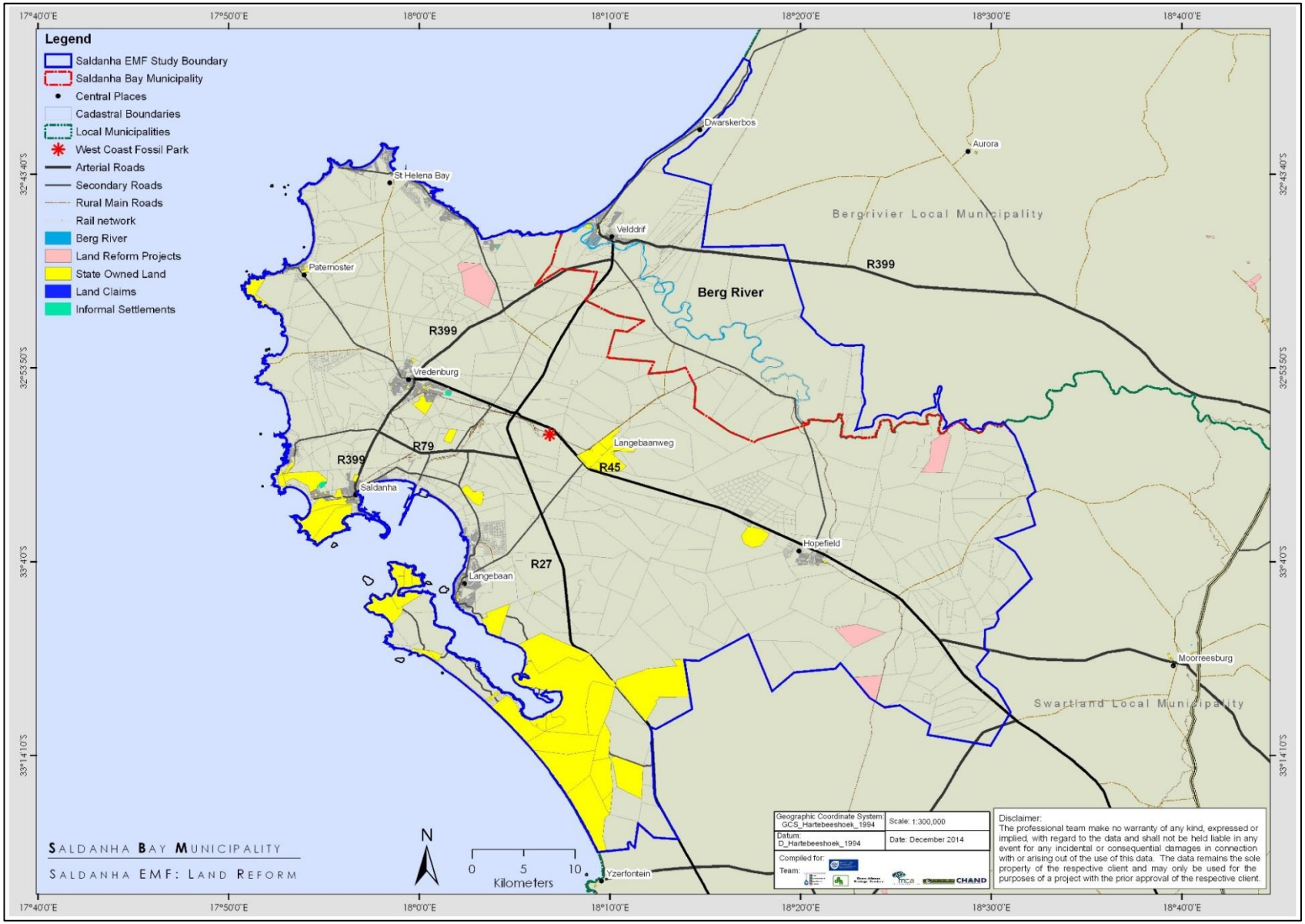
There are some land reform projects within the EMF study area. These are shown on Map 25. State owned land is also shown as this can serve as an indicator of the potential for local economic and even housing opportunities. Most of the state owned land has already been allocated to military use (e.g. air force base at Langebaanweg) or to conservation (e.g. WCNP).



Map 23: Infrastructure



Map 24: Community facilities



Map 25: Land reform projects

3.4 Economic Development

In the 1980s Saldanha became a focus of Regional Industrial Development plan aimed at moving industry away from the Cape Town metropolitan area. Fish processing became a key industry. Marine aquaculture has also developed in the area and has grown into an industry with extremely high socio-economic importance. The CSIR's (2013) SEA of the Port of Saldanha indicates that the desirable state for the local community is formed by the socio-environmental system in the bay. This system could be altered by port expansions, which could affect marine water quality, and hence lead to loss of the mariculture industry, which would in turn change the desirable state, reduce economic activity of this industry and affect the long-term viability of mariculture. Four abalone farms are located along the West Coast in Saldanha, Jacobsbaai, Paternoster and St Helena Bay. Oyster farming is taking place along the West Coast: three farms in Saldanha Bay and one at Paternoster. The alien mussel[73] is cultured mainly in the Western Cape. Seaweed culture in the marine aquaculture industry is currently integrated with abalone culture whereby seaweed is cultured on abalone farms and used to feed the abalone and to improve the quality of effluent water. The sheltered nature of Saldanha Bay (the only natural embayment in South Africa) offers important opportunities for marine aquaculture along the Western Cape coast, and for land-based aquaculture. Constraints to this industry include insufficient understanding of the implications of port development on mariculture activities. There also are constraints in the current body of knowledge of what the mariculture industry's limitations to itself might be in the absence of port development. These limitations are listed by the CSIR (2013) as "e.g. raft density, accumulation of mariculture wastes, limitations on the area available for mariculture activities based on risks posed by winds, waves and currents on mariculture infrastructure and/or operational down-time. Also, inadequate capacity (number of staff) and or staff not trained adequately to implement and enforce legislation".

With the presence of the port and the Sishen-Saldanha railway line, came the establishment of some large mineral processing industries in the 1980s and early 1990s, the most notable being Arcelor Mittal (previously known as Saldanha Steel); Duferco and Exxaro (previously known as Namakwa Sands). There is a range of current and proposed mining activity in the area (phosphates, calcium carbonate, limestone, heavy minerals, amongst others), and there have been some fairly large mining operations in the past (e.g. phosphate at Langebaanweg). Data in this regard are available from the Council of Geoscience and are shown in Map 26.

The West Coast Development Initiative brought attention to the potential of the port and the strategic location of Saldanha as a West Coast export hub. Saldanha Steel was seen as the anchor industry that would give impetus to industrial growth in the region. The Department of Trade and Industry has recognised Saldanha Bay as a key export hub and an area with growth potential. Accordingly, the establishment of an IDZ is under consideration and a feasibility study in this

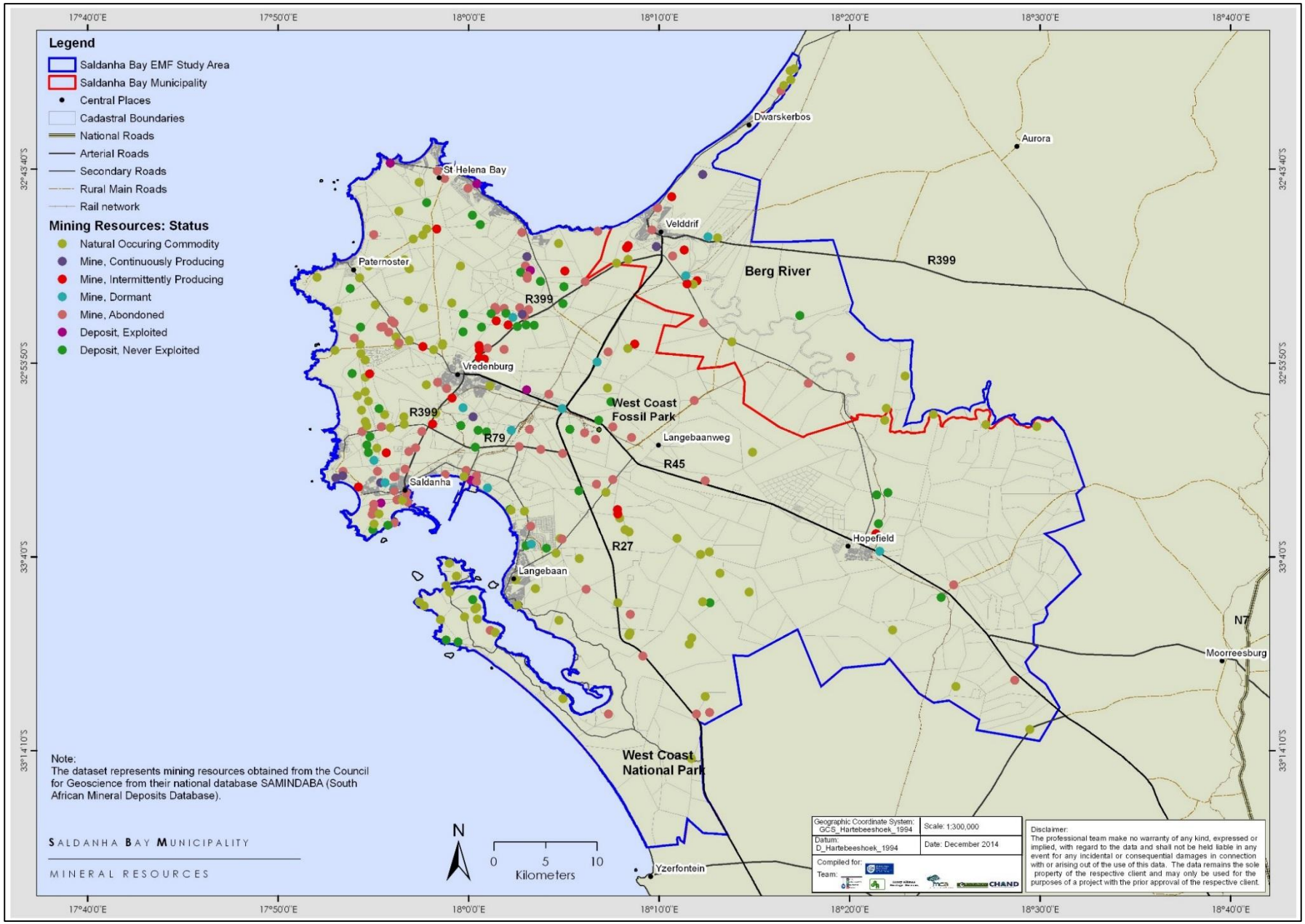
[73] *Mytilys galloprovincialis,* which has invaded much of this part of the coast.

regard has been completed. This feasibility study was based on the development of the following:

- Titanium-Zircon complex (minerals processing)
- Hot Briquetted Iron plant (minerals processing)
- Marine Repair (services to marine sector such as shipping)
- Offshore Oil and Gas support (services to the offshore oil and gas sector)
- Wind turbine manufacturing
- Solar Water Heater Manufacturing.

A more detailed analysis of the IDZ has been undertaken and the current proposals are based on an Oil & Gas and Marine Repair engineering and logistics services complex, serving the needs of the upstream Exploration and Production service companies' operating in oil and gas fields in Sub Saharan Africa.[74]

[74] SBIDZ Gazette Document, November 2012



Map 26: Mineral Resources

The PSDF marks the area as one with a high potential for growth where future investment in infrastructure and service provision would be appropriate. The West Coast District Growth and Development Strategy 2007 identified the following key economic sectors that should be developed:

- Agriculture
- Fishing and Aquaculture
- Women in Construction
- Tourism
- Oil and Gas

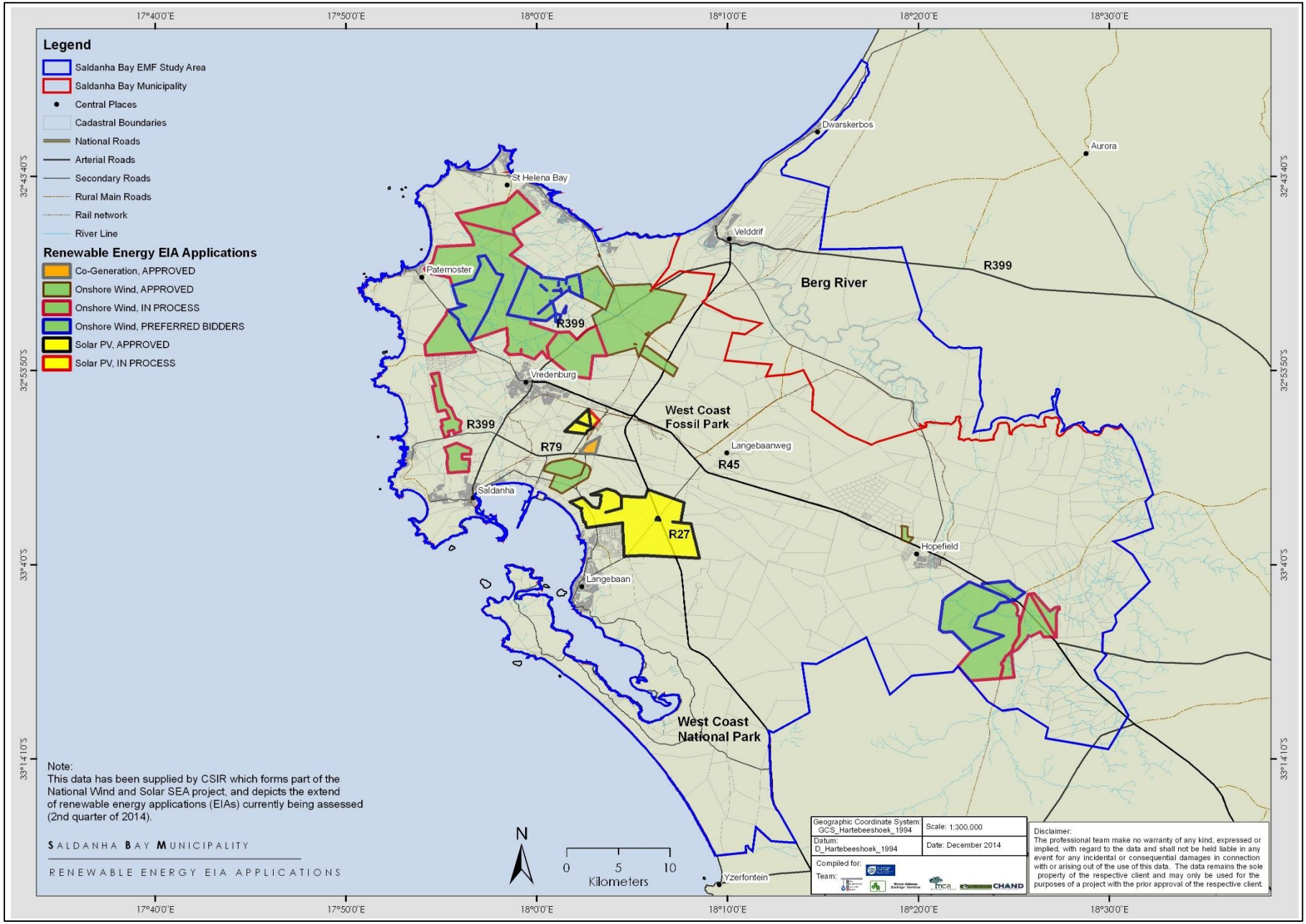
The Saldanha area is seen as a "Regional Motor" for job creation in the West Coast District. A LEDS[75] has been developed for the Saldanha Bay Municipality. The LEDS states a commitment to economic development which does not compromise the health and safety of the environment and to ensure sustainable use of environmental resources. A number of priorities are listed:

- Thrust 1: Development of Agricultural Sector and Activities
- Thrust 2: Industrial Development
- Thrust 3: SMME Development
- Thrust 4: Tourism and Cultural Development
- Thrust 5: Development of Local Economic Activities
- Thrust 6: Environmental Sustainability
- Thrust 7: Renewable Energy Development
- Thrust 8: Development of the Municipality and Its Internal Structure
- Thrust 9: Human Resource Development

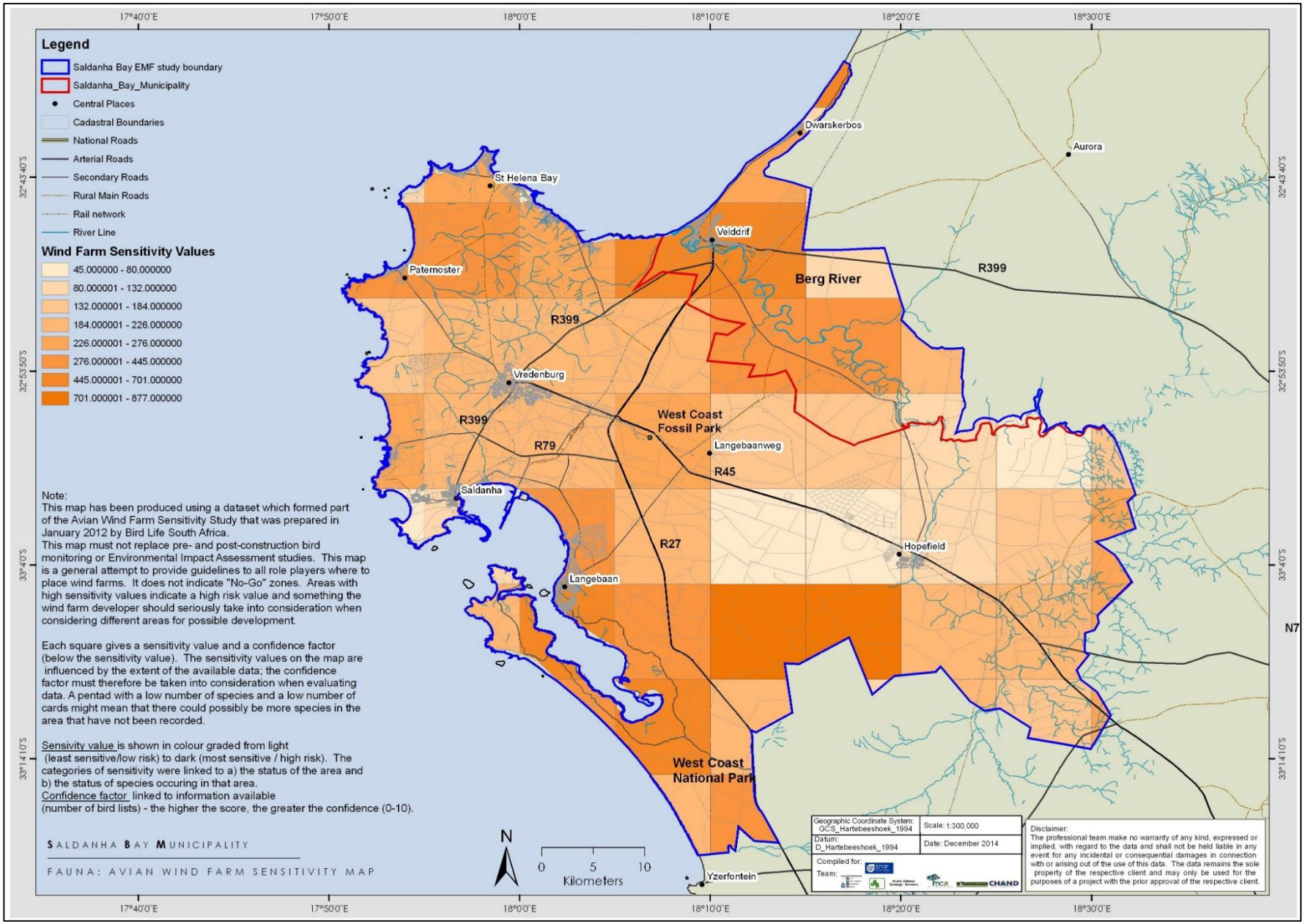
In addition to the IDZ, the other significant potential development in the area relates to growth of the Port, the key elements being expansion of the iron ore handling facility. Marine repair and support services to offshore oil and gas operations are currently taking place and could also increase over time as indicated in the case of this sector forming the focus of the IDZ.

Consideration has been given to the area's potential for renewable energy, especially wind and solar. Research conducted by the Council for Scientific and Industrial Research (CSIR) on Renewable Energy Development Zones indicates that Saldanha has not been identified as a priority zone in this regard (P. Lochner *pers. comm.*). Notwithstanding there are applications that have been approved or that are underway as shown in Map 27. Birdlife South Africa has mapped bird sensitivity in relation to wind farms (Refer to Map 28).

[75] UrbanEcon (2005): Local Economic Development Strategy for the Saldanha Bay Municipality.



Map 27: Renewable energy projects



Map 28: Avian sensitivity to wind farm development

Bergrivier is generally described as a low-growth area, largely as a result of:

- Agriculture has been adversely affected by droughts, lower profitability and rationalization of production techniques over the last few years.

- Fishing has also been affected by lower catches and tighter controls.

Agriculture is the largest employment sector in the Bergrivier Municipality, providing work for almost half the total labour force. This sector is also responsible for secondary employment opportunities such as packaging, bottling (e.g. milk processing) and agro-processing jobs. The only significant mining enterprises currently in operation are the PPC cement factory at De Hoek and a salt reclamation works at Velddrif.

Another important element of the local economy is tourism. The area is rich in both ecotourism and cultural tourism resources/opportunities. Tourism is seen as a growth sector in both the Saldanha Bay Municipality and the Bergrivier Municipality LEDS documents. Tourism facilities are shown on Map 29.

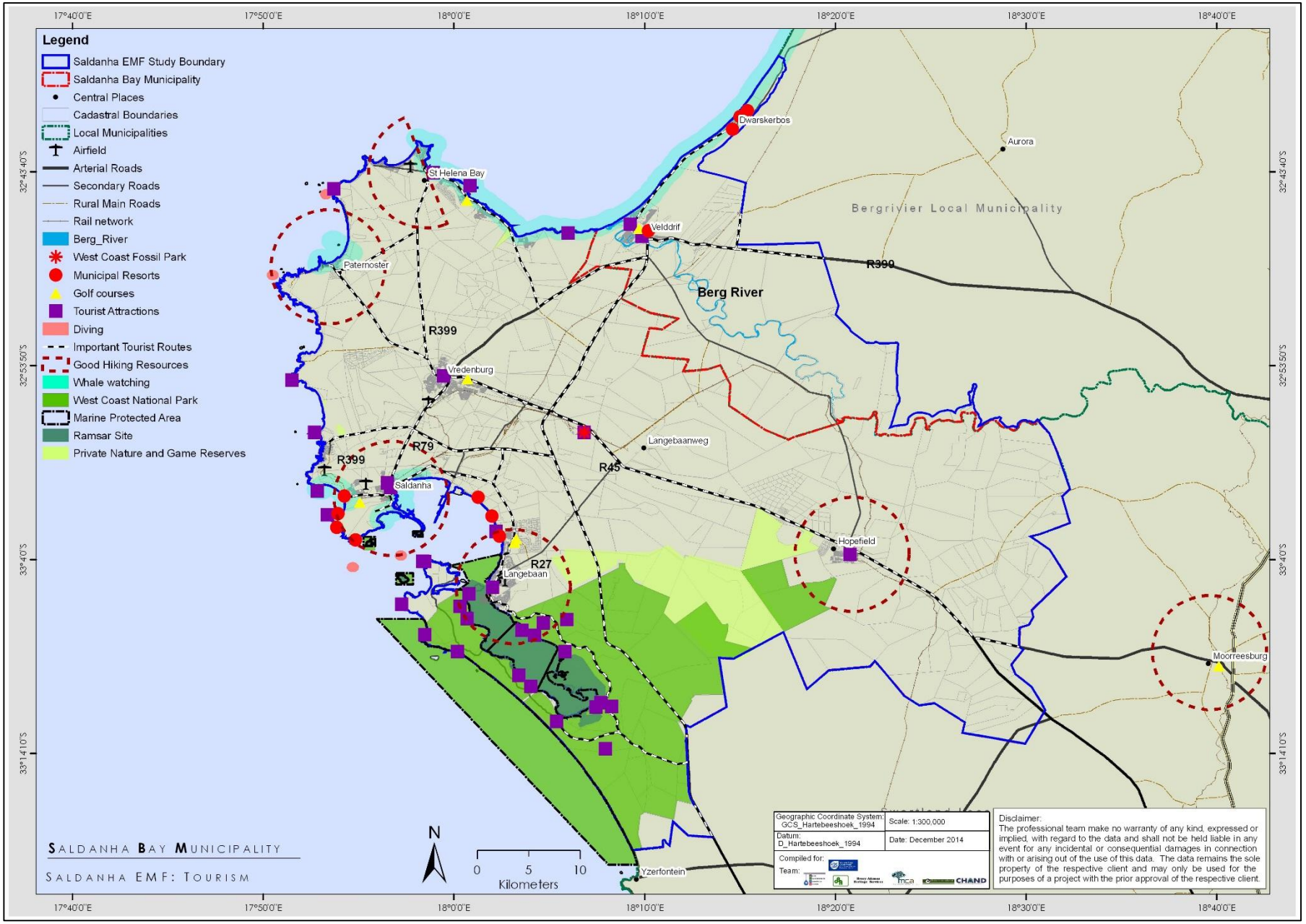
A Tourism Development Strategy has been formulated for the Saldanha Bay Municipality. Various tourism related priorities have been identified in this plan, many of which are focussed on cultural resources (including archaeology and palaeontology). The decline in both fishing (due to reduced stocks, particularly of rock lobster) and agriculture are noted as concerns for towns such as Paternoster and Hopefield respectively. It is noted that rehabilitation of the Zoute River, which has poor water quality is required to realise the tourism potential of this part of Hopefield.[76]

The Bergrivier Municipality LEDS identifies five priorities on which focus is to be placed to facilitate economic growth:

- Business Process Outsourcing
- Tourism
- Floriculture (Cut flowers)
- Kelp farming and processing, and
- Conferencing

In the case of the coastal area, particularly the town of Velddrif, the emphasis is on tourism development including whale and bird watching and resort development.

[76] Seaton Thomson & Associates (2013): Tourism Development Plan for the Saldanha Bay Municipality, Phase 3.



Map 29: Tourism facilities

PARTTWO – Strategic Assessment

4 Strategy informants

The second element of the EMF is the Strategic Assessment. This can be seen as the "forward looking" part of the EMF. Whilst the situation analysis provides insight into where the study area stands in terms of its environmental attributes, strategy looks to the desired situation for the future. In developing the strategy element of the EMF, a key consideration is that of the existing policy environment, particularly that which is relevant to land use, environment and sustainable development. The EMF needs to be placed within and aligned to relevant national, provincial and local policy.

Those policies which are of particular relevance to the use of land form the focus of this section. This is due to the fact that this is the most pertinent aspect to the EMF if it is to serve as a tool to guide development through "encouraging appropriate development in appropriate locations." This is how the EMF can play a role in moving towards a path of sustainable development.

4.1 National Policy

National policy is important in providing contextual information for the EMF, particularly in terms of Government's vision from a sustainable development perspective. The National Planning Commission released the National Development Plan: Vision for 2030 (NDP) in November 2011. Twelve priority areas are identified in this Plan:

- An economy that will create more jobs
- Improving infrastructure
- Transition to a low carbon economy
- An inclusive and integrated rural economy
- Reversing the spatial effects of apartheid
- Improving the quality of education, training and innovation
- Quality health care for all
- Social protection
- Building safer communities
- Reforming the public service
- Fighting corruption
- Transforming society and uniting the economy

The DEA is responsible for formulating policy in respect of sustainable development. A National Framework for Sustainable Development (NFSD) has been formulated and adopted by Cabinet (DEAT, 2008). This document acknowledges the connection between ecosystems, natural resources and sustainable development as well as that South Africa's natural systems and biodiversity provide a basis for economic growth and development. Five strategic priority areas for action and intervention are identified:

- Enhancing systems for integrated planning and implementation;

- Sustaining ecosystems and using natural resources efficiently;
- Economic development via investing in sustainable infrastructure;
- Creating sustainable human settlements; and
- Responding appropriately to emerging human development, economic and environmental challenges.

In the context of development priorities, the NFSD highlights the following:

- The value of ecosystems recognising that ecosystem functioning is critical to achieve sustainable development.
- Improving aquatic ecosystems, specifically water availability and water quality.
- Investing in protecting and enhancing ecosystem services.
- Dematerialising the economy and improving the efficiency of production and consumption systems.
- Air quality enhancement and monitoring through investment in clean technologies.
- Energy efficiency.
- Food security and natural-resource based livelihoods.
- Economic and fiscal instruments as incentives for environmental reform in support of sustainable development.
- Implementation of international agreements.

A process to develop the sustainability strategy has been underway since 2008 and has culminated in the NFSD and the National Strategy for Sustainable Development (NSSD). In the context of South Africa's strategy, sustainable development implies the selection and implementation of a development path which allows for the achievement of appropriate and justifiable social and economic goals (based on meeting basic needs and equity) without compromising the natural system on which human wellbeing and a healthy economy is based.[77]

Table 4: NSSD sustainability priorities and strategic goals

PRIORITY	STRATEGIC GOALS
Responding effectively to climate change	• Decrease greenhouse gas (GHG) emissions to levels required by science • Reduce dependency on fossil fuels and enhance security of energy supply • Improve climate resilience in communities.
Greening the economy	• Increasing the contribution of the Environmental Goods and Services Sector to employment and the GDP • Reducing the resource intensity of the economy (including energy and carbon) • Promoting cleaner technologies and investing in sustainable infrastructure • Promoting sustainable livelihoods and building local economies.
PRIORITY	**STRATEGIC GOALS**

[77] Page 34 of the NFSD

Building sustainable communities	• Enhancing spatial planning to promote social cohesion and integration between communities as well as between communities and the natural environment • Ensuring universal access to basic and community services • Improving the standard/quality of housing and other structures to optimise resource (energy, water, building materials etc.) efficiency • Promoting self-sufficiency, food security and equitable access to natural resources that support livelihoods • Improving equity, security and social cohesion
Sustaining ecosystems and using natural resources efficiently	• Managing the use of all natural resources to ensure their sustainability • Protecting and restoring scarce and degraded natural resources • Preventing the pollution of air, water and land resources so that community and ecosystem health is not adversely affected • Avoiding the irreversible loss and degradation of biodiversity (marine, terrestrial, aquatic ecosystems)
Enhancing governance systems and capacity	• To ensure effective integration and collaboration across all functions and sectors within government • To demonstrate commitment in changing the development focus to one based on sustainable programmes • To adopt a long-term view to development planning and implementation that takes cognisance of intergenerational equity • To adhere to and exercise principles of good and ethical governance • To monitor, evaluate and report performance and progress in respect of sustainability goals.

4.2 Outcome 10 – Programme of Action

Government has agreed on 12 outcomes as the focus of its work between 2009 and 2014. There are measurable outputs with targets associated with each outcome and each output is linked to a set of activities aimed at achieving the targets. Each of the 12 outcomes has a delivery agreement which in most cases involves all spheres of government and a range of partners outside government.

Outcome 10 is related to the environment. The outcome is stated as being: "Environmental assets and natural resources that are well protected and continually enhanced." Outcome 10 makes specific reference to the obligation placed on government in respect of realising the environmental right in the Constitution. Four outputs (each of which has sub-outputs) have been identified in Outcome 10:

- **Output 1:** Enhanced quality and quantity of water resources.
- **Output 2**: Reduced greenhouse gas emissions, climate change impacts and improved air/atmospheric quality.
- **Output 3**: Sustainable environmental management.
- **Output 4**: Protected biodiversity.

4.3 Sector-specific policies and strategies

Sector-specific strategies have been developed which cover various aspects of sustainability.

4.3.1 Climate change

National government's policy position[78] on climate change response is built on six pillars. These are:

- Greenhouse gas emission reductions and limits;
- Build on, strengthen and/or scale up current initiatives;
- Implementing the "Business Unusual" call for action;
- Preparing for the future;
- Vulnerability and Adaptation; and
- Alignment, Coordination and Cooperation.

The above priorities are reflected in the NSSD and National Climate Change Response Strategy where the key focus falls on reducing greenhouse gas emissions and dependency on fossil fuels; enhancing energy supply security; improving communities' resilience to climate change; and ensuring ecosystem resilience is not disrupted.

Furthermore, the government's position on climate change aims to build on the resilience of the country, its economy and its people whilst trying to manage the transition to a climate –resilient, equitable and international competitive lower-carbon economy and society in a manner that addresses South Africa's national priorities for sustainable development, job creation, improved public and environmental health, eradication of poverty and social equality[79].

4.3.2 Greening the economy

National government recognises the importance of promoting a "green economy". The Minister of Finance has acknowledged that the "cost of inaction towards sustainability will far exceed the cost of moving towards a low carbon economy" and has emphasised that the nation should be prepared to do extraordinary things to deliver the jobs and provide skills training and new businesses opportunities in "an environmentally responsible development path."[80]

- Increasing the contribution of the Environmental Goods and Services Sector to employment and the GDP;
- Reducing the resource intensity of the economy (including energy and carbon);
- Promoting cleaner technologies and investing in sustainable infrastructure; and
- Promoting sustainable livelihoods and building local economies.

The following is noted in the NDP ("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

[78] Media statement by the Minister Environmental Affairs and Tourism, 28 July 2008
[79] National Climate Change Response Whitepaper
[80] Minister of Finance, speaking at the United Nations Environment Programme Finance Initiative Global Roundtable, 22 October 2009

impacts of climate-change by; decreasing poverty and inequality; creating employment; increasing levels of education and promoting skills development; improving health care and; maintaining the integrity of ecosystems and the many services that they provide."[81]. The long term strategy is to transition to a low carbon economy.

4.3.3 Natural resources

In the NSSD natural resources (e.g. water, soil, biodiversity) are recognised as being the basis of life, economic activity and human wellbeing. Functioning ecosystems generate goods (natural products e.g. water, timber, flowers, food and medicines) and services (e.g. recycling of wastes, purification of water and air, flood attenuation, recreational opportunities and carbon sequestration). It is recognised that the depletion or wasteful use of natural resources, and/or degradation of ecosystems, therefore pose a threat to the attainment of socio-economic objectives.

The Western Cape can be considered a globally significant biodiversity "hot spot" due to the presence of the Cape Floristic Region, one of only six plant kingdoms in the world. Continued degradation of ecosystems and ecosystem services in the Province is recognised as having the potential for severe effects on the provincial economy. The DEADP is the custodian Department in respect of biodiversity, although most of the on-the-ground management is undertaken by CapeNature. In respect of biodiversity, the DEADP's stated objective is to "promote equitable and sustainable use of natural resources to contribute to economic development, by managing biodiversity, and its components, processes, habitats, ecosystems and functions and to effectively mitigate threats to sustainable management of biodiversity and natural resources."[82] Currently water resources in the Province are over-allocated. Accordingly the Provincial Government of the Western Cape considers it necessary to focus on the sustainable management of water resources due to the implications of climate change. Drier conditions are predicted particularly in the western parts of the province.

The DEADP also have a role to play in respect of pollution and waste management. Various problems have been identified by the Department with regard to pollution and waste[83] which are amongst others, limited waste minimisation at source; poor effluent quality from industry and wastewater treatment works, and pollution of water resources which has water availability and health implications. DEADP is the provincial competent authority responsible for the issuing of Waste Management Licenses. Furthermore, DEADP has an advisory and supportive role for local authorities in terms of planning and implementation of the requirements of the National Waste Act, 2008 (Act No. 59 of 2008).

[81] Page 209 of the NDP.
[82] Page 42 of DEADP Strategic Plan 2010-2015
[83] Page 10 of Strategic Directive 7

4.4 Provincial policy

The Provincial Strategic Plan (PSP) 2014 – 2019 constitutes both the Western Cape Province's policy agenda and the roadmap for execution. It builds on the solid foundations of PSP 2009 -2014, incorporates the lessons learnt along the way, streamlines and reprioritises the eleven former Provincial Strategic Objectives (PSOs) into five overarching Provincial Strategic Goals (PSGs), and introduces a number of "game-changers" to catalyse the realisation of the PSGs. The Western Cape provincial government identified five provincial strategic goals (PSGs) and introduces a number of "game-changers" to catalyse the realisation of the PSGs. The following five PSGs have been identified:

- PSG 1: Create opportunities for growth and jobs;
- PSG 2: Improve education outcomes and opportunities for youth development;
- PSG 3: Increase wellness, safety and tackle social ills;
- PSG 4: Enable a resilient, sustainable, quality and inclusive living environment; and
- PSG 5: Embed good governance and integrated service delivery through partnerships and spatial alignment.

The Provincial Government has also initiated OneCape 2040, a plan which complements the NDP and which also builds on the PSOs/PSGs. The vision for the Province as expressed in OneCape 2040 is for the Western Cape to be "a highly-skilled, innovation driven, resource efficient, connected, high opportunity and collaborative society". Various transitions or changes are identified in OneCape 2040, including the need to change from unsustainable, carbon intensive resource use to sustainable, low carbon resource use.

Another important provincial plan is the Provincial Spatial Development Framework (PSDF). The first PSDF was produced in 2009. As with other spatial plans, it is subject to regular review, with the result that a revised and updated PSDF was published in March 2014. The 2014 PSDF has the following goals:

- more inclusivity, productivity, competitiveness and opportunities in urban and rural space-economies;
- better protection of spatial assets (e.g. cultural and scenic landscapes) and strengthened resilience of natural and built environments; and
- improved effectiveness in the governance of urban and rural areas.

Accordingly, the focus in the PSDF is on:

- Sustainable use of provincial assets, such as water, biodiversity and ecosystem services, soils, minerals and scenic landscapes.
- Promoting opportunities in the space economy in both urban and rural areas.
- Developing integrated and sustainable settlements.

In terms of resource management, the 2009 PSDF committed the Province to safeguarding these assets. The following objectives were set and these have been confirmed in the 2014 PSDF[84]:

- Protect biodiversity and agricultural resources.
- Minimise the consumption of scarce environmental resources, particularly water, fuel, and land – in the latter case especially pristine and other rural land, regarded as the province's 'goldmine-above-the-ground' and is a non-renewable resource.
- Conserve and strengthen the sense of place of important natural, cultural and productive landscapes, artefacts and buildings.

In addition to the general objectives and policies set out it the PSDF, there is specific guidance with regard to investment, policy and location for the Greater Saldanha Area.

Besides the PSDF, there are a number of other specific policies that are aimed at giving effect to the OneCape 2040 vision. These cover infrastructure, land transport and the green economy:

1. The Western Cape Infrastructure Framework (WCIF) quantifies the scale and nature of the infrastructure requirements and how and where infrastructure needs to be provided.

2. The Western Cape Provincial Land and Transport Framework which sets out the requirements for effective and safe public transport systems. It also deals with links to other provinces, as well as addressing issues relating to dependence on fossil fuels within the transport sector.

3. The Western Cape Green Economy Strategic Framework aims at positioning the Western Cape as the leading green economic hub in Africa. This framework is centred around six strategic objectives:
   - To become the lowest carbon Province.
   - To increase usage of low-carbon mobility.
   - To ensure a diversified, climate-resilient agricultural sector and expanded value chain.
   - To become the emerging market leader in resilient, liveable and smart built environment.
   - To ensure high growth of green industries and services.
   - To secure ecosystem infrastructure.

[84] Page 39 of the 2014 PSDF.

4.5 Municipal policies and plans

The municipal IDP is the primary strategic plan. Other plans such as the SDF, LEDS and IWMP fall under the IDP. Key strategic informants from the Saldanha Bay and Bergrivier Municipalities IDPs are summarised in the table below.

Table 5: Strategic informants from municipal IDPs

SALDANHA BAY	BERGRIVIER
VISION	**VISION**
Serve, Grow and Succeed Together, for Saldanha Bay's Future	The Bergrivier Municipality strives towards a satisfied community by means of balanced, agreed upon, sustainable and effective service delivery
SALDANHA BAY	**BERGRIVIER**
MISSION	**MISSION**
We, the community of Saldanha Bay Municipality, want to make Saldanha Bay Municipality the area of choice in which to live, do business and relax. We want to: • be a leading municipality; • render quality service at an affordable price; • be a place in which all have access to developmental opportunities; • utilise the riches of land and seas in a sustainable manner; and • strive to achieve the three aims of sustainable development, namely human well-being, economic success and ecological responsibility.	Our mission is to deliver cost-effective, sustainable services with a well-represented army of employees who are motivated to stimulate local economic development as well as environmentally sensitive development through transparent decision making based on sound management principles within the ambit of unique character and cultural, historical heritage.
GOALS	**GOALS**
Local Economic Development 1. To diversify the economic base of the municipality through industrialisation, whilst at the same time nurturing traditional economic sectors.	<u>Goal 1:</u> A financially viable and sustainable municipality that provides an enabling environment for the development of the Bergrivier economy. *Strategic Objectives:* To budget strategically, grow and diversify our revenue and ensure value for money services.
Municipal Transformation and Organisational Development 2. To be an innovative municipality on the cutting edge in respect of the use of technology and best practice An effective, efficient and sustainable developmental oriented municipal SFA4 administration.	<u>Goal 2:</u> A quality living environment for all residents that is conducive to development and investment. *Strategic Objective:* To provide and maintain bulk and service infrastructure that will address backlogs and provide for future development.
Good Governance and Public Participation 3. To develop and use a multi-platform communication system to ensure swift and accurate dissemination of information. 4. To provide ethical and effective leadership that engenders trust in the municipality amongst its stakeholders. To ensure compliance with the tenets of good governance as prescribed by legislation and best	<u>Goal 3:</u> An effectively managed institution that renders effective and efficient service delivery. *Strategic Objectives:* • To promote good governance and access to services. • Development and capacitation of the municipality's human resources. To create an efficient effective, productive and

practice.	accountable administration.
	<u>Goal 4:</u> A well-managed built environment that is in harmony with the natural environment. *Strategic Objectives:* • To develop, manage and regulate the built and natural environment. To conserve and manage the natural environment and mitigate the impacts of climate change.
	<u>Goal 5:</u> A safe, healthy and secure environment. *Strategic Objective:* • To promote the safety and security of our citizens. <u>Goal 6:</u> An environment that that is conducive to the wellbeing and development of our community. *Strategic Objectives:* To promote the wellbeing and social development of our citizens.

The Saldanha Bay IDP places Strategic Objectives 2, 3 and 4 as being aligned with Outcome 10 and Priority 3 of the National Development Plan of the National Government (refer to Section 3.2). These objectives are also seen as being in line with PSG 4 (refer to Section 3.3). Departmental Objectives have been formulated in respect of each of the Strategic Objectives in the IDP. Those relevant to sustainable development and environmental management are shown in Table 6.

Table 6: Strategic and Functional Objectives – Saldanha Bay IDP

STRATEGIC OBJECTIVE	FUNCTIONAL/DEPARTMENTAL OBJECTIVES
Strategic Objective 2: To develop an integrated transport system to facilitate the seamless movement of goods and people within the municipal area and linkages with the rest of the district and the City of Cape Town.	*Municipal Function – Technical Services* • To provide a road and stormwater infrastructure network in the municipal area to facilitate accessibility to residential areas and stimulate local economic development.
Strategic Objective 3: To develop safe, integrated and sustainable neighbourhoods.	*Municipal Function – Community Services* • To implement, monitor and manage the regulatory legal framework and SDF to achieve a balanced urban and natural environment. • To promote the conservation of the environment and facilitating responsible spatial development and use of resources. • To maintain the cemeteries, beaches and open spaces in the municipal area. • Management, promotion and implementation of social projects, initiatives and programmes. • To provide low cost housing to qualifying households.
Strategic Objective 4: To maintain and expand basic infrastructure as a catalyst for economic development.	• To provide a quality electricity supply, manage demand and maintain existing infrastructure. • To render a compliant solid waste management service that meets the minimum requirements set out by the DWS, • To manage and protect the environment in terms of the required legislation.

	• To provide safe, clean potable water to households, institutions, businesses and industries in the municipal area and to maintain, upgrade and provide infrastructure. • To provide an improved sewerage service.

The Bergrivier Municipality has identified alignment between its goals and strategic objectives and national and provincial policies/frameworks. Goal 4 (A well-managed built environment that is in harmony with the natural environment) is particularly relevant. The Strategic Objectives under this goal are aligned with National Government's Outcome 10 and PSG 4 of Provincial Strategic Plan of 2014-2019 of the Western Cape Province.

Other points of interest are that:

- The Bergrivier Municipality has formulated a Local Biodiversity Strategic and Action Plan. The implementation of this plan has been identified as a priority under Goal 4. The municipality is a member of Local Action for Biodiversity Programme, which is run by ICLEI – Local Governments for Sustainability's Global Biodiversity Centre, in partnership with the International Union for Conservation of Nature (IUCN). This programme is aimed at supporting municipalities in integrating biodiversity considerations into their activities.

- The development of climate change mitigation and adaption plans is also identified as a priority under Goal 4 of the Bergrivier Municipality IDP.

5 Analysis of key trends, concerns and opportunities

This section provides an overview of key trends, concerns and opportunities based on the Situation Assessment. Positive trends and opportunities are also discussed.

5.1 Key trends and pressures

Scientific research and anecdotal information provided by local organisations points to a number of negative trends and pressures. These need to be considered in land use planning and development of the area, particularly if the vision is to be realised.

5.1.1 Availability of water resources

The Western Cape is already stretched in terms of water supply meeting demand, and this is likely to worsen in the future due to climate change effects and continued population growth. Moreover, the West Coast is characterised by a semi-arid Mediterranean climate with an average rainfall of 260 to 280 mm per annum. This region is water scarce, with limited surface water resources. The Berg River is the major surface water resource in the area. Groundwater is also used, mainly from the Langebaan Road Aquifer System. Water is supplied to the Saldanha Bay Municipality by the West Coast District Municipality through the Berg River – Saldanha Water Supply Scheme. Similarly, the Bergrivier Municipality also receives water via the West Coast District Municipality.

Scarcity of potable water is identified as a challenge in respect of delivery of basic services in the Saldanha Bay Municipality IDP (2012-2017). In the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis in the IDP, water scarcity is noted as a threat. The following is noted: "With the projected industrial growth in the municipal area taken into consideration, there may be insufficient bulk water supply for industrial purposes in future." A Water Master Plan[85] has been prepared for the West Coast District Municipality and projections are that by 2015 water demand may exceed supply.

Water demand projections are based on current available yields and do not take climate change into consideration. The Berg Water Management Area in general is already in deficit, under current climate conditions. This is also the water management area that is expected to show the highest population growth.[86]

- Dams in the catchment and extraction of water from rivers have resulted in a reduction in freshwater inflows into rivers, streams and estuaries. In addition, the Berg River estuary and Langebaan lagoon systems are both vulnerable to impacts of groundwater abstraction.

[85] GLS (2013): West Coast District Municipality Water Master Plan.
[86] UrbanEcon (2005): Local Economic Development Strategy for the Saldanha Bay Municipality

- Desalination is seen as an option for water supply but the understanding of environmental impacts in the local context is limited. There are risks associated with the release of brine solution and associated chemicals. Energy demand implications, particularly in light of rising costs of electricity, concerns about greenhouse gas emissions and climate change are also important.

5.1.2 Coastal development

There are many developments within coastal towns where services have been installed, but properties remain undeveloped or have not been sold. Additional developments are underway, even though there appears to be surplus land versus demand. This may be attributable to the economic downturn. There are various concerns associated with this trend:

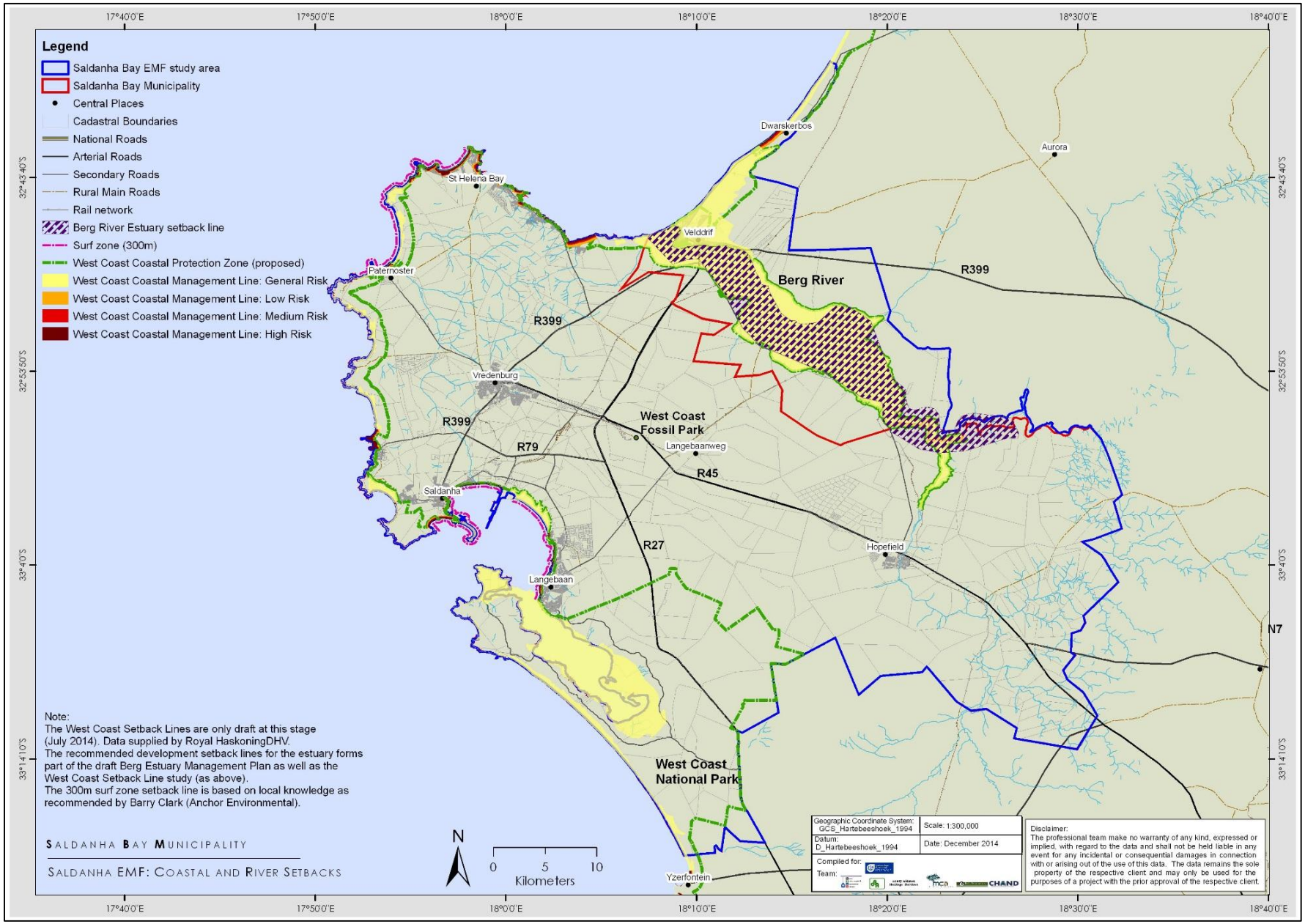
- Ribbon development along the coast.
- Loss of character of coastal towns.
- Cost of maintaining infrastructure that is being under-utilised and/or where costs are not being recovered because properties are not being developed (i.e. municipality does not recover income for services such as water, sewage etc.).
- Loss of or restriction of access of people to the coastline and facilities is a major problem.
- Shrinking landfill airspace in the study area.

Coastal development in Langebaan and Saldanha extends almost to the water's edge. This places stress on the marine environment due to increased risk of erosion, trampling and habitat loss. In addition, large volumes of storm water may be generated which enters the bay and lagoon. Coastal set-back lines in terms of the Integrated Coastal Management Act are set boundaries which prevent development seawards or development that is adjacent to sensitive areas or within areas that present a threat to humans. Coastal setback lines are established to inform decision making with regards to the planning and management of coastal areas. There may be more than one setback line developed, and may be established for more than one purpose. For example, an erosion setback line may exist with a coastal setback line. These setback lines are aimed at guiding developers with respect to future developments and land uses. DEADP initiated a study to determine setback lines with a view to managing development in the coastal zone. The delineation of the setback lines were proposed through stakeholder engagements where the public and other interested and affected parties had the opportunity to have their opinions heard. The various data sources used were that of Ariel photography, wind and wave data for the region and Light Detection and Ranging (LIDAR). Thereafter, a risk-based approach using different time horizons was applied to identify zones of High (1:20 year), Medium (1:50 year), and Low (1:100 year) risk in urban areas. A generic setback has been proposed for coastal areas beyond urban boundaries and adjacent to estuaries (Map 30). A 1:100 year coastal floodline has been established for the Saldanha bay as seen in Map 32. The 1:100 year coastal floodline was proposed in an effort to provide guidance for future developments in the area. This coastal floodline aims at restricting any

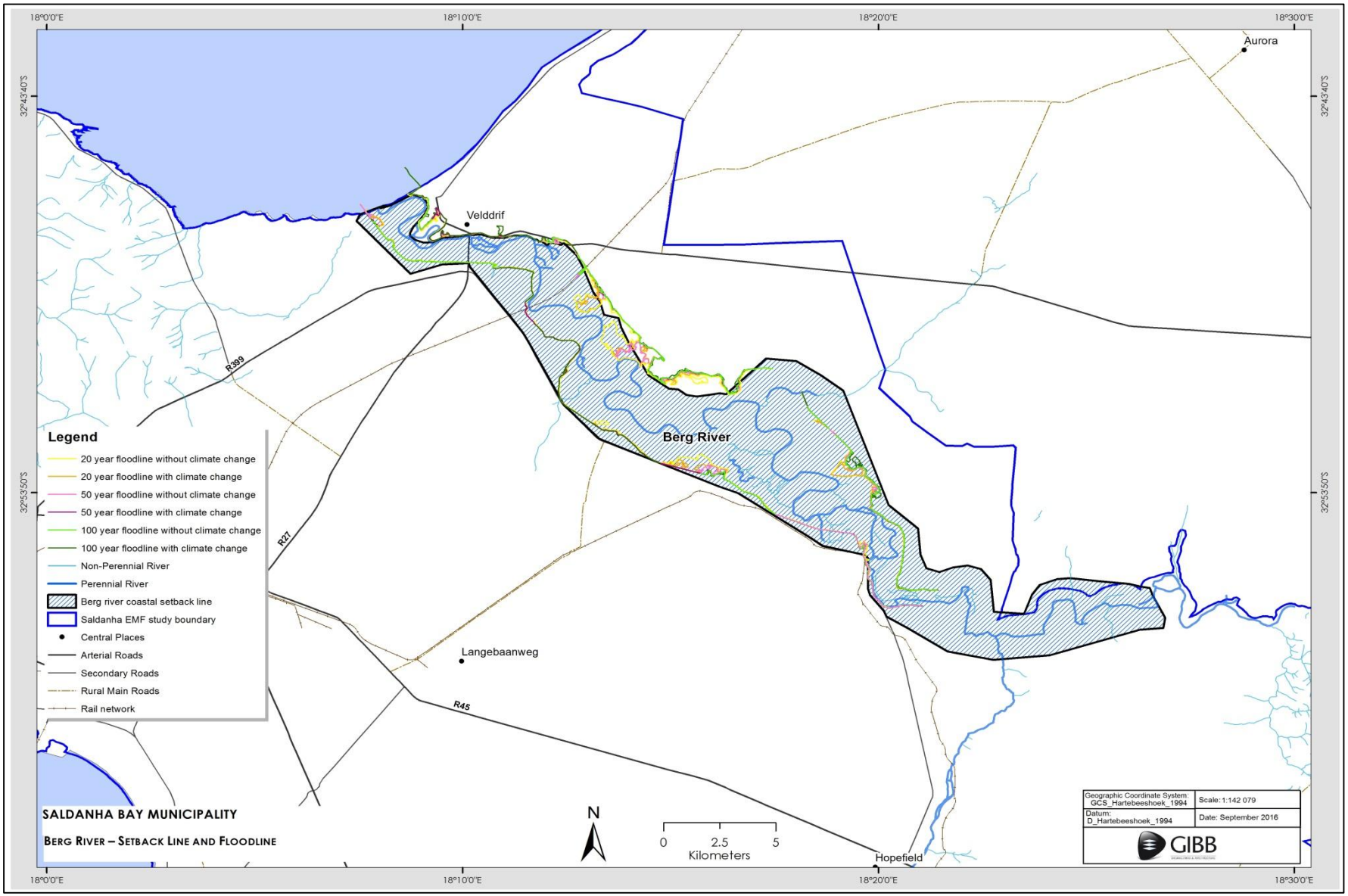
development seaward of the floodline, thus ensuring protection of the coastline as well as human life in the occurrence of a flood event [87].

In addition, a setback line has been proposed for the Berg River Estuary[88]. Setback lines such as these are not solely for the purpose of managing development along the coastline. They are also aimed at protecting humankind from the potential consequences of climate change such as erosion and sea level rise as noted in Section 4.1.3. Given the sensitivity of the coastal environment, particularly the intertidal zone, a setback line has been proposed in this EMF on the seaward side of the coastline (Refer to Map 27). This line is indicative as it has not been formalised in any way. It is based on local knowledge and research gained through the Saldanha Bay State of the Bay project. A setback of 30 m is suggested (B Clarke, *pers. comm*). However, a Berg River floodline study was conducted by ASP in 2014. The floodline study determined the 1:20, 1:50 and 1:100 year floods for the estuary under current development and taking into consideration climate change. These flood lines are depicted in Map 31 and will need to be taken into account considering current climate change predictions and development pressure along the estuary. Flood line determination also has the potential to predict floods, which is beneficial in understanding the impact that potential floods may have on future developments.

[87] Royal Haskoning DHV (2014). Coastal Set-back Lines for the West Coast District- Coastal Processes and Risk Modelling.
[88] Anchor Environmental (2009): Berg Estuary Draft Management Plan, CAPE Estuaries Management Programme.

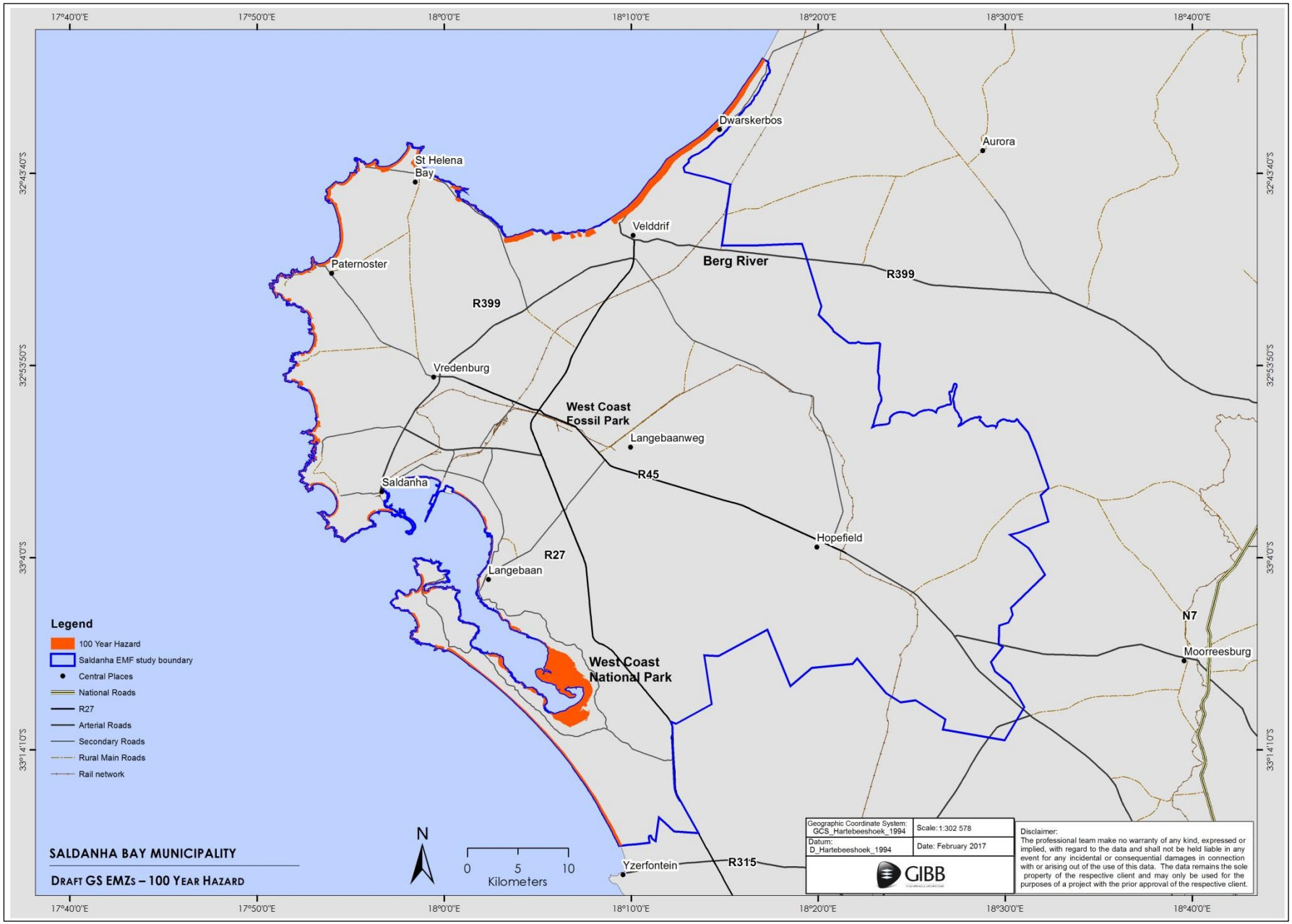


Map 30: Coastal and river/estuary setbacks



Map 31: Berg River Floodlines[89]

[89] ASP (2014). Berg River Floodline Study



Map 32: Coastal Setback Line 1:100yr Hazard

5.1.3 Disturbance and degradation of terrestrial and aquatic ecosystems

The loss of irreplaceable biodiversity resources through transformation of land, particularly in the form of urban development is an ongoing issue. Map 33 shows the original and remaining extent of threatened ecosystems while Map 34 shows the original and remaining extent of CBAs, which has experienced a loss of approximately 7184 ha. In this regard, the proliferation of development of residential areas along the coastline is of particular concern, as discussed in Section 5.1.2.

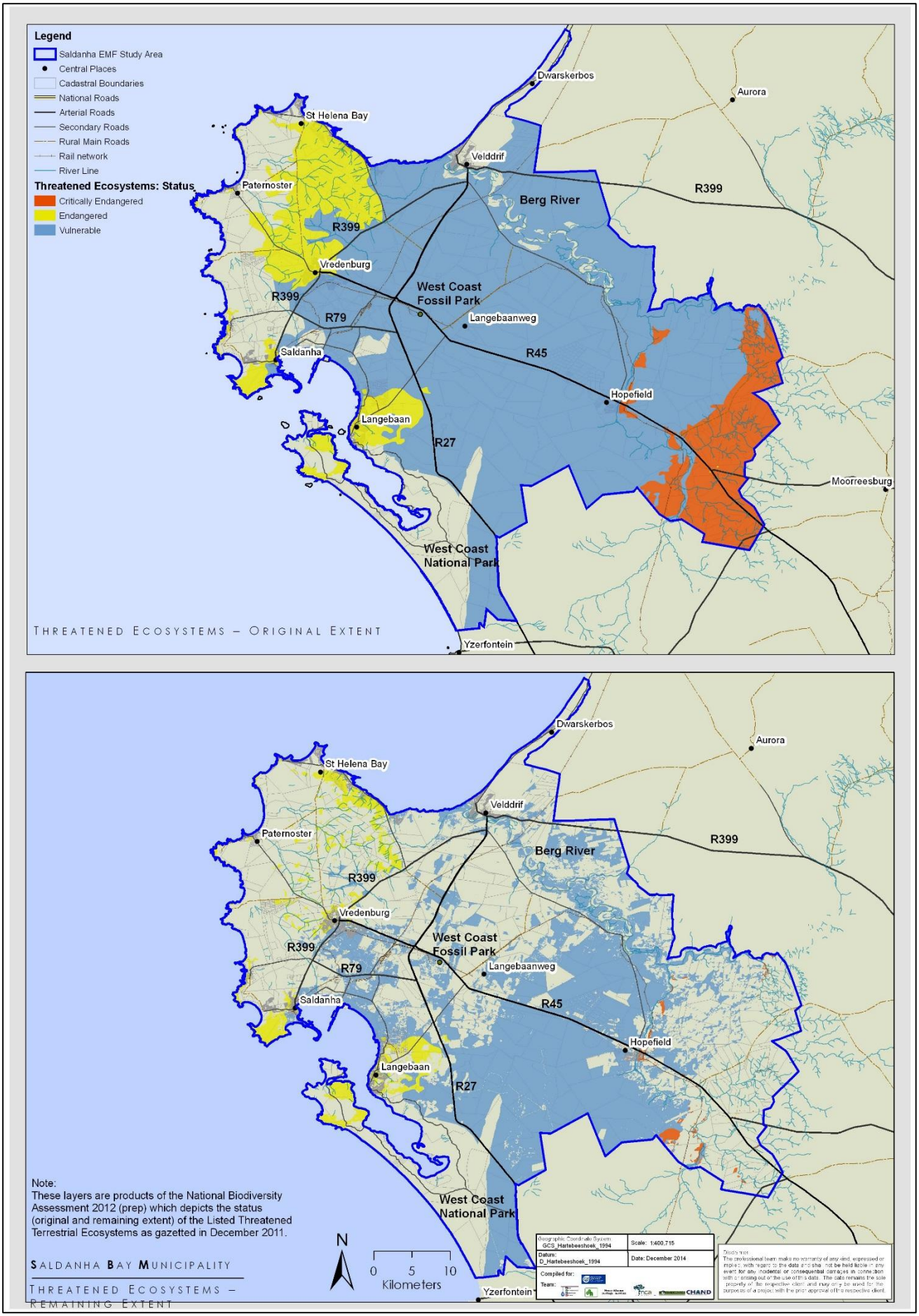
The spread of alien invasive plants on land is a concern: in particular the alien wattles *Acacia cyclops* (Rooikrans), *Acacia longifolia* (long-leaf wattle) and *Acacia saligna* (Port Jackson), a number of *Eucalyptus* species, Manitoka and prickly pear. There is a high density of alien vegetation (13% of the total Berg River catchment area), chiefly around Langebaan, Langebaan Road and Hopefield.

Rivers within the municipality have lost much of their diversity due to human modification of their banks, invasive alien plant species, and invasive alien fish species. Indigenous freshwater fish species have been lost over much of the length of the Berg River due to alien invasive fish.[90] Some of these invasive freshwater species move into the estuary in the drier summer months.[91]

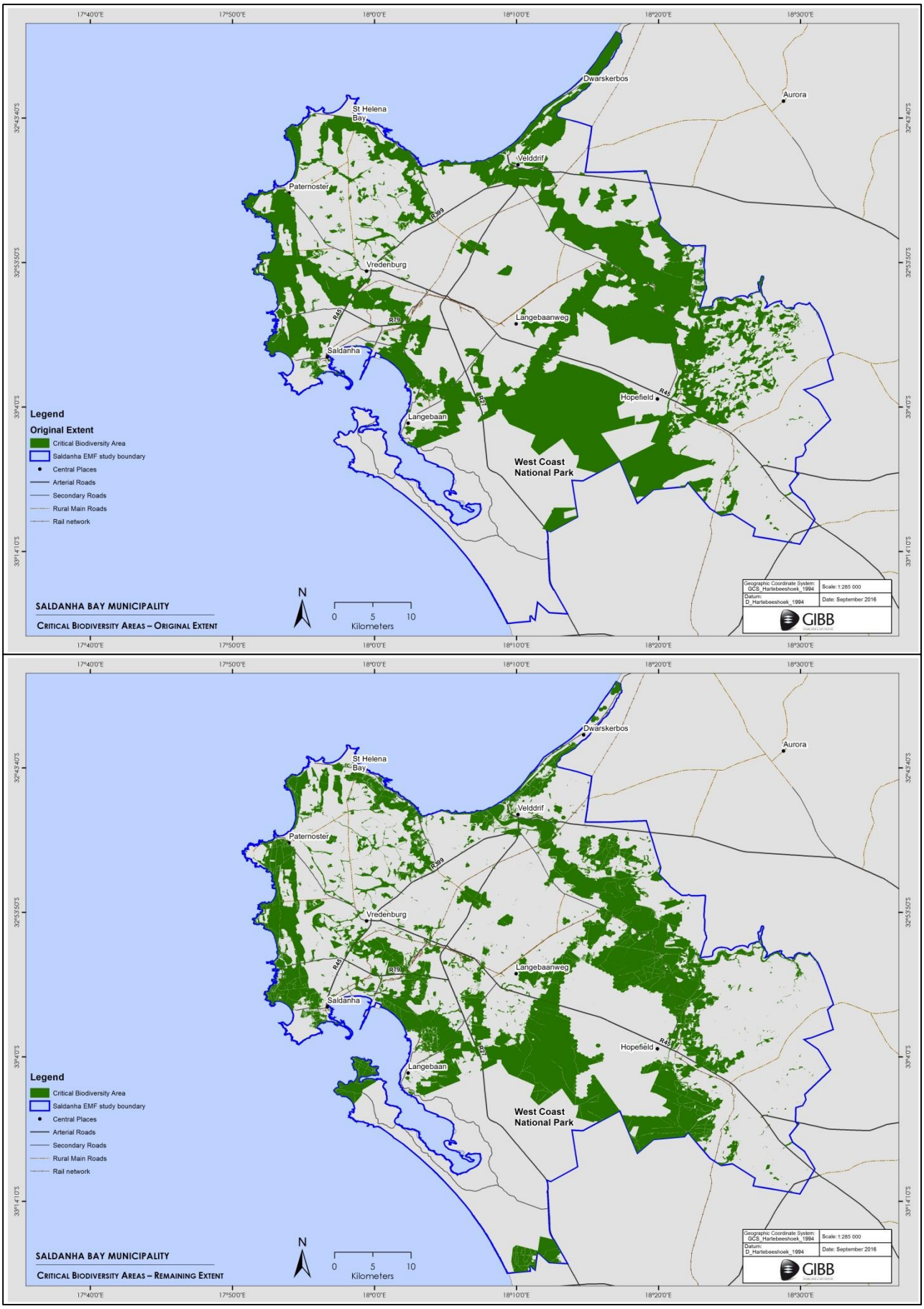
Most of these major rivers have been modified through abstraction and construction of storage facilities to improve water security. According to the FSP, biodiversity in most of the rivers has been impacted by modification of river banks, and the spread of invasive alien plant and fish species. The well-being of a river ecosystem is largely dependent on the health of the adjacent natural vegetation. Wetlands have also been degraded or even lost through human activity. Development of areas surrounding wetlands limits their ecological role.

[90] Clarke, B. and Radcliffe, G (eds.) (2007): Berg River Baseline Monitoring Programme, Final Report, Volume 5, Synthesis

[91] Anchor Environmental Anchor Environmental (2009): Berg Estuary Situation Assessment, CAPE Estuaries Management Programme



Map 33: Original vs. remaining extent of threatened ecosystems



Map 34: Original vs. remaining extent of CBAs

5.1.4 Marine pollution and pollution risks

The socio-environmental system in the Port of Saldanha does not have much latitude available to accommodate anthropogenic change to marine water quality. A ripple-effect change in the state of this system is a reality due to this system's interconnected characteristics, and could unexpectedly alter the system to an undesirable state. Therefore extreme caution must be applied when actions are implemented that could alter this system variables.

Activities such as expansion of bulk liquid storage, shipping traffic, oil spills, desalination brine discharge, ship repair, poor water circulation, ballast water discharge, and increased dredging occurrences, eutrophication, as well as increased stormwater discharge due to increased hardened surfaces will contribute to reduced marine water quality.

Acceptable marine water quality supports mariculture, marine ecosystems, and contributes positively to the West Coast National Park; and maintaining the water quality will maintain the Ramsar site designation. It is not only the natural environment that is affected by marine water quality, industries are also affected: desalination intake functioning requires acceptable marine water quality to function properly, and acceptable marine water quality is required for fish processing water intake[92].

- *Organic nutrient* overloading in Small Bay and St Helena Bay is mainly the result of fish processing plants (e.g. Sea Harvest monthly discharges range between 50 000 and 90 000 kl). Marine aquaculture can cause localised impacts such as eutrophication, algal growth and anoxia, as well as changes in benthic marine species composition. Expansion in mariculture activities could also exacerbate the already low dissolved oxygen levels in the bay. Discharges from the fish factories require a coastal water discharge permit in terms of the National Environmental Management: Integrated Coastal Management Act, 2008 (NEMICMA)(Act No. 24 of 2008). The DEA is the authority for the issuing of the coastal water discharge permits. Where the discharge of effluent occurs in an estuary, DEA works in consultation with the DWS.

- *Faecal coliform* pollution in Small Bay, particularly at Bok River sewage outlet and in Pepper Bay poses a hazard. Sewage discharge is by far the most important waste product in terms of continuous environmental impact that is discharged into Saldanha Bay. According to the 2012 State of the bay Report, although there has been improvement in water quality since 2006, faecal coliform counts still exceed guideline levels for recreational use in some parts of Small Bay (mostly around the Bok river outfall and Hoedjiesbaai). Faecal coliform levels are well in excess of guideline limits for mariculture over a much wider area. The highest faecal coliform counts are routinely recorded at the beach sewage outlet (Bok River) and in Hoedjiesbaai and Pepper Bay. Big Bay and Langebaan Lagoon have lower Faecal coliform and *Escherichia coli* (*E. coli)* counts when compared to Small Bay. Coastal erosion of Langebaan

[92] Council for Scientific and Industrial Research (2013). Strategic Environmental Assessment (SEA) of Port of Saldanha

Beach may exacerbate risk of sewage pollution via broken or leaking sewage holding tanks; e.g. sewage collection tanks lay buried 3 to 4 m from the dune-edge near Paradise Beach and sewerage is situated along the edge of the Lagoon.

- The *concentrations of several contaminants* (nitrate, ammonia, metals and faecal coliforms) in Saldanha Bay's stormwater runoff are well above water quality guidelines, adding to the Bay's pollution levels (Anchor Environmental 2010). Coastal waters in Small Bay have faecal coliform counts in excess of safety guidelines for both marine aquaculture and recreational use the majority of the time. There have been noticeable improvements in water quality in Small bay from 2004 to 2009 in terms of recreational use; however faecal coliform counts are still well above guideline limits. The highest faecal coliform counts are routinely recorded at the beach sewage outlet (Bok River) and in Pepper Bay. *Faecal coliform* and *E. coli* counts are lower in Big Bay and Langebaan Lagoon when compared to Small Bay.

- *Heavy metal concentrations* in sediments of Small Bay (Cd, Pb, Cu, Fe, Ni) and in flesh of mussels are currently at acceptable levels, but dredging and/or increased industrial activity could pose significant problem. Contaminants (metals and toxic pollutants) are commonly associated with fine sediments and mud. In areas of the Bay where fine sediments tend to accumulate these contaminants sometimes exceed acceptable threshold levels. This is believed to be due either to naturally occurring high levels of the contaminants in the environment (e.g. in the case of Cd) or due to impacts of human activities (e.g. Pb, Cu and Ni associated with ore exports). While such trace metals are generally biologically inactive when buried in the sediment, they can become toxic to the environment when re-suspended as a result of mechanical disturbance (e.g. dredging). On average, the concentrations of all metals were highest in Small Bay, lower in Big Bay and below detection limits in Langebaan Lagoon. Following the most recent major dredging event in 1999, cadmium concentrations in certain areas in Small Bay exceeded internationally accepted safety levels, while concentrations of other trace metals (e.g. Pd, Cu and Ni) approached threshold levels. According to the State of the Bay study, conditions in Small Bay remain very much poorer than those in Big Bay or Langebaan Lagoon. The most severely-impacted sites within Small Bay in 2011 remain the Yacht Club basin and the base of the ore terminal. These sites are prone to the accumulation of pollutants due to restricted water movement. Benthic fauna have been almost entirely eliminated from the Yacht Club basin in Small Bay, which is also the site registering the highest concentrations of metals and other contaminants (Persistent Organohalogen Contaminant, Cu, Cd and Ni).[93]

- Based on data from the DEA Mussel Watch Programme, *heavy metal concentrations* in mussels show that lead was consistently above guideline limits for foodstuffs for as long as these data have been collected (1997-2007), while

[93] Anchor Environmental (2012): Saldanha Bay and Langebaan Lagoon, State of the Bay, 2011 – Technical Report, Saldanha Bay Water Quality Forum Trust.

concentrations of cadmium frequently exceed these limits, and those for zinc did so occasionally.[94] Data on trace metals concentrations in shellfish from the mariculture farms in the Bay were provided by DAFF (courtesy of the farm operators) for the purposes of the State of the Bay study. Trace metal concentrations away from the shore are much lower than those in nearshore water. For the most part, the results meet the guidelines for foodstuffs for human consumption.

- Volumes of *ballast water discharge* from ships are greatest at the iron ore terminal and have increased steadily. The volume of ballast water discharged to the Bay has doubled since 2004, with almost 23 million tons being discharged in 2013.[95] Historical measurements suggest that the mean concentrations of the trace metals (Cd, Cu, Zn, Pb and Cr) in ballast water discharged into Saldanha Bay exceed the South African water quality guidelines, indicating that ballast water discharge contributes significantly to metal contamination within the bay. Ballast water is also the source of introduction of alien invasive species in the Bay. An estimated 85 marine species have been recorded as introduced to South African waters mostly though shipping activities or marine aquaculture, and at least 62 of these are thought to occur in Saldanha Bay-Langebaan Lagoon (Anchor Environmental 2011, 2012 and 2014).

- The *risk of oil spills* (uncertainty about the status of oil spill contingency plans and associated government responsibility) will increase with any increase in shipping traffic. The Ramsar Secretariat, in a letter dated March 2008, expressed concern about potential negative effects of Transnet's proposed iron ore terminal and infrastructure expansion in the Port of Saldanha to double its current capacity. The lack of an effective oil spill contingency plan by the National Ports Authority and the South African Maritime Safety Authority to deal with major oil spills in the Lagoon was specifically noted.

- The *quality of wastewater* that is discharged into Saldanha Bay is also a concern. According to the Saldanha Bay Municipality IDP 2012-2017, there are seven waste water treatment plants. These were evaluated in terms of the criteria set out in the Green Drop programme developed by the DWS. In terms of the overall Green Drop Assessment, performance in respect of the Waste Water Treatment Works is "less than satisfactory". Of the seven plants, two were considered to be performing well, namely Saldanha and Langebaan. Saldanha Bay is an important area for marine aquaculture and the excessive nutrient inputs into the bay (influx of stormwater, waste water treatment works, and fish factories) could affect mariculture operations. Shellfish farms are susceptible to poor water quality as a result of harmful algal blooms, sewage and industrial and domestic contamination. A coastal water discharge permit in terms of the ICMA is required for any wastewater discharged into Saldanha Bay.

[94] Anchor Environmental (2013): Saldanha Bay and Langebaan Lagoon, State of the Bay, 2012 – Technical Report, Saldanha Bay Water Quality Forum Trust.

[95] Anchor Environmental (2014): Saldanha Bay and Langebaan Lagoon, State of the Bay, 2013 and 2014 – Technical Report, Saldanha Bay Water Quality Forum Trust.

- *Small Bay* is frequented by oxygen deficits during late summer and winter months, mostly caused by mussel farms and fish processing plants which flush and discharge organic rich effluents. *Big Bay* experiences less frequent and lower magnitude oxygen deficits. These deficiencies are indicative of the reduced flushing capacity of the greater Saldanha Bay area which resulted from development and expansion of port facilities[96]

5.1.5 Disturbance and degradation of coastal and marine ecosystems

The building of a breakwater in the late 1970s between the mainland and Marcus Island has resulted in changes in the flow dynamics in Saldanha Bay. This has been confirmed through the ongoing State of the Bay study which is undertaken under the auspices of the SBWQT. Evidence shows that Small Bay is ecologically degraded and that there is a tendency for accumulation of pollutants in this area. This is considered to be due to the reduction in the movement of water in and out of this section of the Bay as a result of the construction of the breakwater and the ore terminal. Further seaward expansion of this infrastructure is a key concern.

As well as the implications of port expansion for both Small Bay and Big Bay, as pointed in Section 2.2.3 of this report, there is evidence that points to Langebaan Lagoon being affected by activities in the rest of the Bay. The Ramsar Secretariat has already expressed concern in this regard. A letter dated March 2008[97], concern was expressed about potential negative effects of Transnet's proposed iron ore terminal and infrastructure expansion in the port of Saldanha to double its current capacity. In particular, concerns about dredging on Langebaan Lagoon, and associated habitat loss, negative impacts on birds, fish and other species dependent on that habitat, were expressed. Langebaan Lagoon thus runs the risk of being placed on the Montreux Record[98] should threats to the integrity of this Ramsar site increase. The necessity for alternatives to be considered when it comes to the expansion of port infrastructure is clearly evident.

Various ecological changes and negative trends have been observed as described in Section 2.2.3. These have become evident through long-term monitoring which has been facilitated through the State of the Bay research. The most detailed information is available for Saldanha Bay (including Langebaan Lagoon), although some work has also been conducted in St Helena Bay. Declines in species diversity and abundance are largely attributable to human activities. These have led to changes in physical parameters (e.g. water quality) as well as ecological consequences (e.g. invasive species introduction).

The most recent report for Saldanha Bay, which covers 2013 and 2014, includes data from Danger Bay. This serves to provide baseline information for this area, thereby enabling future trends to be assessed. The inclusion of Danger Bay is important due to proposed developments in this area, which include a desalination

[96] Council for Scientific and Industrial Research (2013). Strategic Environmental Assessment (SEA) of Port of Saldanha

[97] This letter was written to the DEA (formerly DEAT) Directorate: Biodiversity Conservation.

[98] A listing of Ramsar sites where human-induced ecological changes have occurred or have the potential to occur due to technological developments, pollution or other human interference. It is maintained as part of the Ramsar List. It is used to identify priority sites for positive national and international conservation attention.

plant and disposal of effluent to sea. In addition, factors such as oil spills, which is a risk associated with increased shipping activity and possible competition with commercial fishing (e.g. food source for some species) also place pressure on marine and coastal species. The isolated pockets of formal MPAs are suboptimal in terms of effective management of these resources.

Heavy industrial activity, increased urbanization and pollution from land-based sources entering the marine environment undoubtedly places strain on the supporting environment and ecosystem for fisheries. Increasing human exploitation places direct pressure on fish stocks. These factors have significant economic and social implications, given the importance of the fishing industry on the West Coast.

5.1.6 Climate change and anticipated effects

The climate projections[99] for the West Coast, for the period between 2030 and 2045, are provided for in Table 7. These projections and possible impacts have various repercussions for planning within the Greater Saldanha area.

Table 7: Climate Projections and Possible Impacts

CLIMATE PROJECTION	POSSIBLE IMPACTS
Higher mean annual temperatures	↑evaporation and ↓ water balance
	Reduced crop quality and food security
Higher Maximum temperatures ↑ hot days and ↑ heatwaves	↑ in heat related stress –both human and livestock
	↓Crop Yields
	↑threat to infrastructure
	↑ Urban Heat island effect
	↑ Energy usage for cooling-impacting on already burdened energy supply
	↑ threat to infrastructure exceeding design specifications due to temperature increase (roads, electrical infrastructure, traffic lights etc.)
Higher minimum temperatures, fewer cold days and frost days	↓ risk of damage to some crops and ↑ risk to others such as deciduous fruits that rely on cooling period in autumn
Intensification of rainfall events	↑ Flooding
	Negative impact on agriculture leading to lower productivity levels and loss of harvest
	↑ soil erosion
	↑ challenges to stormwater systems in urban settlements
General drying trend in western part of the country	↓ average runoff, stream flow;
	↓ water resources and potential increases in cost of water resources;
	↓ water quality;
	↓ in shoulder season length threatening the Western Cape fruit crops;
	↑ in fire danger (drying factor); and impacts on rivers and

[99] West Coast District Municipality (2014). Policy Framework for Climate Change Response in the West Coast District

CLIMATE PROJECTION	POSSIBLE IMPACTS
	Wetland ecosystems.
↑ **mean sea level and associated storm surges**	↑ storm surges leading to coastal flooding, coastal erosion and damage to coastal infrastructure; and
	↑ impact on estuaries and associated impacts on fish and other marine species

As shown, climate change is likely to result in:

- Changes in flood patterns and flooding and increasingly stormy seas which could impact on access to port and port activities.
- Changes in recreation and tourism opportunities, with changes in extent of sandy beaches (e.g. due to coastal erosion).
- Decrease in net primary productivity. This directly affects all farming activities and underlines the need for food security and switching types of crops. The marginal agricultural areas of the study area, that is central Hopefield area and Saldanha-Vredenburg will be impacted in the shorter-term by increases in average maximum annual temperature and lesser annual rainfall/water availability, negatively affecting existing crop type production and livelihoods.

Climate change puts pressure on biodiversity, ecosystem services such as soil productivity, and water resources. Research indicates an expectation of higher temperature levels, with lower rainfall. This will increase the demand for potable water. The demand for water abstraction from rivers and aquifers will increase. Water tables of rivers and wetlands will diminish, impacting negatively on biodiversity. Alien plant species have high impacts on biodiversity and water availability. Higher carbon dioxide levels from climate change will benefit woody plants. This could stimulate alien plant growth, with an increased threat to water resources and a fire hazard in the area, again impacting on biodiversity.

A concern that is related to climate change is that of sea level rise and erosion. The coastline is a dynamic and sensitive environment affected by events such as coastal erosion, storm surges, sea level rise and storm wave run-up and dynamic ecological processes, for example mobile dune systems (DEADP, 2014). Frontal dunes play an important role in protecting properties inland. In comments from local residents[100] on the Discussion Document it is noted that the Langebaan Main beaches south of the Alabama slipway are severely affected by erosion and generally lose sediment every winter. This erosion has caused sewage infrastructure to be exposed and poses risks to private property. Private owners defended their properties through erection of a granite breakwater.

Another important consideration is that of climate change implications for the coastal zone. Anticipated effects of climate change and shoreline erosion are:

- Increased exposure to extreme events (which themselves might increase in frequency or intensity).
- Increased saltwater intrusion and raised groundwater tables.
- Greater tidal influence.

[100] Comments from Langebaan Ratepayers and Residents Association on the 2010 EMF Discussion Document.

- Increased flooding (frequency and extent).
- Increased coastal erosion and under-scouring of house foundations, retaining walls and access roads.
- Damage to coastal properties.

5.1.7 Air quality

Saldanha Bay Municipality planned the installation of an ambient air quality monitoring network as such monitoring is required by NEM:AQA, Act 34 of 2004). This monitoring network was designed to include two fully automated ambient air quality monitoring stations and seven dust fallout monitoring stations. Ambient air quality monitoring must include current weather conditions as these conditions influence the dispersion of pollutants.

Air pollution dispersion results in lower concentrations of pollution whilst higher concentrations result from conditions that inhibit dispersion of pollutants, causing accumulation near the emission source. Knowledge of these movements of pollution informs what the reasons for higher or lower concentrations are. At meso scale, the sea breezes blowing in from the sea onto land leads to vertical dispersion of air pollution as these breezes cause turbulence and atmospheric instability. More stable conditions are experienced during night times when land breezes blow from land to sea. These are light wind conditions that disperse air pollution across long distances as a narrow plume. Land and sea breezes develop better during winter when nocturnal cooling is greater[101].

Air pollution modelling undertaken for the purposes of the IDZ feasibility study have shown particulate emissions to be of concern at certain locations. These include emissions from industry, such as sulphur dioxide (SO2), nitrogen oxide (NO), nitrogen dioxide (NO2), oxides of nitrogen (NOX), ozone (O3), and particulate matter (PM10 and PM2.5). Dust emissions from agricultural areas are also high. Other sources of emission include transportation (vehicles, and shipping, quarries, and natural windblown dust. Particular "hot spots" in terms of particulate levels (PM_{10}) were found in the vicinity of the iron ore handling facility and in the vicinity of the large industry "complex" - Arcelor-Mittal / Exarro.

Air quality information is however currently not exhaustive as an emission inventory of all point and mobile sources (including vehicles) should be developed. Unique emissions to the area also include Iron oxide (Fe2O3) dust from storage, handling and processing of iron ore; concentrations of various metals in the dust fallout, including Fe2O3, Pb, zinc (Zn), titanium (Ti) and copper (Cu).

Air quality will be negatively impacted by future developments such as new oil and gas industry infrastructure and expansion, vehicle traffic, shipping traffic, and rail operations. These activities will also contribute to noise, odour and fugitive emissions[102].

101 Comments from the DEA&DP Directorate: Air Quality Management
102 Comments from the DEA&DP Directorate: Air Quality Management

Complaints and concerns raised in the area include:

- Iron ore dust pollution is of significant nuisance value to local communities. There are also potential health concerns, expressed by local communities, in respect of the dust.
- There are also concerns in respect of potential health, impacts on food sources of migratory shorebirds.
- Odour nuisance can be associated with the fish industry in Both Saldanha bay and St Helena Bay.
- The Western Cape Government's Operation "Red Dust Reduction" indicates additional conditions for storage and stockpile areas to reduce red dust emissions at the Transnet Port Terminal, such as suitable dust control measures installations to contain ground-surface fugitive dust emissions in the stockpiles area[103]

To reduce noise, odour, and health impacts on communities, their concerns must be considered when developments take place. Buffer zones are recommended to separate any proposed housing developments from agricultural sectors (to reduce potential health impacts of crop spray on communities). Housing developments should not be located near Wastewater Treatment Plants, industrial areas, or any other development that may negatively impact the community.

5.1.8 Poverty and unemployment levels

The population grew at a rate of 4.7% from 1985 and 1991; 3.3% from 1991 and 1996; 6.6% from 1996 and 2001; and 3.45% from 2001 to 2011. According to the IDP of Saldanha Bay Municipality, there was an increase of approximately 63% and 41% in the residential figures of the rural areas of Vredenburg and Saldanha Bay respectively, that in total represents an increase of approximately 20 000 residents (Urban Econ, 2005). The poverty gap has expanded from 1996 to 2002. This implies that people in the Saldanha Bay Municipal area are becoming poorer each year, due to the fact that there are no jobs available and that the skills levels are very low in the area (Urban-Econ, 2005). Rural livelihoods and informal settlements are the most vulnerable to climate change.

The population growth rate does pose difficulties around competition for resources and jobs, and the potential for increase in poverty. This could be exacerbated by the fact that overall the level of education in the municipality does not adequately facilitate the goals of local economic development and more skills will need to be developed for the workforce to participate more actively in the economy in future.

[103] Leaner, J. 2012. Western Cape Government, Operation "Red Dust Reduction"; Directorate: Air Quality Management. [Presentation]

Access to services and public amenities is largely inequitable. While the municipality has performed well on basic service delivery, the quality of other public services remains inequitable in many settlements. For example, schools in township areas are of a lower quality and public health services are over-extended a situation which primarily affects the poor. The towns continue to be developed on the assumption of motorised transportation which makes new retail areas less accessible to poorer population groups. A case where this is especially noticeable is the West Coast Mall, which is situated far from the low income areas in Vredenburg.

5.1.9 Inadequate infrastructure

Infrastructure, especially in relation to waste and sewage facilities, is inadequate to meet demands from ongoing development. Water and sewerage infrastructure overload is exacerbated by seasonal patterns of demand. For example, the seven waste water treatment plants in Saldanha Bay were evaluated in terms of the DWSs Green Drop criteria in 2009 and performance was found to be "less than satisfactory". Similarly, poor management of waste management facilities has been raised as a concern by local residents/communities. The Saldanha Area currently has the Vredenburg and the Langebaan Waste Disposal facilities (WDFs) operational to receive demolition and construction waste. An application for the closure of the Langebaan WDF was received by the Department during September 2015. This means that only one WDF will be available. The Vredenburg WDF is also reaching its landfill airspace capacity. The Municipality is thus in the process of preparing an application for the expansion of the footprint of the facility. The Municipality has adequate waste collection measures in place and a functional weighbridge. However, more focus is required in terms of waste diversion and minimisation, as well as reuse and recycling (particularly industrial waste).

The Langebaan and Vredenburg WDFs were audited during the first quarter of this year and had compliance ratings of 74% for Langebaan and 68.52% for Vredenburg which place both in the 'amber status indicator' which requires some attention.

5.1.10 Loss of settlement character and identity

- Urban sprawl, mixed and indistinctive architectural styles and inappropriate scale of housing have all contributed to a loss of character of many settlements in the municipality. St Helena Bay and Stompneus Bay present perhaps the most concerning cases of loss of place in the area. There are also examples of development which does not fit in with the character and special places in the landscape such as ridge lines and granite outcrops (e.g. Langebaan). One exception to this trend is the settlement of Paternoster where dwellings are of a smaller scale and a winding street network creates shelter and intimacy. This however could be compromised by the large expanses of land laid out for larger scale luxury housing developments in the vicinity of this town.

- Luxury residential developments are mainly centred on the holiday home market. This has resulted in a large, sprawling urban footprint and ribbon development along sections of the coastline.

5.2 Key positive trends and developments

- There is general consensus (based on comments made in the course of the stakeholder engagement process) that the quality of the Ramsar site (Langebaan Lagoon) has improved greatly since SANParks took over its management.
- Improvement or at least stabilisation in some water quality parameters in Saldanha Bay is evident from the State of the Bay study and there are indications that ecological health has improved in some respects.
- Monitoring has been underway in St Helena Bay and in Saldanha Bay for a number of years, through the respective State of the Bay studies. This means that an understanding of ecological trends over time is being developed, which in turn provides insight into, and hard information on, the consequences of human activities. Greater monitoring (e.g. Mussel Watch Programme) of marine species is being undertaken.
- A baseline relating to air quality has been obtained through the study undertaken for the SBIDZ. The Saldanha Bay Municipality is also conducting its own ongoing air quality monitoring. Information gathered by these studies and monitoring will be useful in understanding the air quality implications associated with further industrial development.
- Both the Saldanha Bay Municipality and Bergrivier Municipality have recognised the importance of natural/environmental resources in their respective IDPs. In addition, the Bergrivier Municipality has formulated a Local Biodiversity Strategic and Action Plan. Both municipalities have priorities related to Basic Service Delivery, which is fundamental to improving quality of life as well as environmental quality (e.g. water pollution reduction).

5.3 Key opportunities

The natural characteristics of the area are seen as an important asset, particularly for the tourism industry. This is noted in the Saldanha Bay SDF and LEDS, for example. Protected areas such as the WCNP, Langebaan Lagoon and the Berg River Estuary provide natural areas that serve as important tourist destinations. The West Coast Biosphere Reserve also plays a role in this regard. Outdoor activities are important for both local residents and visitors, particularly water sports. Comments from local interest groups indicate that growth in nature-based tourism to the area, and tourism demand, has occurred. Furthermore, the rich cultural history of the area is also a resource. From an economic perspective, this relates to the tourism sector in particular. In the social context, cultural history contributes to sense of place for local communities. The LEDS of both municipalities recognise the importance of cultural heritage for the area.

Fisheries are an important component of the West Coast economy. Opportunities exist for restoration of degraded habitat in important nursery areas such as the Berg River Estuary. Such initiatives have potential to be linked to local

employment creation programmes. These areas provide opportunities for natural resource based activities such as kelp farming, which has been identified as an option in the LEDS of the Bergrivier Municipality.

6 EMF Vision and strategic objectives

The vision and strategic objectives that have been developed for the purposes of the EMF has taken account of the policy context, stakeholder inputs, the situation analysis and the analysis of opportunities, pressures and trends. Objectives relating to sustainable development as put forward by national, provincial and local government provide the context for the EMF's vision and objectives.

6.1 Stakeholder views / opinions

This sub-section provides a summary of the views expressed by stakeholders in response to a questionnaire that was circulated to persons that registered their interest in the EMF project. It was also made available at workshops that were held for the purposes of the Draft SDF and also at SBWQT annual meetings. It must be noted that the stakeholder views/opinions presented here represent a small sample of opinion, since responses to the questionnaire were extremely limited. Additional information on stakeholder involvement and inputs is available in Appendix B.

What environmental characteristics/features in the Saldanha area are important to you?	• Sandy beaches and beautiful scenery (Saldanha Bay, Langebaan Lagoon and Harbour) • Maintenance of sea water quality • Minimal effluent from factory, sewage and stormwater • Endangered wildlife and flora • Sense of place • Preservation of historical sites • Marine ecosystem
What are your favourite outdoor activities in the Saldanha Bay area?	• Kayaking, • Bird watching, • Walking the veld and shoreline, • Water sports; • Boating and fishing
Which cultural/heritage/historical features are the most important to you? Why?	• Dune areas, natural vegetation and the Langebaan lagoon and bay • History of the Koi and San • Laaiplek home to fishing industry museum • Shipwrecks • WCNP
Do you think it is important to have natural areas where people can spend leisure time? If yes, why?	• Huge contribution to tourism sector
What don't you like about Saldanha Bay?	• Indiscriminate development • Air, water and noise pollution • Iron ore dust

Which natural resources do you think are the most important for the Saldanha Bay economy and why?	• Marine environment • Wild flowers • Water
Which natural resources do you believe are the most important for people's health and wellbeing? Why?	• Air • Water quality
Which natural resources do you think are the most stressed in the Saldanha area? Why?	• Water quality and air quality due to the iron ore • Marine ecosystem
If you could wave a magic wand, what would you change about Saldanha Bay? What wouldn't you change?	• Remove the iron ore dust • Stop all development • Would like public to be more involved in these types of processes • Bay to return to natural state • Replace municipality
What are your biggest fears for the future of the Saldanha Bay area?	• Increase in industrialisation, pollution and urbanisation • Oil spill • Corrupt municipality • Economic growth
What do you think Saldanha Bay's biggest contribution is to the Western Cape? Why?	• Tourism • Import and export (harbour) • Employment
What would you like the Saldanha Bay area to look like in 20-30 years' time?	• Clean and attractive • Passenger quay at harbour • Great Municipality • Healthy ecological system
Any other comments?	• Concern for wind and solar farms in most insane locations • EMF to address the current approach of industry and bring logic into future planning and development. • Importance to take cognisance of the sensitivity of the area. • Saldanha should be developed into a multipurpose terminal.

6.2 EMF vision and strategic objectives

> ***Vision***
> Natural and cultural resources are protected and managed to sustain livelihoods, economic activity and the wellbeing of people.

Strategic objectives:

- To communicate clearly the limits of acceptable change relating to the natural and cultural environment for consideration in decision-making by all authorities. The proponent/applicant is responsible for demonstrating that proposed development would not infringe on or cross those limits of acceptable change.
- To create a predictable development environment, providing an early warning system for developers of the levels of likely risk in submitting development proposals in different areas and the associated need to consider alternatives to minimise unacceptable impacts on the environment.
- To apply the mitigation hierarchy, namely first striving to avoid and then minimise and remedy negative impacts, as a requirement of the national environmental management principles (Section 2 of NEMA).
- To guide land use, including the location of development in such a way that it:
  - ensures that the integrity of ecosystems, on which human wellbeing depends, is not undermined;
  - conserves systems that regulate and provide reliable supply of clean water;
  - avoids, and where not possible fully to avoid, minimises pollution of land, air, surface water and groundwater;
  - facilitates the efficient and effective use of resources conserves land cover to prevent erosion;
  - conserves heritage and cultural resources;
  - conserves landscape character and aesthetic qualities;
  - avoids exposure to natural hazards; and
  - protects community health and avoids human health risks.
- To guide environmental decision making regarding development so that it:
  - Promotes good stewardship of land;
  - Promotes greater efficiency of energy, land and water use;
  - Promotes rehabilitation/restoration of degraded natural areas to improve ecosystem services.
  - Promotes opportunities that offer sustainable employment and economic benefits and avoid those that involve profits for a select few.

PART THREE – Strategic Environmental Management Plan

7 Overview of SEMP

The SEMP forms the heart of the EMF; as it provides guidance to support environmental decision making that will benefit the management of important resources in the Saldanha area. It is not the purpose of the EMF to serve as a resource management plan – its purpose is to facilitate the incorporation of sustainability issues into spatial development and land use planning, specifically within the development of the Saldanha and Bergriver Spatial Development Frameworks. The management of air quality, waste and water resources as well as heritage resources at municipal level would be the focus of Air Quality Management Plans (AQMPs), IWMPs, Infrastructure/Services Plans (e.g. water supply, sewage) and heritage management plans. The management of agricultural land is the responsibility of the Provincial Department of Agriculture and water resources are the responsibility of the Provincial Department of Water and Sanitation or a Catchment Management Agency, if in place. For this reason, **these municipal-wide issues – nested within provincial and national scales - are only addressed in the EMF insofar as they are relevant to jurisdiction of NEMA and the EIA Regulations.**

7.1 Purpose of the SEMP

The purpose of the SEMP is as follows:

- to identify EMZs based on the environmental attributes of the area;
- to provide management guidance for the EMZs in respect of the environmental / development attributes that fall within that EMZ and the aim and objectives of the EMZ;
- to provide for conflict areas between EMZs of differing aims, for consideration during spatial development and land use planning;
- provide for possible exclusions and restrictions, in terms of NEMA, for the EMZs, based on the environmental / development attributes that fall within that EMZ and the aim of the EMZ;
- to establish a framework to check the 'on the ground' effectiveness of the EMF; and
- to ensure sustainable land use and protection of the environment.

The SEMP therefore comprises the following:

- Environmental management zones with management recommendations.
- 'Excluding' and 'restricting' of activities.
- Roles and responsibilities in respect of the EMF.
- Decision-making framework.
- Monitoring and evaluation framework.
- Revision/updating of the EMF.
- Integration with SDF/IDP/etc.

The purpose of the SEMP must also align with the objectives of the EMF and be within the jurisdiction of the EMF. Therefore, development of the

EMZs, which are a fundamental aspect of the SEMP, does not consider or account for attributes, activities and critical issues that are not under the auspice of NEMA. An objective of the EMF is intended to streamline development through identifying possible activities that can be considered for exclusion. However, these exclusions can only be undertaken under NEMA and therefore only apply to the requirements of NEMA. Issues such as water use, coastal management and heritage management fall under the jurisdiction of the NWA, ICMA and the NHRA respectively. Any exclusion or restriction identified does not negate the need for requirements under these acts. Therefore, the development of the EMZs focused on environmental attributes and activities that fall within the EMFs jurisdiction.

8 Environmental Management Zones

Different types of development, activities and land or resource uses have different impacts on the environment. The significance of these impacts depends in part on the type of development/activity/use proposed, and in part on the nature and attributes of the receiving environment. The focus of the EMF is on the latter, thus providing key relevant information that will determine the significance of impacts, the acceptable level of change and the level of mitigation that would be required of development that affects a group of attributes, with similar degrees of sensitivity, in the defined area.

The EMZs are identified and described in this section. There are 7 EMZs, which have been identified based on a combination of the environmental / development attributes and the potential for significant impacts in relation to the activities listed in the 2014 EIA Regulations, namely Listing Notices 1, 2 and 3 (GN R.983, R.984 and R.985 of 4 December 2014) as well as the potential for development. The EMZs comprise of 4 conservation focused zones and 3 development focused zones. An additional dataset has been created where there is a conflict between EMZs that overlap and have differing aims (i.e. conservation vs. development). This dataset is referred to as Conflict Areas, and will provide vital information in developing the local SDF for Saldanha Bay and Bergriver Municipality.

In determining the EMZs, the key driver must be the objectives of an EMF. Regulation 2(3) of the 2010 EMF Regulations state that EMFs must be aimed at "promoting sustainability" and "securing environmental protection." As has been noted elsewhere in this document South Africa's NFSD recognises that South Africa's natural systems and biodiversity provide a basis for economic growth and development. This reality is recognised on an international and national level and has been highlighted through initiatives such as the Millennium Ecosystem Assessment. This study drew the following key conclusions[104]:

1. Human activity leads to fundamental and widespread environmental change, resulting in rates of extinction a thousand times faster than background rates (Balmford, 2012). "The extent of this loss should not be underestimated" (Paragraph 11).

2. The ways in which humans have altered the natural environment have led to significant benefits to society, but these benefits have been accompanied by rapidly increasing costs due to ecosystem degradation. Human activity is creating a world for future generations that is likely to be substantially degraded (Paragraph 20).

3. "It has been established conclusively that efforts to eradicate poverty will not succeed where environmental degradation is allowed to continue. This is of particular concern as environmental degradation is set to significantly worsen

[104] These paragraphs have been cited or paraphrased from the House of Commons Environmental Audit Committee Report on the UN Millenium Ecosystem Assessment, First report of Session 2006-07 (http://www.publications.parliament.uk/pa/cm200607/cmselect/cmenvaud/77/77.pdf)

over the next 50 years. It therefore seems unlikely that the international community will meet its Millennium Development Goal commitments to reduce poverty and increase development, at least in the long-term. These changes may also undermine the current progress that is being made, leading to a worsening of poverty" (Paragraph 25).

4. "If the devastating impact of continued ecosystem degradation on development and the economy is to be avoided, it is clear that substantial changes will have to be made to the way in which the natural environment is valued. The case for concerted and decisive action has now been made" (Paragraph 30).

Similarly, the Southern African Millennium Ecosystem Assessment[105] notes that: "All people, everywhere, are absolutely dependent on ecosystem services, although well-being is also affected by many other factors… Low levels of well-being can make it difficult to focus resources on protecting ecosystem services. This can lead to a downward spiral of ecosystem degradation and declining well-being through the creation of a 'poverty trap'. On the other hand, if appropriate interventions are made, it can drive an upward spiral of healthy ecosystems and rising well-being… ". From 2000 to 2015, the Millennium Development Goals (MDGs) have provided a strong framework for developing countries in alleviating poverty. However, at the end of 2015, at least four of the eight MDGs [reducing hunger, reducing child mortality, combating diseases and ensuring environmental sustainability] were not met in the Southern African region. However, an outcome of the RIO+20 summit was the establishment of the Sustainable Development Goals (SDGs), which is a continuation of the MDGs for the period 2015-2030. The SDGs differ slightly from the MDGs in that they are targeted at countries worldwide, and not limited to developing countries. The SDGs feed into achieving sustainable development along the triple bottom line, and is focussed on integration and the well-being of individuals (e.g. SDG 3, to ensure healthy lives and to promote well-being for all at all ages).

This same message has been acknowledged by Ms Buyelwa Patience Sonjica, formerly South Africa's Minister of Water and Environmental Affairs, in the Foreword of a publication relating to biodiversity and development:[106] "Our experience in South Africa has shown us that we must look after our natural capital if we are to meet our country's pressing socio-economic challenges in the face of climate change. Biodiversity and healthy ecosystems provide us with essential services – pollination of crops, a regular supply of clean water, and prevention of flooding and soil erosion. Many of the benefits derived from biodiversity and ecosystems are public goods that appear to be free, and their values are not captured in markets and prices or taken into account in decision-making, leading to loss of biodiversity, degradation of ecosystems and worsening greenhouse gas emissions. We can turn this situation around, however, by

[105] Biggs, R., Bohensky, E., *et al* 2004. Nature supporting people: the Southern African Millennium Ecosystem Assessment. CSIR, Pretoria

[106] Cadman, M., Petersen, C., Driver, *et al*. 2010. Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience. South African National Biodiversity Institute, Pretoria.

investing in maintaining and restoring our ecological infrastructure to promote development and help us adapt to climate change. This kind of investment can promote food security, ensure a sustained water supply, reduce damage from natural disasters and create work opportunities for the unemployed."

The reason for providing the above context to the EMZs is that the EMF does provide a tool to support the change that is being sought in the way the natural environment is valued. Transformation of land on which natural systems exist is the leading cause of environmental change (Balmford, 2012) and the EMF is concerned with issues related to land use and development. In particular, the fact that it is a spatial tool that is concerned with environmental attributes, means that it has a potentially significant role to play in avoiding or at least reducing the transformation of natural areas that are important assets for long-term wellbeing.

8.1 Identification of the EMZs

The point of departure that has been applied in determining the EMZs is that natural resources and human endeavours are not separate from each other. Natural attributes and human activities need to be seen in the context of the landscape in which they are located. Thus human activities and natural attributes need to be viewed holistically – as different aspects of one system or landscape. Human wellbeing is related to various benefits that nature provides to humankind (referred to as ecosystem services) such as soil for growing of food crops; clean water for drinking; pollination of food crops and features that fulfil recreational, cultural or spiritual needs, to name a few. Maintaining the natural resource base is central to ensuring the wellbeing of humans and meeting their developmental needs.

The concept of "significant impact" has been applied in determining the EMZs. A significant impact is any impact that would threaten the health of either the environment and/or people in the area covered by the EMF. That is, it is an impact that would:

- Threaten the integrity and resilience of ecosystems which sustain development, human wellbeing and livelihoods, by degrading or causing deterioration or loss of:
  - important biodiversity;
  - ecosystems that regulate and provide reliable supply of clean water (i.e. that meets relevant water quality standards), either groundwater and/or surface water;
  - air quality (i.e. air that meets relevant air quality standards);
  - soils having high agricultural productivity that contribute to food security in the long term; and
  - natural areas known to support livelihoods of vulnerable communities.

- Threaten the physical health or increase the vulnerability of people to:
  - natural hazards and/or unstable areas;

- the spread of disease; and
- pollution with known adverse health effects.

Any activity that would be likely to cause one or more significant impacts, as defined above, would be considered to be 'undesirable'. Those impacts that are significant and also irreversible, or could result in irreplaceable loss of unique resources, should be considered as a "fatal flaw" or a "show stopper". Developments involving transformation of land, particularly on an extensive scale would typically be of particular concern in this regard.

The approach described above is in line with the principles and goals of the PSDF and other strategic frameworks/policies developed for the Western Cape (Refer to Section 4.4). It also reflects municipal priorities and those of stakeholders. In all of these instances, protection of agricultural, biodiversity and cultural assets or resources is regarded as an imperative.

8.1.1 Description of EMZs

Spatial data has been mapped for each of the attributes in the study area. These attributes cover resources and restrictions (constraints) or risks. The value, irreplaceability and vulnerabilities associated with the attributes have been central to determining the conservation EMZs, while potential sustainable development in areas with less sensitive receiving environment was central in determining the development EMZs. Four conservation focused EMZs and three development focused EMZs have been determined (refer to Map 35):

Conservation Focused Zones: Zones 1 – 4:

- *EMZ Zone 1 – Urban Conservation Zone:* This EMZ is based on ensuring the conservation and protection of irreplaceable resources and biodiversity, which are under considerable development pressure, due to their proximity to urban and industrial areas.

- *EMZ 2 – Rural Conservation Zone:* This EMZ is based on the same attributes and sensitivities as the urban conservation zone. The EMZ aims at ensuring the conservation and protection of irreplaceable resources and biodiversity. Although as this EMZ occurs within the rural setting, the pressures exerted on the resources in this EMZ are not as severe as within urban and industrial areas. However, the environmental attributes and significant impact are still substantial enough for strict measures to be required.

- *EMZ 3 – Controlled Development Zone*: This EMZ is based on resources that fulfil an important supportive role in maintaining critical natural resources identified in EMZ 1 and EMZ 2 through means of a buffer is some areas and maintaining ecological corridors in others. Furthermore, it contains resources that may be regarded as particularly sensitive to certain types of disturbance (i.e. high impact development that may have a more significant risk in terms of severity, duration and extent) but also considered to be more resilient to low

impact (i.e. impacts that are considered having lower risk in terms of severity, duration and extent) developments. Therefore, controlled development would be allowed within this EMZ thereby avoiding development form taking place in more sensitive receiving environments.

- *EMZ 4 – Restoration Zone:* There are two concepts embedded in the development of this EMZ. Firstly, areas exist where there is an opportunity for rehabilitation and restoration to achieve a functioning state and increase conservation. Secondly, some development in sensitive areas cannot be avoided. The aim of this EMZ is to provide an area for restoration and offsetting initiatives that can be safeguarded from future development and can contribute to the overall conservation targets of the region.

Development Focused Zones: Zones 5 – 7:

- *EMZ 5 – Agricultural Development Zone:* This EMZ is informed by existing agricultural areas and aims at protecting and retaining productive agricultural land that is vital for ensuring food security.

- *EMZ 6 – Industrial Activity Zone:* This EMZ takes into account the major role industrial development plays in the region and aims to promote industrial development in less sensitive areas to ensure sustainable economic development.

- *EMZ 7 –Urban Development Zone*: This EMZ takes into account the need for service delivery and aims to promote service related development in less sensitive areas to ensure sustainable urban development.

- *Conflict Areas:* As previously mentioned, a Conflict Areas dataset has been created that identifies conflicts between land use objectives i.e. EMZs that overlap and have differing aims (conservation vs. development).

It must be noted that no one attribute within an EMZ is regarded as being more or less sensitive than any other attribute. Each is of equal status. Thus a single set of management objectives, mitigation etc. have been assigned to an EMZ, irrespective of how many attributes are present at a particular location, therefore, the implication is that a wider range of issues will require investigation (e.g. through specialist studies). The fact that more than one attribute within an EMZ occurs on a site does not make this location more sensitive than if only a single attribute were to be present. Environmental sensitivity is not based on the number of attributes at a particular location – rather it is driven by the type of attribute, with those in the Urban Conservation Zone and Rural Conservation Zone being the most sensitive due to their irreplaceability.

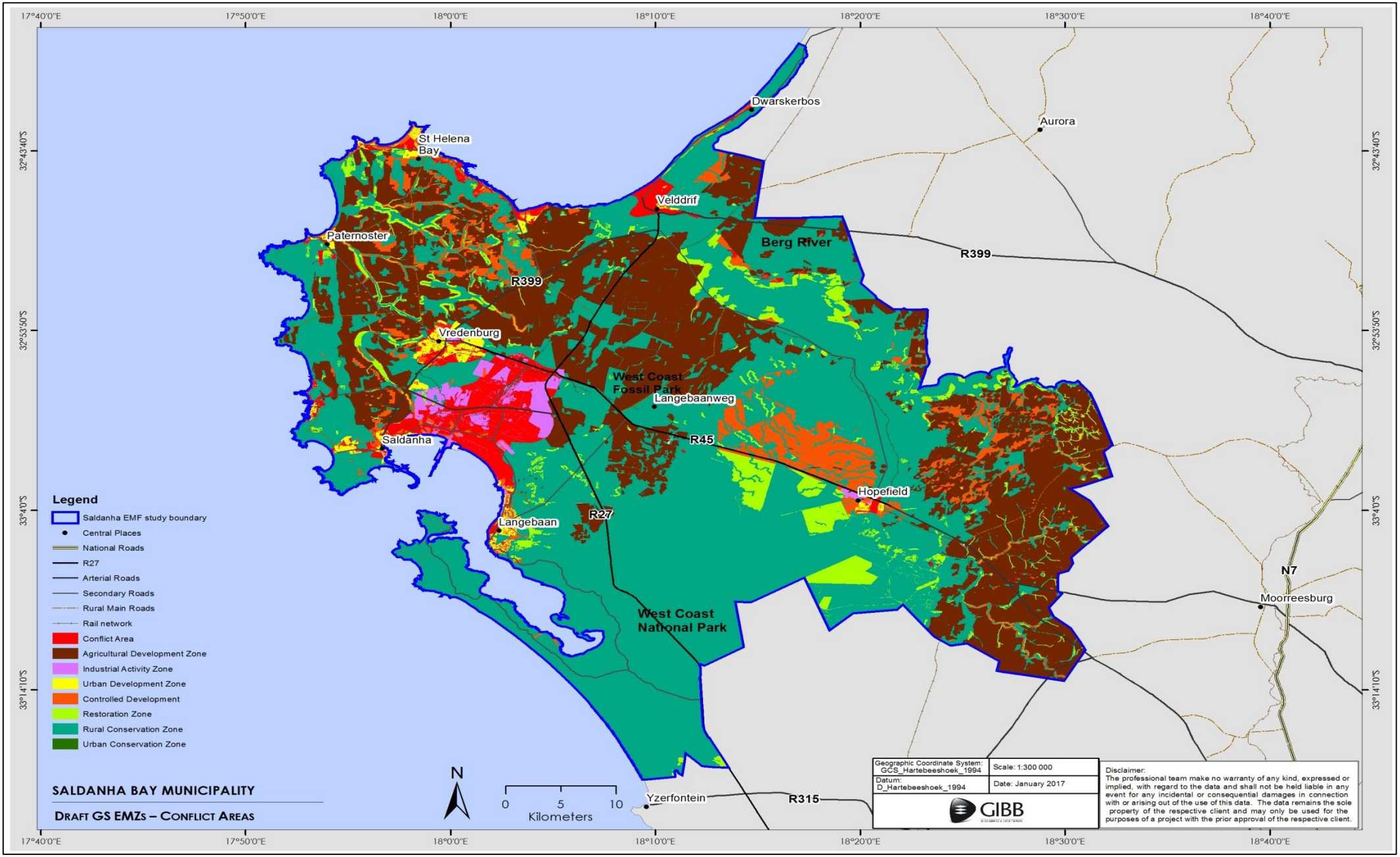
The EMZs provide a means for achieving the following requirements as set out in the 2010 EMF Regulations, in that they serve to:

- Specify the attributes of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes.
- Identify any parts in the area to which those attributes relate.
- Show the environmental management priorities of the area.
- Indicate those areas with specific environmental values and the nature of those values.

This has been achieved by considering the environmental attributes in an integrated and holistic way. Stated differently, the attributes have been looked at in combination rather than solely as individual entities. Thus it enables the identification of areas that are most or least sensitive to development. This provides an integrated rather than a fragmented perspective, which could arise if an attribute-by-attribute approach is adopted.

These EMZs could be regarded as a tool to assist applicants or developers in identifying appropriate locations for development proposals and for providing a "first scan" of the issues that may need to be addressed in the application process (e.g. through specialist studies). Clearly, the more responsive the application is to the EMZ information the lower the risk of conflict with stakeholders / I&APs and of authorisation being refused. The converse also applies. The EMF is not concerned with providing detailed guidance on the conducting of the EIA process. Guidelines in this regard are available as noted in Section 9.

Furthermore, as previously stated, the EMZs should be used in the development of the Saldanha Bay and Bergriver Municipality SDFs to identify listed activities that can be either excluded or further restriction in terms of NEMA as well as determining the urban area as defined in NEMA.



Map 35: GS EMZs and Conflict Areas

8.2 Management guidelines for the EMZs

Since the purpose of the EMF is to consider the environmental attributes of an area and to use this information to provide guidance with respect to appropriate/inappropriate development, the following has been developed for each EMZ:

A management framework which can be used as a basis for testing development proposals or for developing objectives/goals for a development proposal (i.e. objectives-led planning and design of a development proposal. The management framework comprises the following:

- *Zone aim:* the overarching vision of what the zone intends to achieve.
- *Management objectives*: these are the objectives that should be borne in mind in the planning of land use and development and in related decision-making processes.
- *Desired outcomes*: These are the effects that one would want to see "on the ground", namely the results of giving effect to the objectives.
- *Limits of Acceptable Change*: these are thresholds that need to be considered in the planning of land use and development and in related decision-making processes. They represent a limit beyond which change in the current status of that particular EMZ would be regarded as undesirable because of the potential for loss or degradation of an irreplaceable resource. These limits are based on the best available scientific information.
- *Opportunities for benefit*: these represent areas where social and/or economic and/or environmental benefits could be realised.
- *Mitigation options:* these show the level of mitigation in the mitigation hierarchy that could be used to address impacts on particular EMZs. Where the attributes/resources are irreplaceable, avoidance (rather than minimising, rehabilitating or offsetting) is likely to be the sole option.

A matrix linking EMZs and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction. The activities in this matrix are based on the Listed Activities in the 2014 EIA Regulations. This matrix should only be used as being indicative of developments that may or may not be appropriate – it is not to be taken as being definitive, as each application must be evaluated on its own merits. The matrix should also be used as a point of departure for developing exclusions and restrictions for the necessary EMZs. This will be vital in developing the Saldanha Bay and Bergriver Municipality's SDF.

The exclusions and restrictions presented in this EMF are only indicative of possible exclusions and restrictions. A complete process of applying for exclusions

and restrictions through the development of specific norms and standards / minimum requirements for exclusions within the Saldanha Bay and Bergriver Municipality's SDF must still be undertaken. The SDF will need to provide the process to be followed for "excluded" or "restricted" activities and the minimum requirements for undertaking said activities.

All proposed developments in each EMZ should be evaluated to ensure that:

- It would meet the management objectives for this zone and preferably result in net benefit both for the natural and social environment;
- Changes to the environment as a consequence of the development would not result in the limits of acceptable change being exceeded; and
- Once the process of excluding or restricting activities within the relevant zone has been undertaken, the development meets the requirements for exclusion or restriction and complies with the minimum requirements as set out for excluding or restricting the activity.

The management objectives, desired outcomes and limits of acceptable change that have been provided for each EMZ have been formulated on the basis of sustainability principles. It is necessary for the EMF to be framed within these principles in order for it to guide the formulation of appropriate development proposals and environmental decision-making effectively, within its "scope of influence." This means that it must be borne in mind that the EMF is a tool that is aimed at supporting and streamlining the implementation of the EIA Regulations. It cannot be seen as the sole mechanism whereby sustainability objectives would be achieved.

From the perspective of development proponents, the information in respect of each EMZ can be used to guide the formulation of the development/project proposal. The objective is to achieve development proposals that are aligned with, and hence do not undermine, sustainability objectives. Similarly, the management objectives, desired outcomes and limits of acceptable change ought to be considered in decision-making. This issue is covered in more detail in Section 5 of the SEMP.

The information on environmental attributes that has been used in the EMF is the most recent available from the various organisations or institutions that house these data. Applicants and their consultants must ensure that the latest GIS database is consulted and not rely solely on the maps published (i.e. hard copy) in the EMF. The GIS information is available from the DEADP as well as the municipalities.

Where an attribute intersects a particular location or property, this points to the need to investigate this issue as part of the EIA process. This would normally involve consulting a relevant specialist to assist in undertaking a more detailed investigation of the issue. Typically, this would involve 'groundtruthing' to verify the presence of the attribute at the specific location as well as its surroundings, since environmental impacts may extend beyond the boundaries of a site. In cases

where scientific (specialist) studies are at variance with the EMF (e.g. area identified as being sensitive in the EMF is not found to be sensitive in a specialist study), the onus is on the applicant and the Environmental Assessment Practitioner (EAP) to ensure that the scientific analysis is rigorous, that findings have been discussed with relevant authorities and, preferably, that the study concerned has been subject to peer review, if required by the competent authority. **The burden of proof to demonstrate that a development proposal is aligned to the EMF lies with the project proponent/applicant.**

8.2.1 Road map for using the EMZ information

A summary of how to use or apply the EMZ information is provided in the flow diagram below.

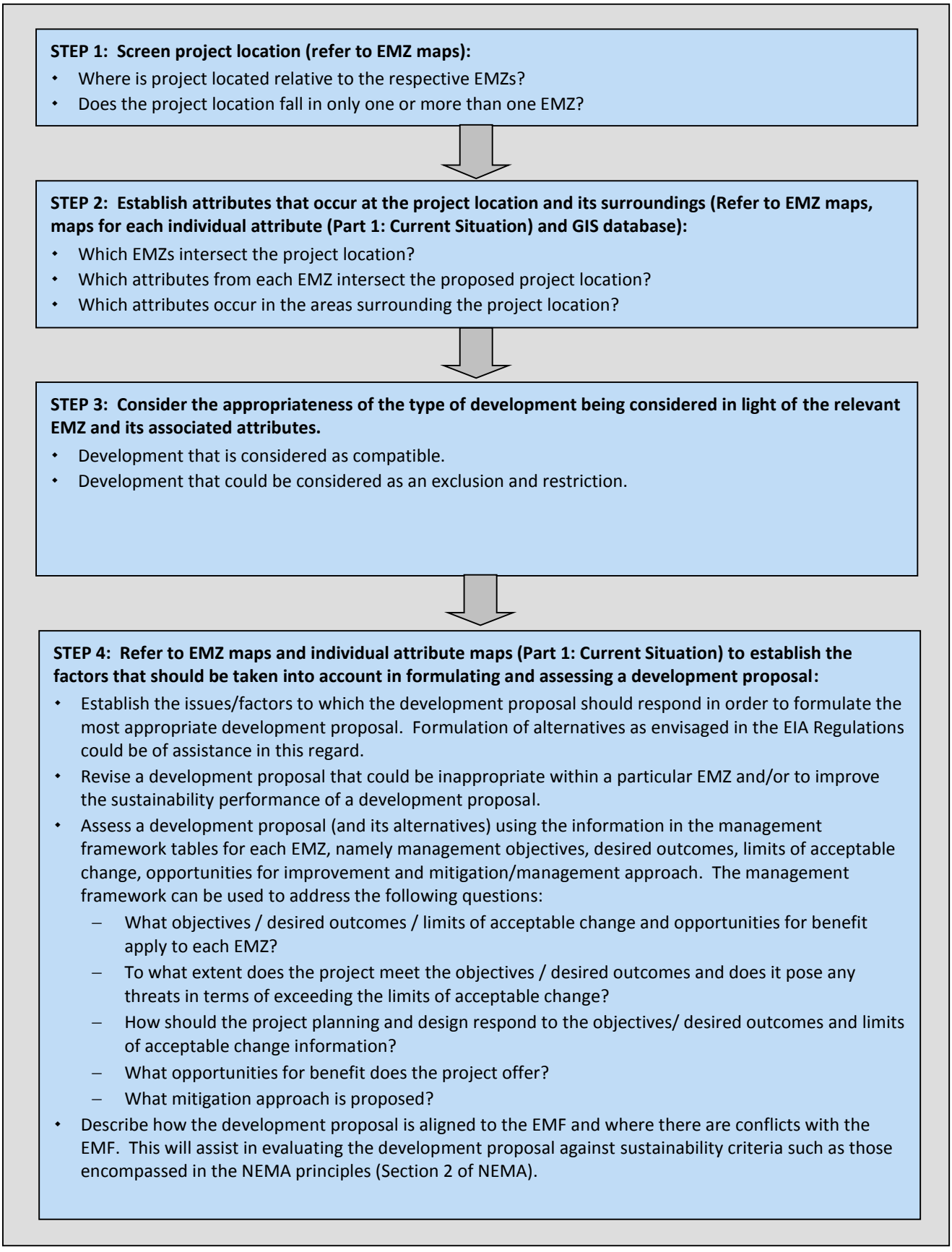


FIGURE 3: EMF Road Map

8.3 Environmental Management Zones – Attributes and Actions

8.3.1 EMZ 1: Urban Conservation Zone

The Urban Conservation Zone is intended to map irreplaceable biodiversity and resources within urban areas that are under significant pressure. The aim of the Urban Conservation Zone is to promote the protection and conservation of irreplaceable and valuable resources that are currently, and will be in the future, under severe threat by surrounding urban and industrial developments. The Urban Conservation Zone also intends to encourage sustainable land and resource use.

Table 8: Attributes that inform EMZ 1 – Urban Conservation Zone

EMZ 1 – URBAN CONSERVATION ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
CBA1 and ESA1 (within Urban and Industrial Areas)	• Maintain healthy ecosystems for the long-term, which in turn are needed to support human wellbeing and a strong economy. • Meet conservation targets required in terms of international commitments. • To protect natural buffers such as dunes and other ecological features from urban development.	• CBAs are based on conservation targets and on maintaining and protecting ecological infrastructure. • CBA areas should be kept natural and should not allow for further loss of habitat. These should only support land use that has a low impact. • Ecological support areas should be maintained in a near-natural state allowing some habitat loss on condition that the ecosystem is not compromised in any way.
Protected Areas (within Urban and Industrial Areas)	• Maintain healthy ecosystems and prevent disturbance by human activities in the long term. • Meet international targets in respect of formal conservation areas. • Support the ecotourism sector.	• Formal terrestrial and freshwater conservation areas, including national parks, provincial and local protected areas. • Protected areas identified in the National Protected Areas Act are special nature reserves, national parks, nature reserves, protected environments and can also allow for the inclusion of World Heritage Sites.
Aquatic CBA's (within Urban and Industrial Areas)	• Aquatic ecosystems in this area are vital for the sustenance of daily livelihoods and provide valuable ecosystem goods and services and form a fundamental aspect of the ecological infrastructure of the region.	• The conservation and protection of these ecosystems is essential to ensure water purification and increased quality, provision of habitat for variety of wildlife species.
Rivers and Wetlands (within Urban and Industrial Areas)	• Provision of social cultural, economic and environmental goods and services. • Habitat for an array of fauna and flora.	• Wetlands and rivers serve as an important ecosystem, producing a diversity of ecosystem goods and services. Many species depend on wetlands for their sustenance. • Rivers are also of importance to the agricultural sector, providing a source of irrigation for agriculture, whilst wetlands can also assist in flood control due to the absorption of water during flood events. Thus

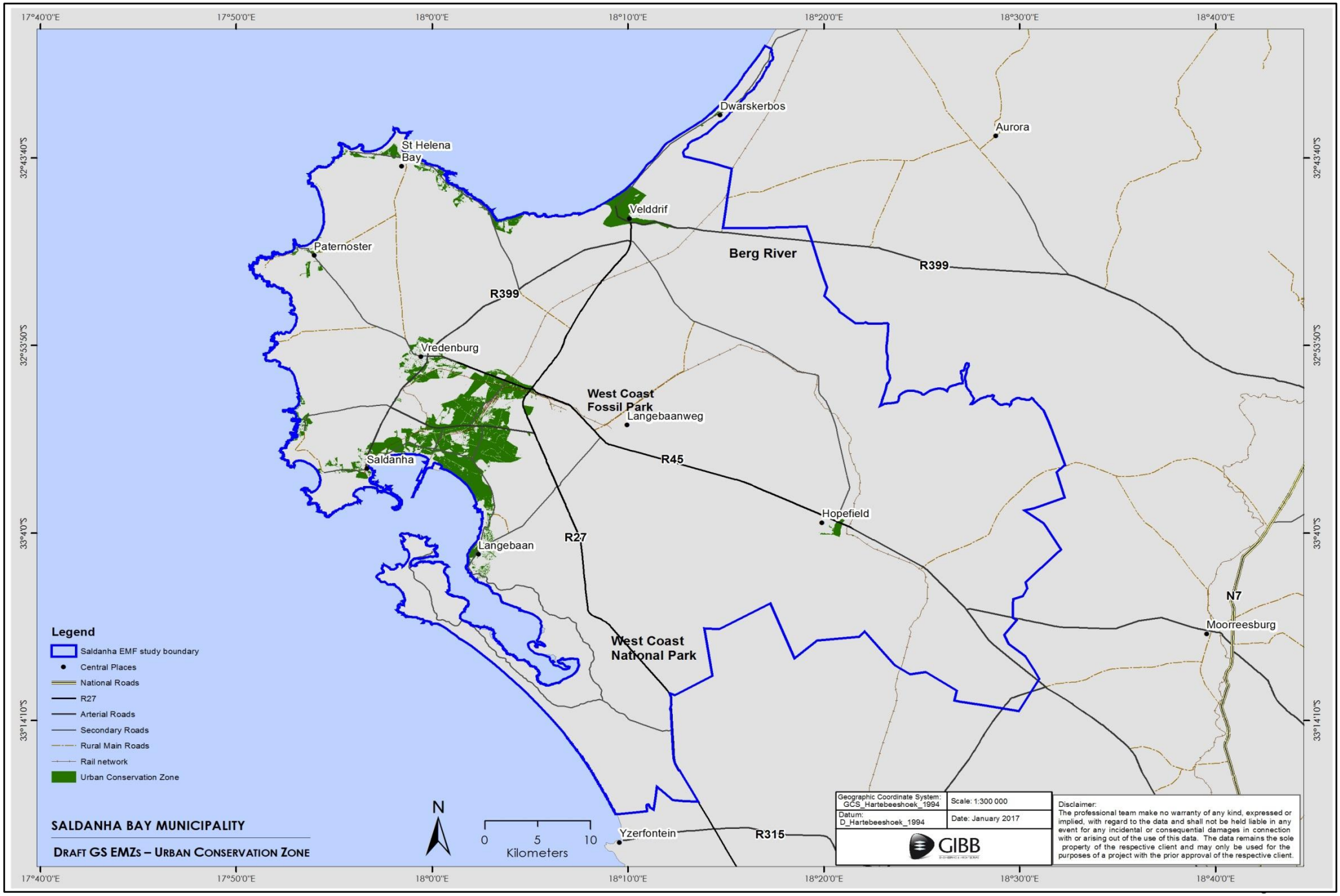
EMZ 1 – URBAN CONSERVATION ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
		acting as a source of water for human consumption during periods of droughts. • Rivers that have wetlands still intact have a better flow of water than rivers whose wetlands have been cleared. • Wetlands and rivers are both highly susceptible to degradation and are considered as highly sensitive.
RAMSAR sites (within Urban and Industrial Areas)	• Provision of ecological goods and services • Supporting ecological infrastructure to many avifaunal and marine faunal species.	• RAMSAR listed Langebaan Lagoon forms a habitat for many species and is an important hub for ecotourism during spring. This wetland is of international importance as it is the breeding ground for over 11 varieties of bird species and serves as an important wetland for waders along the west coast of Southern Africa. Additionally, this wetland is of significant importance as it supports many water birds especially species of wader, during summer. These areas need to be conserved to ensure the diversity of species is maintained.
Dune Fields (within Urban and Industrial Areas)	• Ensures stability. • Prevents erosion.	• Sand dunes contain a diversity of fauna and flora which are vital in ensuring dune stability. Since sand dunes are prone to elements such as wind and water which have the ability to erode the dunes, the vegetation found in dunes assists in stabilisation through root structures and rhizomes. Sand dunes form an important ecological structure, acting as a buffer to developed areas, from hazards such as storms and flooding. Thus, the protection of this ecological structure is important and development near dune fields should be controlled.
Private Reserves (within Urban and Industrial Areas)	• Maintains healthy ecosystems and prevent disturbance by human activities in the long term. • Meet national targets through informal conservation areas. • Provides a wilderness experience for people.	• Much land in SA is privately owned and contains an array of biodiversity. Consequently, it is important to conserve these areas to maintain biodiversity and ecosystem functioning. Private land owners have the potential to play an important role in conservation of biodiversity through the controlled public access and sustainable use of the land.

The attributes set out in the table above were used as an informant for the development of the Urban Conservation Zone, which is shown spatially on Map 36 below. Maps showing the individual attributes are provided in Part 1: The situational

analysis of this EMF is available as individual layers in the GIS database. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of EMZ 1. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 9):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).
- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).
- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 36: EMZ 1 – Urban Conservation Zone

Table 9: Management Framework for EMZ 1 – Urban Conservation Zone

ZONE 1: URBAN CONSERVATION ZONE					
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**	**LIMIT OF ACCEPTABLE CHANGE**	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
Promotion of conservation and protection of irreplaceable resources and biodiversity, under significant development pressure, within urban areas.	• To ensure protection and conservation of irreplaceable ecosystems and ecological features within urban areas. • To ensure sensitive areas are kept intact and in a near natural state.	• Restriction of development within an urban area where it may cause further degradation to ecosystems. • To maintain ecological functioning of the ecosystem. • To protect the goods and services, the ecological infrastructure provides to the urban area (e.g. flood attenuation).	• No loss of ecosystem functioning to a point where conservation targets (e.g. CBA targets) are compromised. • No development should be allowed in any sensitive and protected areas (i.e. within the Urban Conservation Zone). • Buffers must be allocated and protected.	• The promotion of community based natural resource projects (e.g. removal of alien invasive species in wetlands and rivers). • Urban conservation projects (e.g. environmental educational programmes). • Increased quality and quantity of ecosystem goods and services resulting in increased social, economic and environmental benefits.	• Avoid. Limited development should be undertaken in these areas. If development is unavoidable, biodiversity offsets may be considered in order to meet conservation targets. Offsets must be established in designated zones. • Relevant specialist studies must be undertaken for any development being undertaken within the zone. Study must include appropriate mitigation measures. • Establish partnerships with NGOs and other stakeholders to develop tools and projects to manage the man and environment interface within urban areas.

APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
Conservation (e.g. Environmental education initiatives). Protected Areas (e.g. National Parks and reserves). Private areas (e.g. private nature reserves). Public open areas (with correct zoning).	No listed activities should be considered for EMZ 1 due to the sensitivity of the receiving environment and significant impact development would have.	As a result of the sensitivity of the receiving environment and significant impact development would have within the EMZ, Listing Notice 3 activities should be

		considered as being applicable for the entire area, therefore, more restrictive requirements for development would be necessary.

8.3.2 EMZ 2: Rural Conservation Zone

> The Rural Conservation Zone is intended to map irreplaceable biodiversity within rural areas that are equally important but are not under as significant pressure as biodiversity in urban areas. The development of an urban edge will control development and urban sprawling is, thus protecting rural environments and resources.

Table 10: Attributes that inform EMZ 2 – Rural Conservation Zone

EMZ 2 : RURAL CONSERVATION ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
CBA1 and ESA1(outside of Urban and Industrial Areas)	• Maintain healthy ecosystems for the long-term, which in turn are needed to support human wellbeing and a strong economy. • Meet conservation targets required in terms of international commitments. • To protect natural buffers such as dunes and other ecological features from urban development.	• CBAs are based on conservation targets and on maintaining and protecting ecological infrastructure. • CBA areas should be kept natural and should not allow for further loss of habitat. These should only support land use that has a low impact. • Ecological support areas should be maintained in a near-natural state allowing some habitat loss on condition that the ecosystem is not compromised in any way.
RAMSAR sites (outside of Urban and Industrial Areas)	• Provision of ecological goods and services • Supporting ecological structure to many avifaunal and marine faunal species	• RAMSAR listed Langebaan Lagoon forms a habitat for many species and is an important hub for ecotourism during spring. This wetland is of international importance as it is the breeding ground for over 11 varieties of bird species and serves as an important wetland for waders along the west coast of Southern Africa. Additionally, this wetland is of significant importance as it supports many water birds especially species of wader, during summer. These areas need to be conserved to ensure the diversity of species is maintained.
Aquatic CBA's (outside of Urban and Industrial Areas)	• Aquatic ecosystems in this area are vital for the sustenance of daily livelihoods and provide valuable ecosystem goods and services and form a fundamental aspect of the ecological infrastructure of the region.	• The conservation and protection of these ecosystems is essential to ensure water purification and increased quality and, provision of habitat for variety of wildlife species.
Rivers and Wetlands (within Urban and Industrial Areas)	• Provision of social cultural, economic and environmental goods and services. • Habitat for an array of fauna and flora.	• Wetlands and rivers serve as an important ecosystem, producing a diversity of ecosystem goods and services. Many species depend on wetlands for their sustenance. • Rivers are also of importance to the agricultural sector, providing a source of irrigation for agriculture, whilst wetlands can also assist in flood control due to the absorption of

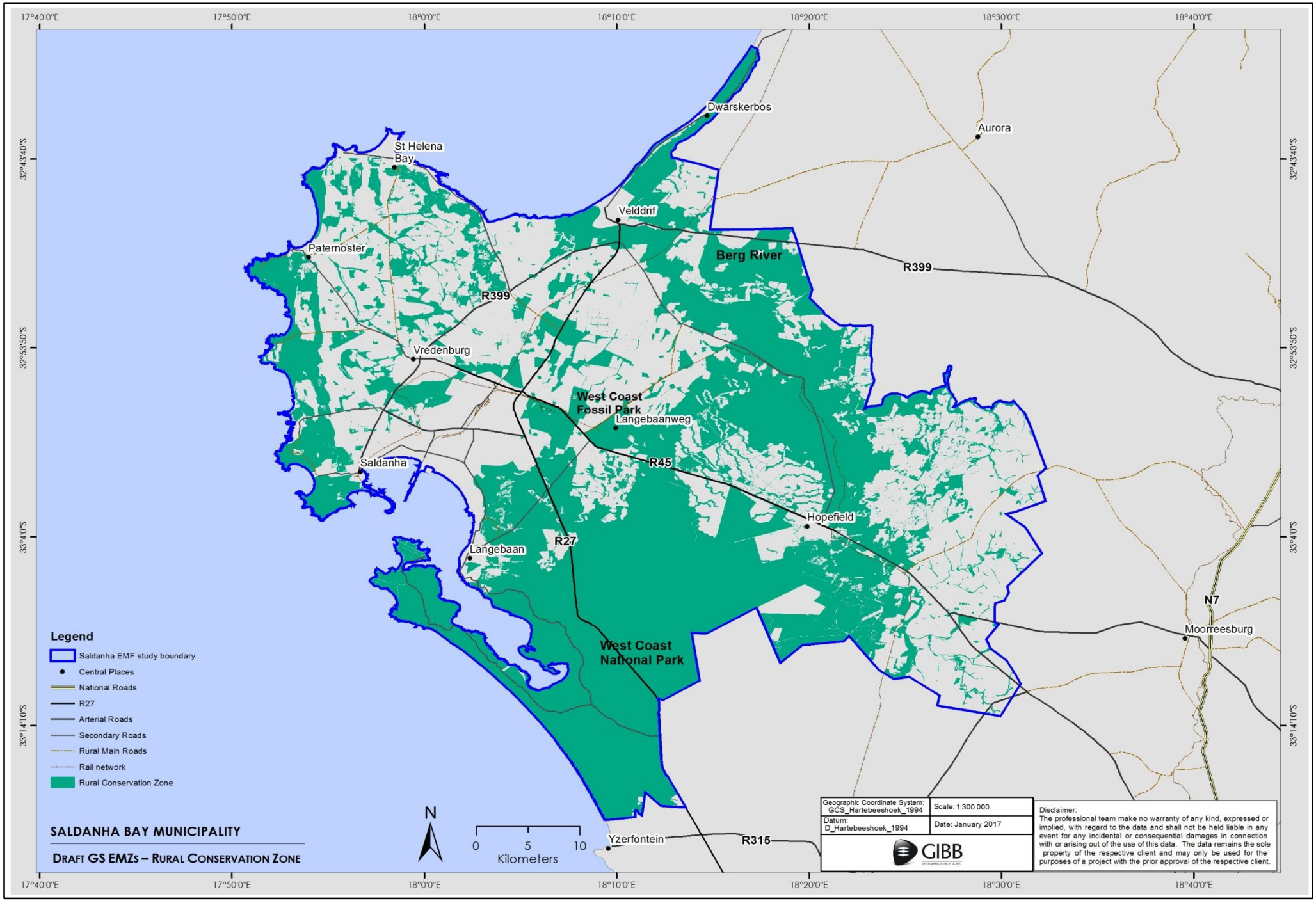
EMZ 2 : RURAL CONSERVATION ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
		water during flood events. Thus acting as a source of water for human consumption during periods of droughts. • Rivers that have wetlands still intact have a better flow of water than rivers whose wetlands have been cleared. • Wetlands and rivers are both highly susceptible to degradation and are considered as highly sensitive.
Protected Areas (outside of Urban and Industrial Areas)	• Maintain healthy ecosystems and prevent disturbance by human activities in the long term. • Meet international targets in respect of formal conservation areas. • Support the ecotourism sector to provide a wilderness experience for people	• Formal terrestrial and freshwater conservation areas, including national parks, provincial and local protected areas. • Protected areas identified in the National Protected Areas Act are special nature reserves, national parks, nature reserves, protected environments and can also allow for the inclusion of World Heritage Sites.
Dune Fields (outside of Urban and Industrial Areas)	• To identify areas of mobile sand that could negatively impact development. Dunes are important ecological structures as they: ○ Ensure stability ○ Prevent erosion ○ Protect developments from hazards	• Sand dunes contain a diversity of fauna and flora which are vital in ensuring dune stability. Since sand dunes are prone to elements such as wind and water which have the ability to erode the dunes, the vegetation found in dunes assists in stabilisation through root structures and rhizomes. Sand dunes form an important ecological structure, acting as a buffer to developed areas, from hazards such as storms and flooding. Thus, the protection of this ecological structure is important and development near dune fields should be controlled.
Private Reserves (outside of Urban and Industrial Areas)	• Maintains healthy ecosystems and prevent disturbance by human activities in the long term. • Meet national targets through informal conservation areas. • Provides a wilderness experience for people	• Much land in SA is privately owned and contains an array of biodiversity. Consequently, it is important to conserve these areas to maintain biodiversity and ecosystem functioning. Private land owners have the potential to play an important role in conservation of biodiversity through the controlled public access and sustainable use of the land.
Undetermined areas	• Undetermined areas i.e. areas with no known sensitivities that, due to their proximity to a sensitive area (i.e. a rural conservation zone attribute), could not be allocated to the development focused zones, were allocated to this zone. • To aid in achieving international	• The allocation of the undetermined areas to this zone allows for increased conservation of sensitive biodiversity within the rural areas.

EMZ 2 : RURAL CONSERVATION ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
	conservation targets and conserving sensitive biodiversity within rural areas.	

The attributes set out in the table above were used as an informant for the development of the Rural Conservation Zone, which is shown spatially on Map 37 below. Maps showing the individual attributes are provided in Part 1: The situational analysis of this EMF is available as individual layers in the GIS database. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of EMZ 2. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 11):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).
- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).
- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 37: EMZ 2 – Rural Conservation Zone

Table 11: Management Framework for EMZ 2 – Rural Conservation Zone

ZONE 2: RURAL CONSERVATION ZONE					
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**	**LIMIT OF ACCEPTABLE CHANGE**	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
Promotion of conservation and protection of irreplaceable biodiversity within rural areas.	• To ensure protection and conservation of ecosystems and ecological features within rural areas. • To ensure sensitive areas are kept intact and in a near natural state	• Restriction of development within the rural conservation zone, where it may cause further degradation to ecosystem and their functioning. • To maintain overall ecological functioning of the ecosystem. • To protect the resources utilised by communities in order to maintain livelihoods (e.g. water supply).	• No loss of ecosystem functioning to a point where conservation targets are not met/ hindered. • Development should not enter protected areas • Low impact development in sensitive areas may allow for minimal loss of habitat on condition that the ecosystem is not compromised in any way. No high impact development should be allowed. • Buffers must be allocated and protected.	• The promotion of community based natural resource projects. (e.g community projects such as the "Working for Water" and "Working for Wetlands" projects which focus on the removal of alien invasive species in wetlands and rivers). • Increased quality and quantity of ecosystem goods and services resulting in increased social, economic and environmental benefits.	• Avoid. Limited development should be undertaken in these areas. If development is unavoidable, biodiversity offsets may be considered in order to meet conservation targets. Offsets must be established in designated zones. • Relevant specialist studies must be undertaken for any development being undertaken within the zone. Study must include appropriate mitigation measures.

APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
Conservation (e.g. Environmental education initiatives). Protected Areas (e.g. National Parks and reserves). Public open areas. Natural areas. Private areas (e.g. an individual's farm which contain sensitive biodiversity). Conservation (e.g. through environmental education and community based natural resource projects).	No listed activities should be considered for exclusion in EMZ 2 due to the sensitivity of the receiving environment and significant impact development would have. All activities must be undertaken through the NEMA EIA regulations.	Although sensitivity of the receiving environment and significant impact development would have on it is considered high, the current development pressures do not constitute the need for further restrictions. The current EIA regulations and associated process remains.

8.3.3 EMZ 3: Controlled Development Zone

> The controlled development zone was established with the intention of ensuring sustainable development on landscapes that can withstand lower impacts. Development activity is allowed if controlled and monitored in a sustainable manner. This zone contains heritage and scenic resources that are important to society for sense of place and an element of wilderness.

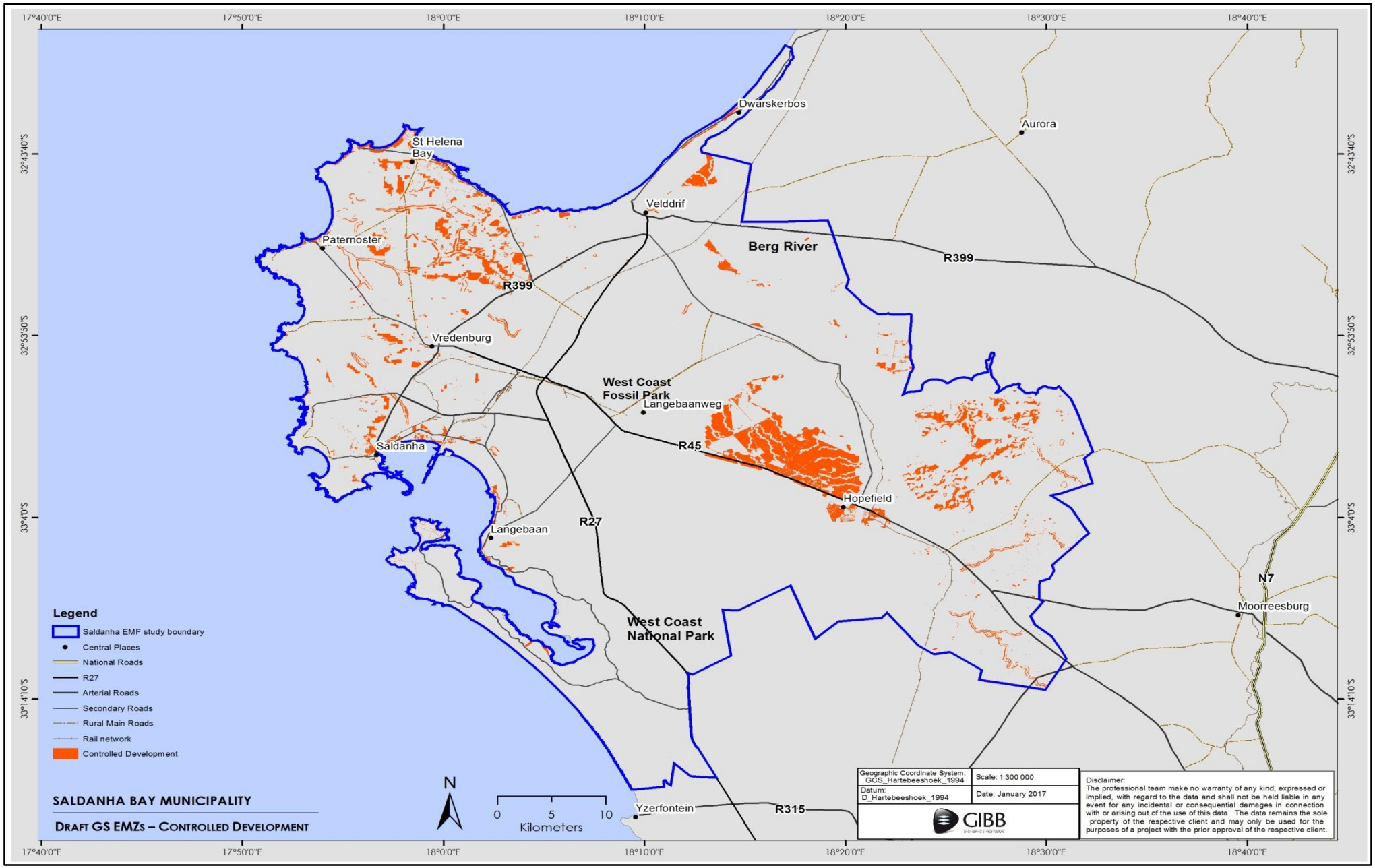
Table 12: Attributes that inform EMZ 3 – Controlled Development Zone

EMZ 3 : CONTROLLED DEVELOPMENT ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
Mountains, ridges & prominent hills	• These resources are of local to national aesthetic and heritage value. • These landscapes are environmentally sensitive and serve as a catchment area for valuable water resources.	These landscapes attract developers due to their high aesthetic value and untouched natural resource base thus increasing tourism opportunities.
Coastal Setback lines	• Coastal setback lines need to be taken into consideration for development within this zone. Certain areas need to demarcated and controlled to prohibit certain activities within the zone. • The coastal setback line serves to avoid harm to humans and property through incidents such as flooding, coastal erosion, storm surges and the like.	In accordance with the ICM Act, controlled developments within setback lines are vital to ensure sustainable development within this zone.
Berg River Flood lines	• Development needs to take into consideration the 1:20, 1:50 and 1:100 year flood line for the Berg River.	Development along the floodplains and catchment areas should be controlled to reduce the risk of flooding adjacent to rivers. The new 1:100 year flood line accounts for climate change predictions.
Other National Areas	• Development within these areas may be permitted and controlled. • ONAs consist of land that is of less biodiversity importance. Unlike the CBAs, the ONAs do not need to be protected in order to meet biodiversity thresholds therefore allowing for controlled development to occur.	ONAs contain some biodiversity that can be lost to development. However, development needs to be undertaken in a controlled manner to ensure sustainable use of the land. Ecosystem functionality is safeguarded through strategic landscape planning thus minimising habitat loss.
Other Ecological Support Areas	• These are important areas for maintaining ecological processes but are not of the same priority as the CESAs, which are considered essential in supporting the maintenance and functioning of the CBAs and Protected Areas.	OESAs contain some biodiversity that can be lost to development. However, development needs to be undertaken in a controlled manner to ensure sustainable use of the land. Ecosystem functionality is safeguarded through strategic landscape planning thus minimising habitat loss.

The attributes set out in the table above were used as an informant for the development of the Controlled Development Zone, which is shown spatially on Map 38 below. Maps showing the individual attributes are provided in Part 1: The situational analysis of this EMF is available as individual layers in the GIS database. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of EMZ 3. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 13):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).
- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).
- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 38: EMZ 3 – Controlled Development Zone

Table 13: Management Framework for EMZ 3 – Controlled Development Zone

ZONE 3: CONTROLLED DEVELOPMENT ZONE					
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**	**LIMIT OF ACCEPTABLE CHANGE**	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
Sustainable development on landscapes that can withstand lower impacts.	• To minimise the loss of sensitive areas which play an important role in the conservation of threatened species. • To ensure that development within high risk areas (such as coastal setback lines and flood lines) are controlled. • To prevent fragmentation by maintaining ecological corridors and by acting as a buffer for more sensitive features.	• To retain aesthetic appeal of the landscape. • To reduce the development within high risk areas. • Protection of irreplaceable resources (urban and rural conservation zones). –	• Allow controlled low impact development. • Controlled development should not hinder the objective of the zone (i.e. ecological corridor and buffer). • Loss of biodiversity must be undertaken without substantial loss to habitats and biodiversity (must not have a negative impact on CBAs and PAs). • Low impact development could be allowed in these areas.	• Potential for controlled low impact development, thereby allowing for protection of more sensitive resources in the conservation zones. • Potential for controlled developments that enhance the value of more sensitive resources (e.g. ecotourism development).	• Where development is proposed, relevant specialist input to be attained to generate mitigation strategies that may offset the negative impacts of the proposed development. • Limit type of development. Low impact development should be undertaken (such as certain linear service infrastructure). • Where higher impact development cannot be avoided, development should be compatible with zone and aim to enhance biodiversity protection (e.g. ecotourism).

APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
• Tourism (e.g. hiking, fishing facilities, game farming to an extent where carrying capacity of an area is not exceeded). • Commercial development (e.g. sustainable development to boost tourism opportunities).	No listed activities should be considered for exclusion in EMZ 3 due to the sensitivity of the receiving environment and significant impact development would have. All activities must be undertaken through the NEMA EIA regulations.	The current EIA regulations and associated process will provide the required protection of resources within this EMZ. No additional restrictions should be required.

• Service related infratructure (e.g. Transmission lines, bulk water supply pipelines etc.) • Eco-tourism (e.g. Game drives) • Agri-tourism (e.g. vineyard tours, farmers markets and wedding venues). • Public open space • Natural areas		

8.3.4 EMZ 4: Restoration Zone

A restoration zone was determined in which offsets can be established for unavoidable developments may occur in highly sensitive areas, with the intention of compensating for the inevitable environmental damage resulting from these development activities.

Table 14: Attributes that inform EMZ 4 – Restoration Zone

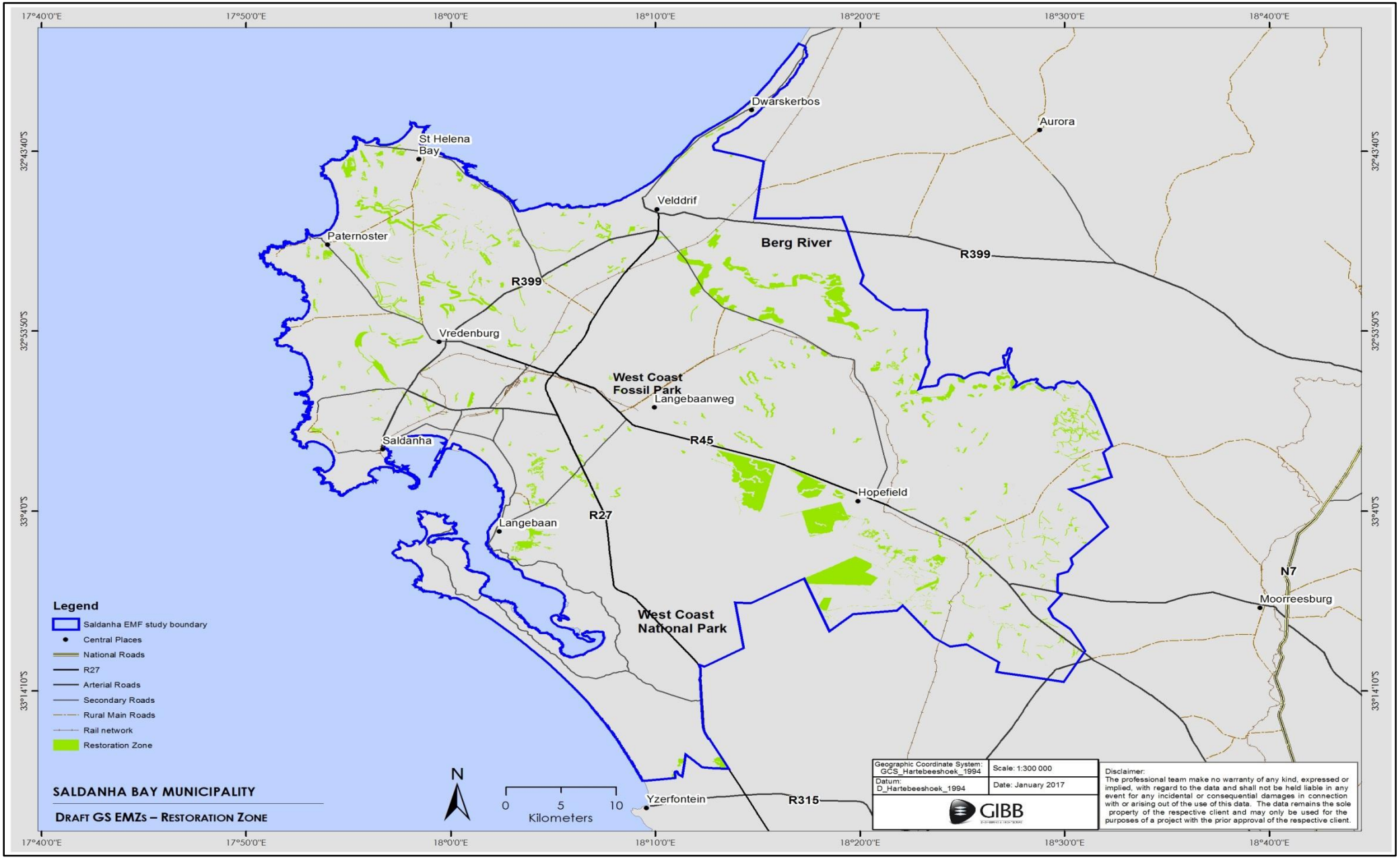
EMZ 4 : RESTORATION ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
RESOURCE CRITERIA		
CBA2	• CBA2 areas that are degraded, should be rehabilitated and allow for low-impact land use to occur.	Activities that have minimal impact on biodiversity and the receiving environment can be undertaken in these areas.
ESA2	• ESA2 areas focus on restoration and managing the impacts on ecosystem functioning.	These areas can allow for a degree of habitat loss for restoration purposes provided that the ecological functioning of the ecosystem is not disrupted.
Expansion Strategy	• Areas that are protected by law (NEMPAA) are conserved and managed to ensure ecological sustainability and increase resilience towards climate change.	With the intention of ensuring areas protected by law are managed, targets are set for protected areas expansion. Maps are produced to indicate potential areas for expansion. The expansion strategy ensures expansion is not only concentrated in areas that well-protected, but identifies potential areas for expansion.

The attributes set out in the table above were used as an informant for the development of the Restoration Zone, which is shown spatially on Map 39 below. Maps showing the individual attributes are provided in Part 1: The situational analysis of this EMF is available as individual layers in the GIS database. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of EMZ 4. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 15):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).

- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).
- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 39: EMZ 4 – Restoration Zone

Table 15: Management Framework for EMZ 4 – Restoration Zone

ZONE AIM	MANAGEMENT OBJECTIVES	DESIRED OUTCOME	LIMIT OF ACCEPTABLE CHANGE	OPPORTUNITY FOR BENEFIT	MITIGATION/ MANAGEMENT APPROACH
Promotion of restoration to ensure protection of resources and continued ecological functioning.	• To ensure rehabilitation and restoration of ecosystems in less sensitive areas. • To offset the negative impacts development may render on ecosystems. • Controlled expansion of sensitive and protected areas to ensure maximum protection of biodiversity.	• The restoration of ecosystems and habitats in order to achieve conservation targets. • Increased conservation and protected biodiversity through development of Protected Areas. • Increase of restored habitats through conservation initiatives.	• Transformation of degraded areas to rehabilitated/ restored habitats.	• The promotion of community based natural resource projects such as restoration (e.g. WWF's Sand River Wetland Restoration Project) and conservation projects (e.g. Wildlife ACT conservation projects). • Areas that can be established for the protection of biodiversity and ecosystems in order to meet conservation targets. • Biodiversity offsetting for development taking place in irreplaceable ecosystems and ecological features.	• If restoration is undertaken, as a result of a biodiversity offset, relevant specialist studies must be undertaken to determine the offset ratio. • Avoid. Limited development should be undertaken in these areas. If development is unavoidable, relevant specialist studies must be undertaken. Studies must include appropriate mitigation measures. • Development must not be undertaken in an area that is already designated as an offset.

APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
• Conservation (e.g. conservation initiatives which ensure conservation targets are met). • Restoration (e.g. through initiatives that rehabilitate and protect habitats). • Afforestation. • Protected areas (expansion of protected areas to ensure protection and conservation of biodiversity). • Biodiversity offsets.	No listed activities should be considered for exclusion in EMZ 4 due to the sensitivity of the receiving environment and significant impact development would have. All activities must be undertaken through the NEMA EIA regulations.	(i) As a result of the sensitivity of the receiving environment and significant impact development would have within the EMZ, Listing Notice 3 activities should be considered as being applicable for this area, therefore, more restrictive requirements for development would be necessary.

8.3.5 EMZ 5: Agricultural Development Zone

This zone was established to promote sustainable agricultural development with the intention of boosting the economy while conserving natural resources. The agricultural sector is important to the local economy and job creation in the area. Therefore, sustainable agricultural development is critical for resources that are important for food security, livelihoods, economic activity and job creation.

Table 16: Attributes that inform EMZ 5 – Agricultural Development Zone

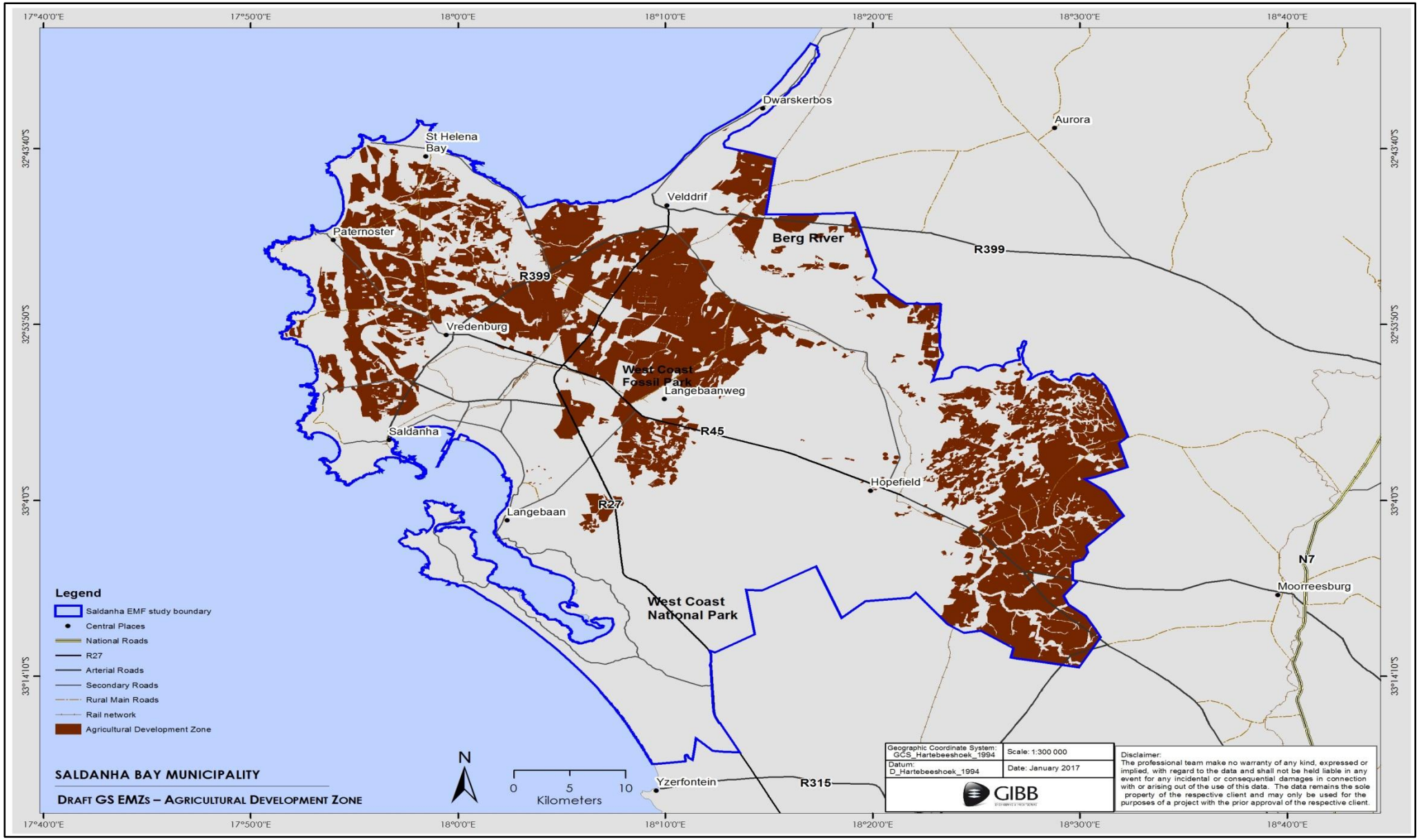
EMZ 5 : AGRICULTURAL DEVELOPMENT ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
Dryland agriculture	• These areas are important for grain crop production and food security. • Crops produced in this region are produced through dryland agriculture and are dependent on rain.	Dryland agriculture is a dominant agricultural activity in this region. Suitable areas for dryland agriculture should be established to ensure maximum crop outputs in a sustainable manner.
Irrigated agriculture	• These areas are important for grain crop production and food security.	Saldanha contains a number of irrigated areas that are vital for agricultural activity.
Undetermined areas	• Undetermined areas located within proximity to the Agricultural Development Zone, and had no inherent sensitivities, were allocated to this zone. • To encourage agricultural development in the area.	Agricultural areas play a vital role in sustenance of livelihoods in the area. The allocation of undetermined areas to this zone, encourages the development of agricultural activities / agricultural growth / agricultural progress in the area.

The attributes set out in the table above were used as an informant for the development of the Agricultural Development Zone, which is shown spatially on Map 40 below. Maps showing the individual attributes are provided in Part 1: The situational analysis of this EMF is available as individual layers in the GIS database. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of any activities that have not undergone an exclusion process and are identified as an excluded activity for EMZ 5. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 17):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).

- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).
- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 40: EMZ 5 – Agricultural Development Zone

Table 17: Management Framework for EMZ 5 – Agricultural Development Zone

ZONE 5: AGRICULTURAL DEVELOPMENT ZONE					
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**	**LIMIT OF ACCEPTABLE CHANGE**	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
Boosting the economy while conserving resources, through sustainable agricultural development.	• To protect and retain productive agricultural land that is vital for ensuring food security. • Reduce requirements for undertaking development.	• Agricultural transformation and development on land that is important for ensuring food security and sustenance of livelihoods. • Transformation of land for agricultural development for increased agricultural production.	• Only agricultural development (including auxiliary infrastructure) may take place in productive agricultural land. • Subdivision and fragmentation of agricultural land must be avoided.	• Improvement of ecosystem services through proper management and sustainable agricultural development. • The potential for community based projects around sustainable agricultural practice and natural resource management. • Increased food security for the region. • Increased job creation based on agricultural development. • Intensified agricultural practices and vertical expansion to utilize the available land more effectively.	• Avoid development on areas of high productivity. • Relevant specialist studies must be undertaken to identify areas of potential development and impacts. Thereafter, potential mitigation strategies may be devised.

APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
• Agriculture and Aquaculture (e.g. crop farming, dryland agricultural activities) • Agri-industrial (e.g. development of agricultural facilities such as silos for grain storage). • Commercial and susbsistance agriculture (e.g. development of facilities for crops grown for commercial use).	The following activities in Listing Notice 1 should be considered for exclusion within the Agricultural Development Zone. The activities are aimed at the expansion of already existing facilities in order to increase capacity and the productivity of agricultural land. Minimum requirements for undertaking any "excluded" activity must be developed as part of the exclusions process. ***Listing Notice 1: Activity 38***	The current EIA regulations and associated process will provide the required protection of resources within this EMZ. No additional restrictions should be required.

	The expansion and related operation of facilities for the slaughter of animals where the daily product throughput will be increased by more than- (i) 50 poultry; (ii) 6 units of reptiles, red meat and game; or (iii) 20 000 kg wet weight per annum of fish, crustaceans and amphibians. ***Listing Notice 1: Activity 43*** The expansion and related operation of hatcheries or agri-industrial facilities outside industrial complexes, where the development footprint of the hatcheries or agri-industrial facilities will be increased by 2 000 square metres or more.	

8.3.6 EMZ 6: Industrial Activity Zone

The industrial activity zone was established with the intent to promote industrial development in areas that are less sensitive to pressures and areas that have the potential to support industrial development in a sustainable manner. The industrial activity zone will act as a catalyst for sustainable economic development as well as job creation in the area.

Table 18: Attributes that inform EMZ 6 – Industrial Activity Zone

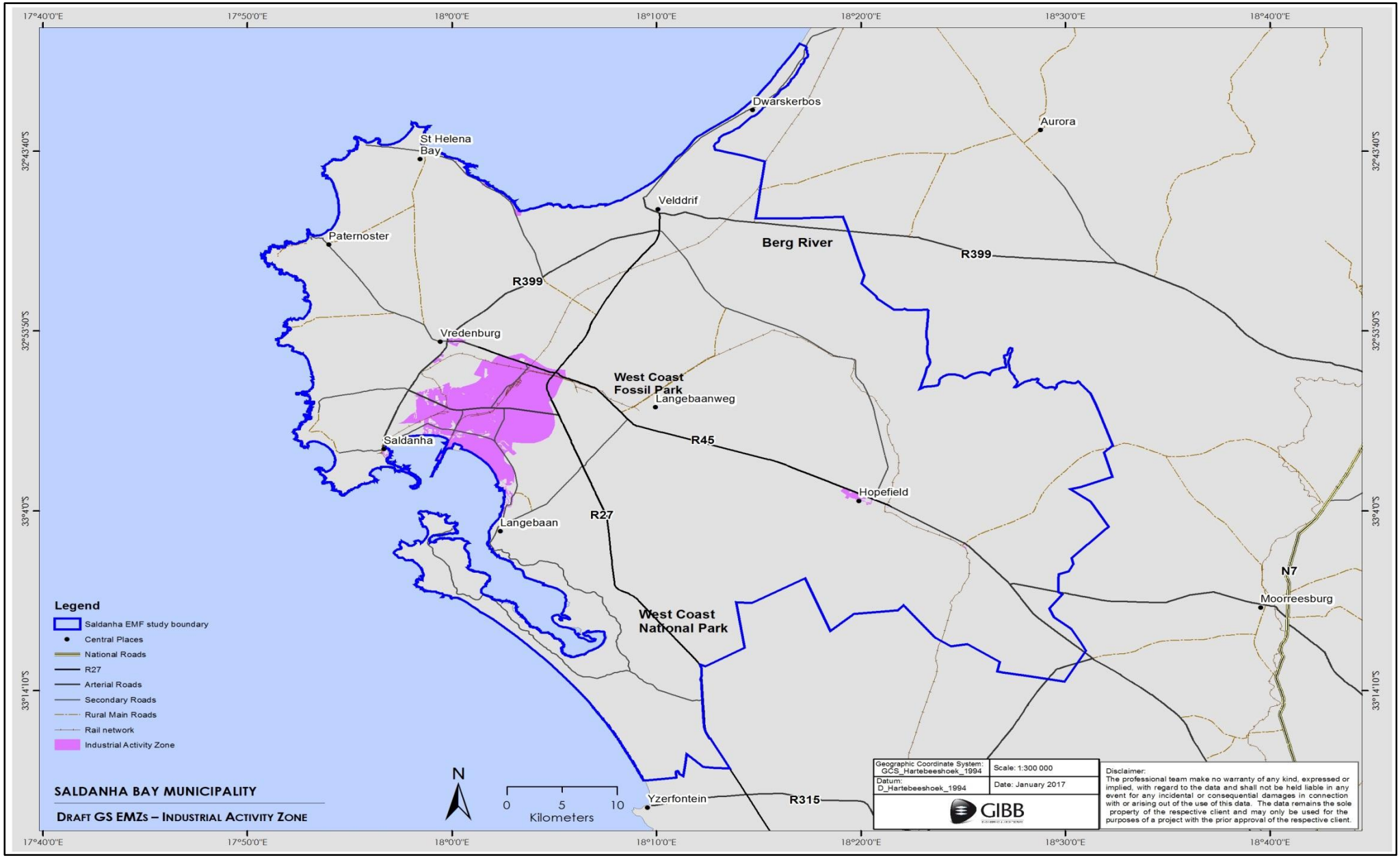
EMZ 6 : INDUSTRIAL ACTIVITY ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
Port expansion	• Port expansion will allow for the development of an oil and gas service facility in the area.	This expansion of the port will contribute largely to the country's GDP and creation of jobs. The port contains a high diversity of species and therefore careful management of biodiversity is needed during the expansion of the port.
Industrial Zoning and Industrial expansion.	• The expansion of industries in this area has the potential to promote job creation and increased economic growth, in a sustainable manner. • To develop a competitive environment to attract foreign and domestic investment within the oil and gas industry.	The IDZ will act as a catalyst to ensure industrial investment thus creates job creation and ensure sustainable development within the area.
IDZ PM10	• PM10 pollution limits the types of developments that should be allowed within the area.	Industrial development should aim to concentrate pollution related activities to within the already polluted area to enable more effective management and mitigation.
Undetermined areas	• Unidentified areas adjacent to the Industrial Activity Zone, that contained no inherent sensitivities, were allocated to this zone. • To encourage development and expansion of industries • To allow for increased development to occur with no restrictions	The allocation of these areas to this zone, allows for increased industrial development to occur. Thus contributing largely to the country's GDP and job creation.

The attributes set out in the table above were used as an informant for the development of the Industrial Activity Zone, which is shown spatially on Map 41 below. Maps showing some of the individual attributes are provided in Part 1. Other datasets have been provided for the sole purpose of developing the EMZ: The situational analysis of this EMF is available as individual layers in the GIS database. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being

consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of any activities that have not undergone an exclusion process and are identified as an excluded activity for EMZ 6. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 19):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).
- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).
- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 41: EMZ 6 – Industrial Activity Zone

Table 19: Management Framework for EMZ 6 – Industrial Activity Zone

ZONE 6: INDUSTRIAL ACTIVITY ZONE					
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**	**LIMIT OF ACCEPTABLE CHANGE**	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
Promotion of industrial development in less sensitive areas to ensure sustainable economic development.	• Promote industrial development. • Promote sustainable economic growth • Reduce requirements for undertaking development.	• Expansion of the industrial area (e.g. development of an oil and gas facility and broaden the industrial base (capacity) of the port).	• Industrial development may occur to a point where there is minimal effect on biodiversity. • A degree of habitat loss may occur in these areas as long as the development remains within the designated zone. • Development to not hamper the ecological functioning of surrounding terrestrial and ecological ecosystems (e.g. the Langebaan Lagoon).	• The potential for community development and stakeholder partnerships to ensure economic development that benefits all. • The opportunity for job creation to decrease poverty and improve standards of living. • Increased GDP and economic growth in a sustainable manner.	• Development should be sustainable taking into account the sensitivity of the biodiversity in the area while ensuring maximum benefits. • If the loss of important habitats is inevitable, rehabilitation and restoration strategies should be devised in offset receiving areas. • Development must be restricted to already disturbed areas where possible.

APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
• Industrial (e.g. manufacturing infrastructure development, power generation, transport infrastructure, storage of oil and gas and port and harbour development). • Mining (e.g. prospective exploration for oil and gas).	The following activities in Listing Notice 1 should be considered for exclusion within the Industrial Activity Zone. The activities are aimed at the expansion of already existing facilities in order to increase capacity and the productivity or the development of auxiliary service to assist in the increase of capacity. Minimum requirements for undertaking any "excluded" activity must be developed as part of the exclusions process. ***Listing Notice 1: Activity 9*** The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or	The current EIA regulations and associated process will be required for activities that have not undergone an exclusions process. No additional restrictions should be required.

	more; excluding where- a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or b) where such development will occur within an urban area. ***Listing Notice 1: Activity 10*** The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or b) where such development will occur within an urban area. ***Listing Notice 1: Activity 11*** The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more. ***Listing Notice 1: Activity 45*** The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure- (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded	

	by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to transportation of water or storm water within a road reserve; or (bb) will occur within an urban area. ***Listing Notice 1: Activity 46*** The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure- (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve; or (bb) will occur within an urban area. ***Listing Notice 1: Activity 47*** The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase. ***Listing Notice 1: Activity 51*** The expansion of facilities for the storage, or storage and handling, of a dangerous good, where the capacity of such storage facility will be expanded by more than 80 cubic metres.	

	Listing Notice 1: Activity 64 The expansion of railway lines, stations or shunting yards where there will be an increased development footprint, excluding- (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in mines; or (iii) additional railway lines within the railway line reserve.	

8.3.7 EMZ 7: Urban Development Zone

The purpose of establishing an urban development zone was to promote sustainable development within less sensitive urban areas while decreasing urbanisation and urban sprawl into the rural areas. The selection of areas that are under less pressure, allows for the conservation of biodiversity and resources in sensitive areas during development.

Table 20: Attributes that inform EMZ 7 – Urban Development Zone

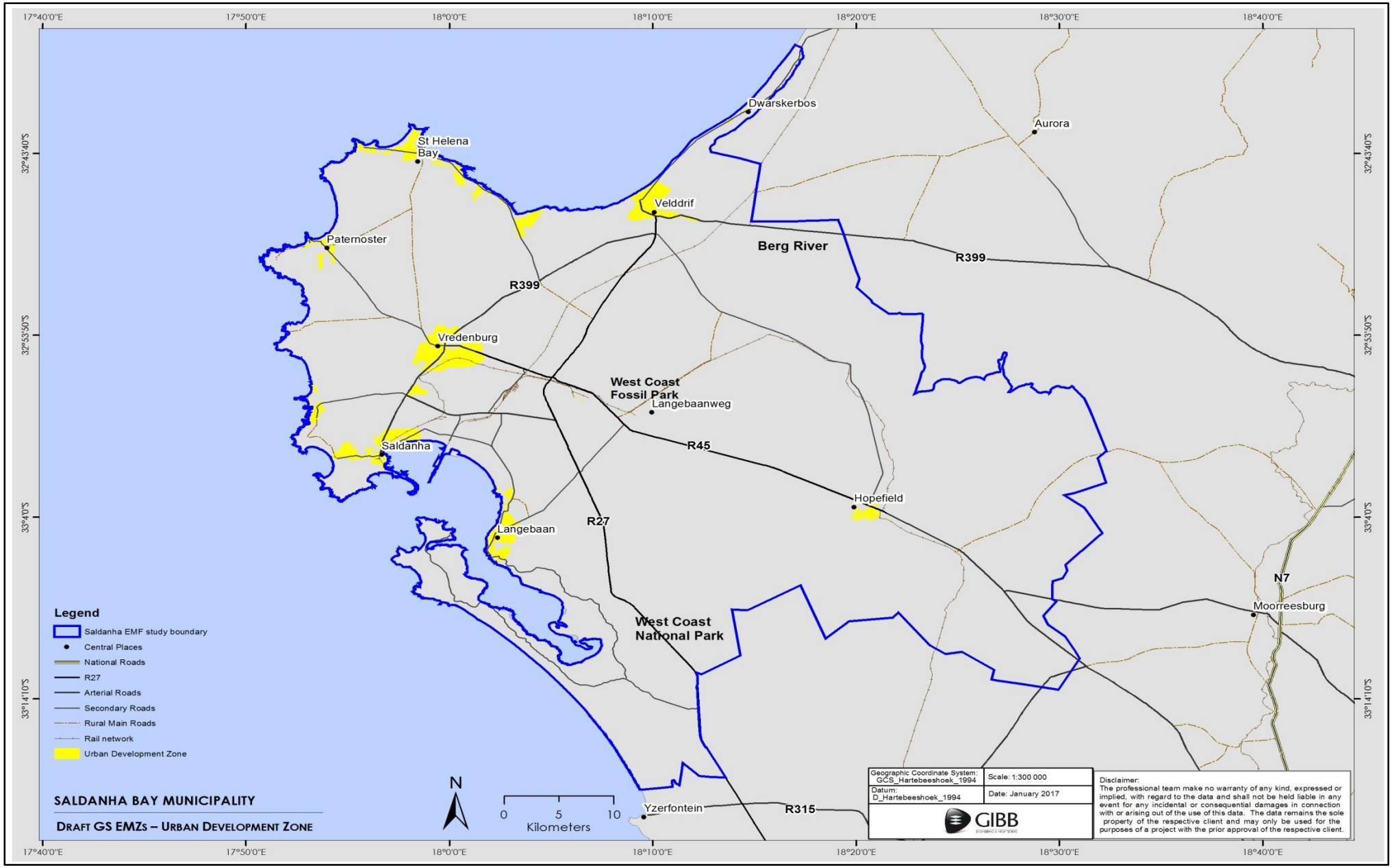
EMZ 7 : URBAN DEVELOPMENT ZONE		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
Urban Areas (as derived from the Local SDFs)	• Urban areas that have been identified in the local SDFs provide opportunity for sustainable urban development.	The establishment of an urban edge will regulate the types of land uses prohibited outside the urban area and provide for exclusions already defined in NEMA. The Urban Edge will also act as a mechanism to ensure resources and features in sensitive areas are protected
Undetermined areas	• Areas adjacent to the Urban Development Zone, which have no inherent sensitivities, have been allocated to this zone. • To promote and increase development within the urban area without any restrictions.	The allocation of areas adjacent to Urban Development Zone, allows for increased areas of urban development.

The attributes set out in the table above were used as an informant for the development of the Urban Development Zone, which is shown spatially on Map 42 below. The dataset used as an informant for the development of this EMZ was derived from the latest municipal SDF for current and future urban development planning. Applicants and EAPs are advised to consult the GIS database that forms part of this EMF to ensure that all of the relevant environmental attributes are identified for the project location and that the most accurate and up-to-date information is being consulted. Specialist studies would always be required for "groundtruthing" purposes in respect of any activities that have not undergone an exclusion process and are identified as an excluded activity for EMZ 7. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework comprises the following (refer to Table 21):

- The overarching aim of the zone.
- The management objective.
- Desired outcome (basis against which objective can be measured to establish progress, even success, in respect of the objective).
- Limit of Acceptable Change (limit beyond which irreversible change to an EMZ is likely to occur and thus compromise the functioning of this EMZ and thus the ability to sustain the services/benefits that are important to human wellbeing).

- Opportunity for benefit (factors for consideration that could result in benefits to society and to the environment; includes opportunities that could contribute to social priorities such as poverty alleviation and job creation).
- Mitigation / management approach.
- An appropriateness matrix linking attributes and activities/types of development that may be considered inappropriate or appropriate as well as being considered for exclusion or restriction.



Map 42: EMZ 7 – Urban Development Zone

Table 21: Management Framework for EMZ 7 – Urban Development Zone

ZONE 7: URBAN DEVELOPMENT ZONE					
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**	**LIMIT OF ACCEPTABLE CHANGE**	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
To promote sustainable urban development.	• The promotion of urban development in areas of less sensitivity • The development of an urban edge. • Reduce requirements for undertaking development.	• Expansion of urban development in a sustainable manner. • The regulation of various land uses within an urban area. • The control of development outside an urban area. • The protection and conservation of biodiversity exceeding the urban edge.	• Urban development may occur to a point where there is minimal effect on biodiversity. • A degree of habitat loss may occur in these areas as long as the development remains within the designated zone. • Development to not hamper the ecological functioning of surrounding ecosystems.	• The potential for increased service delivery through service infrastructure development. • Protection of sensitive areas falling outside an urban edge has the potential to increase their value and role in safeguarding ecosystem goods, services and overall ecological functioning.	• Development in sensitive areas outside the urban edge should be avoided • Development that may disturb the ecological functioning of the ecosystem should be avoided. • Where development that will affect areas outside the designated zone is unavoidable, biodiversity offsets should be taken into consideration.

APPROPRIATE MATRIX		
COMPATIBLE LAND USE	**EXCLUDED ACTIVITIES**	**RESTRICTED ACTIVITIES**
• Residential (e.g. housing complexes) • Commercial (e.g. service delivery infrastructure such as bulk public water supply, energy infrastructure, sewerage and storm water infrastructure, transport structures such as roads). • Recreational (e.g. the development of hotels, entertainment areas and resorts). • Tourism.	The following activities in Listing Notice 1 should be considered for exclusion within the Urban Development Zone. The activities are aimed at enabling the improvement of service delivery. ***Listing Notice 1: Activity 9*** The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- a) such infrastructure is for bulk transportation of water or	The current EIA regulations and associated process will be required for activities that have not undergone an exclusions process. No additional restrictions should be required.

	storm water or storm water drainage inside a road reserve; or b) where such development will occur within an urban area. ***Listing Notice 1: Activity 10*** The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or b) where such development will occur within an urban area. ***Listing Notice 1: Activity 13*** The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014. ***Listing Notice 1: Activity 28*** Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	

	Listing Notice 1: Activity 45 The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure- (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to transportation of water or storm water within a road reserve; or (bb) will occur within an urban area. ***Listing Notice 1: Activity 46*** The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure- (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve; or (bb) will occur within an urban area ***Listing Notice 1: Activity 47*** The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the	

	development footprint will increase. **Listing Notice 1: Activity 50** The expansion of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, where the combined capacity will be increased by 50000 cubic metres or more. ***Listing Notice 1: Activity 56*** The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas. ***Listing Notice 1: Activity 63*** The expansion of facilities or infrastructure for the transfer of water from and to or between any combination of the following- (i) water catchments; (ii) water treatment works; or (iii) impoundments; where the capacity will be increased by 50 000 cubic metres or more per day, but excluding water treatment works where water is treated for drinking purposes.	

8.4 Conflict Areas

A Conflict Areas dataset has been created that identifies conflicts between land use objectives i.e. EMZs that overlap and have differing aims (conservation vs. development). This should be used in the development of the Local SDF to:

- establish trade-offs between development and conservation priorities, at a principle level of specific "hot-spot" areas;
- understand the implications of trade-offs taking place the land use planning process and the possible implications thereof.
- establish an engagement strategy for undertaking the trade-offs between the respective stakeholders; and
- develop a strategy for resolving trade-offs, such as a biodiversity offset strategy.

The following main conflicts exist within the conflict areas:

- *Conflict 1*: conflicts between biodiversity (e.g. CBAs and ESAs) and urban development plans;
- *Conflict 2*: conflicts between biodiversity (e.g. CBAs and ESAs) and industrial development plans;
- *Conflict 3*: conflicts between natural resources (Controlled Development Zone and Rural Conservation Zone) (e.g. rivers, CBAs, ONA etc.) and agricultural areas.

In order for these conflicts to be resolved, trade-offs need to take place with respective stakeholders. The following stakeholder must be consulted for the resolving of the conflicts:

- *Conflict 1:* CapeNature, DEADP and the Local Municipalities;
- *Conflict 2:* CapeNature, DEADP and the investors, developer and applicable stakeholders;
- *Conflict 3:* Areas that are encroaching on river boundaries etc. These conflicts are less problematic and can be resolved by the local municipality through refining of the spatial development proposals in the SDF.

8.5 Undetermined Areas

Several areas of the dataset contained areas that were undetermined, meaning, there were no attributes allocated for that area. Depending on the proximity of the undetermined zone to an existing zone, the undetermined area was allocated to an adjacent zone. The focus of allocating the undetermined areas were concentrated on the development focused EMZs (e.g. if an allocated zone fell within the proximity of the Agricultural Development Zone, it was allocated to the Agricultural Development Zone and if an undetermined area fell within proximity to an Industrial Activity Zone, it was allocated to the Industrial Activity Zone). Undetermined areas, that would result in unwanted development within pre-dominantly conservation focused areas (i.e. would affect surrounding resources) were not allocated to the any of the development focused EMZs, rather these were allocated to the Rural Conservation Zone.

9 General Guidance for EIA Process

This section provides guidance on the use of the EMF in respect of the EIA Regulations as well as for the use of the EMF when undertaking an application for environmental authorisation. It is not intended to provide detailed guidelines for the undertaking of EIAs. Rather this section deals with the manner in which the EMF should be used in the EIA process.

9.1 Use of the EMF

The EMF should be used as follows:

- As a screening tool to evaluate whether the proposed location for a project is appropriate or not. This should be done through consulting both the EMF document and the associated GIS database. "Groundtruthing" would be of assistance in this regard. Where more than one location is under consideration, the EMF could be used to establish which option would be the most suitable. Furthermore, the EMF could be consulted prior to acquiring land (e.g. prior to purchase), as part of the process of assessing its suitability for a particular use, purpose or project.

- As a scoping tool to identify the issues that require investigation as part of the EIA process. Each attribute that is indicated as being present at a particular location and its surroundings would need to be considered and relevant specialist input obtained. Note that a site should not be viewed in isolation since impacts can extend beyond cadastral or property boundaries. Thus, attributes within close proximity to the proposed development location must also be considered. This would be particularly relevant where a proposed development will relay on resources outside of its boundaries or where it would result in the discharge of emissions, effluent or wastes. The use of the EMF to assist scoping should involve reference to both the EMF document and the associated GIS database. "Groundtruthing" would be of assistance in this regard.

- As an impact assessment tool, particularly in respect of determination of the acceptability of impacts. The tables that provide the management framework for each EMZ are applicable in this regard. Acceptability of impacts should be tested against the objectives, desired outcomes and limits of acceptable change described in these tables.

The earlier the EMF is consulted in the project planning and design process, the greater the potential for formulating a development proposal that is appropriate and that meets important sustainability criteria. Identifying issues that may be 'show stoppers' at an early stage is invaluable. These would be those issues that have significant potential for the rejection of the proposed development by I&APs and/or that have a high risk of having environmental authorisation refused. The EMF would also serve to identify issues that represent 'red flags'. These would be those issues that need to be addressed to ensure the proposed development is

appropriate. Such issues require investigation and the development would need to be responsive to the findings of the resultant studies. The more the development proposal responds to the sensitivity of environmental attributes (e.g. through avoiding adverse impacts), the greater the potential for it to be accepted and to make a positive environmental and social contribution.

9.2 Relevant legislation and guidelines

There is various legislation that needs to be considered when undertaking an environmental application. In addition, environmental and land use authorities or agencies may have published guidelines that need to be taken into account. Authorities and environmental organisations should always be consulted to determine the availability of guidelines: There may also be useful guidelines available through professional organisations.

9.2.1 Legislation

Legislation that may be relevant to an environmental application is shown in the table below. This table summarises key information in respect of national legislation. There may be applicable provincial and local legislation that also requires consideration. In particular, municipalities may have legislation that relates to effluent discharge, water conservation and fire and safety requirements. It is the responsibility of the applicant/proponent and the EAP to ascertain which legislation needs to be taken into account in the planning and design of the project and in the assessment of impacts.

Table 22: Key relevant legislation

LEGISLATION	RELEVANCE
National Environmental Management Act (Act 107 of 1998) read with the 2014 EIA Regulations (GNR 982, 983, 984 and 985 of 4 December 2014)	• Principles (section 2) – these are relevant to developing assessment criteria. • Integrated Environmental Management objectives (NEMA - section 23) • EIA requirements (NEMA - section 24)
National Environmental Management Air Quality Act (act 39 of 2004) read with: • Listed Activities (GNR 893 of 22 November 2013) • Regulations regarding air dispersion modelling (GNR 533 of 11 July 2014)	• Projects that result in atmospheric emissions: – Establish need for an Atmospheric Emissions License (AEL) – Emission standards to inform project design – Requirements for dispersion modelling within air pollution/quality specialist study
National Environmental Management Waste Act (Act 59 of 2008) read with: • Listed Waste Activities (GNR 921 of 29 November 2013) • Norms and Standards for disposal of waste to landfill (GNR 636 of 23 August 2013) • National Norms and Standards for storage of waste (GNR 922 of 29 November 2013	• Projects that involve waste facilities: – Establish need for a waste license – Design of waste disposal facilities – Design of waste storage facilities

LEGISLATION	RELEVANCE
National Environmental Management Biodiversity Act (Act 10 of 2004) and: • Alien and invasive species regulations (GNR 598 of 1 August 2014) • National list of ecosystems that are threatened and in need of protection (GNR 1002 of 11 December 2011) • Critically Endangered, Endangered Vulnerable and Protected Species List (GNR 1187 of 14 December 2007).	• Projects located on vacant/undisturbed/undeveloped land • Alien clearing and rehabilitation requirements for land where alien species are present • Establish need for permit – restricted activities. • Establish presence of listed species and/or listed ecosystems • Establish need for permit – restricted activities
National Environmental Management Integrated Coastal Management Act (Act 24 of 2008)	• Projects that take place on the coast / coastal zone – Establish need for a license/permit (e.g. effluent discharge) – Planning and design of project (e.g. public access to coast) – Coastal protection zone
National Water Act (Act 36 of 1998) General Authorisation (GNR 665 of 6 September 2013)	• Projects that involve abstraction of water or discharge of effluent or stormwater into water resources. – Establish need for water use license. – Establish water quality requirements.
National Heritage Resources Act (Act 15 of 1999)	• Any project that could affect heritage resources. Of particular relevance is: – Establish need for a permit (e.g. section 27) – Establish need for permission to alter buildings older than 60 years. – Establish need for Heritage Impact Assessment (section 38)
Major Hazard Installation Regulations (GNR 692 of 2001) read with the General Machinery Regulations (GNR R1521 of 5 August 1988)	• Project that involve the handling, storage and/or use of substances that could pose a major hazard – Establish need for Major Hazard Installation risk assessment and procedures for undertaking such assessment. – Notification of Major Hazard Installation.
Hazardous Chemical Substances Regulations (GNR 1179 of 25 August 1995)	• Establish design requirements for facilities involving handling storage and use of hazardous substances.
General Safety Regulations (GNR 1031 of 30 May 1986)	• Establish design requirements for facilities involving handling storage and use of hazardous substances.

There are numerous guidelines that available to assist applicants and EAPs in addressing environmental issues and thresholds in project planning and design. A list of guidelines is given below – this list is not exhaustive.

- DWAF Water Quality Guidelines of 1996. These guidelines comprise several volumes relating to different water uses, with the objective of ensuring water resources remain fit for use.
- Western Cape PSDF: Rural Land Use Planning and Management Guidelines, May 2009
- NFEPA: Management Guidelines for wetland and river FEPAs (Implementation Manual for FEPAs (Driver *et al* 2011).
- DWAF Minimum Requirements relating to waste management (4 volumes) of 1998.

- DEADP Guidelines for involving specialists in the EIA process. A series of documents make up these guidelines including heritage, economic and biodiversity specialists.
- DEADP EIA Guideline and Information Document Series March 2013.
- DEADP Guideline on Environmental Management Plans.
- DEADP Guideline for the Management of Development on Mountains, Hills and Ridges in the Western Cape.
- DEADP Guideline on the Application of the EIA Regulations to Structures Associated with Communications.
- DEADP Guidelines for Golf Courses, Golf Estates, Polo Fields and Polo Estates in the Western Cape.
- DEADP: Rural Land Use Planning & Management Guidelines (2009)
- DEADP Generic Environmental Best Management Practice Guideline for Aquaculture Development.
- DEADP – PSDF (2009 and 2014).
- DEADP – A Guide to Reporting and Estimating Emissions.
- DEADP West Coast District Municipality Coastal Management/Set-back Lines.
- DEA Integrated Environmental Management Information Series. This comprises a series of documents that deal with various aspects of the EIA process.
- DEA: South African Manual for Outdoor Advertising Control.
- CapeNature stewardship guidelines.
- CapeNature FSP.
- Berg River Estuary Management Plan, C.A.P.E. Estuary Management Programme.
- West Coast Biosphere Reserve SDP.
- SANS 241 – South African Drinking Water Standard.
- SANS 1929 – Ambient Air Quality – limits for common pollutants.
- SANBI: National Biodiversity Assessment, 2011.
- State of the Bay reports for Saldanha Bay & Langebaan Lagoon, and St Helena Bay.
- DAFF Environmental Integrity Framework for Marine Aquaculture 2012.

9.3 "Exclusion" and "restriction" of activities

Section 24 (2) of NEMA and the Environmental Management Framework Regulations of 2010 state that the Minister, and every MEC with the concurrence of the Minister may identify –

a) "geographical areas based on environmental attributes, and as specified in spatial development tools adopted in the prescribed manner by the environmental authority, in which specified activities may not commence without environmental authorisation from the competent authority;
b) geographical areas based on environmental attributes, and specified in spatial development tools or environmental management instruments adopted in the prescribed manner by the environmental authority, in which specified activities may be excluded from authorisation by the competent authority;

c) activities contemplated in paragraphs (a) and (b) that may be excluded from the requirement to obtain an environmental authorisation from the competent authority, but that must comply with prescribed norms or standards; or
d) activities contemplated in paragraphs (a) and (b) that, based on an environmental management instrument adopted in the prescribed manner by the Minister or an MEC, with the concurrence of the Minister, may be excluded from the requirement to obtain an environmental authorisation from the competent authority."

Accordingly where an EMF constitutes a "listed area" specified activities may be excluded from having to obtain environmental authorisation. The management framework for each EMZ has identified potential activities that can be excluded for that EMZ. The process of excluding listed activities should be undertaken during the development of the local SDF and must integrate the EMZs developed within this EMF. The process of excluding activities requires the development of the following:

- a process that will guide the undertaking of excluded activities;
- a set of minimum requirements for the undertaking of excluded activities; and
- the adoption of the exclusions process and minimum requirements by the MEC.

Exclusions in terms of NEMA does not negate the need to undertake any other authorization or permit under the jurisdiction of another act (e.g. NHRA, NWA , NEMWA etc.)

Similarly to the development of exclusions for activities, section 24 (2) (a) allows for the identification of activities that may not commence without an environmental authorisation from the competent authority. Therefore, more stringent measures for sensitivities are can be developed, such as requiring Listing Notice 3 authorisations.

10 Roles and responsibilities

The roles and responsibilities in respect of the EMF are concerned with its implementation. There are various parties that have a role to play in giving effect to the EMF. These are:

- The environmental decision-making authorities (competent authority in respect of environmental authorisations under section 24 of NEMA).
- Commenting authorities.
- Authorities responsible for natural resources management.
- Environmental Assessment Practitioners.
- Applicants.

The respective roles and responsibilities of the above-mentioned parties are shown in Table 23 below.

Table 23: Roles and responsibilities in respect of the EMF

ROLE	RESPONSIBILITY
DEADP and DEA – competent authority for issuing environmental authorisation[107]	• **Take the EMF into account:** Cognisance must be taken of the EMF when considering environmental applications in the area covered by the EMF. This is a requirement of regulation 2(1)(c) of the 2010 EMF Regulations and of section 24(3) of NEMA. • **Measure performance:** The competent authorities should include performance indicators in their Annual Performance Plans to track the extent to which environmental decision are aligned / not aligned with the EMF. • **Maintain the EMF:** Ensure that the EMF is kept up-to-date in accordance with an appropriate review period schedule. In doing so, cognisance must be taken of policy and legal developments as well as information pertinent to environmental trends including (but not limited to) the provincial and municipal SoER / Environmental Outlook Report, water resource management plans, biodiversity plans, waste management plans and AQMPs.
DEADP (Directorate: Climate Change and Biodiversity) / CapeNature / SANBI	• **Keep track of transformation of biodiversity:** This applies in general and in particular to CBAs/CESAs/FEPAs and listed threatened ecosystems. Monitoring of levels of illegal conversion of natural areas also needs to be monitored. • **Monitor remaining areas of natural, indigenous vegetation:** It is essential that remaining areas of natural vegetation are monitored in relation to conservation targets and that a reliable record of areas formally protected for conservation is maintained. • **Revise biodiversity plans:** It is important that any erosion of CBAs/CESAs/FEPAs triggers a revision of associated biodiversity plans and re-assessment of areas needed to meet conservation targets.
DEADP and DEA – integration of EMF with SDF for exclusion	• **Integration of EMF:** As the excluding of activities must be undertaken in accordance with the MEC, DEADP and DEA must ensure that the EMF in integrated with the SDF to allow for the undertaking of exclusions.

[107] "**environmental authorisation**", when used in Chapter 5 of NEMA, means the authorisation by a competent authority of a listed activity or specified activity in terms of this Act, and includes a similar authorisation contemplated in any Specific Environmental Management Acts (NEM Protected Areas Act, NEM Biodiversity Act, NEM Air Quality Act, NEM Integrated Coastal Management Act, NEM Waste Act and National Water Act). That is, 'environmental authorisations' include emissions and waste licenses/permits, in addition to EIA authorizations.

ROLE	RESPONSIBILITY
DEADP (Directorate: Spatial Planning)	• **Take the EMF into account**: Although there is no specific regulatory obligation placed on this Directorate to consider the EMF in decision-making, it must be borne in mind that an obligation is placed on all organs of state to consider the NEMA principles in respect of any activity for which they are responsible, where the activity could have significant environmental consequences. Decisions that involve land use and spatial planning would fall into this category. The EMF has taken cognisance of the NEMA principles and thus provides a mechanism for the Directorate to meet this legal obligation. Similarly, the EMF offers support to the Directorate in giving effect to the Environmental Right in the Constitution. It also supports the realisation of the Provincial Government of the Western Cape's strategic objective relating to the mainstreaming of sustainability into its activities.
Municipalities	• **Take the EMF into account**: Although there is no specific regulatory obligation placed on the municipality to consider the EMF in decision-making, it must be borne in mind that an obligation is placed on the municipality to consider the NEMA principles in any activity that could have significant environmental consequences. Decisions that involve land use and spatial planning would fall into this category. The EMF has taken cognisance of the NEMA principles and thus provides a mechanism for the municipality to meet this legal obligation. Similarly, the EMF offers support to the municipality in giving effect to the Environmental Right in the Constitution. Furthermore, the EMF would be of assistance to the municipality in drawing up comments on environmental applications in its role as a commenting authority. • **Integrate the EMF into the SDF:** The SDF must be integrated with the EMF to ensure that environmental considerations are taken into account. This is critical in the development of exclusions in terms of NEMA. The exclusions process then becomes a regulatory process that must be considered during decision-making. • **Participation in the review and updating of the EMF:** The EMF would require revision on a regular basis (Refer to Section 13). The municipality may initiate the revision of the EMF and/or participate in this process and make relevant information available such as the SoER/Environmental Outlook Report, IWMP and the AQMP to ensure that there is consistency and synergies between these different environmental management tools.
Other authorities	• **Take the EMF into account**: Consider the EMF in decision-making as it is a requirement to consider the NEMA principles in any activity that could have significant environmental consequences. The EMF has taken cognisance of these principles and thus provides a mechanism for the authority concerned to meet this legal obligation. • **Use the EMF for commenting purposes**: The EMF would be of assistance in drawing up comments on environmental applications.
Environmental Assessment Practitioners and specialists	• **Take the EMF into account**: Consider the EMF when conducting BA or S&EIR processes. The EMF serves as a guide for the location of development proposals. It also provides assistance in the identifying potentially significant impacts and risks upfront. In this regard, impacts should be evaluated within the context of the management objectives and the limits of acceptable change detailed in the EMF. The objective of this approach would be to determine whether impacts are within acceptable levels or not. Finally, the EMF provides an early indication of specialist studies that may be required. EAPs should bear in mind that the competent authority is obliged to consider the EMF in its decision-making process. Thus, if the EMF is not considered in a BA or S&EIR process, there is a high probability that these reports will be rejected.

11 Decision-making framework

Concern regarding the mainstreaming of environmental considerations into development and investment decisions has been debated and expressed at an international level. Among others, this is evidenced by the nature of international discussions associated with climate change and biodiversity conventions. This is despite the commitment made by governments, including South Africa, to promote the integration of the principle of environmental protection into development decision-making, as set out in the Rio Declaration. In an analysis by the United Nations Development Programme, United Nations Environment Programme, World Bank and the World Resources Institute[108] it is concluded that development decisions are being made without local information, consultation, or support. Accordingly the contribution of ecosystem goods and services to human welfare is not being adequately recognised, which leads to erosion of civil and economic rights, as well as natural heritage.

One of the reasons that this situation exists is that there is a "disconnect" between different levels of decision-making. There are basically two types or levels of decision-making: namely strategic decisions and implementation decisions, which are interdependent. Progress with mainstreaming environmental considerations into development decisions has improved in the last decade in South Africa through the development of tools such as biodiversity plans and the prioritisation of freshwater resources.

In the context of determining how land should be used (i.e. development planning) **strategic decisions**, are primarily concerned with defining the direction over the long-term. Thus, a strategy would reflect the "desired future state" of an area or region, for example. Strategic decisions range from the adoption of international agreements, the formulation of national policies and plans (which become gazetted as White Papers) and the preparation of Spatial Planning Frameworks, as the PSDF and Municipal SDFs. Similarly, an EMF can be regarded as a strategic-level document and its endorsement or adoption by the Minister or MEC responsible for environmental matters amounts to a strategic-level decision.

Implementation decisions relate specifically to the management or control of development on a particular site or area. Decisions at this level (site specific) ought to be aligned with the strategy for the area. If they are not, they have the potential to undermine the strategy and its vision and goals. This in turn means that it would be highly unlikely that the "desired future state" put forward in the strategy would be achieved. Thus, given that a sustainable future is generally acknowledged to be desirable, decisions about development and economic growth must be taken with sustainability principles in mind.

[108] United Nations Development Programme, United Nations Environment Programme, World Bank, World Resources Institute, (2003): World Resources 2002 – 2004: Decisions for the Earth, Balance, Voice and Power

11.1 Decision-making (sustainability) criteria

Together, the Constitution and NEMA provide a robust foundation for sustainability that has guided the preparation of this EMF. Section 24 of the Constitution of South Africa, the 'environmental right', states that everyone has the right to an environment that is not harmful to health or wellbeing, and to have the environment protected for the benefit of present and future generations, through reasonable measures that:

- prevent pollution and ecological degradation
- promote conservation and
- secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

This section lays a solid foundation for long-term conservation or protection of important natural and social resources as envisaged by the environmental management principles in the NEMA. The NEMA principles underline the fact that the environment is 'held in public trust', to be safeguarded as 'the people's heritage'. These principles therefore acknowledge the dependence of human wellbeing on natural systems and resources. It is widely acknowledged that environmental concerns must be considered if basic human needs are to be met, both now and in the future. The NEMA principles emphasise conservation of biodiversity and ecological integrity (paying particular attention to sensitive, vulnerable, highly dynamic or stressed ecosystems subject to development or use pressure), conservation of heritage landscapes and sites, and avoiding or minimising and remedying pollution and environmental degradation.

In addition, a 'risk averse and cautious' approach is advocated, that takes into account limits of current knowledge about decisions and actions. Importantly, the principles include an expanded 'polluter pays' requirement, that requires applicants to take account of the potential of their proposed project/development to cause adverse environmental impacts (e.g. pollution, environmental degradation, adverse human health effects) upfront. In effect, this means that the applicant's project would carry the costs of avoiding negative environmental and social impacts, and where these cannot be fully avoided to minimise such impacts. This is in accordance with the mitigation hierarchy, which is encompassed in the NEMA principles. In circumstances where adverse impacts involve threatened resources (natural or social), impact mitigation might include compensation for or offsetting of the residual negative impact. In essence, this approach deals with equity and environmental justice concerns; preventing private enrichment at the cost of loss or deterioration in public resources.

Table 18 presents a number of broad sustainability criteria which should be used to guide decision-making on development within the Saldanha area. These criteria have been developed internationally and can be seen to resonate well with the requirements of both the Constitution and NEMA. In addition, they reflect the contents of the draft Municipal Decision-making Guideline prepared for DEADP.

Table 24: Linking the Sustainability Criteria proposed for use in the EMF to the Constitution of South Africa and the National Environmental Management Act (NEMA: Act 107 of 1998)

SUSTAINABILITY CRITERIA		S24 OF THE CONSTITUTION	RELATED NEMA PRINCIPLES
1	*Integrity and resilience of social-ecological systems* Maintain the long-term integrity of ecosystems and associated social systems. Protect the irreplaceable life-support functions and diversity of life (biodiversity) that provides future insurance against change, and on which human as well as ecological well-being depends, and maintain or improve the ability of the ecosystems and dependent social systems to recover after disturbance or shocks.	Everyone has the right to an environment that is not harmful to health or wellbeing, and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development while promoting justifiable economic and social development.	s4(a) Sustainable development requires consideration of all relevant factors, including: (i) Avoid or, where not possible to altogether avoid, minimise & remedy, disturbance of ecosystems & loss of biological diversity; (ii) Avoid or, where not possible to altogether avoid, minimise & remedy pollution & degradation of the environment; (iii) Avoid or, where not possible to altogether avoid, minimise & remedy, disturbance of landscapes and sites that constitute the nation's cultural heritage. (r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.
2	Social and livelihood sustainability Support and improve sufficient services, resources and opportunities to contribute to sustainable livelihoods (e.g. access to basic resources and essential services, employment opportunities, reduced vulnerability to disease and economic insecurity, and opportunities to seek improvements in social, human and productive capital in ways that do not compromise future generations).		s2(2) Environmental management must place people and their needs at the forefront of its concern, and serve their long term physical, psychological, developmental, cultural and social interests equitably. s4(a)(v) Responsible and equitable use and exploitation of non-renewable natural resources, taking into account consequences of resource depletion. (vi) Development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised. (q) Recognise the vital role of women and youth in environmental management and development, and promote their full participation
3	Equity and environmental justice within current generations Ensure fairness in allocation of, and access to, natural resources and opportunities in the Saldanha area, so that gaps in wellbeing between rich and poor in the current generation are narrowed.		s4(c) Pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons. (d) Pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure well-being. Special measures may be taken to ensure access by categories of persons disadvantaged by unfair discrimination. (p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.
4	Equity and environmental justice between generations Ensure fairness in allocation of, and access to, natural resources and opportunities in the Saldanha area, so that		s4(o)The environment is held in public trust for the people, the beneficial use of resources must serve the public interest and the environment must be protected as the people's common heritage.

	options for future generations are kept open.		
SUSTAINABILITY CRITERIA		**S24 OF THE CONSTITUTION**	**RELATED NEMA PRINCIPLES**
5	Efficiency in use of natural resources and available capacity Ensure that no one would be left worse off, benefits are maximised and costs are minimised, resources (e.g. water, energy) are used efficiently, and best use is made of available capacity.	Everyone has the right to an environment that is not harmful to health or wellbeing, and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development while promoting justifiable economic and social development.	s4(a)(v) Responsible and equitable use and exploitation of non-renewable natural resources, taking into account consequences of resource depletion. (vi) Development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised.
6	Democracy and good governance Promote good governance, appropriate and capacitated institutions, greater attention to fostering reciprocal awareness and collective responsibility.		s4(f)Promote participation of all I&APs in environmental governance, and all people must have the opportunity to develop understanding, skills and capacity necessary for achieving equitable and effective participation. Ensure participation by vulnerable and disadvantaged persons. (g) Decisions must take into account the interests, needs and values of all I&APs, recognising all forms of knowledge including traditional and local knowledge. ….(h) Promote community well-being and empowerment through environmental education, raising environmental awareness, sharing of knowledge and experience and other appropriate means (k) Decisions must be taken in an open and transparent manner and access to information must be provided in accordance with the law. …. (l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.
7	**Precaution and adaptation** Respect uncertainty, avoid even poorly understood risks of serious, irreversible damage to the foundations of sustainability, or irreplaceable loss of resources, plan to learn, design for surprise and manage for adaptation.		s4(a)(vii) A risk-averse and cautious approach is applied, taking into account the limits of current knowledge about the consequences of decisions and actions (vii).
8	**Integration** Seek mutually supportive benefits, synergies and overall gains or positive outcomes for all the above sustainability criteria and in integrating different land uses in the terrestrial and aquatic environment of the Saldanha area.		s4(a)(viii) Anticipate and prevent negative impacts on the environment and on people's environmental rights; where they cannot be altogether prevented they should be minimised and remedied. (b) Environmental management must be integrated and take into account effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

11.2 Using the EMF to inform environmental decision-making

The significance of impacts caused by development depends on:

- The nature of the proposed development (e.g. heavy industry is generally associated with high pollution potential and health hazard) and the extent to which potential impacts can be effectively mitigated; and
- The attributes of the receiving environment (e.g. scarce water resources, sensitive, vulnerable or threatened ecosystems, fertile soil / productive agricultural area, sensitive cultural resources).

Where the characteristics and value of the receiving environment are unique or considered to be irreplaceable, almost any type of development would cause significant impacts. This situation is represented by the 'conservation focused' EMZs. Where the receiving environment has a low sensitivity, in that there are no important attributes, the nature of the development would determine the significance of impacts and whether these developments are compatible. The 'development focused' EMZs are of relevance to this situation.

The Saldanha area has been extensively transformed in the past for a range of industrial, tourism and agricultural uses and settlement. Most of the areas that could support productive land uses have already been converted, and the ecosystem services underpinning those uses are reaching, have reached or have exceeded, their capacity to support further growth. Pressures on natural resources are illustrated by, for example, the deterioration in the quality of water in, and the condition of Saldanha Bay and the pressure on water resources.

Since this area has a high concentration of unique, threatened and/or highly valued natural and heritage resources, further transformation and use of resources outside existing urban and industrial areas must be approached with caution. Furthermore, as a result of the significance of biodiversity in Saldanha, highly sensitive and irreplaceable resources exist within the existing urban and industrial areas that require additional protection and must be avoided where at all possible. In effect, the receiving environment dictates the type of development that could be supported. For this reason, all of the areas beyond existing urban areas fall into either a 'Rural Conservation', a 'Controlled Development' or a 'Restoration' EMZ, while highly sensitive resources under considerable development pressure within the urban and industrial areas fall within the 'Urban Conservation' EMZ. The EMF provides clear management objectives and specifies limits of acceptable change for each EMZ. These considerations should be used by decision-makers to evaluate development proposals, and by developers to guide their proposals in such a way as to minimise risk.

In essence, further development of the Saldanha area should be **'smart growth'** rather than simply growth for its own sake, in response to the municipality's values of 'sustainable' and 'quality' living environments. That is, the focus should be on advancing human wellbeing and quality of life through improving the efficiency and quality of - and increasing the spread of benefits from - existing tourism, fishing and commercial activities, and on realising the opportunities for development associated with the unique natural assets of this municipality.

Development proposals that would lead to environmental impacts inconsistent with the recommendations of the control zones and associated limits of acceptable change should not be authorised, unless there are unique and/or exceptional circumstances. These 'exceptional circumstances' would be associated with over-riding public good issues such as meeting basic needs and the equitable distribution of resources. Projects involving public infrastructure developments where it can be demonstrated conclusively that there are no alternative locations for these projects, and no options exist for delivering the intended benefits to the public would fall into this category. Where at all possible, development should strive to exploit opportunities to make a net positive contribution to the health of the environment and wellbeing of people in the Saldanha area as well as avoiding negative impacts.

With reference to the Table 24, the issues in the Saldanha area that are central to its sustainability are:

- Biodiversity conservation;
- Conservation and/or improvement of ecosystem services;
- Safeguarding productive agricultural land;
- Protecting cultural heritage and important social resources,
- Controlling urban spread; and
- Providing infrastructure and services in support of poor and vulnerable communities.

The tables relating to the EMZs provide criteria in the form of management objectives and limits of acceptable change which should be applied in the environmental decision-making process. There is no uniform definition or description of a good environmental decision. Gibson *et al* (2005) note that decisions should be aimed at achieving net gains from a sustainable development perspective. In this regard, decision-making criteria need to be clarified and the trade-offs between criteria that are applied by decision-makers must be open. Generally, attributes of a good decision are considered to include[109] the following:

- That it provides for protection of natural resources.
- That the social costs are not borne solely or primarily by vulnerable groups or communities.
- That it is in the interests of the "public good" particularly in respect of access to resources.
- That it does not result in limits of acceptable change being exceeded.
- That it takes cognisance of the NEMA principles.
- That it is technically sound.
- That it is based on a defensible rationale.
- That it reduces risk at a reasonable cost.
- That it is consistent with other similar decisions.
- That it meets legal obligations or requirements.
- That it takes account of limitations in knowledge, adopting a precautionary approach where warranted.
- That it is based on input from all parties.

[109] Adapted from NOER (1996)

- That it addresses a clearly-defined problem.
- That it provides a solution and does not transfer the problem from one place or time to another place or time.
- That it is widely accepted.

12 Monitoring and evaluation framework

The EMF highlights particular environmental attributes within each EMZ and provides the EMZ's limits of acceptable change in relation to specific management objectives. The EMF strives to instil a proactive approach to environmental management by directing development to areas that could support such development (inclusive of potential for exclusions), thereby striving to avoid or prevent significant negative effects and optimise potential benefits. In addition, the EMF sets explicit objectives and limits of acceptable change for EMZs; the onus being on the proponent of development to demonstrate reliably that these limits would not be exceeded.

However, for the EMF to be effective, it is essential that these attributes are monitored and evaluated in light of the objectives, and that negative trends are brought to the attention of the Municipality, other responsible authorities and the public. Only in this way can decision makers take due notice of potential problem areas and build in relevant safeguards to halt negative trends. As such, a Greater Saldanha Bay Inter-Governmental Task Team has been established that provides all relevant authorities operating within this area a platform for discussion. Further from this, a forum to engage with affected communities and stakeholders must be established to ensure transparency with the public and the effective implementation of the EMF.

The monitoring and evaluation of these attributes should be a focus of the SoER , of the Municipality's IWMP and AQMP, of relevant catchment management agency or water user associations and of monitoring in terms of biodiversity plans.

12.1 Indicators – delivering sustainability through the EMF

The purpose of the indicators is to provide a basis for measuring performance. In the case of the EMF, the indicators are focused primarily on the EIA Regulations, with a view to assessing the performance of this system against policy goals and priorities and in relation to objectives and desired outcomes described in this EMF. Indicators are provided for:

- Environmental authorisation compliance
- Green economy
- Biodiversity and ecological integrity
- Agricultural resources
- Water resources and water quality
- Heritage resources
- Environmental quality and risk

It is envisaged that these indicators would be incorporated into the performance management system of the DEADP in respect of its environmental impact management role. Other decision-making authorities could also utilise these indicators (e.g. land use and planning decision-makers). It is not the intention that all of the indicators are applied as this would result in a potentially cumbersome performance monitoring system. Rather, a wide range and number of indicators are provided from which the most meaningful, useful and appropriate would be selected.

Environmental authorisation compliance

- Number of incidents of non-compliance with conditions of environmental authorisation.
- Number of incidents of non-compliance with conditions of authorisation that have resulted in environmental pollution or degradation.
- Number of incidents of non-compliance with conditions of authorisation that have resulted in the reduction of, or loss in extent of, environmental resources.

Green economy

- The number and type of projects authorised which have resulted in job creation through community-based natural resource management and the number of jobs created.
- The number and type of projects authorised where green technology has been applied to reduce water use and the extent of water savings achieved.
- The number and type of projects authorised where green technology has been applied to reduce energy use and the extent of energy savings achieved.
- The number and type of projects authorised where green technology has been applied to reduce waste production and the extent of waste reduction achieved.
- The number and type of projects authorised where green technology has been applied to reduce pollution to air, water or land.

Biodiversity and ecological integrity

- The number and type of projects that have been authorised which have resulted in the loss or reduction in the area (ha) of CBAs, CESAs, FEPAs and important ecological corridors.
- The number and type of projects that have been authorised which have resulted in a reduction in the area of unique or special habitats.
- The number and type of projects that have been authorised which have resulted in a decline in the number of threatened or local endemic plant or animal populations.
- The number and type of projects authorised that have resulted in the loss or infilling of wetlands and the number of wetlands affected.
- The number and type of projects authorised that have resulted in land conversion (ha) within the prescribed buffer zones of river corridors and wetlands.
- The number and type of projects authorised where an area of land has been committed to formal conservation in terms of NEMPAA and/or set aside as a biodiversity offset.

- The number and type of projects authorised which have resulted in a reduction of the area (ha) of invasive alien plant cover (e.g. through clearing) and where this area is undergoing an ecological restoration process.
- The number and type of projects approved in which wetlands have been restored or created and the extent thereof (ha).
- The number and type of projects authorised which include riverine corridor restoration and the extent thereof (ha).
- The number and type of projects authorised within the Coastal Protection Zone.
- The number and type of projects authorised within the marine or coastal zone of environment Big Bay, Small Bay, Langebaan Lagoon, St Helena Bay and the Berg River Estuary, respectively.

Agricultural resources

- The number and type of projects authorised which have resulted in the loss of irrigated agricultural land (ha).
- The number and type of projects authorised which have resulted in the loss of dryland agricultural land (ha).

Water quality and flow

- Number and type of projects authorised that require water abstraction from rivers or water bodies.
- Number and type of projects approved that require water abstraction to the extent that could threaten the maintenance of the ecological reserve or in-stream flow requirements in rivers.
- Number and type of projects authorised that will result in the release of effluent into rivers or water bodies.
- The number and type of projects authorised that result in changes to the floodlines, such that flooding risk has changed and whether this risk has increased or decreased.

Heritage resources

- Number and type of projects authorised which have resulted in the damaging or destruction of heritage resources.
- Number and type of projects authorised which have resulted in restoration and/or given formal protection.

Hazards

- Number and type of projects authorised which have a known nuisance or pose a hazard and are located next to sensitive land uses.

12.2 Indicators – adherence to the EMF

- Number of applications authorized that meet the EMF management objectives relevant to the application.
- Type/nature of EMF objectives where difficulty is being experienced in meeting these.
- The number of applications where trade-offs have been applied in decision-making where the outcomes/objectives of the EMF are being met.

- The number of applications where trade-offs have been applied in decision-making where the outcomes/objectives of the EMF are being undermined.
- The nature of trade-offs that are being applied in decision-making – what is being traded off and why?

13 Maintaining the EMF

This section deals with both the updating of the EMF and its integration with spatial plans.

13.1 Updating the EMF

The EMF must be updated every five years. It is preferable that the revision cycle be synchronised and integrated with the IDP/SDF revision. A protocol for revision is as follows:

1. The revision cycle would be initiated by the DEADP in consultation with the relevant municipality/ies.
2. The DEADP should inform the DEA of the EMF revision process.
3. The DEADP should inform other relevant national, provincial and local authorities that the EMF is entering a revision cycle. These authorities can be requested to contribute useful information.
4. Assess the performance of the EMF against the relevant indicators and determine where performance has been weak and where it has been satisfactory. In particular, ascertain whether the EMF has contributed to the reversal of negative trends and if so, how this was achieved. If the EMF is deemed to have resulted in a worsening of negative trends, then the reasons need to be established so that these weaknesses can be addressed in the revision process. The results of this performance assessment process should be used to inform the Scope of Work for the EMF revision/updating. It is preferable to involve other relevant authorities in the evaluation of performance of the EMF.
5. The revision process should involve the following:
   - Establish whether new or revised data with respect to environmental attributes are available. The GIS database and Situation Assessment must be updated accordingly.
   - Determine whether new or revised policies and/or guidelines relating to sustainability, heritage resources, biodiversity, water and other natural resources management and/or environmental management have been published that are of relevance to the EMF area. Review the criteria on management objectives, desired outcomes and limits of acceptable change in light of new or revised policies/guidelines.
   - Evaluate whether the attribute criteria for the EMZs are still relevant and revise as necessary. Update the EMZ maps and the associated tables as relevant.
   - Determine whether trends and pressures identified in the EMF are still relevant, whether negative trends have worsened, stabilised or reversed, and if there are any new trends emerging that pose challenges for environmental management, drawing in particular on SoER and/or Environmental Outlook reports. Review the categories of EMZ, and the

criteria relating to management objectives, desired outcomes and limits of acceptable change, as appropriate, to address these trends. Integration with spatial plans

The information base used to determine EMZs in this EMF comprises the best available up to date data on a wide range of attributes. These EMZs should therefore inform the pattern and direction of future development and thus the decision-making process. Furthermore, they should be used by the municipality to assist in defining an urban edge and giving environmental input into the SDF and zoning schemes.

Every municipality must adopt an IDP within a prescribed period after the start of its elected term.[110] An IDP adopted by the council of a municipality is "the principal strategic planning instrument which guides and informs all planning and development."[111] The IDP must be "compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation."[112] In practice, there is likely to be an IDP already in place while the EMF is being drafted. Municipalities are required to review their IDPs annually.[113] It is at this stage that a relevant EMF adopted during the previous year, could be considered and the SDF aligned with the EMF.

EMFs could have legal effect through linking them to other development plans. These may include zoning schemes adopted under the Land Use Planning Ordinance;[114] IDPs (which municipalities must compile in terms of the MSA)[115] and the SDFs contained in IDPs.

The EMF highlights both opportunities and focal areas for directing future development, and constraints to development. These opportunities and constraints can only be translated into effect by informing and linking with the SDF; i.e. it is important for the SDF and EMF to 'speak the same language'. The EMF ultimately needs to be embedded in the zoning scheme

[110] Section 25(1) of the MSA.
[111] Section 35(1)(a) of theMSA.
[112] Section 25(1)(e) of the MSA.
[113] Section 34 of the MSA.
[114] Ordinance 15 of 1974.
[115] Act 32 of 2000.

14 REFERENCES:

Anchor Environmental (2008): Berg Estuary Situation Assessment, C.A.P.E. Estuaries Management Programme

Anchor Environmental (2009): Berg Estuary Draft Management Plan, C.A.P.E. Estuaries Management Programme

Anchor Environmental (2012): Saldanha Bay and Langebaan Lagoon, State of the Bay, 2011 – Technical Report, Saldanha Bay Water Quality Forum Trust.

Anchor Environmental (2013): Saldanha Bay and Langebaan Lagoon, State of the Bay, 2012 – Technical Report, Saldanha Bay Water Quality Forum Trust.

Anchor Environmental (2014): Saldanha Bay and Langebaan Lagoon, State of the Bay, 2013 and 2014 – Technical Report, Saldanha Bay Water Quality Forum Trust

ASP (2014). Berg River Floodline Study

Balmford, A. (2012). *WILD HOPE: On the Front Lines of Conservation Success*. The University of Chicago Press, Ltd., London. ISBN-13: 978-0-226-03600-7

Bergrivier Municipality IDP 2012 - 2017

Bergrivier Municipality (2011): Local Economic Development Strategy

BKS (2011): Status Quo Report, IDZ Feasibility Study, Wesgro.

Bridget O'donoghue (2016). Saldanha Bay Municipality: Heritage Resources Survey Phase One

Cadman, M., Petersen, C., Driver, *et al.* 2010. Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience. South African National Biodiversity Institute, Pretoria.

Cape West Coast Biosphere Reserve (2011): Site Assessment Review

Cape West Coast Biosphere Reserve (2012): ZA 5164 - Securing a Corridor of Endangered Vegetation through an Industrial Area within the Cape West Coast Biosphere Reserve

Clark, B. and Ractliffe, G (Eds.) (2007): Berg River Baseline Monitoring Programme, Final Report – Volume 5: Synthesis, DWAF Report No. P WMA 19/G10/00/2107.

Council for Scientific and Industrial Research, (2013). Strategic Environmental Assessment (SEA) of Port of Saldanha

Driver *et al* (2011): NFEPA: Management Guidelines for wetland and river FEPAs (Implementation Manual for FEPAs, SANBI.

du Plessis J.A. (2008): Managing the unseen: Langebaan Road Aquifer System, Water SA Vol. 35 No. 2 (Special WISA 2008 edition).

Department of Agriculture Forestry and Fisheries (2014): AQUACULTURE YEARBOOK 2014 SOUTH AFRICA, DAFF

Department of Water Affairs and Forestry (2009): Western Cape Water Reconciliation Strategy, Newsletter 5

Department of Water Affairs, South Africa (2012). Report No.1: Ecological Water Requirement Assessments, Volume 3 – Berg Estuary Environmental Water Requirements

Department of Water and Sanitation (2015): Groundwater Status Report-Western Cape Region

GEOSS (2006): Groundwater Assessment of the North-West Sandveld and Saldanha Peninsula as an Integral Component of the of the Cape Fine Scale Biodiversity Project.
Aquaculture Yearbook 2012, Department of Agriculture, Forestry and Fisheries

Maree, K.S. and Vromans, D.C., 2010. The Biodiversity Sector Plan for the Saldanha Bay, Bergrivier, Cederberg and Matzikama Municipalities: Supporting land-use planning and decision-making in Critical Biodiversity Areas and Ecological Support Areas. Produced by CapeNature as part of the C.A.P.E. Fine-scale Biodiversity Planning Project. Kirstenbosch

Pence, G (2008): C.A.P.E. Fine-Scale Systematic Conservation Planning Assessment - Technical Report, CapeNature

Ranger, K.S. & Du Plessis, C. (2010). Bergrivier Municipality Biodiversity Report.

Royal Haskoning DHV (2014). Coastal Set-back Lines for the West Coast District- Coastal Processes and Risk Modelling.

National Climate Change Response Whitepaper

Saldanha Bay Municipality IDP Review 2011/12 –- April 2011.

Saldnaha Bay Municipality (2012). IDP 2012 - 2017

Sarah Winter (2013). Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape

Seaton Thomson & Associates (2013): Tourism Development Plan for the Saldanha Bay Municipality, Phase 3.

SRK Consulting (2007). Port Of Saldanha Proposed Reverse Osmosis Water Desalination Plant - Groundwater Resources Impact Assessment

UrbanEcon (2005): Local Economic Development Strategy for the Saldanha Bay Municipality

Western Cape Government Provincial Treasury (2014). Saldanha Bay Municipality Socio-economic Profile

West Coast District Municipality (2014). Policy Framework for Climate Change Response in the West Coast District