Western Cape Government
Environmental Affairs and Development Planning

ENVIRONMENTAL MANAGEMENT FRAMEWORK FOR THE GREATER SALDANHA AREA

MARCH 2021

CONTENTS

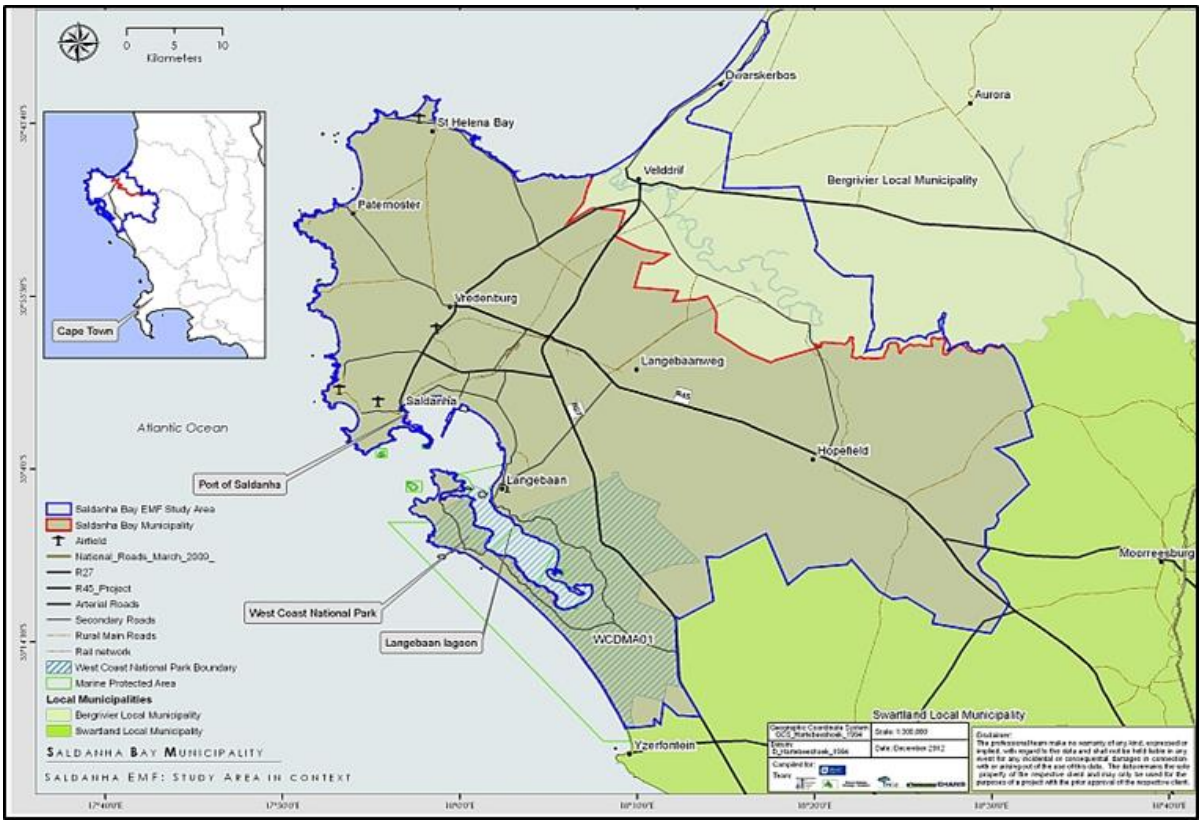
ACRONYMS AND INITIALISMS

AEL	Atmospheric Emissions License
AQMP	Air Quality Management Plan
BRM	Bergrivier Municipality
BRMA	Bergrivier Municipal Area
BSP	Biodiversity Spatial Plan
C.A.P.E.	Cape Action for People and Environment
CBA	Critical Biodiversity Area
CESA	Critical Ecological Support Area
CFR	Cape Floristic Region
CML	Coastal Management Lines
CoCT	City of Cape Town
CR	Critically endangered
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture Forestry and Fisheries (Now split into DEFF and DALRRD)
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEFF	Department of Environment, Forestry and Fisheries
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DWS	Department of Water and Sanitation
E. coli	Escherichia coli
EAP	Environmental Assessment Practitioner
EI	Ecological Infrastructure
EIA Regs	Environmental Impact Assessment Regulations
EIA	Environmental Impact Assessment
EIIF	Ecological Infrastructure Investment Framework
EMF	Environmental Management Framework
EMZ	Environmental Management Zone
EN	Endangered
ESA	Ecological Support Areas
FEPA	Freshwater Ecosystem Priority Area
GDP	Gross Domestic Product
GIS	Geographical Information Systems
HDI	Human Development Index
I&Aps	Interested and Affected Parties
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IWMP	Integrated Waste Management Plan

Kl	Kilolitres, a measurement of volume
LEDS	Local Economic Development Strategy
MASL	metres above sea level
MDG	Millennium Development Goal
MEC	Member of the Executive Council
MERO	Municipal Economic Review and Outlook
MPA	Marine Protected Area
MSA	Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)
NEM: PAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEM: WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NFSD	National Framework for Sustainable Development
NSSD	National Strategy for Sustainable Development
NWA	National Water Act, 1998(Act No. 36 of 1998)
ONA	Other Natural Areas
PSDF	Provincial Spatial Development Framework
PSP	The Provincial Strategic Plan (2019 – 2024)
REDZ	Renewable Energy Development Zones
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SAS Saldanha	Land owned by the South African Navy
SBM	Saldanha Bay Municipality
SBMA	Saldanha Bay Municipal Area
SBWQT	Saldanha Bay Water Quality Trust
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SoER	State of Environment Report
SPC	Spatial Planning Category
VIP	Vision-Inspired Priorities
WCCCRIF	Western Cape Climate Change Response Implementation Framework
WCCCRS	Western Cape Climate Change Response Strategy
WCDM	West Coast District Municipality
WCNP	West Coast National Park

1. 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 (SBM).

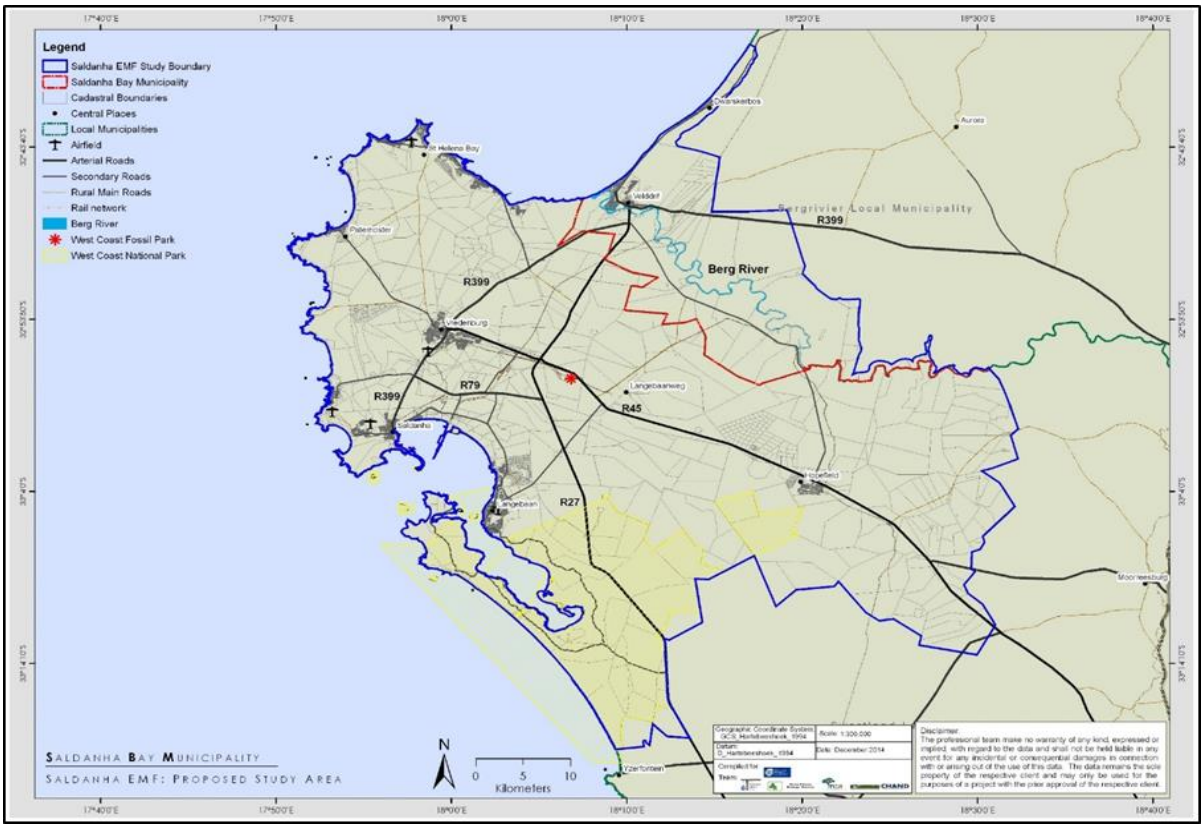


Map 1. General Locality Map

The EMF for the Greater Saldanha Area covers the Saldanha Bay municipal area (SBMA) and a portion of the Bergrivier Municipality (BRM). 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 SBMA. Since the SBM'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 on Map 2.

Both the SBM and the BRM fall within the WCDM. 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 and Velddrif.

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 (DEA&DP) initiated a project to compile an EMF for the SBM. This project was also supported by the Department of Environment, Forestry and Fisheries (Previously the Department of Environmental Affairs). Subsequent to the

commencement of the project, it was decided to include a portion of the BRM in the EMF, as explained in the introduction to this report. This decision was made in consultation with the relevant municipalities, DEA&DP and DEFF.

The National Environmental Management Act, 1998 (Act No. 107 of 1998), commonly referred to as NEMA, is a framework law that gives effect to the environmental right in the Constitution. 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. The process of doing so is commonly referred to as Environmental Impact Assessment (EIA). Section 24 also allows the Minister of Environmental Affairs and Members of the Executive Council (MEC) responsible for environmental affairs in the nine provinces, 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*…".

The Environmental Impact Assessment Regulations ("EIA Regulations") that 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, 1989 (Act No. 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. Although amended on 7 April 2017 (GN R.326 of 7 April, 2017) the 2014 EIA regulations, and the EMF Regulations as published in 2010, remain in place.

In addition to EIA's, EMF's may also provide the strategic context for the development of alternate environmental instruments. These may include instruments such as Standards or Environmental

Management Programmes. *The Regulations Laying down the procedure to be followed for the adoption of Spatial Tools or Environmental Management Instruments contemplated in Section 24(2)(c) and (e) of the National Environmental Management Act, 1998 (Act No.107 of 1998)* was adopted in April 2019 for this purpose. NEMA itself also provides for these alternative Environmental Management Instruments in section 24.

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*".
- 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 consider any applicable EMF when investigating, assessing and communicating the potential impacts of activities on the environment to the competent authority. The draft guideline on EMFs prepared by DEFF (formerly Department of Environmental Affairs / & Tourism) in 2005 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 frameworks, 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. 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. The Regulations also allow for EMFs to be taken into account even if not adopted by the MEC in concurrence with the Minister 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, EMFs should be used to support the goal of sustainability. This is acknowledged in the EMF Regulations, 2010 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 exclusions must be specified in a spatial tool or environmental management instrument, adopted in the prescribed manner.

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 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 exclusion or restriction, based on the significance of anticipated impacts 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 and be integrated with spatial development tools, specifically the SBM and BPM Spatial Development Frameworks (SDF), for more effective land and resource use planning and development.

An EMF comprises a set of information maps showing the environmental attributes or characteristics of an area. These maps must show information that is important for the planning of development, and for decision-making purposes surrounding land use. The main purpose of an EMF is to support the competent authority, which in the Western Cape is DEA&DP, in making their decisions in terms of the EIA Regulations. It must also be considered by DEFF, 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 DEA&DP, 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 Western Cape Department of Agriculture). Thus the authorities would then be using a common information base and vision, which in turn would support the obligation placed on them to give effect to co-operative governance principles.

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 proposed project to determine:
    - the likely environmental issues and thus specialist inputs required;
    - the appropriateness of the proposed project given its context; and

- the alignment of the project with environmental management and sustainability objectives.

- Identifying the factors that need to be considered in formulating a project proposal that is responsive to its receiving environment – proactive planning rather than reactive planning.
- Determining alternatives for comparative 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.
- 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 2014 EIA Regulations will require environmental authorisation if they occur within sensitive areas as identified in an environmental management framework.
- Identifying activities that could potentially be excluded from the need for environmental authorisation on condition that such activities will not result in significant environmental harm. In such an instance, a separate notice will be published, outlining the requisite measures to ensure the avoidance of environmental harm and giving effect to such an exclusion in terms of section 24(2)(c) or 24(2)(d) of NEMA.

In summary, the EMF is aimed at providing a vision for a geographical area that can be used by (1) project proponents to design projects that are appropriate for the receiving environment, and (2) the authorities to substantiate decision-making that is in line with the NEMA principles of Environmental Management.

1.1.3. 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.*" Regulations made under the Local Government: Municipal Systems Act, No. 32 of 2000 (MSA) 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*" and "*must contain a strategic assessment of the environmental impact of the [SDF]*". 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;
- that sustainable development is promoted,
- that a clean and healthy environment is promoted; and
- that municipalities participate in national and provincial development programmes.

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 Minister.

In the case of the Greater Saldanha Area EMF, the Department and the SBM went a step further to move towards an integrated SDF / EMF. The intention is to have one integrated SDF / EMF in future and significant strides have already been taken. The reason is that it is important to have one vision of sustainable development to promote consistent decision-making. The municipality has thus, for example, in the SDF already started including information from the EMF and indicating where there are differences. Similarly, the EMF uses some of the SDF information as baseline information and starts to ensure that the Environmental Management Zones are comparable with the Spatial Planning Categories of the SDF.

The urban edge is a spatial planning tool that is commonly defined by the local authority of an area and is included in the drafting of an SDF. In an instance where an urban edge has been defined by a local authority, the competent authority can choose to adopt such an urban edge if such an adoption would not result in significant environmental harm. Additionally, the definition of urban areas, as outlined in NEMA, allows the competent authority to also define an urban area. While the EMF does not set out to define an urban edge, it rather evaluates the various social and ecological attributes of an urban area to arrive at the most appropriate vision for the area. If the urban edge, as defined by the local authority, is congruent with such a vision, the competent authority may adopt the urban edge as being consistent in depicting an urban area. Accordingly, if the urban edge defined by the local authority is incongruent with the findings of the EMF (or if no such urban edge has been defined), the competent authority may decide to rather define an urban area in terms of NEMA. In both instances, the ability to either adopt or define an urban area becomes a more appropriate debate in the presence of an EMF. The findings of this EMF will be utilised in this regard.

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. The principles include that "there must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment." Since the adoption of an SDF is an "action that may significantly affect the

environment" the NEMA principles apply to the adoption of SDFs by organs of state. Thus, SDFs, and any other development plan, should take any EMF in respect of the area concerned into account. Both the EMF and the SDF are concerned with planning for the appropriate use of land of a prescribed area. The EMF:

- 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 inhabitants. 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).
- recognises the social systems within the area in question, and the important role these play in the use of resources. Resource use within the area, to a large extent, gives rise to the socio-economic characteristics of the area, including the spatial configuration of land use. Over and above existing use, other social attributes, such as demographics, economic activity, public amenities, among others, allow the EMF to anticipate changes in resource and land use for the area. The SDF and EMF share considerable overlap in this regard.

1.2. Structure of the EMF

This EMF has been structured into three sections:

- **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) 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 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 other land use and planning instruments (SDF/IDP, zoning schemes) and 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.

1.3. 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 Western Cape Biodiversity Spatial Plan (BSP) 2017, Rural Land Use Planning and Management Guidelines and documents such as the SDFs for the SBM and the BRM.
- The obtaining of available spatial information so as to compile an integrated Geographical Information Systems (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 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.
- Meetings / Workshops with SBM, CapeNature and WCDA to resolve areas of land use competition ("conflict") identified.

The analysis of inputs from Interested and Affected Parties (I&APs) which were obtained through various activities. 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.) and CapeNature over the past several years. A BSP was prepared, which covers the study area, and informed the more recent Western Cape Biodiversity Spatial Plan (2017). The BSP delineates Critical Biodiversity Areas (CBAs) and the Ecological Support Areas (ESAs) of the study area. It includes aquatic systems. Furthermore, this data served as the key informant for developing the conservation-focused EMZs in 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 BSP referred to above, information from the national project on Freshwater Ecosystem Priority Areas (FEPAs) was considered. This is a desktop study. There is a high-level of correspondence between the FEPAs and the aquatic CBAs from the aforementioned BSP. The BSP 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 SBM 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 desktop 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 are not identified within this 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 1 – SITUATIONAL ANALYSIS

2. Environmental Attributes

The following section focuses on the environmental attributes as required by Regulation 4 of the EMF Regulations, 2010. 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; and
d) Heritage and cultural resources.

2.1. Water Resources

The West Coast is known as a water scarce area, with rainfall averaging 300 mm per year (Du Plessis, 2009). 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 study area is located in a winter rainfall region and annual precipitation ranges from 1500 mm in the mountains in the east of the study area, decreasing to about 200mm to the north, east and west of the study area, and dropping to less than 100mm in the far north (DEA&DP,2019). The study area is located in the Berg-Olifants Water Management Area.

The West Coast District Municipality (WCDM) provides bulk potable water to the SBM 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 SBM and some of the towns in the BRM, including Velddrif and Dwarskersbos which fall within the EMF study area.

The provision of potable water within the West Coast District is becoming more challenging as the population growth, urbanisation and migration lead to higher demand for water, especially in the Saldanha Bay – Vredenburg areas. (WCDM, 2020)

There is a limited capacity for additional water to be drawn from the Berg River – Saldanha supply system. As such, other water sources are under consideration, including desalination. The potential for artificial recharge of the Langebaan Road Aquifer has also been investigated. The planning for a sea water desalination plant in the Saldanha Bay area is pending. The increased water demand due to a growing population, reduced precipitation, and a lack of additional water capacity in existing water distribution systems, it is crucial that alternative water sources be identified. Major capital investment (± R400-500 million) is required to establish the proposed sea water desalination plant in

Saldanha Bay area. The proposed sea water desalination plant is one alternative water source, which will contribute to increasing the water supply capacity in the southern half of the WCDM over the medium term. Other alternatives, which require further assessment, may include rainwater harvesting and ground water extraction. (WCDM, 2020)

The Berg River Catchment covers an area of almost 9 000 km² 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:

- 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 Voëlvlei 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, 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).

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 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 / 2019) 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 and 2019 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*

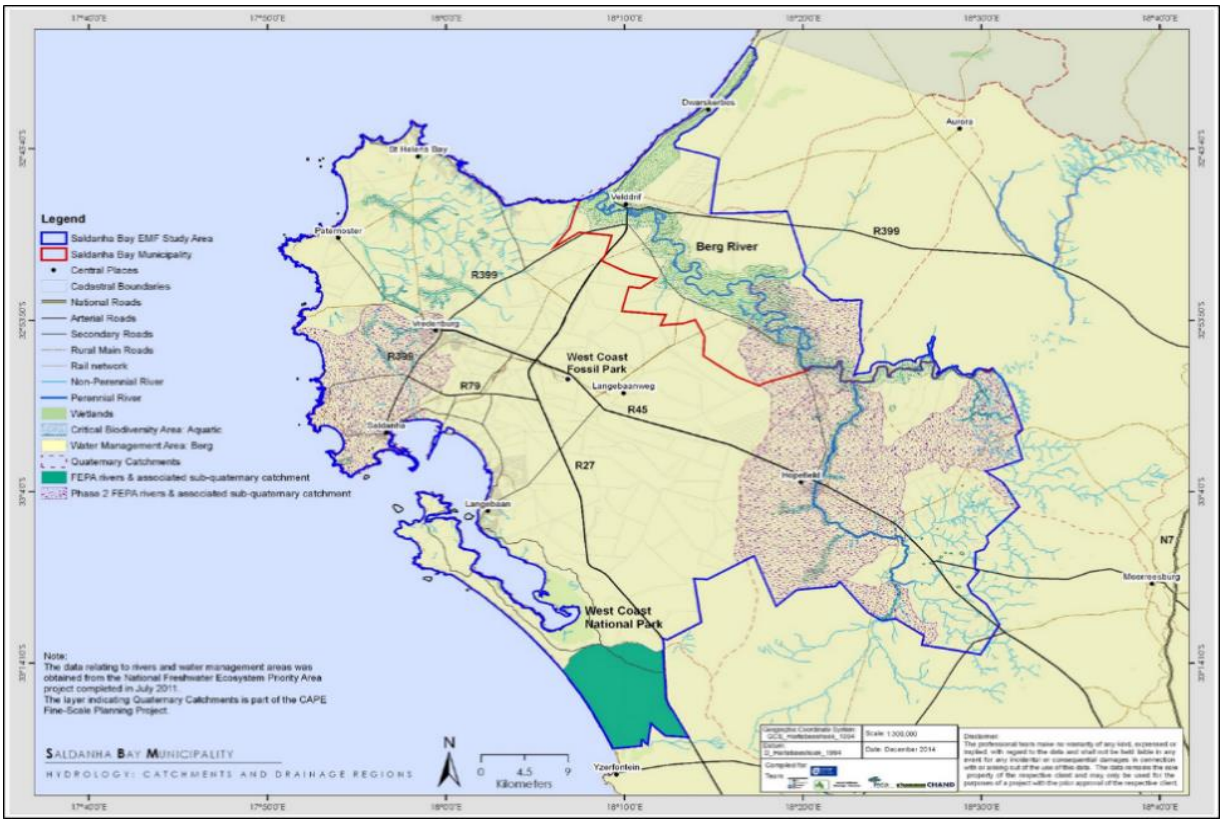
depth below surface and quality. Within the study area there are also a number of non-riverine wetland systems that have important interactions with groundwater. Wetlands are regulators of water flow and water quality. When water moves from most types of wetlands into an aquifer, water is filtered and 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."

The groundwater levels in the primary aquifers of the Berg Water Management Area (WMA) 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 Elandsfontein Aquifer System are insufficient to meet the future water demand of the Port. 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. Comprehensive Reserve determination, classification and development of a management plan for this aquifer has 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.

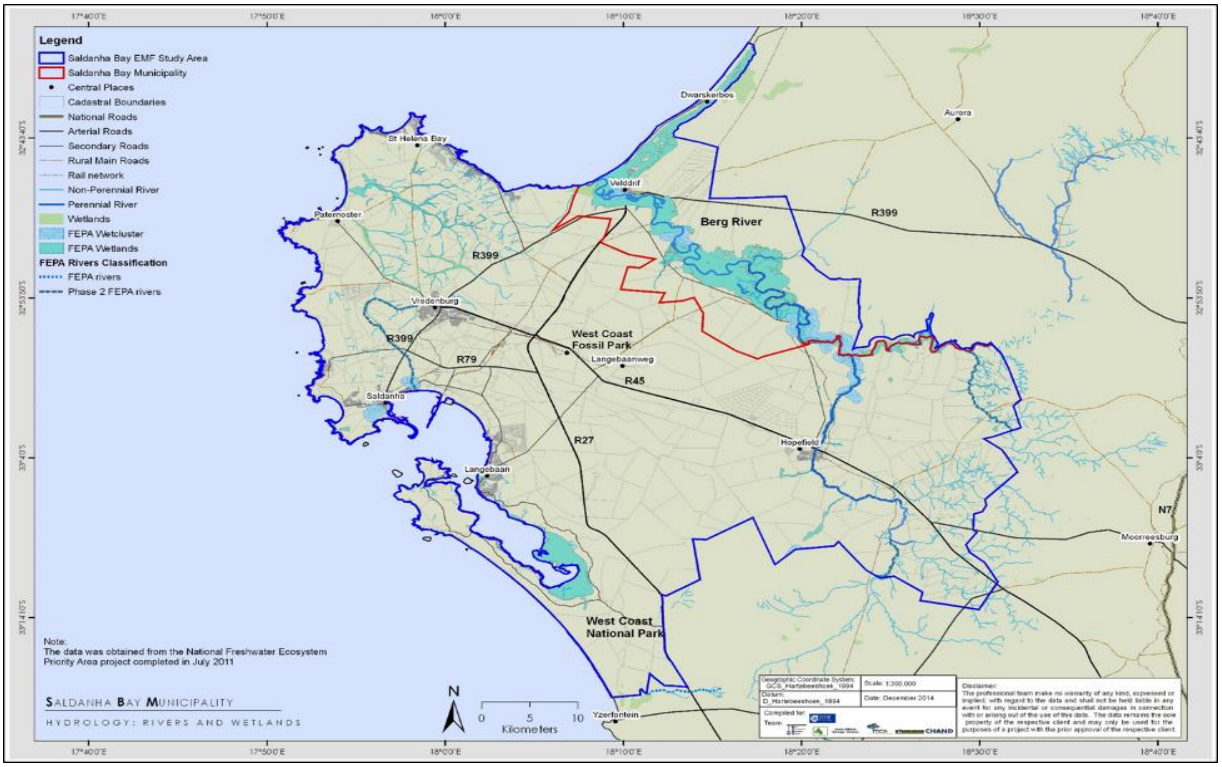
Groundwater is also important for maintaining ecological functioning and biodiversity. GEOSS undertook a desk-top study in this regard in 2006, which included the Saldanha Peninsula aquifer. The Saldanha Peninsula was identified as an area where groundwater plays a role in maintaining ecological functioning and biodiversity. The probability of occurrence of groundwater dependent ecosystems is shown on Map 6. 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 SBM includes the Langebaan lagoon. This is a unique wetland in that no river feeds into the lagoon. These salt marshes constitute approximately 32% of the entire saltmarsh habitat in in South Africa. The lagoon, located in the West Coast National Park, is groundwater fed and has Ramsar Status (i.e. a wetland site designated to be of international importance, especially providing waterfowl habitat, under the Ramsar Convention). It is thus afforded high ecological importance and conservation status and has a high level of sensitivity. The wetland is dependent on groundwater inflows and thus any activity that could alter the flow volumes and velocity of groundwater has the potential to impact the wetland. The ecosystem is thus critically dependent on groundwater. Longer term mapping and monitoring of the groundwater dependant ecosystems within Langebaan Lagoon should be

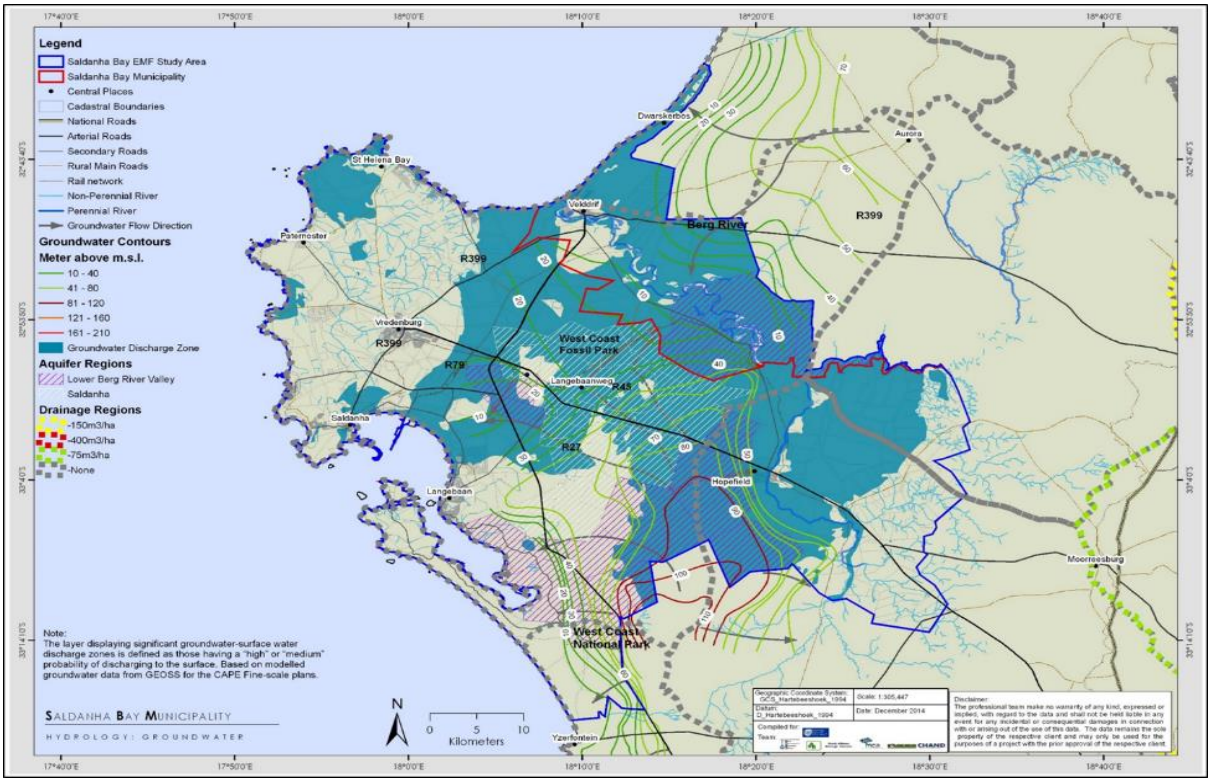
undertaken to evaluate the longer term and cumulative impacts of development of the Langebaan and Saldanha area (Belcher and Grobler, 2015).



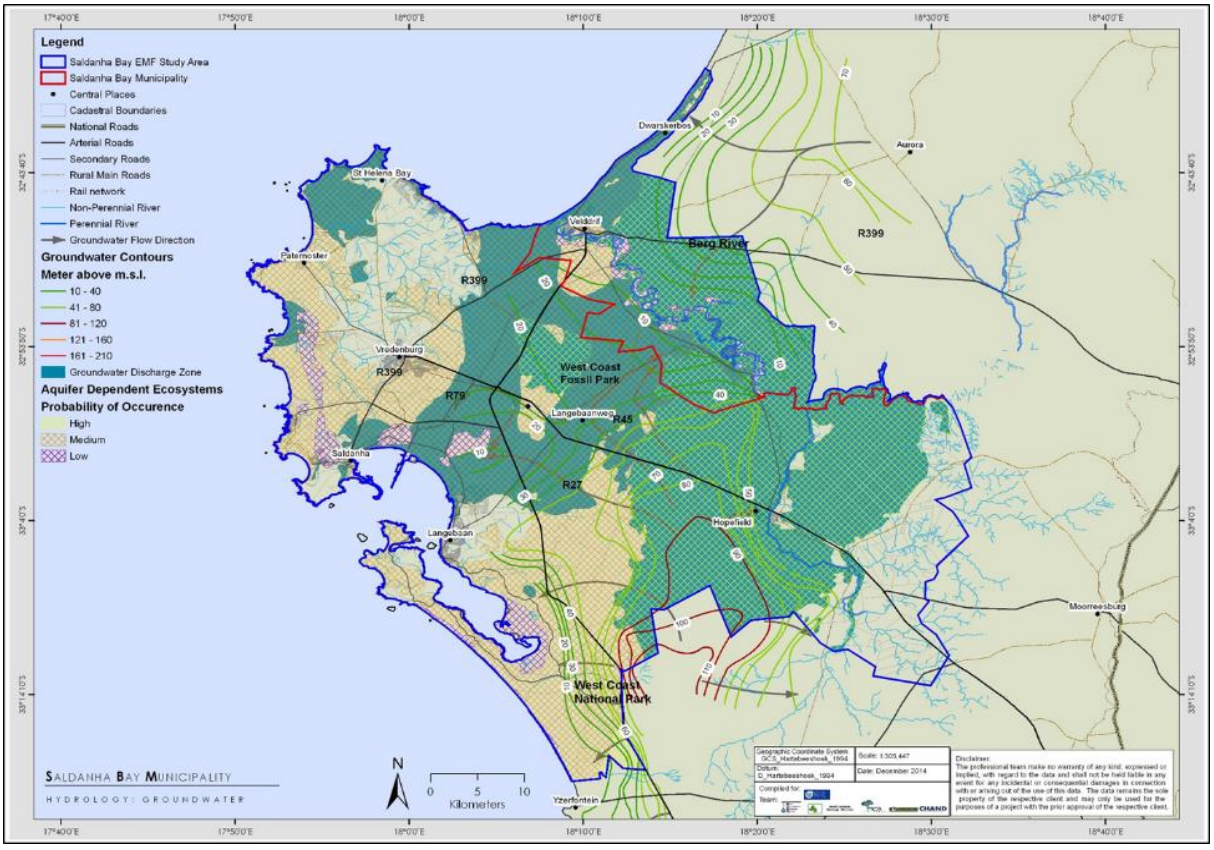
Map 3. Catchments and drainage areas



Map 4. Rivers and Wetlands



Map 5. Groundwater



Map 6. Groundwater and Biodiversity interaction

2.2. Biodiversity

Information in this section is drawn primarily from the 2017 Western Cape Biodiversity Spatial Plan that has been prepared for the Western Cape Province. The BSP (2017) covers 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)***: Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

  These include:

  - All areas required to meet biodiversity pattern (e.g. species, ecosystems) targets;
  - Critically Endangered (CR) ecosystems (terrestrial, wetland and river types);
  - All areas required to meet ecological infrastructure targets, which are aimed at ensuring the continued existence and functioning of ecosystems and delivery of essential ecosystem services; and
  - Ecological corridors to maintain landscape connectivity.

CBAs are areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species. Degraded areas should be rehabilitated to natural or near-natural condition. Only low-impact, biodiversity-sensitive land uses are appropriate.

In the maps, a distinction is made between CBAs that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). This distinction is based on best available land cover data, but may not be an accurate or current reflection of condition.

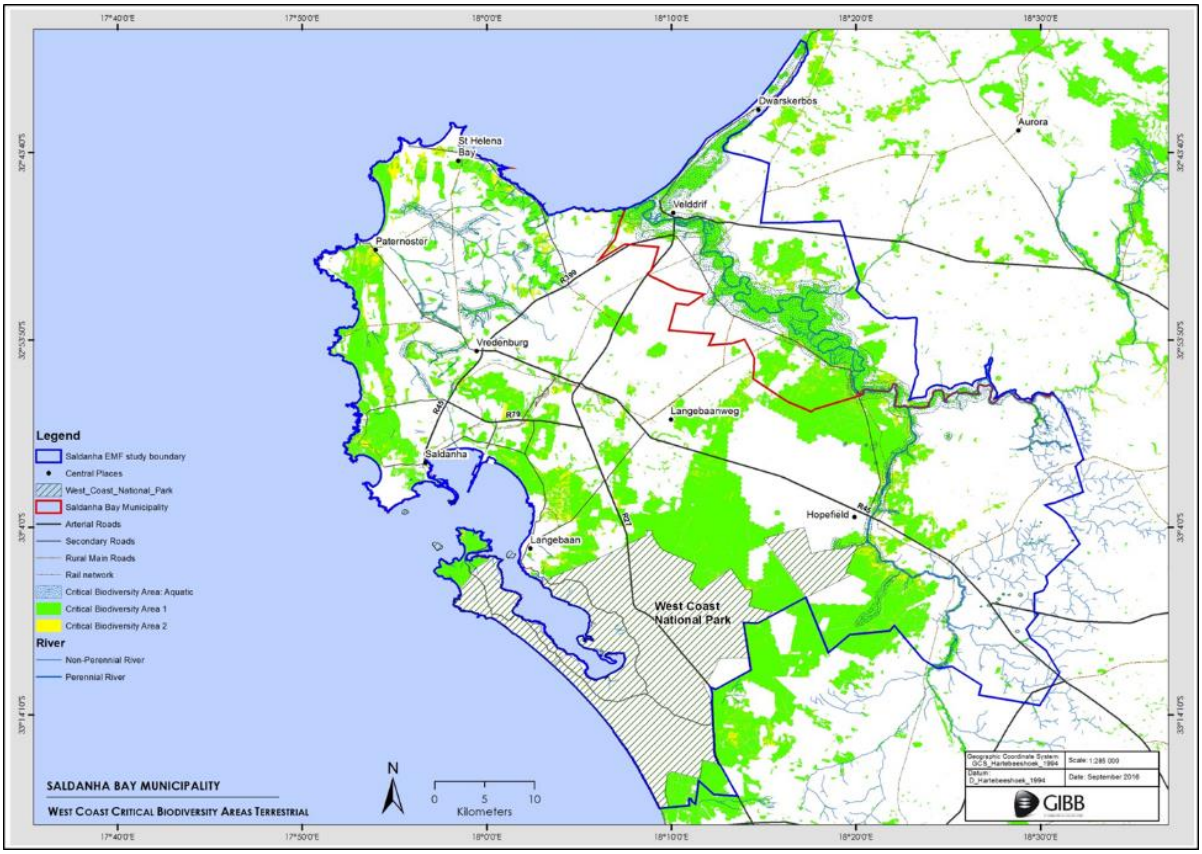
- ***Ecological Support Areas (ESAs)***: Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services. They support landscape connectivity, encompass the ecological infrastructure from which ecosystem goods and services flow, and strengthen resilience to climate change. They include features such as regional climate adaptation corridors, water source and recharge areas, riparian habitat surrounding rivers or wetlands, and Endangered vegetation.
  - ESAs need to be maintained in at least a functional and often natural state, in order to support the purpose for which they were identified, but some limited habitat loss may be acceptable. A greater range of land uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives and ecological functioning are not compromised. Cumulative impacts should also be explicitly considered
  - In the maps, a distinction is made between ESAs that are still likely to be functional (i.e. in a natural, near-natural or moderately degraded condition; ESA 1), and Ecological Support Areas

that are severely degraded or have no natural cover remaining and therefore require restoration (ESA 2).

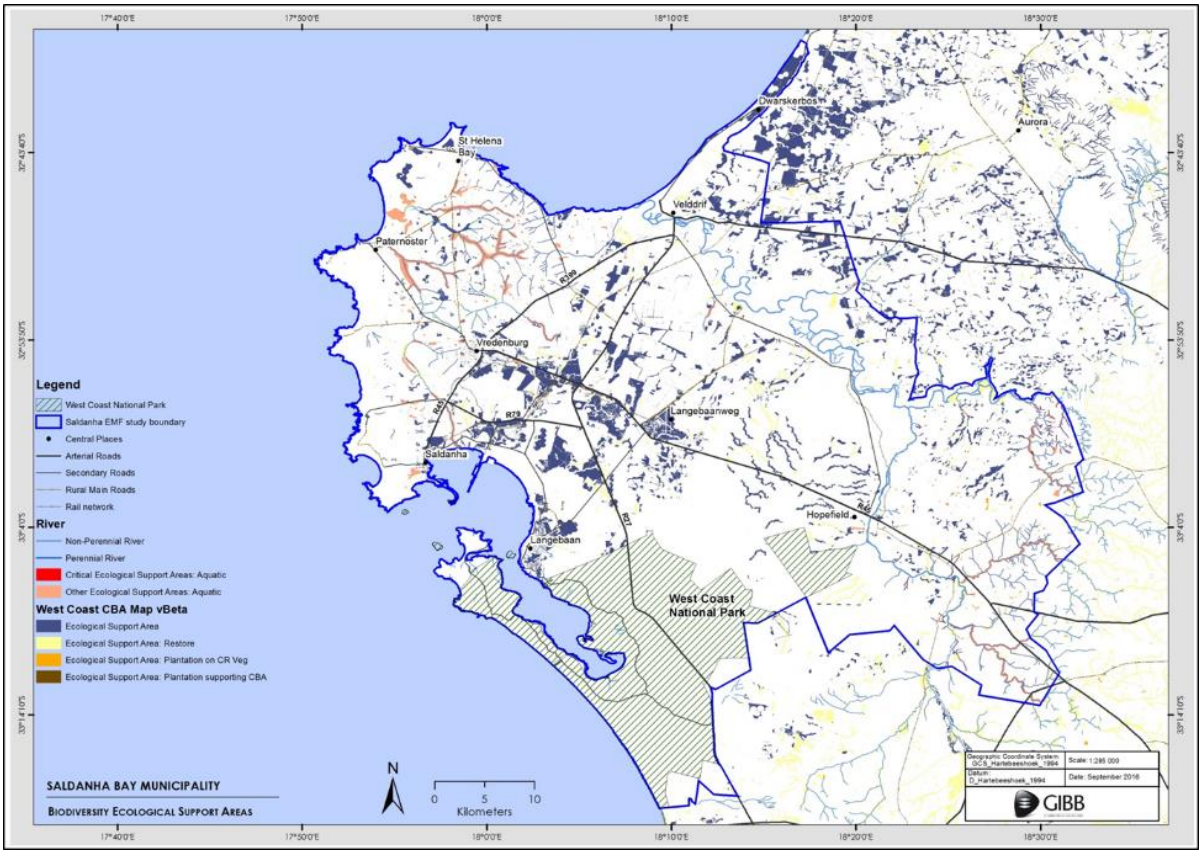
- ***Other Natural Areas (ONAs)***: Areas that have not been identified as a priority in the current biodiversity spatial plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for meeting biodiversity targets, they are still an important part of the natural ecosystem.
  - ONAs should be managed or utilised in a manner that minimises habitat and species loss and ensures ecosystem functionality through strategic landscape planning. These 'other natural areas' offer considerable flexibility in terms of management objectives and permissible land uses, but some authorisation may still be required for high impact land uses.

Map 7 illustrates the latest 2017 CBAs (terrestrial and aquatic), while Map 8 shows the ecological support areas (terrestrial and aquatic) within the Greater Saldanha area. Other natural areas (2017) 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.

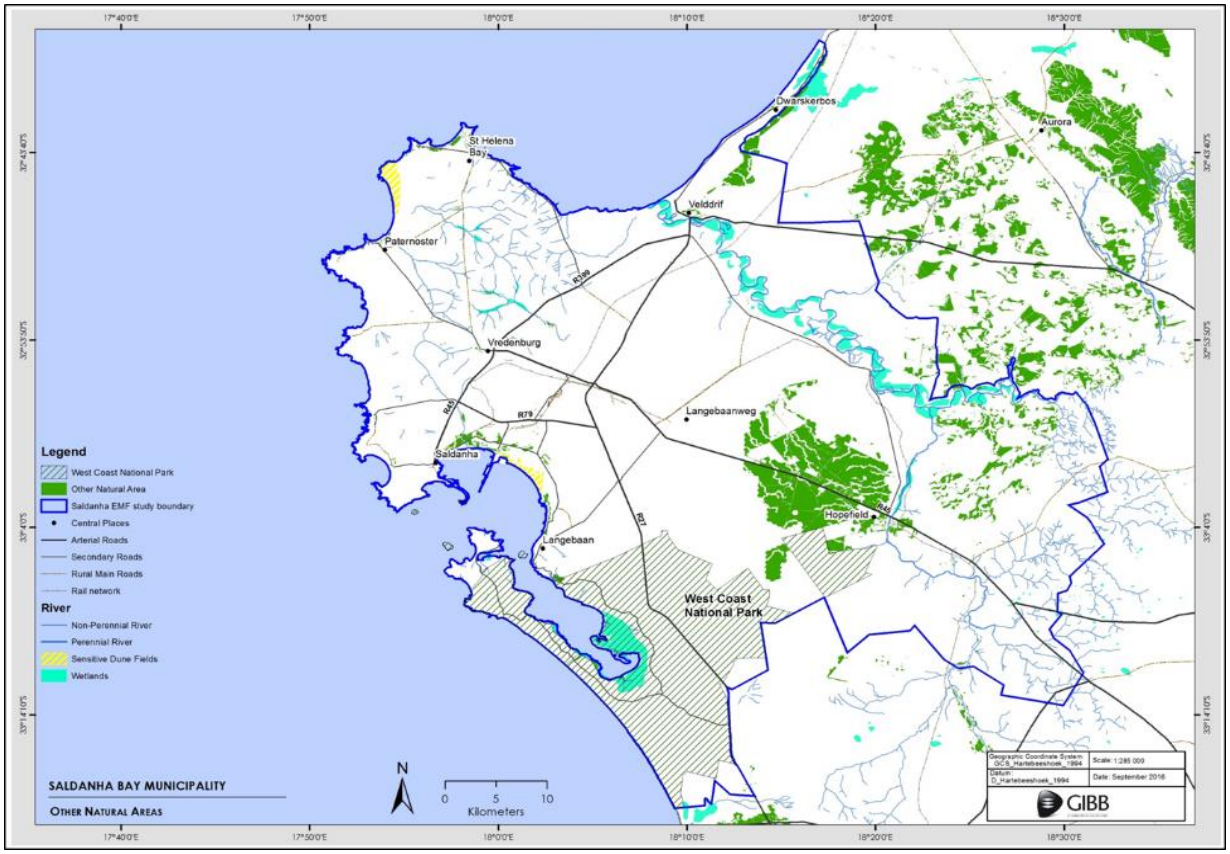
The BSP and associated map provides the best available scientific information regarding the biodiversity resources that need to be retained in the long-term. This is to ensure the maintenance of healthy ecosystems which are fundamental to the wellbeing of people since nature provides humankind with food,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



Map 7. Critical Biodiversity Areas (Terrestrial and Aquatic)



Map 8. Ecological Support Areas (ESAs)



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 and genera. The ecosystem status of the vegetation types along the West Coast have been determined as the result of four previous assessments: The National Biodiversity Assessment (2011); the National list of threatened terrestrial ecosystems, the C.A.P.E. Fine-scale Biodiversity Planning Project (Maree and Vromans, 2010) and through the BSP.

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/targets, 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". The Ecological Support Areas must be conserved as far as possible, to prevent degradation of the CBAs and Protected Areas, and to provide ecological linkages between 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 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, climate change 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 BSP 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 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 as per NBA 2018.

- **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. Hopefield Sand Fynbos is also listed as a threatened ecosystem.

The most important ecological process areas or landscape corridors are:

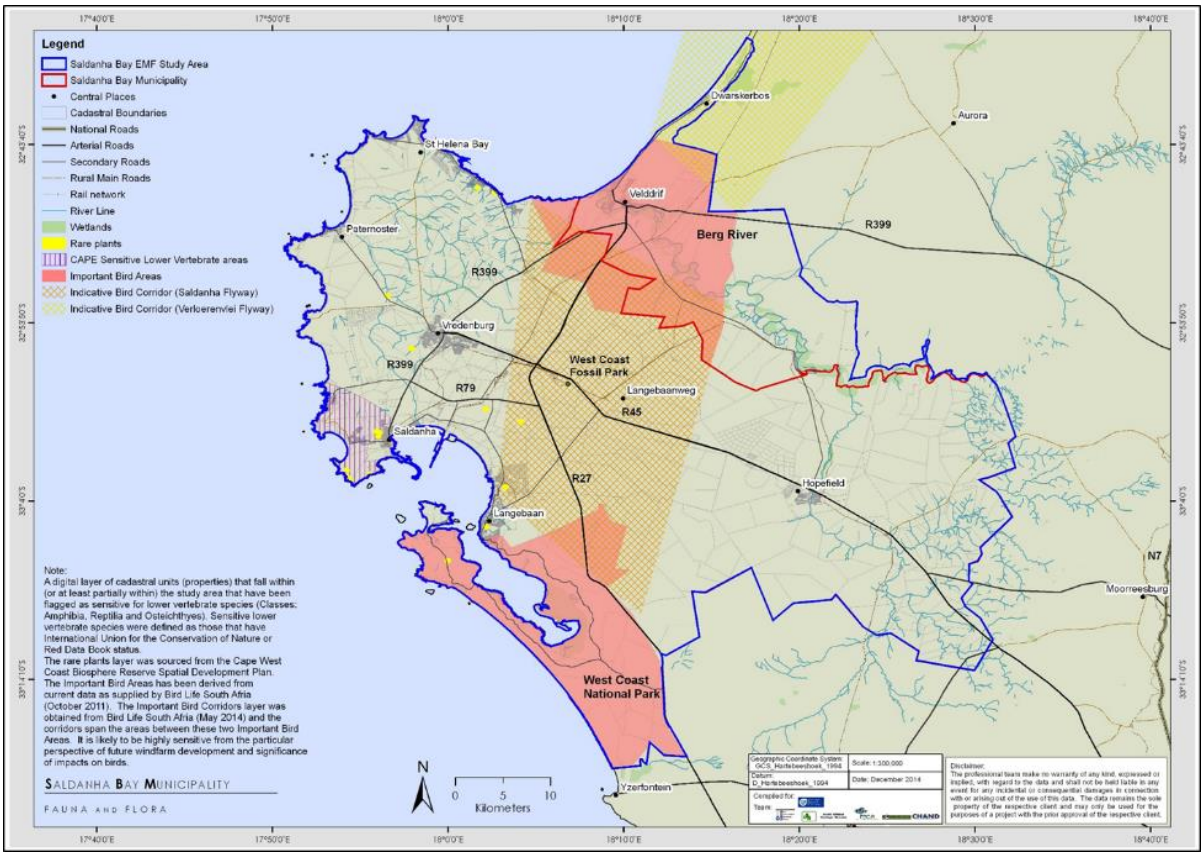
- SAS Saldanha, northwards along the coast towards Tietiesbaai;
- WCNP northwards towards the Berg River estuary;
- WCNP north-westerly towards Tietiesbaai via south Vredenburg;
- The Berg River corridor;
- The Saldanha Strategic Offset Strategy -Core Corridor (the "not developable category");
- The Berg River estuary northwards past Dwarskersbos.

Faunal data has been considered in the BSP, but specific spatial information is fairly limited. Key points about fauna are:

- ***Birds:*** Various species occur in the region including the endangered Black Harrier (*Circus maurus*), which has 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 2020 State of the Bay Report it is noted that "*Saldanha Bay, and particularly Langebaan Lagoon, are of tremendous importance in terms of the diversity and abundance of waterbird populations species they support. Atleast 56 non- passerine waterbird species commonly use the area for feeding or eleven species bread on the islands of Malgas, Marcus, Jutten, Schaapen and Vondeling alone. These islands support nationally important populations of African Penguin, Cape Gannet, Swift Tern, Kelp and Hartlaub's Gull, four species of marine cormorant, and important populations of the endemic African Oystercatcher.*"
- In addition, breeding populations of African Penguin (recently up-listed to Endangered under IUCN's red data list criteria), Cape Gannet (Vulnerable), Cape Cormorant (recently up-listed to Endangered under IUCN's red data list criteria), White-breasted Cormorant, Crowned Cormorant (Near Threatened), Bank Cormorant (Endangered), Kelp and Hartlaub's gulls, Caspian Tern and Swift Tern. The seabird breeding colonies, the islands also support important populations of the rare and endemic African Oystercatcher (Near-threatened).
- 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 niger* (endemic to Cape Peninsula and Saldanha Peninsula) are endemic to the area. The Geometric Tortoise *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).



Map 10. Faunal Information (including bird flight path)

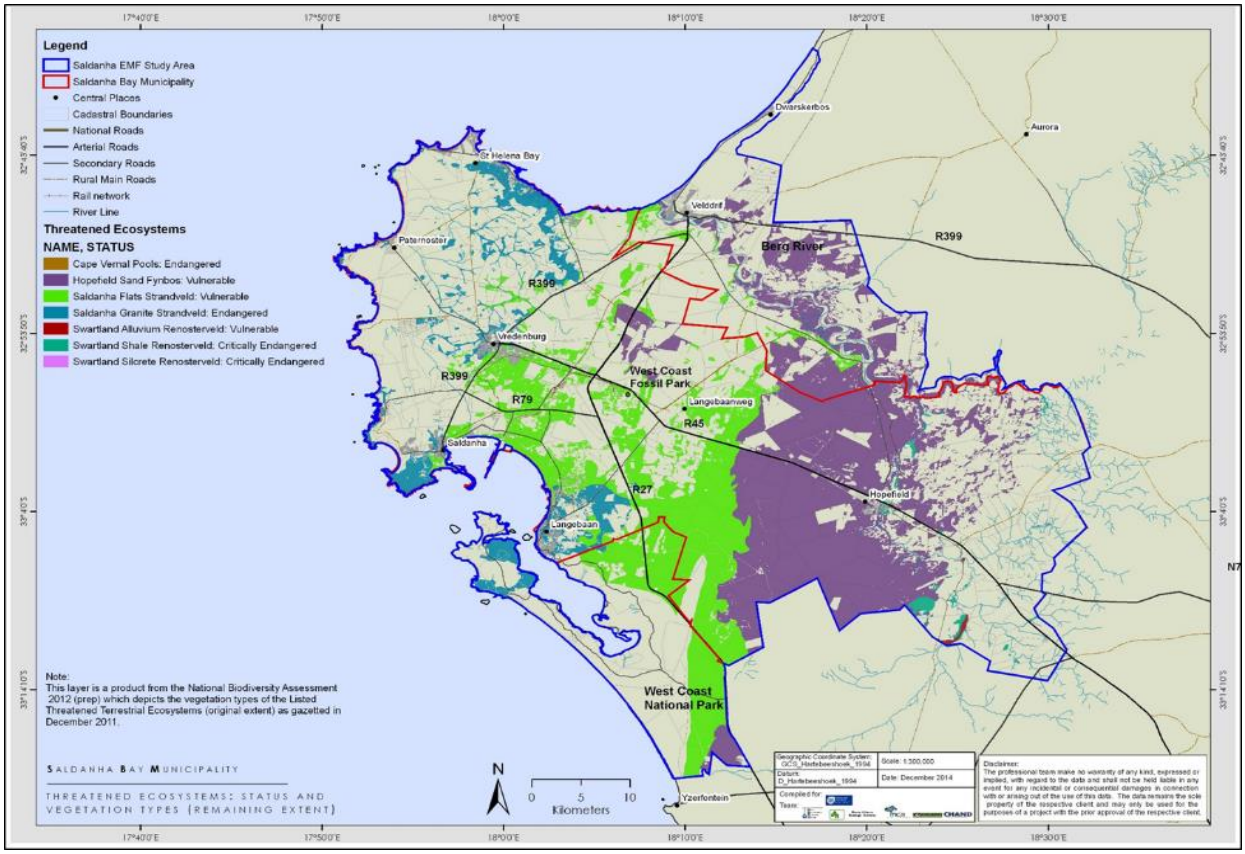
- ***Insects***: The northern reaches of the West Coast constitute the southern-most tip of an area of endemism for darkling beetles *(Tenebrionid* family, which includes *toktokkies*). Another group, found almost exclusively in southern Africa, are the monkey beetles which are concentrated in this area. 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) (NEM: BA) 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. It is important to note that the National Biodiversity Assessment of 2018 has arrived at revised threat statuses of many of the terrestrial ecosystems in the Western Cape. While the revised threat status is not yet official, the National Biodiversity Assessment 2018 is an important informant and must be considered in all project-level decision making.

- ***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. All remaining remnants of these vegetation types are of high conservation importance and support high numbers of plant Species of Conservation Concern (SCC) and should therefore be protected. The ecosystem status of Swartland Shale Renosterveld is also informed by the fact that there are 80 or more threatened 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* since it has undergone significant loss in the last 10 years, where 40 or more threatened 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

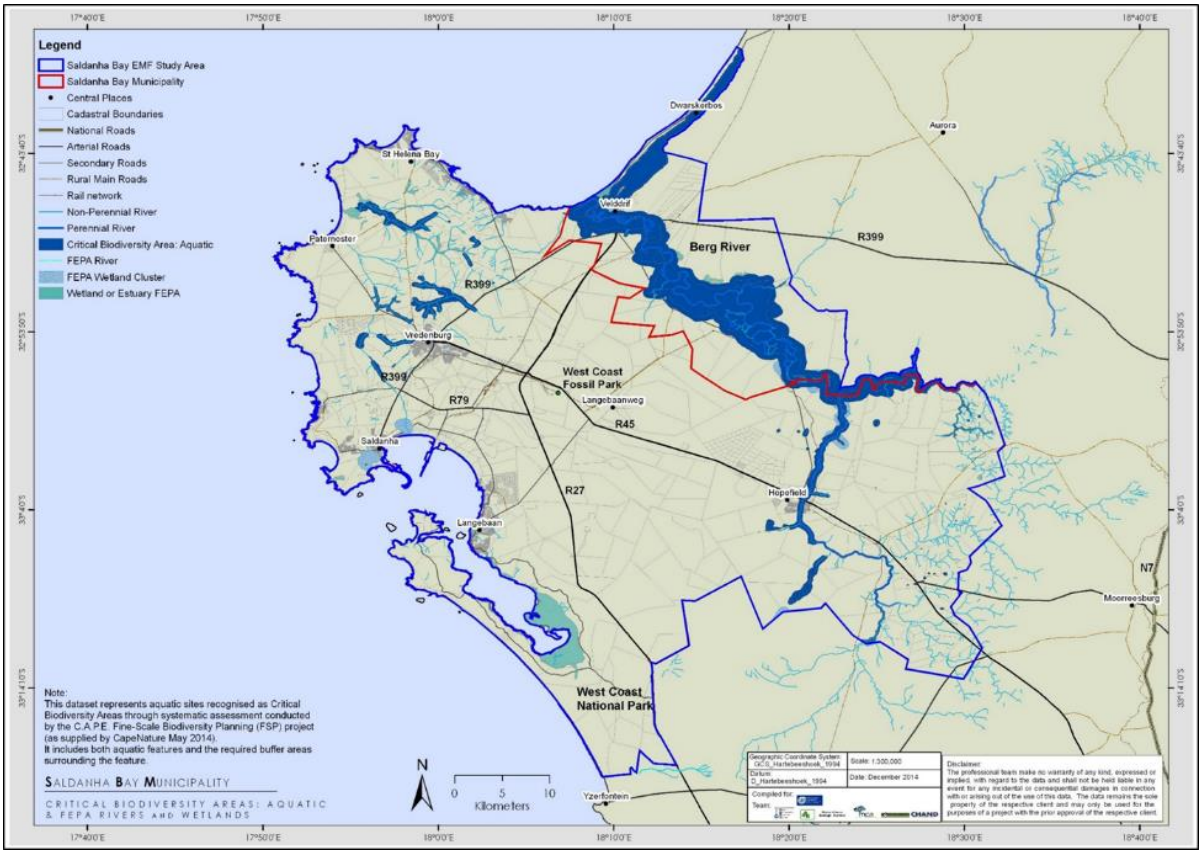
2.2.2 Aquatic Ecosystems

The importance of aquatic ecosystems has been alluded to earlier in the document 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 ESAs it is 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 BSP for the SBM, BRM, 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 Biodiversity Spatial Plan, 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. FEPAs within the study area largely correspond with the CBA – Aquatic areas or the ESAs. 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 BSP whereas that applied for the FEPA project is 1:50 000. As the CBA mapping is at a more detailed scale, the 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

The Berg River an is 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:

- *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 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.

In 2012, the DEA&DP developed the BRIP to address water quality concerns in the Berg River. The Improvement Plan highlights the then status of sources of pollution and various interventions that have been undertaken by municipalities and sector Departments in the Western Cape. It also identifies short- and long-term interventions, and its financial implications. Many interventions have already been implemented since 2012. More detailed information in this regard can be accessed at https://www.westerncape.gov.za/eadp/.

2.2.3 Marine and Coastal Ecosystems

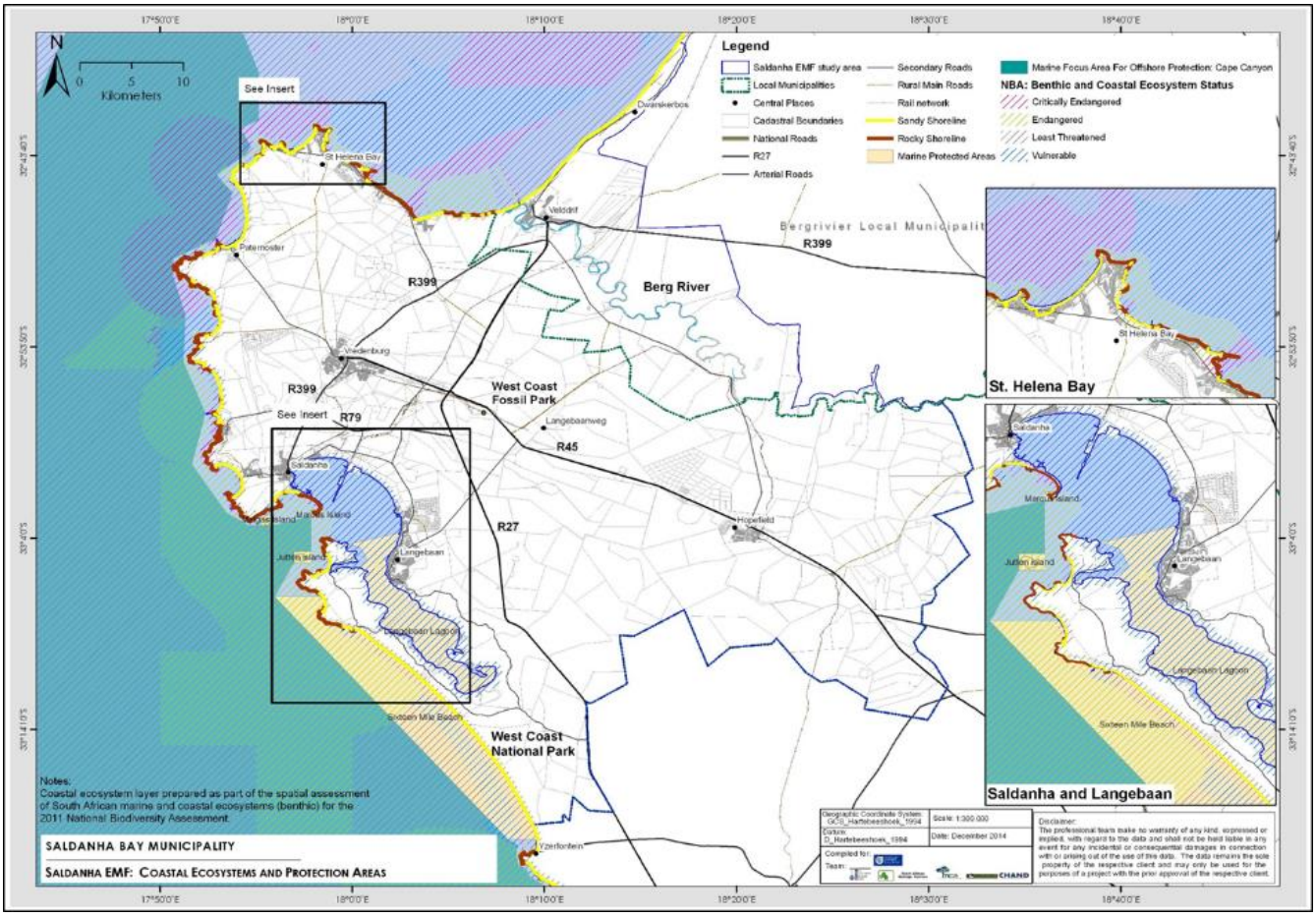
The National Spatial Biodiversity Assessment 2004 defined five distinct marine bio-geographic zones in the country: Namaqua Bioregion, South-Western Cape Bioregion, Agulhas Bioregion, Natal Bioregion and the Delagoa Bioregion. The West Coast lies within the Namaqua Marine Bioregion (from Cape Columbine 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.

South Africa's oceans provide a high diversity of marine resources with more than 770 marine species harvested. Fisheries stock status is not assessed for 90% of these species. Of the assessed resources, more than a third are overexploited or collapsed. South African Abalone (*Haliotis midae*) and West Coast Rock Lobster (*Jasus lalandii*) resources are in crisis with escalating poaching preventing resource recovery (SANBI, 2019).

According to the National Spatial Biodiversity Assessment, marine ecosystems off the West Coast are regarded as being 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. Formal protection of marine resources is largely lacking.

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 (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. 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.

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.

A preliminary assessment of the water requirements of the Berg estuary was completed by Ninham Shand in 1994 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 279 functional estuaries in South Africa (Turpie, 2004) and one of 4 permanently open estuaries on the west coast (Whitfield, 2000) (also cited in DEA&DP, 2021). It is the one of the largest estuaries in the country, with a total area of 61 km². The estuary is one of the most important in the country in terms of its conservation value. The extensive floodplain that surrounds the middle and upper reaches of the system make it unique in the South-Western Cape. It has been identified as an Important Bird Area (Barnes 1998) and a desired protected area in the conservation planning assessment conducted for C.A.P.E. (Turpie & Clark, 2007) as well as in other studies (e.g. Turpie et al. 2002; Turpie, 2004) (Draft DEA&DP, 2021).

The Berg River Estuary is one of the most important estuaries in South Africa from a conservation perspective, scoring in the top 10% for size, habitats, type rarity within its biogeographical zone, and biodiversity. The Berg River Estuary is also included within a minimum set of 50 estuaries in the country identified as requiring protection in order to achieve national biodiversity protection targets (Anchor Environmental, 2008).

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 several factors operating within an intricate system. Conserving ecological reserves is considered a high priority for the Berg River Estuary, however, this does require cooperation from the community where anthropogenic impacts are observed.

The Environmental Water Requirements (EWR) 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).

2.2.4 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. 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 1.

Table 1. Key ecological information – Saldanha and St Helena

SALDANHA BAY
Of the 89 alien marine species known to occur in South Africa. 53 are considered invasive i.e. population are expanding and are consequently displacing indigenous species. At least 28 alien and 42 invasive species occur along the West Coast of South Africa. 62 are present in Saldanha Bay. These species originated primarily from ballast water and cleaning of ships, and to a much lesser extent from mariculture operations.
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 Basin and the base of the ore terminal. In Small Bay, the lowest diversity was observed 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.
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.

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.
- There is now compelling scientific evidence that the stocks of the two most commercially important fish in Saldanha-Langebaan system, namely white stump nose and harders, are overexploited. At some point fishing mortality will need to be contained, if the Saldanha Bay fisheries are to remain sustainable.
- 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.
- A recent stock assessment (Horton 2018) indicated that the Saldanha-Langebaan harder stock is overexploited and recommended that that fishing pressure on this stock need to be reduced and that commercial net gear changes should be implemented to rebuild the stock.
- The recent discovery of rainbow trout in Kraalbaai (possibly escapees from the pilot fish cage farming in Big Bay) is another threat to the indigenous fish fauna in the region. These predatory fish will prey on indigenous invertebrates and fish and could cause irrevocable ecosystem level impacts. These alien fish are highly unlikely though to establish self-sustaining populations in the bay and lagoon due to the lack of suitable spawning habitat in the region.

BIRDS

- Data shows a general downward trend in the occurrence many seabird species, with some exceptions in 2019 to 2020:
  - The lagoon is an important area for migratory wanders and terns, well as for numerous resident waterbird species. In South Africa the penguins breed mainly on offshore islands in the Western and Eastern Cape with strongly downward trends at all major colonies.
  - On the islands of Saldanha Bay, populations of all these species then started to decline, particularly the penguins, gannets, crowned cormorants and kelp gulls, which dropped to 7%, 40%, 23% and 22% of their populations at the turn of the century, respectively. Declines in the numbers of seabirds breeding on the Saldanha Bay Islands can be attributed to several causes.
  - These include (1) emigration of birds to colonies further south and east along the South African coast in response to changes in the distribution and biomass of small pelagic fish

stocks, (2) starvation as a result of a decline in the biomass of sardines nationally, and particularly along the west coast over the last decade, (3) competition for food with the small pelagic fisheries within the foraging range of affected bird species,(4) predation of eggs, young and fledglings by Great White Pelicans, Kelp Gulls and Cape Fur Seals, and (5) collapse of the West Coast Rock Lobster stock upon which Bank Cormorants feed.

- Decreasing numbers of migrant waders utilising the Langebaan Lagoon reflects a global trend, which can be attributed to loss of breeding habitat and hunting along their migration routes as well as human disturbance and habitat loss on their wintering grounds. In Langebaan Lagoon, drastic population declines in four species, including the Ruddy Turnstone, Red Knot, Grey Plover, and Curlew Sandpiper, signified this downward trend in summer migratory bird numbers.
- Most importantly, Curlew Sandpiper numbers have dropped from a pre-1990 average of just over 20 000 birds to 1 335 birds in 2019. Prior to 1990, this species accounted for almost two thirds of the total summer migratory wader numbers in the lagoon. Shrinking wader populations at Langebaan Lagoon are primarily signified by declining populations of migratory species.
- The fact that numbers of resident waders are also declining suggests that unfavourable conditions persisting in the Langebaan Lagoon because of anthropogenic disturbance may be partly to blame. Resident wader numbers in the winter of 2019 dropped to the lowest recorded in the 40-year count record, a continuation of the declining trend over the last decade. Migratory wader counts in summer seem to have stabilized at around 3 000-5 000 birds over the last five years, a fraction of their former abundance.

ST HELENA BAY

BENTHIC MACROFAUNA

- 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.
- 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.

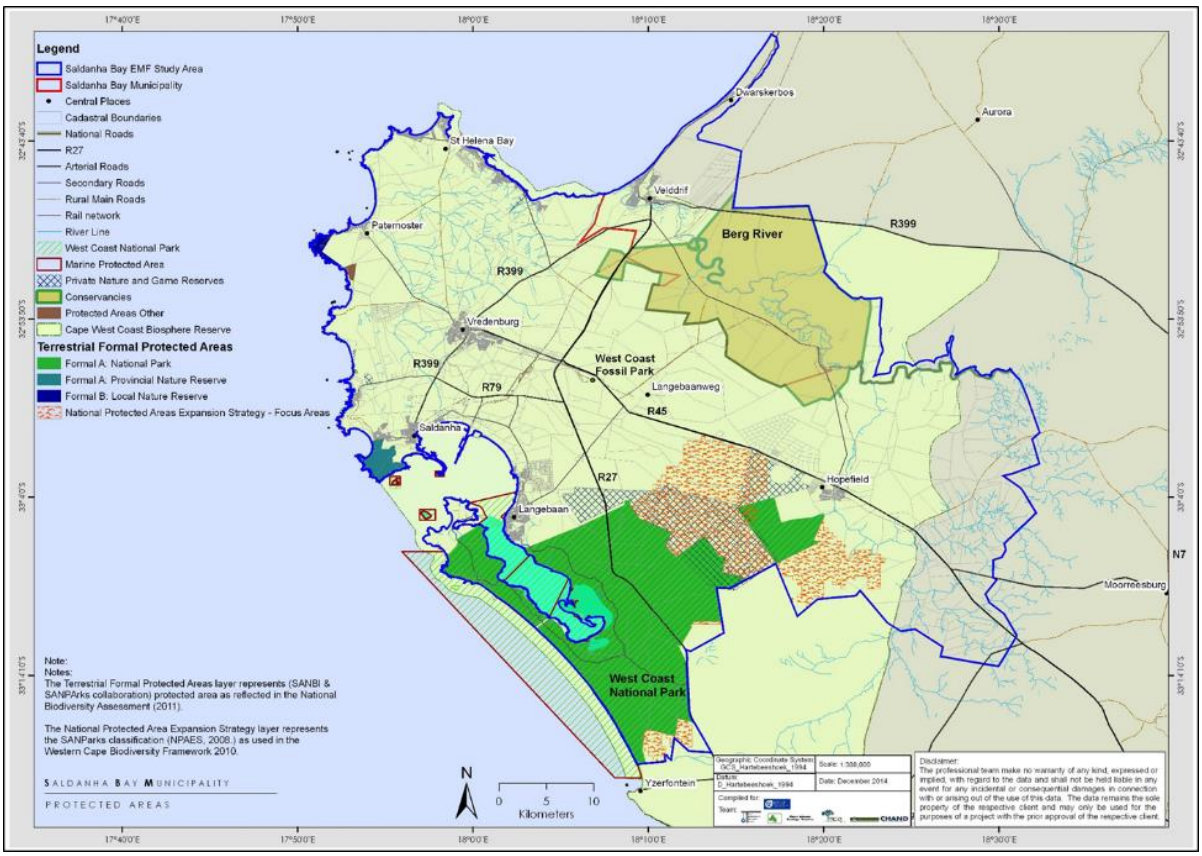
- Effluent from fish factory operations is having a negative impact on benthic macrofauna at a localized level.

2.2.5 Protected Areas and Conservation Initiatives

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

- The West Coast National Park (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

2.2.5.1 The West Coast National Park

The Park totals 47 457ha 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 (NEM: PAA). The Park has a high level of protected conservation status: National Park; MPA, Ramsar status; Core Area of the Cape West Coast Biosphere Reserve.

The WCNP has an approved Park Management Plan (PMP) for the period 2013 – 2023. The PMP is required in terms of NEM: PAA. The PMP serves as a reference to the management and development of the park in its current and envisaged future form with information on the background, biophysical context, desired state, management and programmes at strategic and operational levels. The PMP was amended in 2018. These amendments included the development of a Park Zonation Plan (PZP), of which the primary objective is to establish a coherent spatial framework in and around the part to guide and coordinate conservation, tourism and visitor experience initiatives. The PZP 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 PZP is also a legislated requirement of the NEM: PAA, 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, 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.

Table 2. WCNP Buffer Zones

WCNP BUFFER ZONES	
CATEGORY OF BUFFER ZONE	**LAND USE 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.

2.2.5.2 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).

2.2.5.3 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).

2.2.5.4 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. 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 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 plant 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.

2.3. Agricultural Production

A large economic sector in the Greater Saldanha Bay area is agriculture, in the form of livestock farming, and to a larger extent – crop irrigation (GEOSS, 2019). However, 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 take place in the Saldanha, Vredenburg and Velddrif area. Information from the Western Cape Department of Agriculture on the various crops grown in the area is shown on Map 15. 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.

From the perspective of the Western Cape 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 Western Cape 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.

Agriculture consists of catchment scale irrigation systems e.g. fruit orchards, dryland e.g. grains, livestock e.g. cattle and goats and game farming e.g. antelope. This census indicates that 35% of the municipality is agricultural land, with 14% used for grain farming and 11% being planted pastures (SDF, 2017). Fisheries consist of commercial fishing e.g. off- and near-shore hake, sea-based aquaculture e.g. mussels and oysters, and fish processing e.g. Sea Harvest. Collectively, the agriculture, forestry and fisheries sector comprised ~R 900 million (15%) of the Municipality's GDP in 2015 with growth of 2.85% for the period 2005 – 2015. The sector employs 32% of the regions workforce, 43% of whom are unskilled. Employment over the period 2005 – 2015 grew by 1% per annum on average. The informal sector makes up 19% of the industry's workforce and grew by 5% per annum over the period 2005 – 2015 (IDP, 2017).

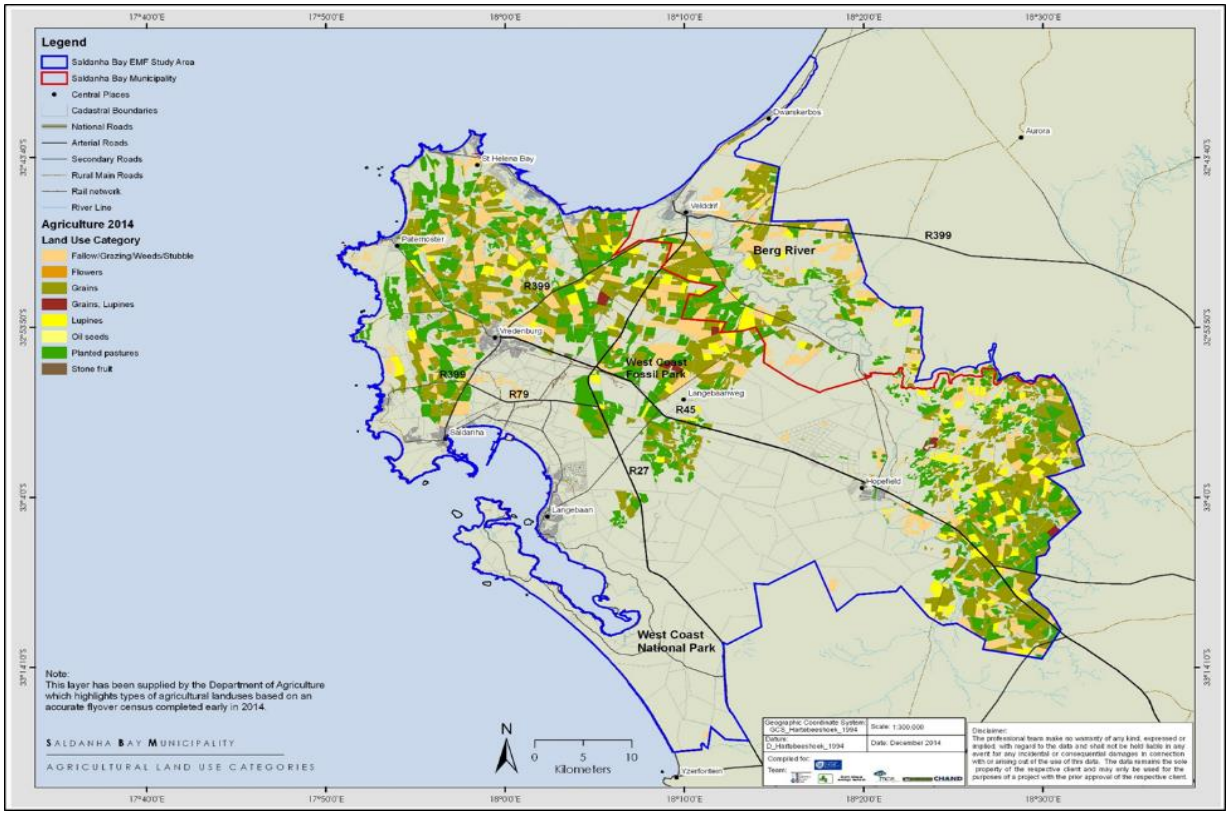
The current agricultural activities driving change in the region are (DEA&DP, 2019):

- Authorised and illegal vegetation clearance;
- Controlled and uncontrolled grazing patterns;
- Standard land care and management practices e.g. erosion control; and
- Groundwater abstraction and use.

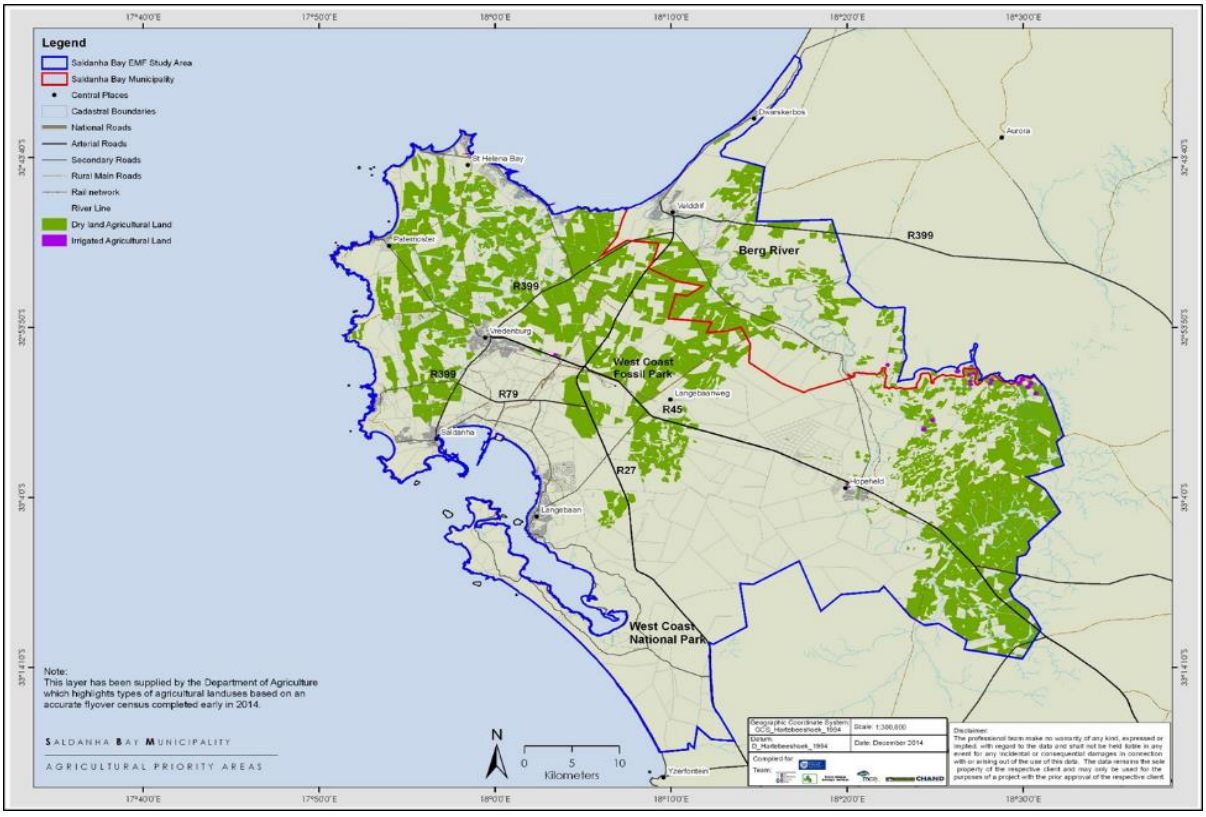
The current fisheries activities driving change in the region are:

- Allocation of sea space for aquaculture activities;
- Fish stock (wild caught) depletion;
- Fish processing near Small Bay and St Helena Bay;
- Ship, nets and other equipment repairs of offshore vessels; and
- Installation and maintenance of floating decks, strings, sea-floor anchors and nets used for aquaculture.

Agriculture, forestry and fishing sector has always been regarded as BRM's most dominant employment sector, but this picture changed in 2009 when the wholesale and retail trade, catering and accommodation sector became most dominant. This is followed by the manufacturing sector and the agriculture, forestry & fishing sector. The wholesale and retail trade sector includes the tourism sub sector, which has been identified as a sector for future economic growth in the Municipal Area. Between 2000 and 2011, a total of 11 277 jobs were lost in the agriculture, forestry and fishing sector. Agriculture nevertheless remains a very important economic driver of the BRM economy and it is imperative that the Municipality focus on ways to support this sector. A study in the agricultural sector of the Western Cape indicates that table grapes will/can increase its economic value, while field crops (cattle, sheep, maize, barley) may decrease in size. Other farming products such as livestock, BRM Local Economic Development Strategy, 2015.



Map 15. Agricultural land use and crops



Map 16. Agricultural Resources: Dryland and Irrigated Land

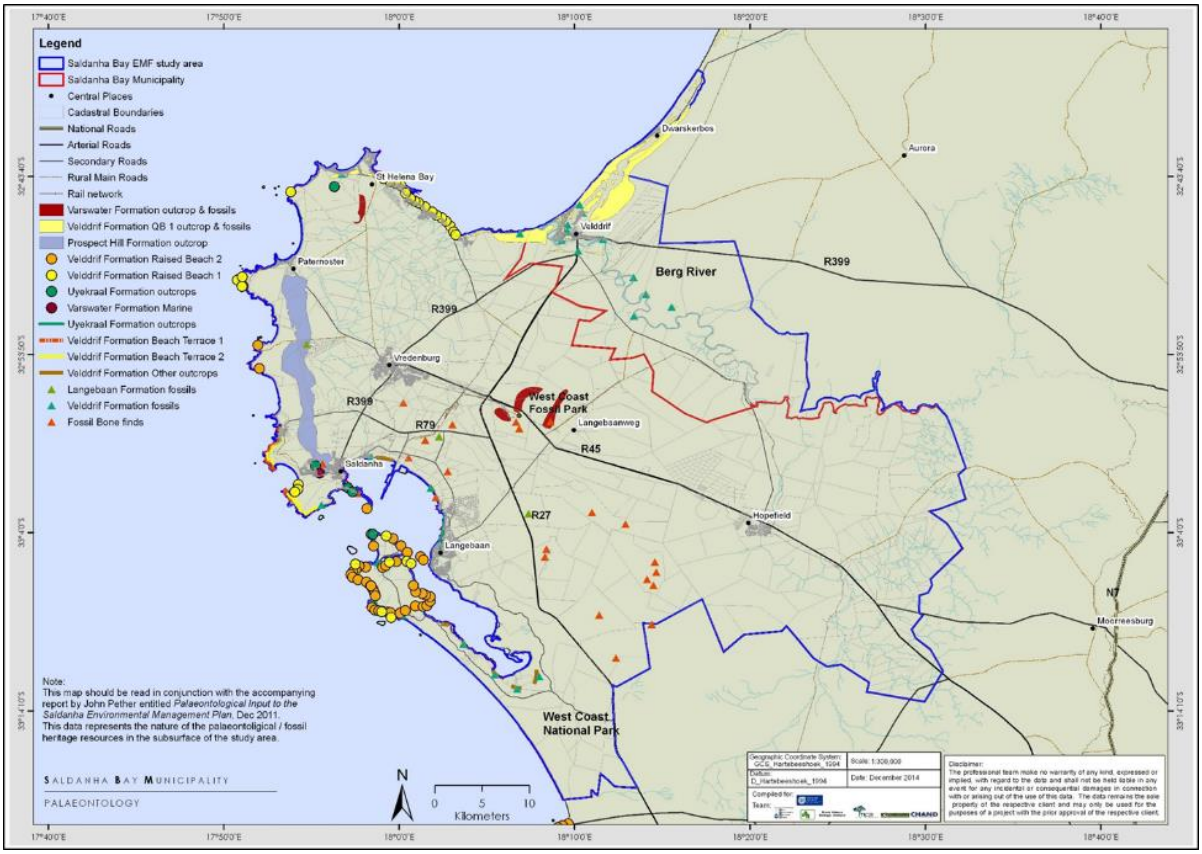
2.4. Cultural and Heritage Resources

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 SBM.

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 17)

- *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.



Map 17. Palaeontological 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, 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 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 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. 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 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 several 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 Saldanha 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 Khoi-khoi resisted the Dutch presence and low-level warfare. 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 occupation*: 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.

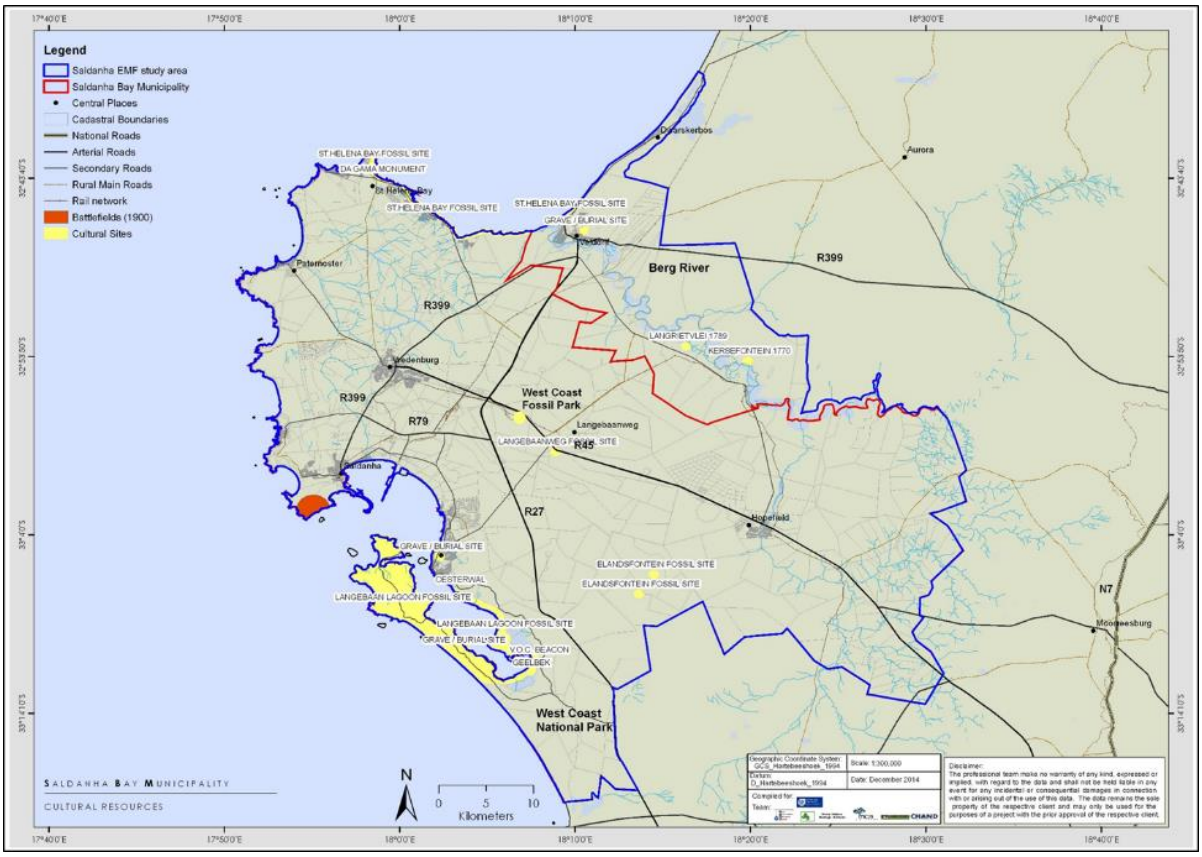
A summary of key historical and cultural elements related to settlements is given below and are shown on Map 20.

- *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 18. 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 19:

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

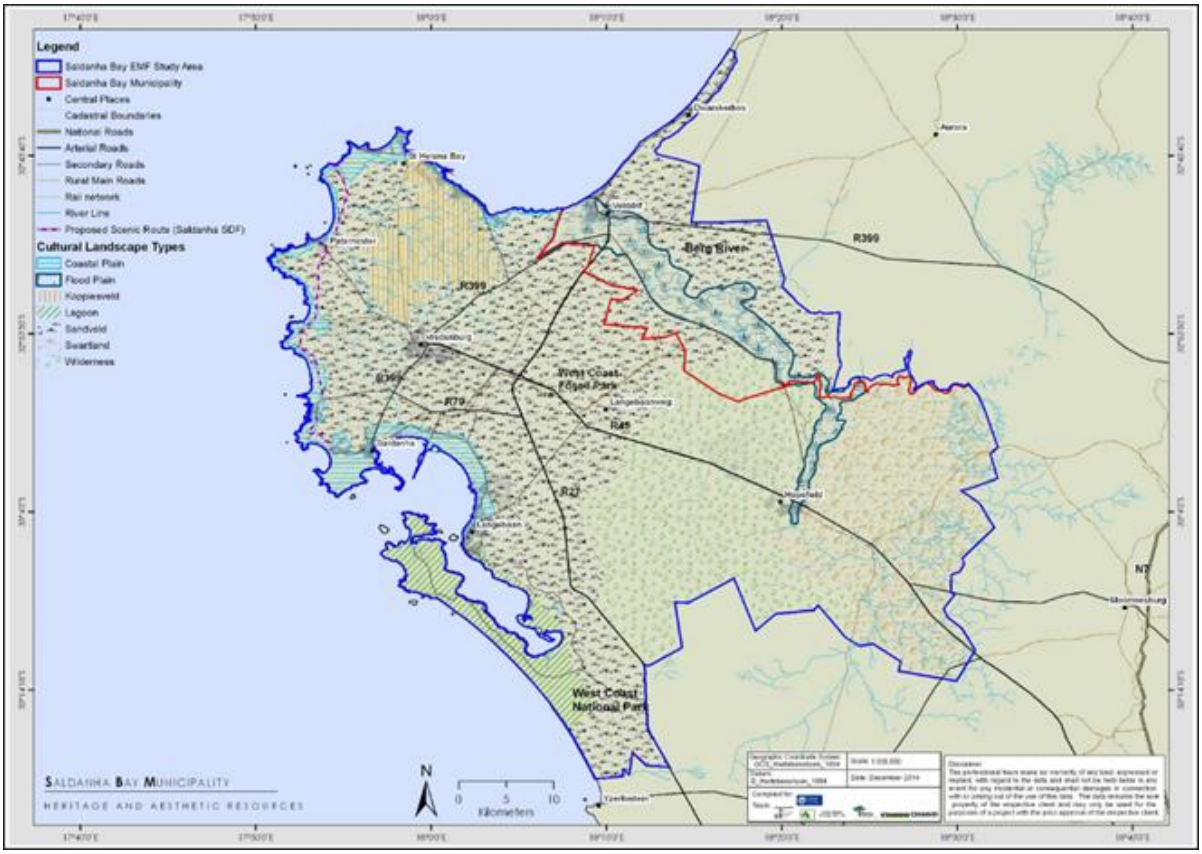
Cultural landscapes can be further subdivided into areas of significance such as the Potberg Peninsula and the Swartland agricultural landscape. Both of these areas offer high aesthetic and architectural value.

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, as seen in Map 20:

- 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.



Map 19. Cultural Landscape Types

Map 20. Cultural Landscapes and Scenic Routes

3. Socio-Economic Conditions

As of 2020, the WCDM population size was 464 056 people, with the SBM making up 26.2% thereof. (MERO, 2020). The population for the BRM is expected to increase between 2020 and 2024 at an annual rate of 1.7%. The population of WCDM is estimated to grow at 1.7% between 2020 and 2024, an increase of 32 370 people. The SBM population growth, at 2.1%, is one of the drivers of the population growth of the WCDM. The WCDM had 121 602 households in 2020, with many households residing in the SBM. (MERO, 2020)

The SBM is attracting smaller or single-person households and the municipal area has more economic activity when compared with other municipal areas in the WCDM. The Saldanha Bay Industrial Development Zone also attracts young skilled manufacturing and services employees (and semi-skilled construction and trade workers). The number of households in the WCDM is expected to grow by 2.3% per annum between 2020 and 2024, an increase of 11 579 households (MERO, 2020). The highest household growth is expected in the SBM, with an estimated growth of 3.4%. The estimated growth of households in the BRM is 2.1% (MERO, 2020). The household growth rate, which is higher than the population growth rate, could be an indication of urbanisation taking place in the WCDM. (MERO, 2020)

The SBM comprises more females (50.4%) than males (49.6%). This may mean that a larger proportion of males in the region move abroad to other regions or provinces in search of greater economic opportunities. The largest share of the municipal area age group is between 15 and 34 years (37.7%), followed by individuals aged between 35 and 64 years (31.9%) and the younger age group of under 15 years (25.6%). Individuals older than 65 make up the smallest share (4.7%) of the municipal area's population. The BRM also has a larger proportion of women (51.8%) than men. The largest share of the municipal area's population is between 35 and 64 years (35.2%), followed by those aged between 15 and 34 years (33.2%). (MERO, 2020)

3.1. Income

There is an expectation that economic growth will result in improvements in human development, and that economic decline will have an adverse effect on human development. The United Nations uses the Human Development Index (HDI) to assess the level of socio-economic development in countries (MERO, 2020). The assumption is that the performance of the economy plays a major role in determining the quality of life for citizens, which is measured by the standards of education, health, dwellings, access to basic services and crime levels. The District's GDPR per capita increased from R68 307.0 in 2018 to R68 685.6 in 2019. However, in real terms the GDPR per capita growth has been on a downward trend. The WCDM's GDPR per capita growth is lower than the provincial GDPR per capita growth. In terms of labour productivity, this may mean that the WCDM is becoming less efficient

compared with the Province (MERO, 2020). All municipal areas in the WCDM experienced contractions in growth of GDPR as a result of the economic slowdown, with the SBM experiencing significant declines in growth in 2019. During this time the ArcelorMittal steel plant in Saldanha Bay was significantly affected by a reduction in China's demand for commodity imports. (MERO, 2020)

The average monthly household income in the WCDM for 2018 was R14 928, which is lower than the average monthly household income in the Western Cape in 2018. The SBM average household income was R15 268. A decline in the average household income is expected, given the anticipated increase in unemployment as a result of the worsening economic conditions in 2020. The COVID-19-induced job losses were a major concern in the BRM, as these would result in food insecurity, particularly for the rural areas of the BRM, during the national lockdown. The "normal" functioning of the agricultural sector, coupled with food donations, helped to ensure that families were supplied with enough food. (MERO, 2020)

The Gini coefficient is used to estimate the unequal distribution of income and wealth within an economy. The income inequality in the WCDM is lower than that of the Western Cape for all reference periods (2013, 2016 and 2019) (MERO, 2020). The BRM showed the greatest increase over the reference period. This may be due to the fishing industry dynamics in terms of factory closures and changes in access rights of small-scale fishermen. The Gini coefficient in the WCDM was 0.602, while the provincial Gini coefficient was 0.618. The Gini coefficient in SBM was 0.611, whilst the Bergrivier Municipal Areas (BRMA) had the lowest income inequality in the WCDM in 2019, with a Gini coefficient of 0.589. (MERO, 2020)

3.2. GDPR and Employment

The SBM is the largest economy in the WCDM. With its coastline of 238 km, the municipal area is host to a large fishing industry and several tourist towns. Saldanha Bay is also known for its harbour and steel mill, while Vredenburg is the largest administrative and commercial centre in the WCDM. Coastal towns such as Paternoster, St Helena Bay, Jacobsbaai and Langebaan are popular areas for holiday homes, whilst Hopefield is a service centre for the grain, dairy, meat and honey farmers in the area (MERO, 2020).

The economy of Saldanha Bay was valued at R9.3 billion in 2018, employing 51 924 people within the municipal area. The estimate for 2019 indicates that the economy was valued at R9.5 billion, employing 51 433 people in the municipal area. Growth in current prices is a result of inflation, and the economy indicates a contraction, which resulted in 491 jobs being shed in the municipal area as the economy stagnated (MERO, 2020).

Unemployment levels are problematic for both SBM and BRM. Between 2018 and 2019, unemployment in both these municipalities increased. In 2018, SBM had the highest levels of unemployment in the WCDM, at 15.9 percent, despite its significant contribution to the GDP. The high unemployment in the SBMA is due to the poor performance of the steel factory in the municipal area. There are limited employment opportunities available in the West Coast region and payment levels are relatively low. This is due to a portion of the active workforce comprising of 'seasonal' workers. This is linked to the agricultural sector being a major employer in the area. (MERO, 2020)

The labour force participation and absorption rate indicate a decrease from 2018 to 2019, which implies a lack of job opportunities in the WCDM. The SBMA (72.4 percent) experienced a significant decrease in the labour force participation rate in 2018 (MERO, 2020).

SBM makes a high contribution to the WCDM's Gross Domestic Product (GDP). SBM provides the bulk of the employment opportunities in the WCDM, contributing 28.2 percent to total employment (MERO, 2020). The BRM provided 16.3 percent to the total employment of the WCDM. The SBM larger and faster growing in the WCDM regional economy. A large amount of job shedding was experienced in the SBM between 2014 - 2018, whereas BRM had minimum change. The poor performance of the Saldanha Steel factory and the contraction in the metals manufacturing subsector contributed significantly to the increase in job-shedding, which affected secondary sectors. The net change for 2019 indicates that in the WCDM, the construction industry shed about 568 jobs, while the agriculture, forestry and fishing sector and the manufacturing sector shed about 541 and 445 jobs respectively. In 2019, SBM alone experienced 491 job losses. (MERO, 2020)

The wholesale and retail trade, catering and accommodation sector was the second largest contributor to employment across municipal areas. This sector is particularly important source of employment in the SBM, where it contributes 4.8 percent. The community, social and personal services sector also provides many jobs in the SBM. (MERO, 2020)

The main industries contributing to GDPR in the municipal area were manufacturing (21.9 percent), agriculture, forestry and fishing (16.9%) and wholesale and retail trade, catering and accommodation (14.9%) (MERO, 2020). Although manufacturing is the main contributor in terms of GDPR in the SBM, the agriculture, forestry and fishing sector was also the largest contributor to employment in the municipal area, with a contribution of 36.0 percent in the same year. The mining and quarrying sector was the smallest, contributing 0.5 percent to the GDPR and 0.1 percent to employment in the SBM in 2018. (MERO, 2020)

Agriculture, forestry and fishing sector was the main source of employment in the region in 2018, with a contribution of 36.0%. This suggests that the industry is labour-intensive. The manufacturing sector

contributed 9.5% to the WCDM's employment in 2018. This reflects that the sector is capital-intensive. Another important source of employment in the SBM is the wholesale and retail trade, catering and accommodation sector, which contributed 16.8% to total employment in the municipal area. (MERO, 2020)

The SBM's economy is expected to contract by 5.3% in 2020 as a result of the COVID-19 pandemic. A slight recovery of 3.1% is expected for 2021. Economic conditions will therefore remain challenging over the medium term considering that the economy was constrained prior to 2020. (MERO, 2020)

The BRM is a popular tourist destination with a 40-kilometre coastline. The coastline is used by local fishermen in the region. The municipal area is well known for its vast farmlands and is home to the towns of Piketberg, Porterville, Eendekuil, Redelinghuys, Aurora, Goedverwacht and Wittewater. These towns are considered service centres for the agriculture industry (MERO, 2020). The coastal towns in the BRMA include Velddrif, Laaiplek and Dwarskersbos, which play a significant role in the economy of the BRMA. The N7 traverses the local municipal area, which forms part of the Cape Town-Namibia transit route. (MERO, 2020)

The size of the BRMA's economy was R4.5 billion (current prices) in 2018, with 29 923 people employed in the municipal area. Estimates for 2019 show a negative growth rate, which resulted in the economy stagnating and experiencing a decline of 59 jobs in the year. The main driver for the economy of the BRMA was the agriculture, forestry and fishing sector and the manufacturing sector, which accounted for 26.7% and 23.2% of GDPR in 2018 respectively. Another important sector that contributed to GDPR in 2018 was the wholesale and retail trade, catering and accommodation sector, which contributed 13.3% to GDPR. (MERO, 2020)

The primary employer in the region is the agriculture, forestry and fishing sector, which contributed 50.6% to total employment. The employment concentration in the agriculture, forestry and fishing sector is an indication of the sector being labour-intensive, whereas the manufacturing sector is a more capital-intensive sector, considering its contribution of 7.7% to total employment. The mining and quarrying sector contributed the least in terms of GDPR and employment in the BRM (MERO, 2020).

The BRMA realised an average annual GDPR growth rate of 1.4% between 2014 and 2018. Among the main economic growth drivers in the BRMA between 2014 and 2018 included the finance, insurance, real estate and business services sector (3.3%) and the manufacturing sector (2.6%). Due to its size (R1.2 billion) the agriculture, forestry and fishing sector was also an important source of economic growth over the same period. This sector is a valuable source of inputs for the local manufacturing sector, which focuses mainly on agro-processing activities. The reliance on agriculture, forestry and

fishing by the BRMA makes it vulnerable to environmental conditions such as the drought, that has affected the region in recent years. Poor diversification in the economy of the BRMA is considered to be one of the key limitations to economic growth in the area. In order to diversify the economy, a manufacturing industry that focuses on the boat-building industry is being considered in Velddrif. (MERO, 2020)

Estimates for 2019 show that the economy of the BRMA contracted by 2.3% owing to the significant decline in the agriculture, forestry and fishing sector (7.4%). Although the wholesale and retail trade, catering and accommodation sector was the main source of employment in 2019, the contraction in the economy also had an impact on the net change of employment, with 59 jobs being shed in the BRM. The secondary sector, particularly the construction and manufacturing sectors, shed 65 and 44 jobs respectively, followed by the agriculture, forestry and fishing sector, which shed 23 jobs. It is estimated that the agriculture, forestry and fishing sector will register strong growth of 15.9% in 2020. This will be driven by the good performance of exports linked to the fisheries value chain, as well as small-scale fisheries linked to Mullet. The economy of the BRMA has been placed further under strain by the current COVID-19 pandemic, with an estimated GDPR contraction of 2.1 percent in 2020. The BRMA economy is expected to partially recover by 1.7 percent in 2021. (MERO, 2020)

3.3. Skills and education

3.3.1. Education:

In 2019, the SBMA had the largest number of learner enrolments for the period under review in the WCDM, with 19 030 learners enrolled. In the WCDM the learner enrolments have shown a consistent positive trend for all municipal areas except for the BRMA, which did not experience a consistent positive trend for the reference period. Between 2017 and 2019, the SBMA experienced a significant increase in the number of learners enrolled, with 1 446 learners. Of all the municipal areas in the WCDM, BRM (106 learners) had the lowest increase regarding learner enrolments. The overall growth in learner enrolments in the WCDM indicates the use of educational resources and is likely to increase owing to the continued growth in learners in the WCDM. (MERO, 2020)

Retention is an important proxy for future labour trends and employment outlook in years to come. The retention rate between 2017 and 2018 in the WCDM showed a marginal decline compared with the period between 2018 and 2019. In 2019, the retention rate in the WCDM was 68.7%, which is higher than the provincial retention rate (66.0%). In 2019, the BRMA showed a retention rate of 76.1%. The Saldanha Bay retention rate significantly regressed year on year between 2017 and 2019. The matric pass rate for the WCDM in 2019 was 83.9%, with the highest pass rate of 85.9% experienced in 2017. In 2019 the pass rate for the District was higher than the pass rate for the Western Cape. (MERO, 2020)

3.3.2. Skills:

Between 2009 and 2010, substantial job losses were experienced, affecting mostly low-skilled and semi-skilled workers in the SBMA. The period between 2011 and 2018 resulted in a net increase, with 3 534 jobs for low-skilled workers for the municipal area. During the same period, semi-skilled workers experienced a net increase of 2 580 jobs for the SBMA. The estimates for 2019 indicate that formal job creation remained positive, although it experienced a decline from 2018. 117 jobs were created for skilled workers, while 98 jobs were created for low-skilled workers. A negative outlook regarding semi-skilled workers was the loss of three jobs for the municipal area. (MERO, 2020)

The SBMA was dominated by semi-skilled and low-skilled workers in 2018; 41.4% of workers were semi-skilled, while 40.5% were low-skilled. In terms of the sector profile for the municipal area, the community, social and personal services sector comprised mainly low-skilled workers (64.8%), followed by the agriculture, forestry and fishing sector (53.8%). All sectors within the SBMA comprised a large proportion of semi-skilled workers in 2018. The five sectors that predominantly consisted of semi-skilled workers were construction (57.1%), electricity, gas and water (56.3%), transport, storage and communication (56.8%), wholesale and retail trade, catering and accommodation (53.9%) and mining and quarrying (55.3%) (MERO, 2020). Skilled employees are most prevalent within the general government sector (38.4%) and the finance, insurance, real estate and business services sector (30.2%). In 2018, only 18.1% of workers in the SBMA were classified as skilled. (MERO, 2020)

Between 2009 and 2010, the municipal area experienced significant job losses as a result of the global economic decline. For the two periods, the municipal area shed 1 848 jobs, and low-skilled workers were significantly affected, with a loss of 1 422 jobs. While net employment improved for skilled and semi-skilled workers in 2011, low-skilled workers experienced net declines in 2011 (MERO, 2020). Regardless of the improvement in employment in the BRMA, a net decline of 163 jobs was experienced again in 2014, while the skilled and semi-skilled levels showed a positive trend. Furthermore, a decline was also noted in 2017 before there was a recovery in 2018, with a net increase of skilled, low-skilled and semi-skilled workers. Estimates for 2019 show that this trend persisted, with the municipal area indicating 281 net jobs created. (MERO, 2020)

Low-skilled workers were concentrated in the agriculture, forestry and fishing sector and the community, social and personal services sector, accounting for 75.5% and 72.6% of the sector's total employment respectively. Since the agriculture, forestry and fishing sector is predominantly composed of low-skilled work, the sector is vulnerable to economic shocks, which may increase poverty levels if the workers in the agriculture, forestry and fishing sector are not upskilled, so they may be used in other positions or sectors during periods of job-shedding. In terms of semi-skilled workers, the electricity, gas and water sector has the largest proportion of semi-skilled workers, comprising 62.0%, with the

community, social and personal services sector having the lowest proportion of the semi-skilled workers. In the BRMA, 14.0% of the workforce are classified as skilled labour. (MERO, 2020)

3.4. Health

The health conditions of people living within the WCDM are analysed in this section by reviewing mortality, the prevalence of tuberculosis (TB), human immunodeficiency virus (HIV), infant mortality rates, maternal death rates and teenage pregnancies (MERO, 2020).

Mortality: The main natural causes of death of the WCDM in 2017 include chronic lower respiratory diseases (8.6% of deaths), diabetes mellitus (7.5%) and tuberculosis (7.4%). Chronic lower respiratory diseases include diseases such as bronchitis, emphysema and asthma. The WCDM has proportionally more people dying of chronic lower respiratory diseases compared with the Province (5.5%), as well as tuberculosis (4.8%). Fewer people in the WCDM die of non-natural causes (11.6%) compared with the Province (12.9%). (MERO, 2020)

HIV/AIDS and TB: The number of people who are known to have tested positive for HIV in the WCDM increased by 1 054, from 19 155 in 2016/17 to 20 209 in 2017/18, and by 519 people in 2018/19 (MERO, 2020). In 2019/20, the number of known people who tested positive for HIV in the WCDM declined to 19 919. The trend in the percentage of people who started antiretroviral treatment (ART) but are no longer on therapy has been increasing year on year, from 31.6% in 2015/16 to 59.8% in 2019/20. This suggests that a significant amount of people are opting out of ART after starting and this may result in numerous adverse impacts, such as an increased risk of drug resistance and increased viral load. However, the proportion of people who are on ART increased by 7.7 percentage points in 2017/18 and by 6.0 percentage points in 2018/19, before a substantial decline of 30.9 percentage points in 2019/20. This could be attributed to the decrease in the number of people who tested positive for HIV in 2019/20. (MERO, 2020)

The TB programme success rate in the WCDM has stayed relatively constant over the reference period. In 2019/20, the TB programme success rate was 83.2%, which is significantly higher than the provincial success rate of 77.3%. The multidrug-resistant (MDR) TB treatment success rate has also increased from 50.9% in 2018/19 to 53.4% in 2019/20, while the TB client death rates have declined from 3.8% in 2018/19 to 3.3% in 2019/20. Despite TB being the third leading cause of death in the WCDM, the TB client death rate in the WCDM is lower than that of the Province (3.8%). (MERO, 2020)

Infant, child and maternal health: Overall, infant mortality has been on a downward trend in the Western Cape and WCDM over the period under review. Between 2008 and 2014, the infant mortality rate was higher in the WCDM compared with the Province. The WCDM experienced a significant increase in infant mortalities between 2009 and 2010, but was on a declining trend from 2010 until

2016, when an increase in infant mortality was recorded, from 13.3 infant deaths per 1 000 live births in 2016 to 18.2 infant deaths per 1 000 live births in 2017. In 2017, the WCDM recorded a marginally higher infant mortality rate than the Western Cape. However, the number of infant deaths was significantly lower (18.2 deaths per 1 000 live births) compared with 2008. (MERO, 2020)

3.5. Human Development Index

The HDI is defined as a composite indicator reflecting education levels, health and income to assess the relative level of socio-economic development in countries. Economic performance plays an important role in determining the quality of life of citizens; economists expect economic growth to result in improvements in human development, and economic decline to have an adverse effect on human development (MERO, 2020). The HDI is a measure of people's ability to live a long and healthy life, to communicate, to participate in the community and to have sufficient means to afford a decent standard of living. The HDI is represented by a number between 0 and 1, where 1 indicates a high level of human development and 0 represents no human development. The HDI in the WCDM is lower than that of the Western Cape. Despite the decline in GDPR per capita, the human development within the District has improved over the reference period, indicating improved health and education outcomes. Out of all the municipal areas in the District, Saldanha Bay (0.730) had the highest HDI (MERO, 2020).

3.6. Housing, infrastructure and services

One of the important indicators of the level of human development within an economy is access to decent formal housing, which is regarded as a basic human right (MERO, 2020). Most of the households in the WCDM reside in formal dwellings, of which the most common dwelling type in the District is a house or brick structures on a separate stand or yard, with 78.5% of the District's population living in dwellings of this type. The BRM has 79.6% of its household living in this dwelling type. Approximately 11.4% of households in the District reside in informal dwellings and the majority are in the Saldanha Bay, Swartland and Matzikama municipal Areas (MERO, 2020).

The SBMA and Swartland municipal areas have the largest economies in the WCDM, with high population growth rates (MERO, 2020). The prospects of job opportunities often attract people to more urban areas, such as Saldanha Bay, Vredenburg and Malmesbury. This often leads to an increase in the demand for housing and results in higher instances of informal dwellings. (MERO, 2020) The national lockdown as a result of COVID-19 hampered the data collection process for this indicator.

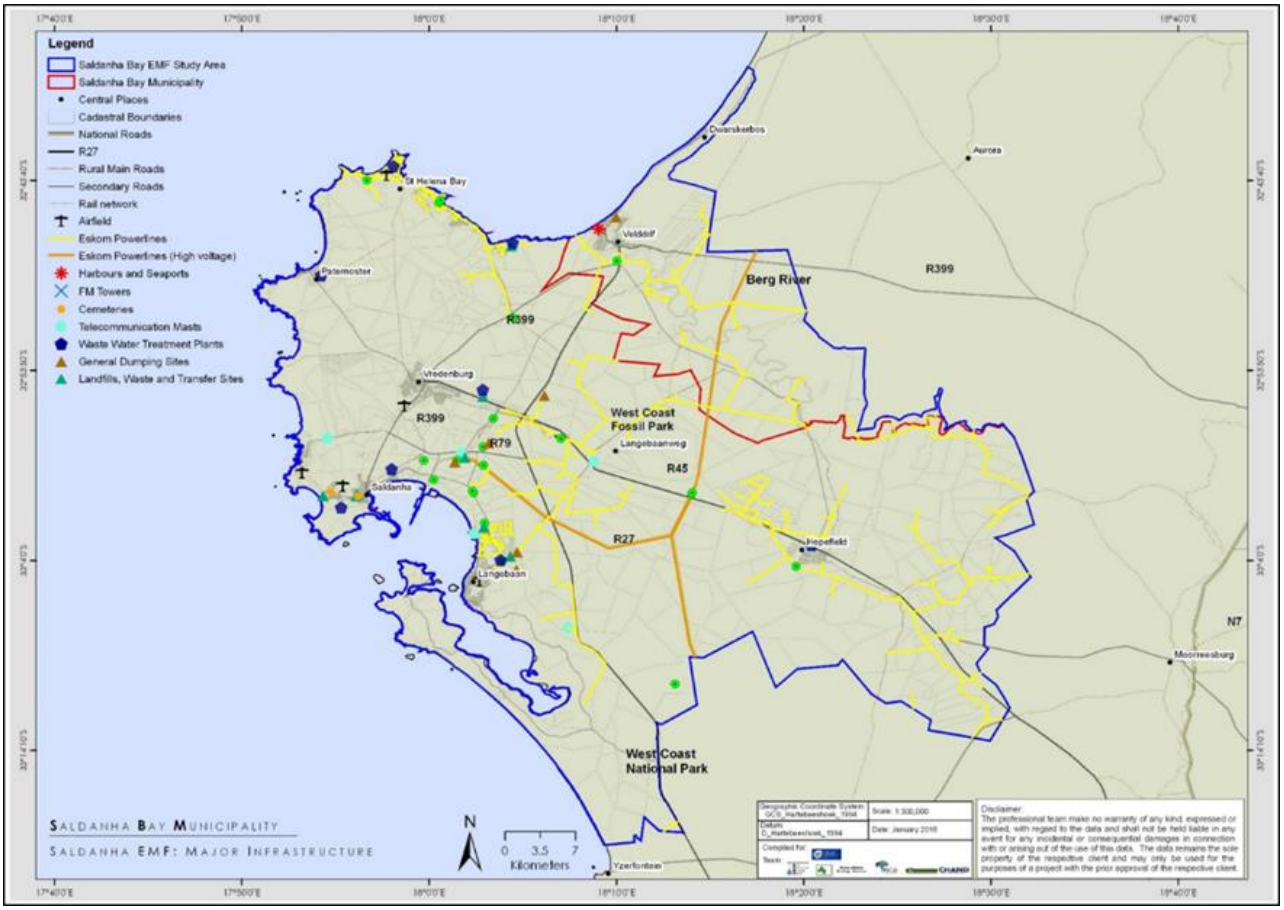
The number of water, electricity, sanitation and solid waste consumers in the WCDM has increased. The estimated future growth of households in the WCDM will increase the demand for services.

However, the poor economic growth and declining household incomes will influence households' abilities to pay for these services. (MERO, 2020)

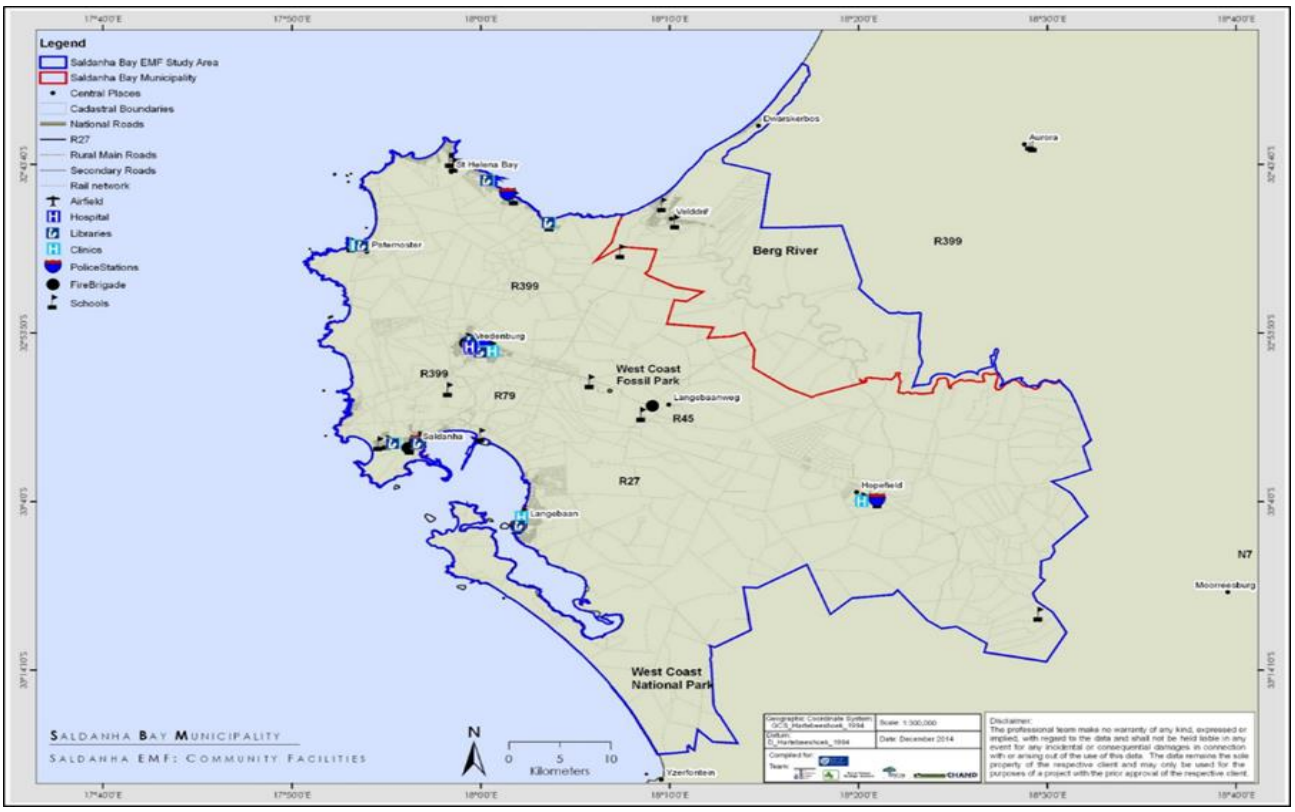
In 2018, the monthly income cut-off point for households to be classified as indigent households was R3 380 for most municipalities, except BRMA, which had a cut-off point of R1 601. The number of indigent households in the WCDM increased between 2018 and 2019. Areas with a high proportion of indigent households in 2019 include Saldanha Bay (21.3% of households). The large number of indigent households in some municipal areas in the WCDM limits the revenue-earning abilities of the local municipalities. However, there is still a demand for services. The worsening economic conditions as a result of COVID-19 in 2020 will probably increase the number of indigent households. This will reduce the revenue of the municipalities. (MERO, 2020)

The BRM notes 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.

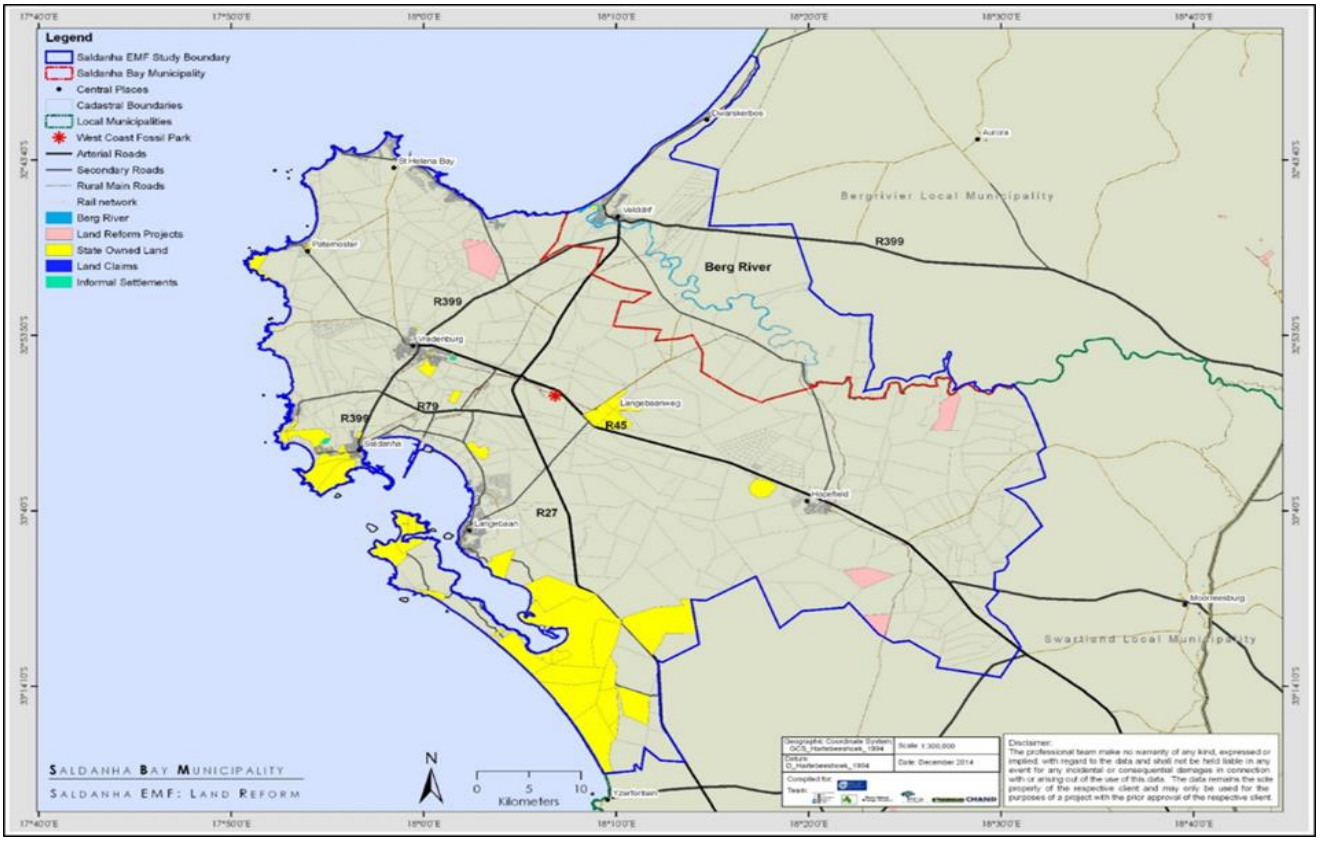
There are some land reform projects within the EMF study area. These are shown on Map 23. State owned land is also shown as this can serve as an indicator of the potential for local economic and even housing opportunities. Most of the state owned land has already been allocated to military use (e.g. air force base at Langebaanweg) or to conservation (e.g. WCNP).



Map 21. Infrastructure



Map 22. Community facilities



Map 23. Land reform projects

3.7. Economic Development

District and local economies in the WCDM are influenced by the spending of local households and by several economic activities within the region. These economic activities include local and international cross border trade of goods and services, domestic and international tourists visiting towns and attractions within the region, as well as private and public sector investments (MERO, 2020). Therefore, exports, tourism and investments can be considered injections into the economy, while imports are considered leakages. This section explores trade, tourism and investment dynamics at a district level and analyses the comparative advantages of the various economic sectors within the District to identify growth opportunities and potential risks in the WCDM (MERO, 2020).

The WCDM maintained a positive trade balance, which was largely due to the trade surplus realised in the manufacturing sector and agriculture, forestry and fishing sector. The peak of the trade surplus in the District was experienced in 2018, as a result of the manufacturing sector and the agriculture, forestry and fishing sector experiencing a significant trade surplus. The trade deficit in the District was observed in the mining and quarrying sector, and this persisted between 2009 and 2019 (MERO, 2020).

Despite a positive trade surplus and reduced imports across all three sectors in 2019, the District's trade balance declined from R4.5 billion in 2018 to R3.4 billion in 2019. The decline in the WCDM's trade balance was mainly attributed to the manufacturing sector – the sector's exports declined by R1.5 billion (MERO, 2020). The sectoral trade distribution for the WCDM indicates that the manufacturing

sector accounted for most imports in the District (69.3%), followed by mining and quarrying (27.0%) (MERO, 2020). The agriculture, forestry and fishing sector registered a small proportion of imports at 3.7% (MERO, 2020).

The manufacturing sector also dominated the export market, accounting for 75.2% of exports, while the agriculture, forestry and fishing sector accounted for only 24.8% of exports (MERO, 2020). The dominance of the manufacturing sector confirms that the District has a comparative advantage with regard to manufacturing, as indicated by the location quotient (MERO, 2020). The SBMA – the largest economy in the WCDM – was the largest contributor for both imports and exports, with a value of R2.0 million for imports and R4.1 million for exports. The SBMA experienced a trade surplus between2009 and 2019, which was mainly driven by the manufacturing sector. In terms of the sectoral distribution, the manufacturing sector accounted for 99.3% of exports and 57.5% of imports. This is a comparative advantage in the manufacturing sector for the municipal area. The trade balance for the SBMA indicates a decrease from R3.1 million in 2018 to R2.1 million in 2019 (MERO, 2020).

The BRMA also maintained a trade surplus for each year over the reference period, which was largely due to the manufacturing sector and the agriculture, forestry and fishing sector, which had a greater proportion of exports compared with imports. In the BRMA the trade balance for 2018 and 2019 displayed a marginal increase, indicating an increase in exports compared with imports (MERO, 2020).

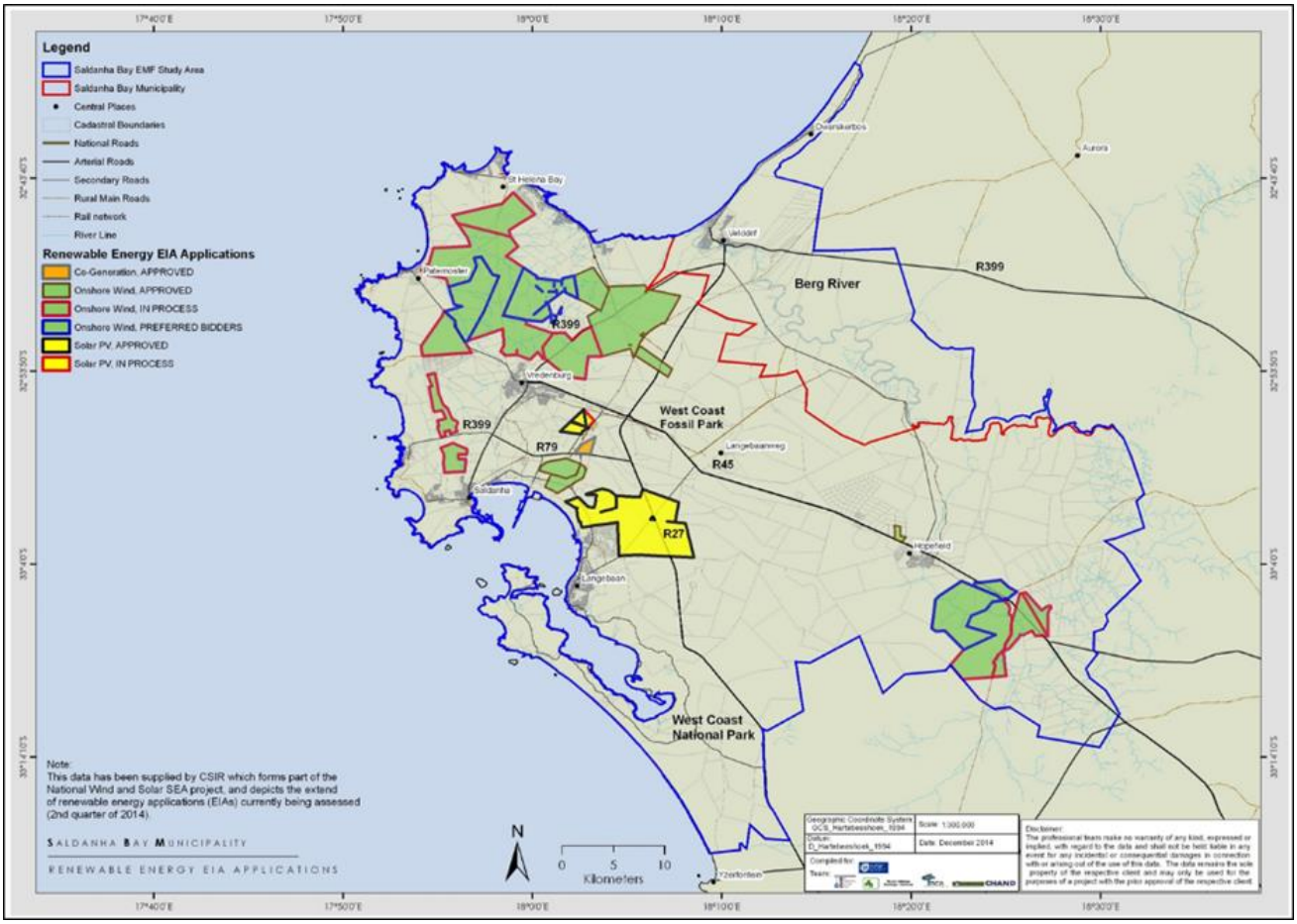
The WCDM has a diverse offering ranging from marine tourism to wine tourism and is known for its unique cultural and natural resources unique to the western coastal area of South Africa (MERO, 2020). Moreover, the District is a hidden gem and is ideal for people wanting to escape from their busy lives and experience tranquillity and the simplicities of life. The region is steeped in the Nama culture and offers nature lovers a variety of attractions and activities (MERO, 2020). The West Coast National Park is the closest spot outside Cape Town where tourists can experience the spring flower season. The West Coast Fossil Park, which lies just next door to the West Coast National Park, has uncovered 200 different kinds of animals, many of them new to science. In 2018, the catering and accommodation services industry contributed 1.0% to the GDPR of the WCDM and employed 4 331 people, accounting for 2.4% of the District's total employment (MERO, 2020).

The Western Cape Provincial Spatial Development Plan (2014) marks the area as one with a high potential for growth where future investment in infrastructure and service provision would be appropriate.

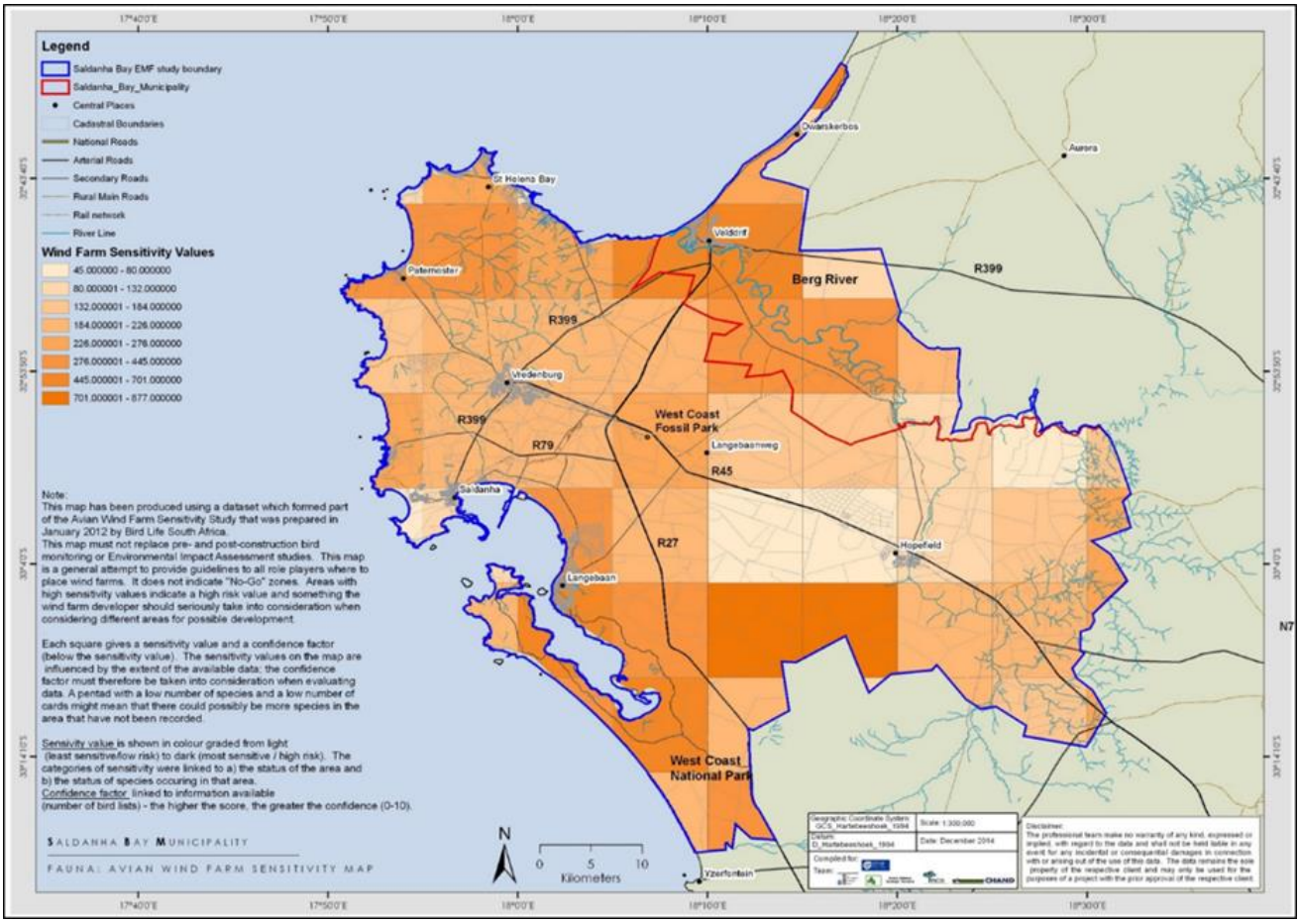
In addition to the IDZ, the other significant potential development in the area relates to growth of the Port, the key elements being expansion of the iron ore handling facility. Marine repair and support

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 CSIR on Renewable Energy Development Zones indicates that Saldanha has not been identified as a priority zone in this regard (Strategic Environmental Assessment (SEA) for wind and solar photovoltaic (PV) energy in South Africa – Renewable Energy Development Zones (REDZs) phase one and two). Notwithstanding there are applications that have been approved or that are underway as shown in Map 24. Birdlife South Africa has mapped bird sensitivity in relation to wind farms (Refer to Map 25).



Map 24. Renewable energy projects



Map 25. Avian sensitivity to wind farm development

BRMA 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 BRM, 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 SBM and the BRM LEDS documents.

A Tourism Development Strategy has been formulated for the SBM. 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.

PART 2 – 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 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 DEFF 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.

Table 3. 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**
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. Sector-specific policies and strategies

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

4.2.1. Climate change

National government's policy position 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 National Strategy for Sustainable Development (2008) and National Climate Change Response Strategy (2004) 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.

Since the development of the WCCCRS, the global context on climate change has reached several catalytic turning points. Of pivotal importance, nations reached a global agreement at the United Nations Framework Convention on Climate Change COP21, 'the Paris Agreement', on 12 December 2015. As of February 2020, all United Nations Framework Convention on Climate Change members have signed the agreement, 189 have become party to it (DEA&DP, 2020). South Africa is one the nations that have become party to it (DEA&DP, 2020)

The National Climate Change Response White Paper (NCCRWP) presents the South African Government's vision for an effective climate change response and a long-term, just transition to a climate-resilient and lower-carbon economy and society. South Africa's response to climate change has two objectives:

1. Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity; and
2. Make a fair contribution to the global efforts to stabilise GHG concentrations in the atmosphere at a level that avoids dangerous anthropogenic interferences with the climate system within a

timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

The National Climate Change Response Policy highlighted eight near-term Priority Flagship Programmes that are being undertaken; these have since been expanded to ten Flagship programmes:

1. The Climate Change Response Public Works Flagship Programme;
2. The Water Conservation and Water Demand Management Flagship Programme;
3. The Energy Efficiency and Energy Demand Management Flagship Programme;
4. Low Carbon, Climate Resilient Transport Systems Flagship Programme;
5. The Renewable Energy Flagship Programme;
6. The Waste Management Flagship Programme;
7. The Carbon Capture and Storage Flagship Programme;
8. The Adaptation Research Flagship Programme;
9. The Agriculture, Food Systems and Food Security Flagship Programme; and
10. The Low Carbon, Climate Resilient Built Environment, Communities and Settlements Flagship Programme.

There is thus important work which will need to be undertaken nationally, provincially and locally to ensure that our targets meet proportionate contributions and adaptation responses. The South African Nationally Determined Contribution (NDC) spells out how this progress will be achieved in South Africa.

The Climate Change Bill, which is under development, is intended to become the primary legal instrument regulating and supporting climate change response in South Africa. The Bill is due to be enacted in 2021. In the absence of mitigation targets set by the Bill, the key document outlining South Africa's ambition currently is the South African NDC which speaks to the Paris Agreement. All signatories to the Paris Agreement have an NDC outlining ambition and programmes to achieve such ambition.

The Western Cape Climate Change Response Strategy (WCCCRS) was approved by the Western Cape Cabinet in 2014. The Strategy is developed as a coordinated climate change response; it aims to guide the implementation of innovative projects and the search for opportunities that combine a low carbon development trajectory with increased climate resilience, enhancement of ecosystems and the services they provide, and economic stability and growth. The WCCCRS, which is aligned to the NCCRWP, also acknowledges the important role that sub-national governments play in responding to climate change, since adaptation and mitigation actions necessary to tackle climate change are, or will be, implemented at this level of governance. Subnational governments are willing to address the issues of climate change and the economic difficulties many of them are facing, by turning these challenges into an opportunity. The WCCCRS document highlights nine focus areas:

- Energy efficiency;
- Renewable energy;
- Built environment – critical infrastructure, disaster management, integrated waste management, human settlements;
- Sustainable transport;
- Water security and efficiency;
- Biodiversity and ecosystem goods and services;
- Coastal and estuary management;
- Food security; and
- Healthy communities.

Building on the WCCCRS, in August 2014, the Western Cape Climate Change Response Implementation Framework was released. This discussed each focus area in greater detail in order to identify impact potential / benefit for the priority programmes and to discuss the opportunities for and barriers to the implementation of the priority programmes identified in the strategy document. The impact potential / benefits were then used to finalise a basket set of indicators that provide a reporting structure for this M&E report series. The WCCCRS will be updated in the 2020/21 financial year.

4.2.2. 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."

- 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 National Development Plan, 2030 ("South Africa's primary approach to adapting to climate change is to strengthen the nation's economic and societal resilience. This includes ensuring that all sectors of society are more resilient to the future impacts of climate-change by; 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.". The long-term strategy is to transition to a low carbon economy.

4.2.3. 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 DEA&DP 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 DEA&DP'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." Currently water resources in the Province are over-allocated. Accordingly, the Western Cape Government 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 DEA&DP 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 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. DEA&DP is the provincial competent authority responsible for the issuing of Waste Management Licenses. Furthermore, DEA&DP 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).

4.2.4. Ecological Infrastructure Investment Framework

The purpose of this Framework is to guide decision-makers from both the private and public sector in making choices around where – and how – to invest in order to promote the resilience of the Western Cape's ecological infrastructure. This investment framework provides a point of departure for further exploration and planning by investors in the context relevant to their proposal (e.g. time, spatial and institutional context of the investor, as well as the proposed investment) (DEA&DP, 2021).

The Ecological Infrastructure Investment Framework (EIIF) is informed by the benefits that society derives from ecological infrastructure and the potential loss of some (or all) of these benefits if such ecological infrastructure is not restored. Within this context, the focus is on the following specific risks: risks to water security (primarily due to alien plant invasions and rangeland degradation), the risks to human life, property and livelihoods posed by uncontrolled fires and by floods (coastal and inland), and the risks to food supply and livelihoods due to rangeland degradation, particularly from over-grazing. The EIIF focuses on where – and how - maximum benefits can be derived from the restoration of ecological infrastructure, in order alleviate these risks, which typically affect the poor the most (DEA&DP,2021).

The EIIF for the Western Cape seeks to advance, facilitate and align investments in Ecological Infrastructure (EI) in the Western Cape Province. The aim of these investments, derived from a consultation process with a wide group of stakeholders and organisations across the province, is to achieve the EIIF's vision for EI, which is as follows (DEA&DP, 2021):

"*By 2040, people of the Western Cape live and organise themselves in a way that promotes healthy and resilient ecological infrastructure, so that it yields goods and services that support physical, psychological and spiritual well-being in the face of population pressure, rapid urbanisation and climate change.*"

The EIIF sets out four strategic objectives to guide decision-makers from the public and private sector in making choices on where and how to invest in order to promote the resilience of the Western Cape's EI.

The EIIF lists four investment objectives, and this component of the Implementation and Monitoring Plan is meant to enable DEA&DP to transform the EIIF into action, to achieve these objectives in a demonstrable manner. The objectives are:

1. **To improve water quality and quantity** in support of people's health and livelihoods in the Province, by controlling the threat of alien invasive plants specifically and improving the ecological status of rivers, wetlands and estuaries more generally.
2. **To reduce the vulnerability** of people, property and the environment **to the threat of uncontrolled wildfires**.
3. To sustainably support local livelihoods and food supply provided by the Province's rangelands through **improved land management practices**, particularly relating to grazing.
4. **To reduce the exposure** of communities, infrastructure and economic activities **to the impacts of increased flooding** within the catchment and along the coast.

In order to achieve the desired outcomes for resilient EI in the Western Cape, cooperation among different stakeholders mandated with guardianship over EI is critical (DEA&DP, 2021)

4.3. Provincial policy

The Provincial Strategic Plan (PSP) 2019 - 2024 constitutes both the Western Cape Province's policy agenda and the roadmap for execution. It builds on the solid foundations of PSP 2014 - 2019,

incorporates the lessons learnt along the way. The stated vision of the PSP is a sage Western Cape where everyone prospers. The following five Vision Inspired Priorities (VIPs) have been identified:

- **VIP 1: Safe and cohesive communities;**
- **VIP 2: Growth and jobs;**
- **VIP 3: Empowering people;**
- **VIP 4: Mobility and spatial transformation; and**
- **VIP 5: Innovation and Culture.**

The Provincial Government has also initiated OneCape 2040, a plan which complements the NDP and which also builds on the VIPs. 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:

- 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 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.

4.4. 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 SBM and BRM IDPs are summarised in the table below.

Table 4. Table 1: Strategic informants from municipal IDPs

SBM	BRM
VISION	VISION
SMART **Superior Service** – The rendering of service which exceed normal expectation **Mandate –** The effective and efficient execution of Council's mandate. **Achievable –** The setting of objectives which a realistically achievable. **Responsive –** The setting of objectives that respond to the needs of the public.	**IDP Vision for BRM:** a prosperous community where all want to live, work, lean and play in a dignified manner.

Team - The promotion of a consolidated approach to address the challenge. **Future through excellence - The vision is to enable a future of prosperity for all through effective objective promoting service excellence.**	
SBM	**BRM**
MISSION	**MISSION**
SBM is a caring institution that excels through: Accelerated economic growth for community prosperity Establishment of high quality and sustainable services Commitment to responsive and transparent governance The creation of a safe and healthy environment Long term financial sustainability	Commitment to sustainable development and the delivery of services that are responsive to the development needs of all communities.
SDF GOALS	**STRATEGIC GOALS**
Goal 1: To develop and maintain a strong local economic base, through the promotion of non-consumptive tourism, Industrial development and the role of agriculture in the municipal area's economy	***Strategic Goal 1:*** Strengthen Financial Sustainability and further enhancing Good Governance
Goal 2: To protect and conserve the heritage resources of the area	***Strategic Goal 2:*** Sustainable service delivery
Goal 3: To provide an environmentally and economically sustainable bulk service infrastructure and road transport network	***Strategic Goal 3:*** Facilitate an enabling environment for economic growth to alleviate poverty
Goal 4: To address the social needs and expectations of all section of the community	***Strategic Goal 4:*** Promote safe, healthy, educated and integrated communities
Goal 5: To promote the conservation and sustainable use of natural resources in the SBM	***Strategic Goal 5:*** A sustainable, inclusive and integrated living environment
Goal 6: To ensure that ongoing development pressure and its spatial implications are managed in a sustainable manner that protects the unique character of the existing	

cultural landscape and the place-specific character and form of the existing settlement pattern	

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 SBM by the West Coast District Municipality through the Berg River – Saldanha Water Supply Scheme. Similarly, the BRM 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 SBM IDP (2017-2022). In the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis in the IDP, uncertainty over water supply on industrial development is noted as a threat.

- Land use activities above Langebaanweg and Elandsfontein aquifers which may or are polluting these ground water reserves (SDF, 2019). Unsustainable water extraction from aquifers which could impact on groundwater movement between the Berg River estuary and Saldanha Bay and Langebaan lagoon. 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.
- 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.

In terms of the SDF, Goal 3 is "*to provide an environmentally and economically sustainable bulk service infrastructure and road transport network*". This includes the objectives, "to identify critical problem areas relating to bulk water supply, ground water extraction and quality" and "*to improve and maintain the standard of bulk services with particular reference to bulk water supply, sewerage and solid waste and sewage management*" (SDF, 2019).

Goal 5 is "*to promote the conservation and sustainable use of natural resources in the Saldanha Bay Municipality. This includes the objectives, "to address and rectify the unsustainable utilisation of natural resources, I/e/ agricultural, fish, flora and ground water*", "*to promote the sustainable extraction of groundwater" and to promote the efficient use of freshwater and energy resources*" (SDF, 2019).

5.1.2. Coastal development

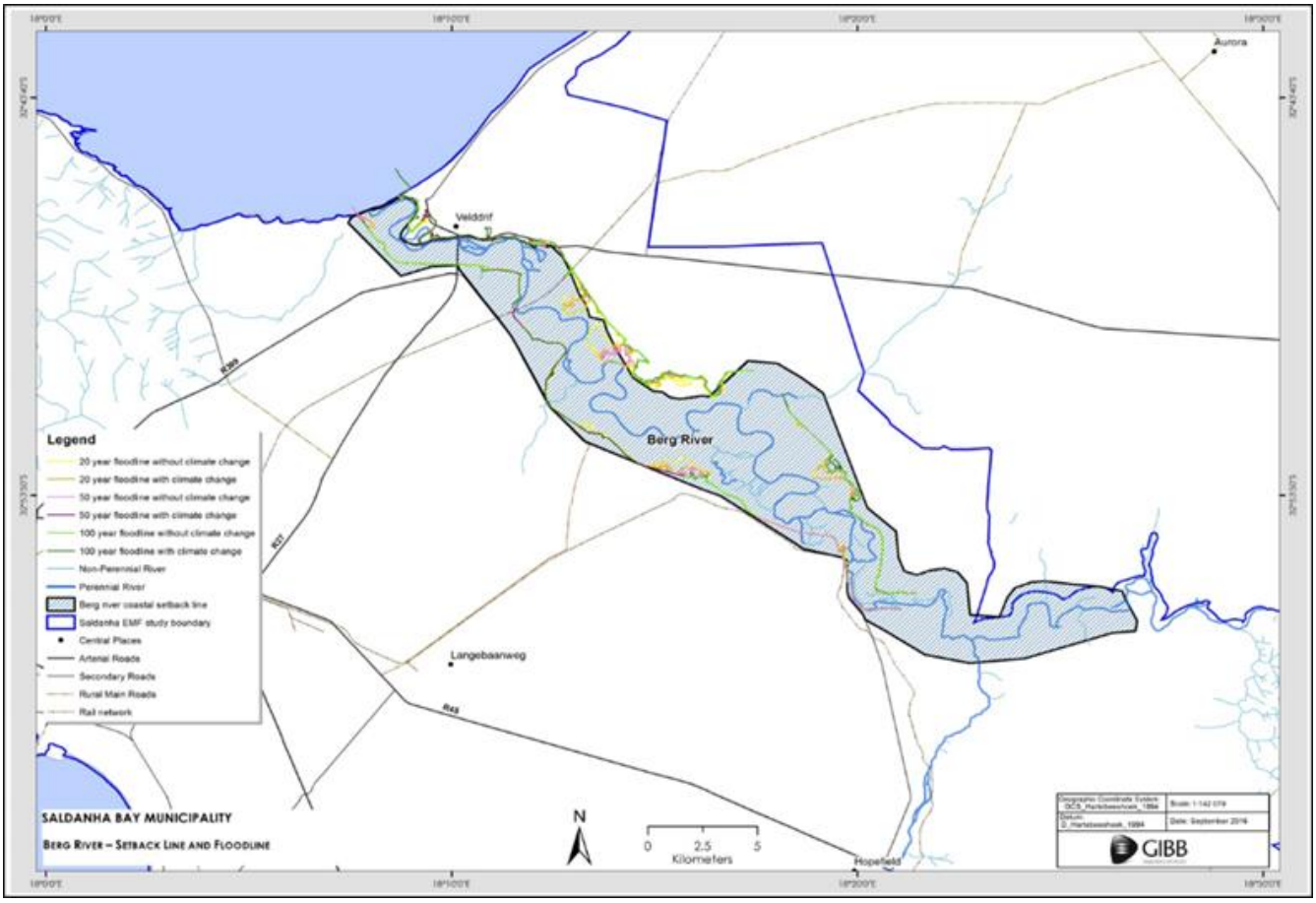
There are many developments within coastal towns where services have been installed, but properties remain undeveloped or have not been sold. Additional developments are underway, even though there appears to be surplus land versus demand. This may be attributable to the economic downturn. There are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

DEA&DP initiated a study to determine setback lines with a view to managing development in the coastal zone. The delineation of the setback lines was 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. A 1:100-year coastal floodline has been established for the Saldanha bay. 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.

In addition, a setback line has been proposed for the Berg River Estuary. 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. 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. 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 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 27 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.



Map 27: Berg River Floodlines

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. 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. Some of these invasive freshwater species move into the estuary in the drier summer months.

Most of these major rivers have been modified through abstraction and construction of storage facilities to improve water security. According to the Fine Scale Plan, 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.

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 these systems 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[1].

- *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 (NEM: ICMA) (Act No. 24 of 2008). The DEFF is the authority for the issuing of the coastal water discharge permits. Where the discharge of effluent occurs in an estuary, DEFF 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 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 problems. 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).

- Based on data from the DEFF 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 concentrations of cadmium frequently exceed these limits, and those for zinc did so occasionally. 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. 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 SBM 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 NEM: ICMA is required for any wastewater discharged into Saldanha Bay.
- *Small Bay* is hampered 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.

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. In a letter dated March 2008, 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 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 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 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 5. Climate Projections and Possible Impacts

Climate Projection	Possible Impacts
Higher mean annual temperatures	• Projections for the near future (2030-2050) for current low mitigation scenario (RCP8.5) suggest an increase of around 1 deg C in winter and 2 deg C in summer for average maximum temperatures, with similar increases for minimum temperatures. Other indices are likely not significant. (ref CSAG.uct.ac.za)
	• Evaporation and water balance
	• Reduced crop quality and food security
Higher Maximum temperatures • hot days and • heatwaves	• 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 é risk to others such as deciduous fruits that rely on cooling period in autumn
	• Flooding

Climate Projection	Possible Impacts
Intensification of rainfall events	• 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;
	• Shoulder season length threatening the Western Cape fruit crops;
	• Fire danger (drying factor); and impacts on rivers and 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. Climate change is anticipated to exacerbate alien plant invasion through the displacement of indigenous species, leaving resources available for ruderal alien invasive species to establish in disturbed areas. The establishment of alien

invasive species is known to be accompanied by an increased threat to water resources and a fire hazard in the area, further disturbing natural habitats.

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 (DEA&DP, 2014). Frontal dunes play an important role in protecting inland properties. In comments from local residents on the Discussion Document it is noted that the beaches of Langebaan 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 the 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 are anticipated to increase in frequency and intensity).
- Increased saltwater intrusion and raised groundwater tables.
- Greater tidal influence.
- Increased flooding (frequency and extent).
- Increased coastal erosion and under-scouring of building foundations, retaining walls and access roads.
- Damage to coastal properties.

5.1.7. Air quality

SBM planned the installation of an ambient air quality monitoring network as such monitoring is required by the National Environmental Management: Air Quality Act, 2004 (Act No. 34 of 2004) (NEM: AQA). 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.

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 (PM10) 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.

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

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 SBM, 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 SBMA 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.

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 operational to receive demolition and construction waste. An application for the closure of the Langebaan Waste Disposal Facility was received by DEA&DP during September 2015. This means that only one Waste Disposal Facility will be available.

The Vredenburg Waste Disposal Facility is also reaching its landfill airspace capacity. The expansion of the Vredenburg landfill to create an addition 11 years of landfill airspace is in progress. 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 Vredenburg landfill has been identified as a potential

district solid waste disposal site. The following waste management needs were identified (The Saldanha Bay Municipal Integrated Waste Management Plan, 2017):

- Separation of waste at source, two-bag collection system have been implemented.
- The two bag system is already in operation or implemented in the Vredenburg area.
- Informal settlments receives regular waste collection by means of door to door refuse bag collection.

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.

5.1.11. 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 SBM 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 SBM and BRM have recognised the importance of natural/environmental resources in their respective IDPs. In addition, the BRM 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).

5.1.12. Key opportunities

The natural characteristics of the area are seen as an important asset, particularly for the tourism industry. This is noted in the SBM 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 BRM.

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 Saldanha Bay Water Quality Trust (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.

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 Khoikhoi 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 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). Where permissible, offsetting may be considered as a last resort.

- 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 3 – 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. 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 Western Cape 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 Environmental Management Zones (EMZs) based on the environmental attributes of the area;
- to provide management guidance for the EMZs in respect of the 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;
- to provide for possible exclusions and restrictions, in terms of NEMA, for the EMZs, based on the 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.

8. Environmental Management Zones / Spatial Planning Categories

Different types of resource use have different impacts on the environment. The significance of these impacts depends in part on the type of resource 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 five EMZs, which have been identified based on a combination of the biophysical and socioeconomic attributes and the potential for significant impacts in relation to the activities listed in the 2014 EIA Regulations. The EMZs comprise of two conservation focused zones and three development focused zones.

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:

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 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 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, which is a continuation of the MDGs for the period 2015-2030. The Sustainable Development Goals differ slightly from the MDGs in that they are targeted at countries worldwide, and not limited to developing countries. The Sustainable Development Goals feed into achieving sustainable development along the triple bottom line, and is focussed on integration and the well-being of individuals (e.g. Sustainable Development Goal 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: "*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 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 environment is valued. Transformation of land on which natural systems exist is the leading cause of environmental degradation (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.

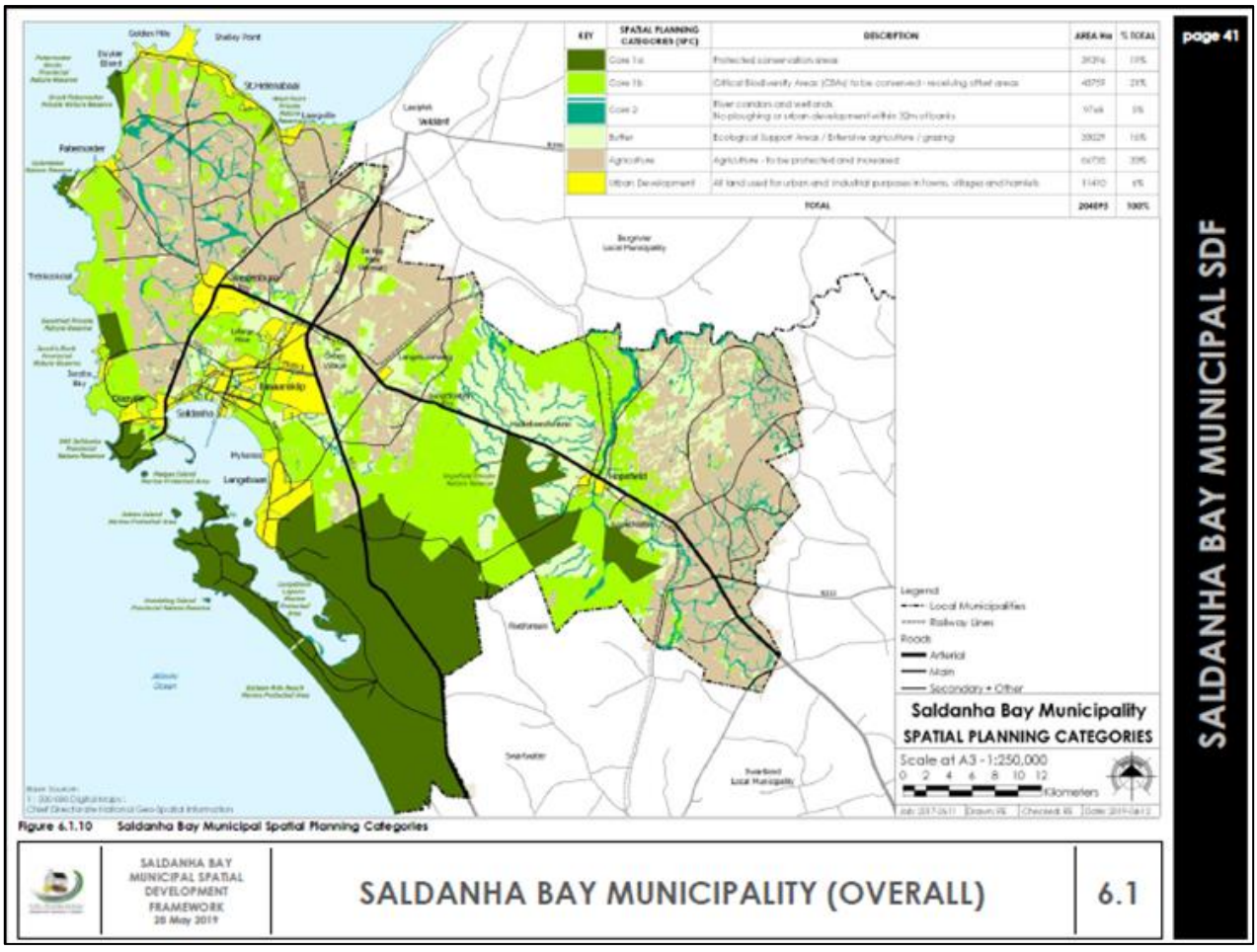
Any activity that would be likely to cause one or more significant impacts, as defined above, would be considered to be 'undesirable'. Those impacts that are significant and also irreversible, or could result in irreplaceable loss of unique resources, should be considered as a "fatal flaw". Developments 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. 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 status, irreplaceability and vulnerabilities associated with the attributes have been central to determining the conservation EMZs, while potential sustainable development in areas with less biophysically sensitive receiving environment was central in determining the development EMZs (including the proximity of these areas to built/cultivated environments). Two conservation focused EMZs and three development focused EMZs have been determined (refer to Map 27).

The Environmental Management Zones are further compared with the Spatial Planning Categories of the SBM SDF.



Map 26. SBM SDF Spatial Planning Categories

Conservation Focused Zones: Zones 1 & 2:

- ***EMZ 1 – Conservation Zone:*** This EMZ is based on ensuring the conservation and protection of irreplaceable resources and biodiversity, which are under considerable development pressure. EMZ 1 is applicable in both urban and rural areas. In urban areas, these are areas that may be under pressure, due to their proximity to urban and industrial areas. In the rural settings, the pressures exerted on the resources may not be as severe as within urban and industrial areas. However, the attributes and potential for significant impact are still substantial enough to warrant strict measures for resource use.

  The Conservation Zone EMZ will also include areas where there is an opportunity for rehabilitation and restoration to achieve a functioning state and increase conservation. This is aimed at providing an area for restoration initiatives that can be safeguarded from future development and can contribute to the overall conservation targets for the region.
  - The Conservation Zone EMZ can be compared with the Core 1a and 1b Spatial Planning Category of the SBM's SDF.
- ***EMZ 2 – Controlled Development Zone*:** This EMZ is based on resources that fulfil an important supportive role in maintaining critical natural resources identified in EMZ 1 by means of a buffer in 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 reducing the need for development in more vulnerable receiving environments.
  - The Controlled Development Zone can be compared with the Buffer Spatial Planning Category of the SBM's Spatial Development Framework.

Development Focused Zones: Zones 3 – 5:

- ***EMZ 3 – 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.
  - This Agricultural Development Zone can be compared with the Agriculture Spatial Planning Category of the SBM's SDF.

- ***EMZ 4 – 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 vulnerable areas to ensure sustainable economic development.

- This Industrial Activity Zone EMZ is included in the Urban Development Spatial Planning Category of the SBM's SDF.

- ***EMZ 5 –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.
  - This Urban Development Zone EMZ is included in the Urban Development Spatial Planning Category of the SBM's SDF.

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 measures 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 vulnerability of the attribute, with those in the Conservation Zone and being the most vulnerable due to their irreplaceability.

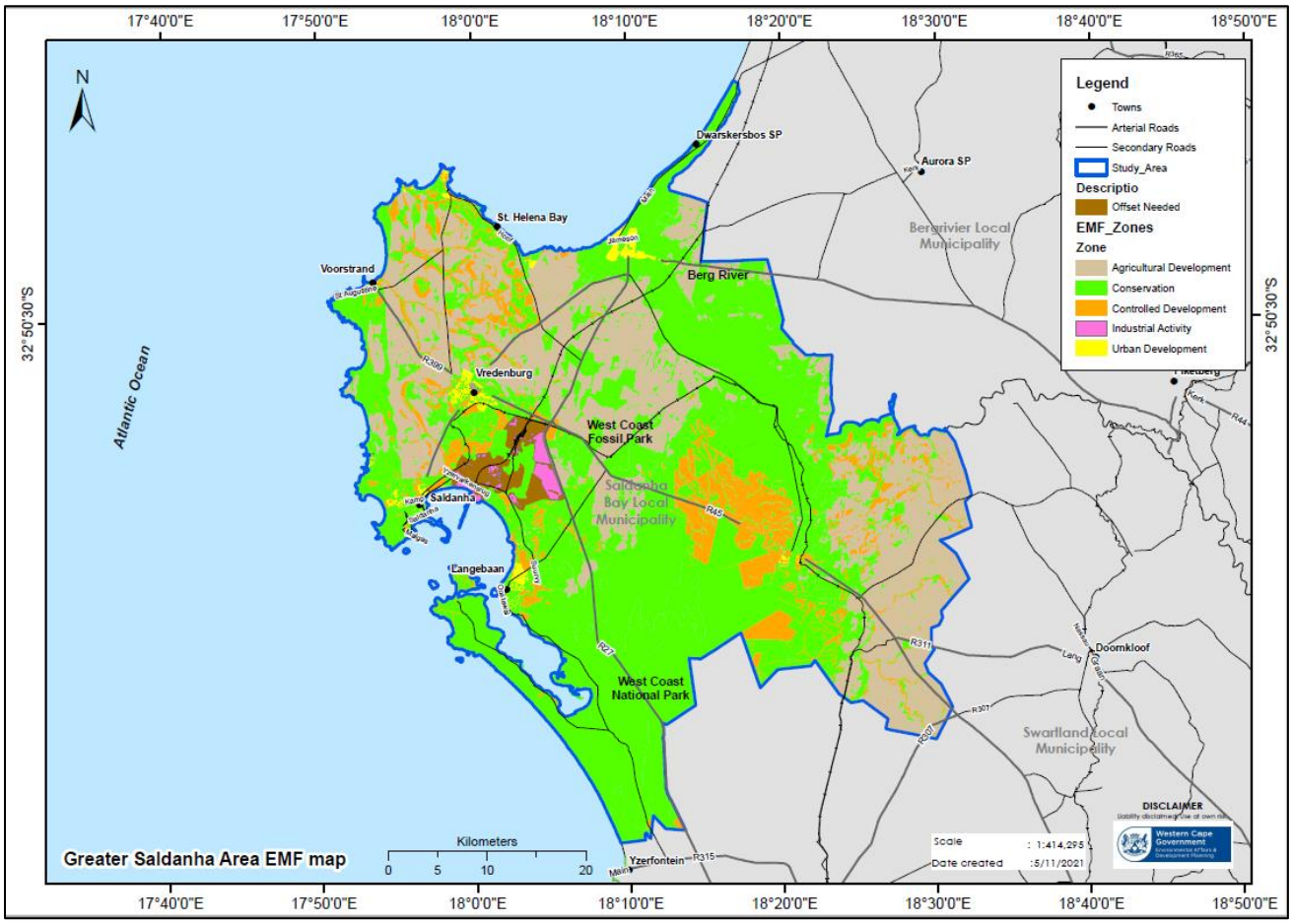
The EMZs provide a means for achieving the following requirements as set out in the 2010 EMF Regulations, in that they serve to:

- 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 vulnerable 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.



Map 27. GSA EMF Environmental Management Zones

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 biophysical 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, mitigation 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. 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.

Each EMZ will outline the above framework in the form of a descriptive table.

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 ecological and social environment; and
- Changes induced by proposals would not exceed limits of acceptable change.

The management objectives, desired outcomes and limits of acceptable change that have been provided for each EMZ have been formulated on the basis of the national environmental management 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. This means that it must be borne in mind that the EMF is a tool that is aimed at, *inter alia*, 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 proponents, the information in respect of each EMZ can be used to guide the formulation of 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 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 DEA&DP 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, if required by the competent authority, that the study concerned has been subject to peer review. 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.

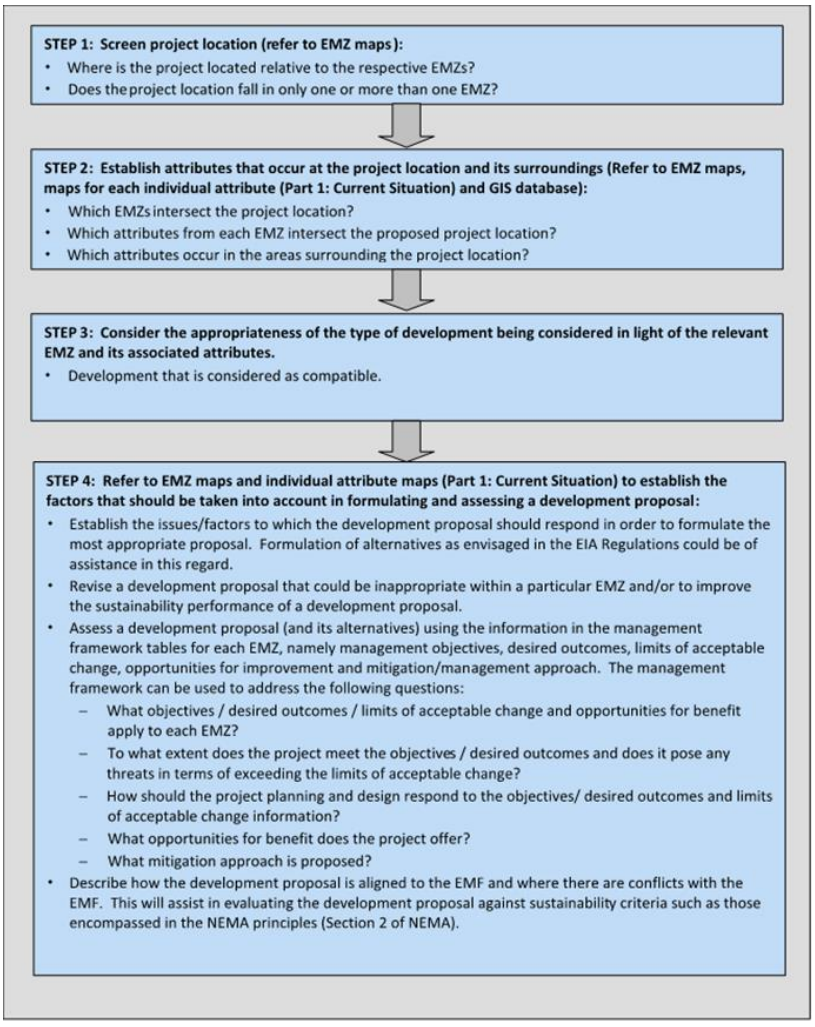


Figure 1: EMF Road Map

8.3. Environmental Management Zones – Attributes and Actions

8.3.1. EMZ 1: Conservation Zone / SPC: Core 1a, Core 1b and Core 2

The Conservation Zone is intended to map irreplaceable biodiversity and resources within urban areas that are under significant pressure. The aim of the Conservation Zone in urban areas 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 Conservation Zone in urban areas also intends to encourage sustainable land and resource use.

In the rural areas, the Conservation Zone is intended to map irreplaceable biodiversity that are equally important but are not under as significant pressure as biodiversity in urban areas. The development of an urban edge will assist in controlling development and urban sprawl, thus protecting rural environments and resources.

Restoration areas were included in this Conservation Zone, in which transformed areas which are of importance in terms of a functional landscape perspective were identified for rehabilitation. Development proposals in the vicinity of these areas must incorporate mitigation measures that ensure the improvement of their ecological status to improve overall landscape ecological functioning. Efforts to rehabilitate these areas can also be seen as a means of mitigation for similar impacts, or even as an offset for the unavoidable disruption of landscape functionality elsewhere. Offsetting is a last resort that can only take place once every measure has been exacerbated to reduce the negative impact, and is only permissible at the discretion of the Competent Authority

EMZ 1 – CONSERVATION ZONE / SPC – CORE 1a, CORE 1b and CORE 2		
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 areas should only support land use that has a low impact. • Ecological support areas should be maintained in a near-natural state allowing

EMZ 1 – CONSERVATION ZONE / SPC – CORE 1a, CORE 1b and CORE 2		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
		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 CBAs (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 and ecological connectivity.
Rivers and Wetlands (within Urban and Industrial Areas)	• Provision of ecosystem services such as social, cultural and economic benefit. • Habitat for an array of fauna and flora.	• Wetlands and rivers serve as an important ecosystem, producing a diversity of ecosystem 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

EMZ 1 – CONSERVATION ZONE / SPC – CORE 1a, CORE 1b and CORE 2		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
		during periods of heavy rain. Wetlands act as a sponge, reducing the rate at which the water is released, prolonging the supply of water during the dry summer season. • 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 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	• Ensures coastal stability. • Prevents coastal erosion.	• Sand dunes contain a diversity of fauna and flora which are vital in ensuring the proper

EMZ 1 – CONSERVATION ZONE / SPC – CORE 1a, CORE 1b and CORE 2		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**

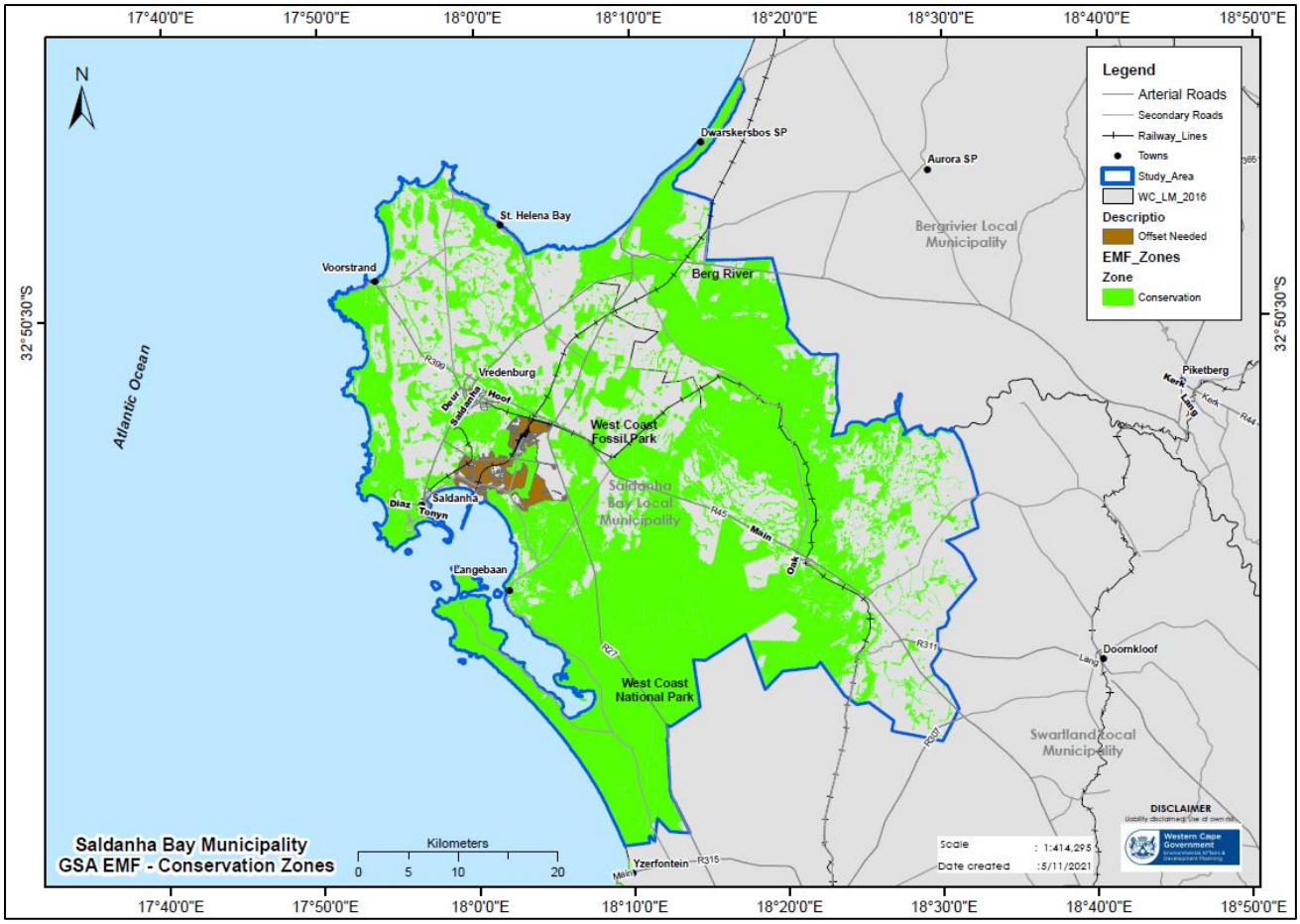
and Industrial Areas)	• To identify areas of mobile sand that could negatively impact development. Dunes are important ecological structures as they:
	  ◦ Ensure coastal stability
	  ◦ Prevent coastal erosion
	  ◦ Protect developments from hazards
		functioning of dune systems. Dune systems provide coastal stability by preventing coastal erosion as part of dynamic sand budgets. Sand dunes form an important ecological structure, acting as a buffer to developed areas, from hazards such as storms and flooding. Given the dynamic nature of dune systems and the vital roles they play, disturbance of these systems must be avoided as far as possible. 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.
Undetermined areas	• Undetermined areas i.e. areas with no known sensitivities that, due to their proximity to a sensitive area (i.e. a conservation zone attribute), could	• The allocation of the undetermined areas to this zone allows for increased conservation of sensitive

EMZ 1 – CONSERVATION ZONE / SPC – CORE 1a, CORE 1b and CORE 2		
ATTRIBUTE	**RATIONALE**	**COMMENTS/NOTES**
	not be allocated to the development focused zones, were allocated to this zone. • To aid in achieving international conservation targets and conserving sensitive biodiversity within rural areas.	biodiversity within the rural areas.
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.
Protected Area Expansion Strategy	• These area areas identified as important in meeting international commitments associated with the expansion of protected areas.	• With the intention of ensuring that South Africa meet commitments set in terms of the Convention of Biological Diversity, national targets are set for the expansion of protected areas. Maps are produced to indicate potential areas for expansion.

Table 6. Attributes that inform EMZ1 - Conservation Zone

The attributes set out in the table above were used as an informant for the development of the Conservation Zone, which is shown spatially on Map 28 below. Conservation Zone includes rural areas, urban area and also areas that require restoration. 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.



Map 28. EMZ 1: Conservation Zone / SPC: Core 1a, Core 1b and Core 2

The management framework for EMZ 1 can be found in Table 7 below.

ZONE 1: CONSERVATION ZONE		
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**
• Promotion of conservation and protection of irreplaceable resources and biodiversity, under significant development pressure.	• To ensure protection and conservation of irreplaceable ecosystems and ecological features. • To ensure sensitive areas are kept intact and in a near natural state.	• Restriction of development 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 (e.g. flood attenuation).

• 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 establishment of Protected Areas for top priority sites. • Increase of restored habitats through conservation initiatives.
LIMIT OF ACCEPTABLE CHANGE	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/MANAGEMENT APPROACH**
• 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 Conservation Zone). • Low impact development that results in minimal loss of habitat may be allowed on condition that the ecosystem is not compromised in any way. No high impact development should be allowed (in rural areas). • 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). • Conservation projects in urban areas (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. • (i) offsets may only be considered as a last resort; (ii) it is not possible to offset impacts on irreplaceable biodiversity, and (iii) when specialist studies recommend mitigation measures, they should also provide an evidence-based assessment of these measures' likelihood of success. • Relevant specialist studies must be undertaken for any development being undertaken within the zone.

• No irreversible loss of threatened species that leads to a change in status from Vulnerable to Endangered, or Endangered to Critically Endangered.		Study must include appropriate mitigation measures. • Establish partnerships with NGOs and other stakeholders to develop tools and projects to manage the social-ecological systems within urban areas.
APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE		
• Conservation (e.g. Environmental education initiatives and community based natural resource projects / conservation initiatives which ensure conservation targets are met). • Protected Areas and activities compatible with the management plans thereof (e.g. National Parks and reserves). • Private areas and activities compatible with the management plans thereof (e.g. private nature reserves / an individual's farm which contain sensitive biodiversity). • Public open areas (with correct zoning). • Natural Areas • Touch the Earth lightly eco-tourism projects that result in minimal loss of natural habitat while considerably increasing socio-economic benefit. • Protected areas and activities compatible with the management plans thereof (expansion of protected areas to ensure protection and conservation of biodiversity). • Biodiversity offsets. • Touch the Earth lightly ecotourism that is of an educational or social benefit directly related to the ecological attributes of the area.		

Table 7. Management Framework for EMZ 1 - Conservation Zone

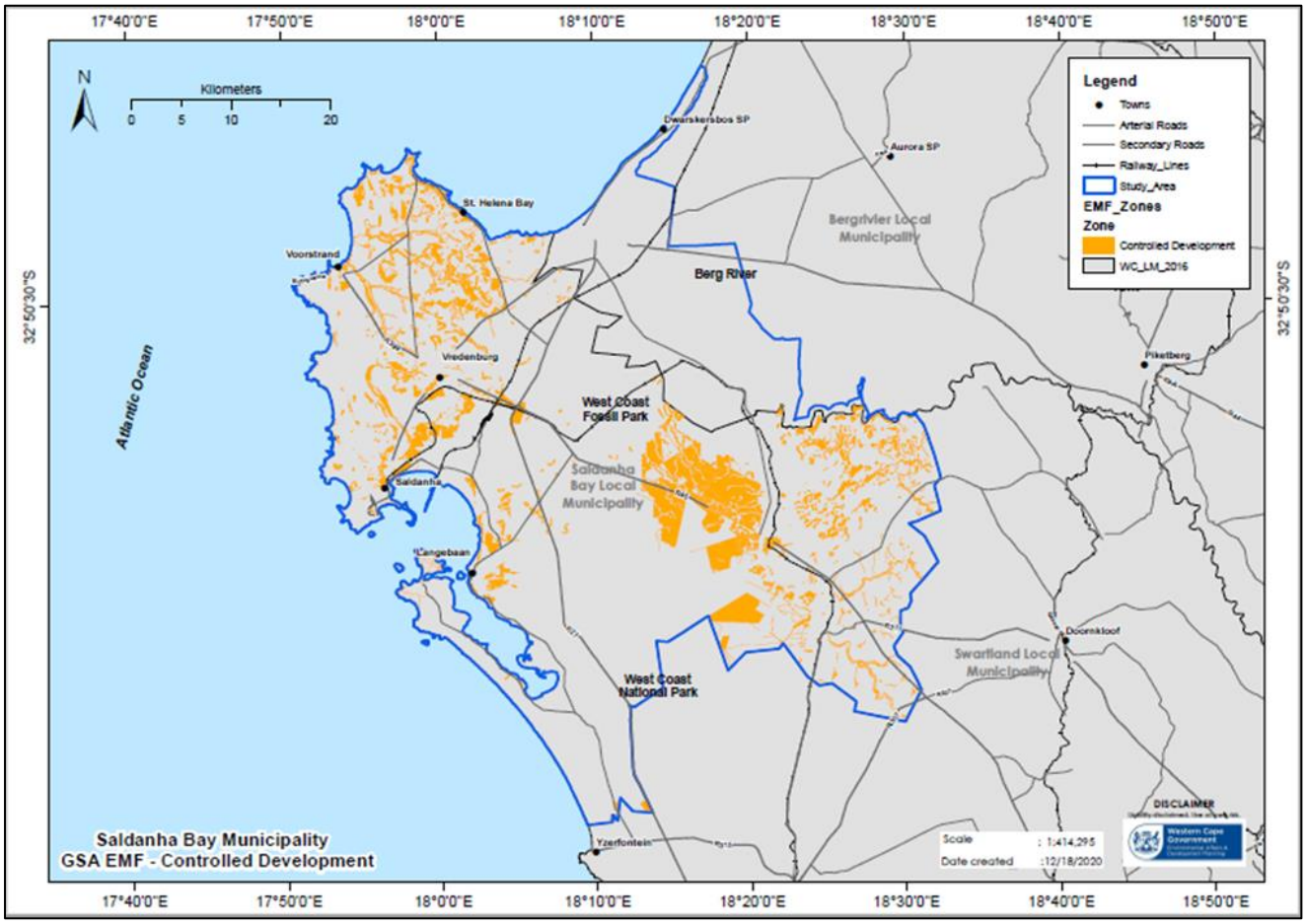
8.3.2. EMZ 2: Controlled Development Zone / SPC: Buffer

The controlled development zone was established with the intention of ensuring sustainable development on landscapes that can withstand marginal 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.

EMZ 2 : 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 vulnerable to change 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. • Two windfarms are operating, one north of Vredenburg and one east of Hopefield. They form the core of two much bigger areas currently under application for further wind farms. (SDF, 2019)
Coastal Setback lines	• Coastal setback lines need to be taken into consideration for development within this zone. Certain areas need to be 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 posed by flooding adjacent to rivers. The 1:100 year flood line accounts

		for climate change predictions.
Other Natural Areas (ONAs)	• 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 resources. Ecosystem functionality is safeguarded through strategic landscape planning thus minimising habitat loss.

Table 8. Attributes that inform EMZ 3 - Controlled Development Zone



Map 29. EMZ: Controlled Development / SPC: Buffer

ZONE 2: CONTROLLED DEVELOPMENT ZONE		
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**
Sustainable development on landscapes that can withstand marginal impacts.	• To minimise the loss of intact habitat 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 areas of high biodiversity importance.	• To retain aesthetic appeal of the landscape. • To reduce the development within areas vulnerable to change. • Protection of irreplaceable resources (conservation zones). •
LIMIT OF ACCEPTABLE CHANGE	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
• Controlled development should not hinder the objective of the zone (i.e. ecological corridor and buffer). • Ecological disruption from development must be minimised as far as possible to prevent substantial detrimental consequences from arising (must not have a negative impact on CBAs and PAs). • Controlled low impact development could be allowed in these areas	• Potential for controlled low impact development, thereby allowing for protection of more sensitive resources in EMZ 1 and EMZ 2. • 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. • (i) offsets may only be considered as a last resort; (ii) it is not possible to offset impacts on irreplaceable biodiversity, and (iii) when specialist studies recommend mitigation measures, they should also provide an evidence-based assessment of these measures' likelihood of success.

depending on the activities proposed to be undertaken.		• Limit the type of development - only low impact development should be acceptable (such as certain linear service infrastructure). • Where higher impact development cannot be avoided, development should be compatible with the zone aim to enhance biodiversity protection (e.g. ecotourism).
APPROPRIATENESS MATRIX		
COMPATIBLE LAND USE		
• Tourism (e.g. hiking, fishing facilities, game farming to an extent where carrying capacity of an area is not exceeded). • Low-impact commercial development (e.g. sustainable development to boost tourism opportunities). • Service related infrastructure (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		

Table 9. Management Framework for EMZ 3 - Controlled Development Zone

8.3.3. EMZ 3: Agricultural Development Zone / SPC: Agriculture

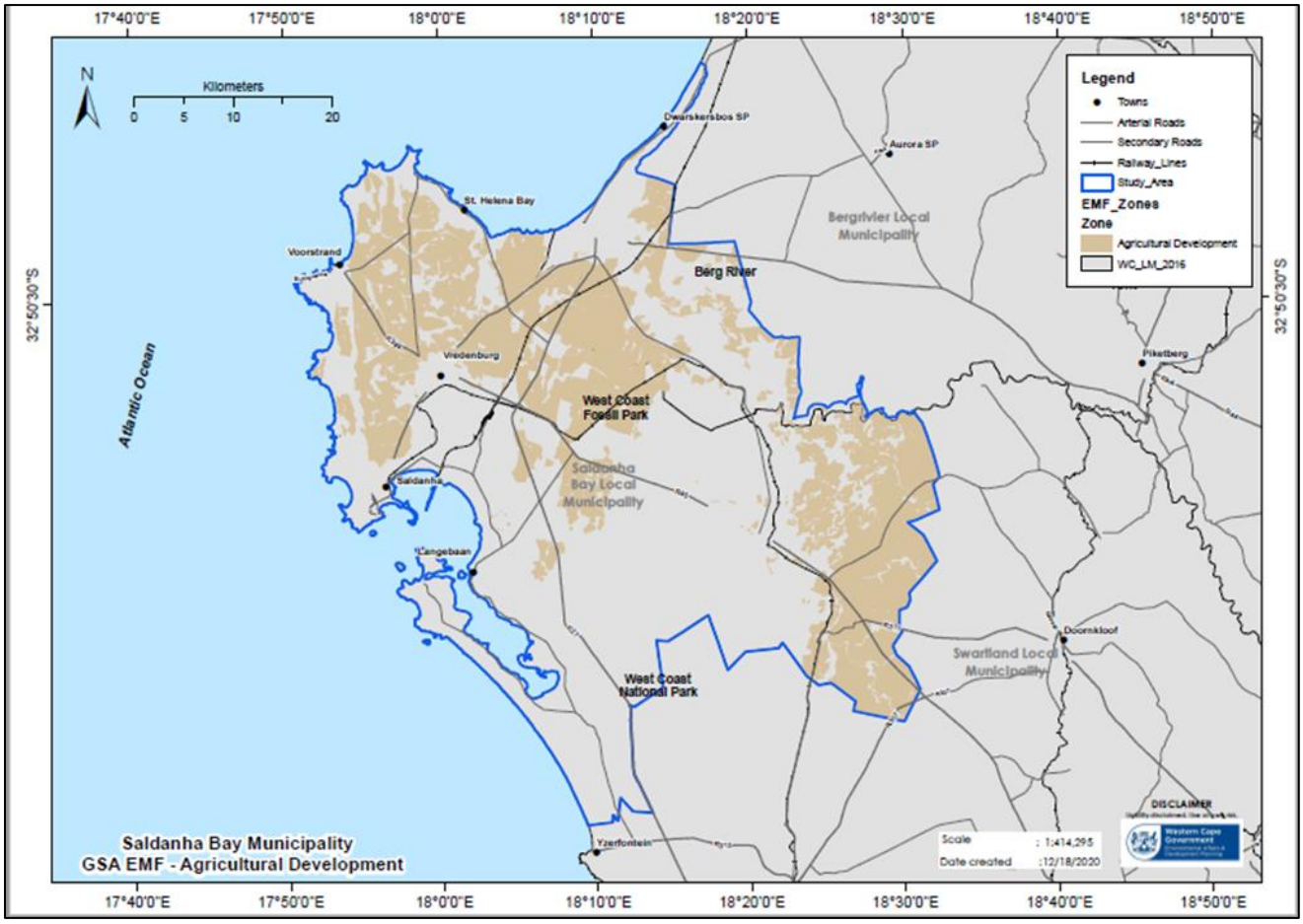
This zone was established to promote sustainable agricultural development with the intention of boosting the economy while conserving natural resources. The agricultural sector is important to the local economy and job creation in the area. Therefore, sustainable agricultural development is critical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

EMZ 3 : AGRICULTURAL DEVELOPMENT ZONE / SPC: AGRICULTURE		
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/ growth/progress in the area.

Table 10. Attributes that inform EMZ 5 - Agricultural Development Zone

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 30 below. 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 listed activities. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework for EMZ 3 can be found in Table 11 below.



Map 30. EMZ: Agricultural Development / SPC: Agriculture

ZONE 3: AGRICULTURAL DEVELOPMENT ZONE		
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**
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.
LIMIT OF ACCEPTABLE CHANGE	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/MANAGEMENT APPROACH**
• Only agricultural development (including	• Improvement of ecosystem services	• Avoid development on areas of high productivity.

auxiliary infrastructure) may take place in productive agricultural land. • Subdivision and fragmentation of agricultural land must be avoided. Loss of irrigated agricultural land must be prevented as far as possible.	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.	• 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		
• 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).		

Table 11. Management Framework for EMZ 5 - Agricultural Development Zone / SPC: Agriculture

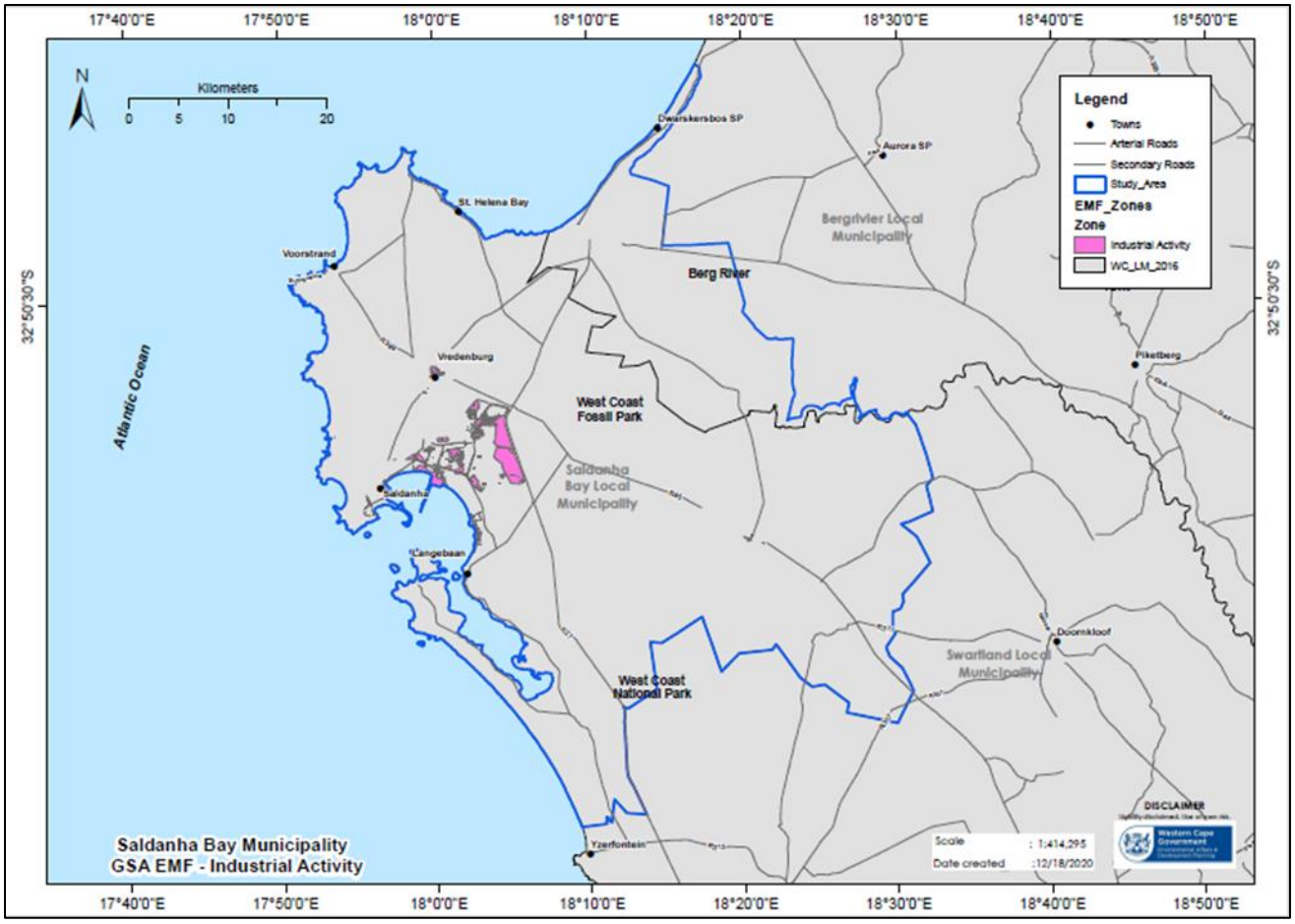
8.3.4. EMZ 4: Industrial Activity Zone / SPC: Urban Development

The industrial activity zone was established with the intent to promote industrial development in areas that are less vulnerable to industrial 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.

EMZ 4: INDUSTRIAL ACTIVITY ZONE / SPC: URBAN DEVELOPMENT		
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 job creation. • 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 creating jobs and ensuring sustainable development within the area. • Consideration must be made of the cumulative impacts on the marine environment of port expansion.
IDZ PM10	• PM10 pollution limits the types of development 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.	• 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. By allowing industrial development in these areas,

	• To encourage development and expansion of industries • To allow for increased development to occur with no restrictions	demand in more vulnerable environments is minimised.

Table 12. Attributes that inform EMZ6 - Industrial Activity Zone / SPC: Urban Development Zone



Map 31. EMZ: Industrial Activity Zone / SPC: Urban Development

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 31 above. 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 listed activity for EMZ 4. Such groundtruthing would also be valuable in determining the extent of the impact assessment required.

The management framework for EMZ 4 can be found in Table 13 below.

ZONE 4: INDUSTRIAL ACTIVITY ZONE		
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**
Promotion of industrial development in areas that are less vulnerable to change 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].
LIMIT OF ACCEPTABLE CHANGE	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/MANAGEMENT APPROACH**
• 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 and its direct and indirect impacts on habitat in surrounding zones are not significant • 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 reduce 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		
• Industrial (e.g. manufacturing infrastructure development, power generation, transport	(i)	

infrastructure, storage of oil and gas and port and harbour development). • Mining (e.g. prospective exploration for oil and gas).		

Table 13. Management Framework for EMZ 4 - Industrial Activity Zone

8.3.5. Saldanha Strategic Offset Strategy (SSOS):

The core purpose of a strategic approach to offsets within Besaansklip Industrial Area is that it would provide clarity in terms of required offsets for addressing the biodiversity impacts of development proposals within the corridor and streamline the offset assessment, design and approval process. Importantly, although it can provide guidance on the process both for the authorities involved with decision making and the developers, and result in more streamlined processes, it cannot replace or remove any legal requirements under the NEMA or any other applicable law. Biodiversity offsets should only be considered as a mitigation option once all feasible actions and alternatives first to avoid or prevent impacts on important biodiversity, then to minimize impacts, and then to repair or rehabilitate areas harmed by impacts, have been taken into account (DEA&DP, 2020).

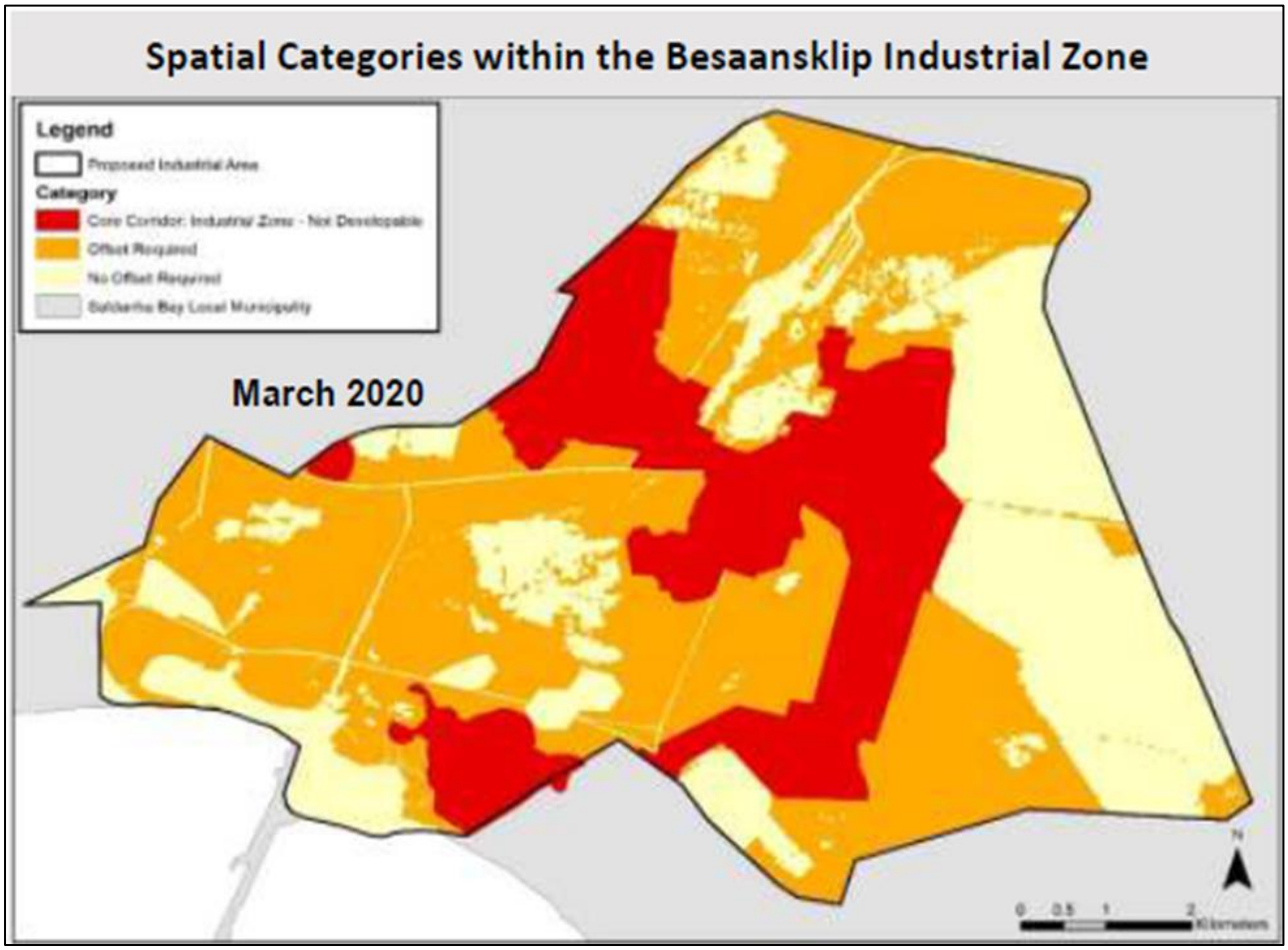
The SSOS approach is strategic in that it aims to meet offset requirements at the level of the overall industrial area rather than for individual projects within the industrial area and sets out predefined offset receiving areas. The process resulted in the identification of four offset scenarios and evaluated the feasibility of offsetting impacts in relation to the extent of land made available for industrialisation. The key concept that underlies these scenarios is the differentiation between valuable areas that are not CBAs, CBAs where viable alternatives to meet targets exist in the landscape, and CBAs where this is not the case (DEA&DP, 2020).

Therefore, SSOS as a formal Provincial Policy for decision-making in the Greater Saldanha Bay area will direct the actions of the Department in this context, which then has to be taken into consideration when decisions are taken under NEMA, LUPA or any other applicable law. Deviations from the policy may only be approved in instances where such deviations can be justified by applicants and decision takers. The SSOS with its set of principles and guidelines will help to determine what needs to be done in a particular situation and will form the basis for guiding actions by the Department. The SSOS also provides guidance on the process both for the authorities involved with decision making and the developers and will result in more streamlined processes. It does not replace or remove any legal requirements under the NEMA or any other applicable law (DEA&DP, 2020).

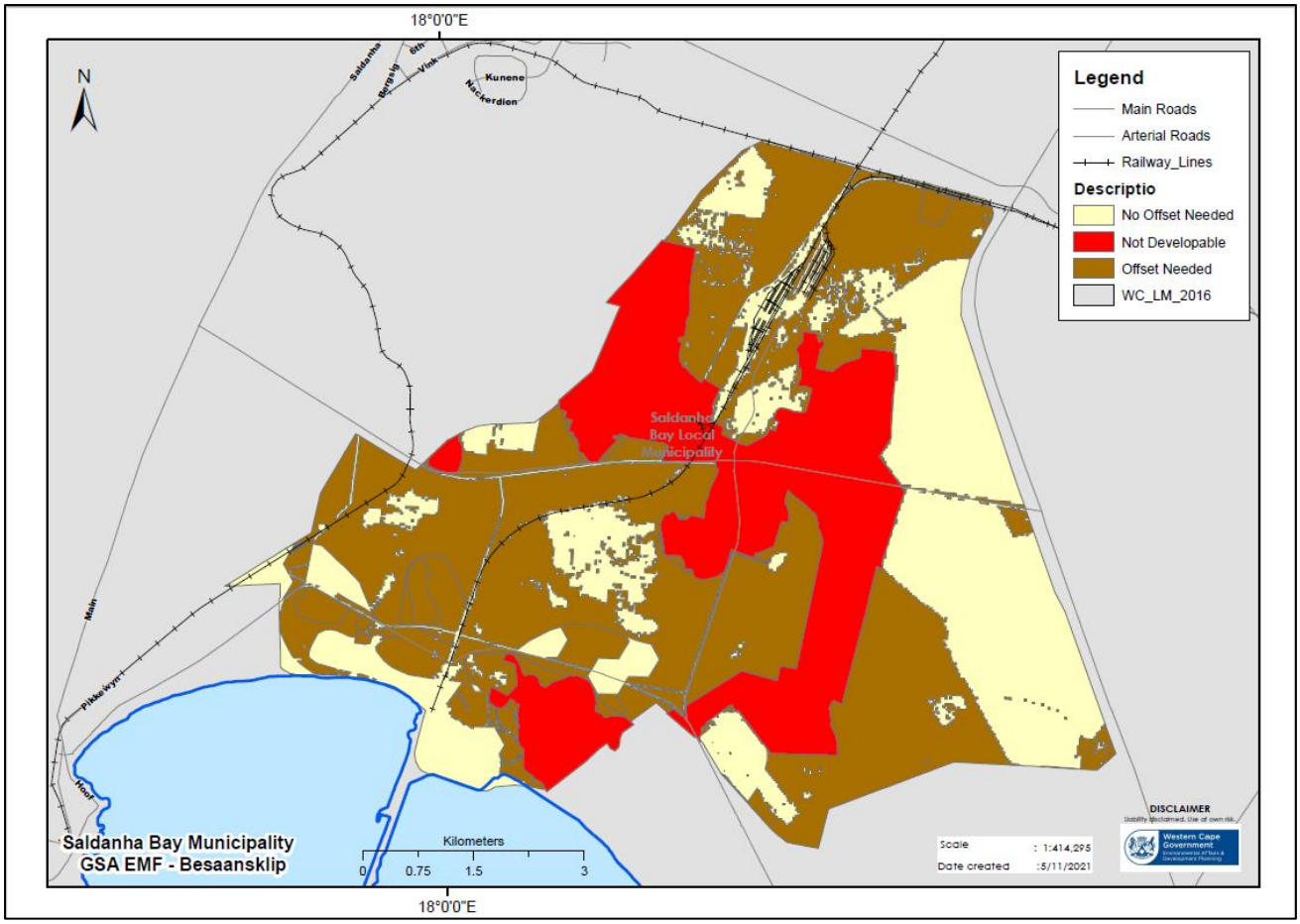
In order to protect ecosystems and other important biodiversity features, and to fulfil industrial development goals and unlock economic growth opportunities, the implementation of the SSOS holds strategic benefit for the Western Cape (DEA&DP, 2020). All stakeholders are encouraged to use the

SSOS as a principle of action to guide development in the SBMA in a sustainable manner towards a better future for all. It is imperative that all stakeholders recognise the strategic intention of the SSOS and work jointly towards the implementation of a pro-active biodiversity offset and therefore the function and roles of different role players in a biodiversity offset need to be understood (DEA&DP, 2020).

Below is the overall picture of key offset issues in the Besaansklip Industrial Area. This includes the CBA network, intact areas of threatened terrestrial ecosystems, and ecological process issues such as the key climate change corridor which runs through the area.



Map 32. Besaansklip Industrial Area.



Map 33. Areas requiring offsets in the Besaansklip Area

8.3.6. EMZ 5: Urban Development Zone / SPC: Urban Development

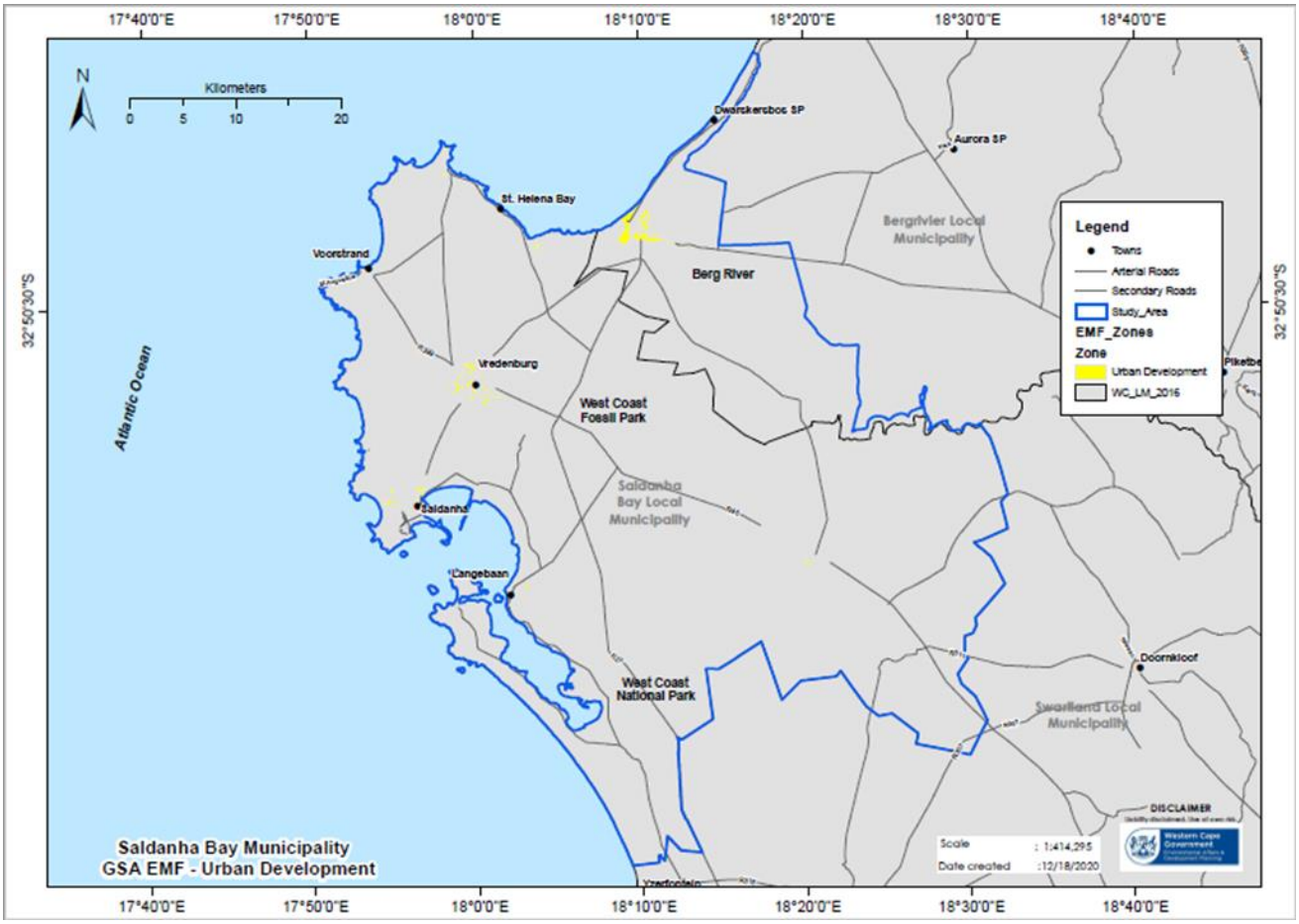
The purpose of establishing an urban development zone was to promote sustainable development within areas less vulnerable to urban development while decreasing urbanisation and urban sprawl. The selection of areas that are of less ecological importance, allows for the conservation of biodiversity and resources in areas more vulnerable to urban development.

EMZ 5: URBAN DEVELOPMENT ZONE / SPC: URBAN DEVELOPMENT		
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 promote the use of vacant land within the urban edge over that of land outside of the urban edge.
Undetermined areas	• Areas adjacent to the Urban Development Zone, which are less vulnerable to urban development,	• The allocation of areas adjacent to Urban Development Zone reduces the demand for urban

	have been allocated to this zone.	development in areas of greater ecological importance.

Table 14. Attributes that inform EMZ 7 - Urban Development Zone

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 34 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 listed activities. Such groundtruthing would also be valuable in determining the extent of the impact assessment required. The management framework for EMZ 5 can be found in Table 15 below.



Map 34. EMZ: Urban Development Zone / SPC: Urban Development

EMZ 5: URBAN DEVELOPMENT ZONE / SPC: URBAN DEVELOPMENT		
ZONE AIM	**MANAGEMENT OBJECTIVES**	**DESIRED OUTCOME**
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.	• The consolidation of urban development in a sustainable manner. • The regulation of various land uses within an urban area. • The protection and incorporation of green infrastructure within urban areas, such as bioswales, urban parks, and novel ecosystems that provide services to residents within an urban area. . •
LIMIT OF ACCEPTABLE CHANGE	**OPPORTUNITY FOR BENEFIT**	**MITIGATION/ MANAGEMENT APPROACH**
• Urban consolidation and densification that leaves vital ecological infrastructure intact and operational. • A degree of habitat loss may occur in these areas as long as the development	• The potential for increased service delivery through service infrastructure development. • Reducing the demand for urban development in areas of greater ecological importance OR areas that are more vulnerable to	• Urban development in vulnerable areas outside the urban edge should be avoided • The impact of development on important urban ecology should be avoided and minimised. Where the important urban ecology cannot be avoided and the impact is significant after minimisation and mitigation, offsetting the impact may be acceptable to the Competent Authority.

remains within the designated zone.	urban development.	
APPROPRIATE MATRIX		
COMPATIBLE LAND USE		
• Residential development (e.g. housing complexes) • Commercial development (e.g. service delivery infrastructure such as bulk public water supply, energy infrastructure, sewerage and storm water infrastructure, transport structures such as roads). • Recreational developments and activities (e.g. the development of hotels, entertainment areas and resorts). • Tourism.		

Table 15. Management Framework for EMZ 5: Urban Development Zone / SPC: Urban Development

8.4. Competition Areas

A Competition Areas dataset has been created that identifies competition between land use objectives i.e. EMZs that overlap and have differing aims (i.e. competing land use interest). This was also 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 competition exist within the areas of competition:

- Competition 1: competition between biodiversity (e.g. CBAs and ESAs) and urban development plans;
- Competition 2: competition between biodiversity (e.g. CBAs and ESAs) and industrial development plans;

- Competition 3: competition between natural resources (Controlled Development Zone and Conservation Zone) (e.g. rivers, CBAs, ONA etc.) and agricultural areas.

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

- Competition 1: CapeNature, DEADP and the Local Municipalities;
- Competition 2: CapeNature, DEADP and the investors, developer and applicable stakeholders;
- Competition 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.

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 Conservation Zone.

After evaluating attributes mentioned above to give rise to the development-focused and conservation-focused environmental management zones, it became apparent that certain areas within the study domain were considered important both from a conservation and development perspective. These areas are referred to herein as "areas of competition". The original extent of competition was vast as a result of utilising the land use data, the attribute data mentioned herein, as well as the SDFs of the SBM and the BRM. Addressing this competition required an evaluation of the original extent map to identify precisely where the competition was arising. Often, the competition arose as a result of existing land use, or as a result of mapping errors.

In these instances, rules were applied to the data in order to eradicate false reports of competition. An example includes agricultural areas within the buffer zones of watercourses. While these buffer zones must be conserved to safeguard the important ecological processes they abut, instances of historical agricultural development within the buffer zones was not necessary competition as these areas would not be expanded, and existing farming practices within those zones would be encouraged to retreat over the duration of the EMF. As a result, it was decided that all instances

where buffers and agricultural development "competed" would be removed by reflecting the conservation-focused value in these instances, thereby avoiding future and further agricultural development in these areas. Many similar instances where identified, and rules applied in attempt to obtain an understanding of the true competition within the study domain.

8.4.1 True competition in SBM

The resulting map reflected instances where true competition between development and conservation imperatives existed. In these instances, the merits around developing or conserving a competition area would need to be debated with the stakeholders in question (namely the authority responsible for conservation and the municipality). Each area would be debated, and a mutually agreed outcome recorded. In instances where the competition for an area was not easily resolved, the area was designated as "controlled development", which requires the proponent to resolve the competition in question within the Environmental Authorisation application process (i.e. the project level evaluation of the area in question would determine the best use thereof). See map 35 below for the true competition that was discussed with the stakeholders in question. Much of this competition has been resolved and has been assigned an Environmental Management Zone in the final EMF maps. These competition areas were considered during the development of the SBM SDF, 2019. The remaining areas of competition are also reflected and referred to in the SBM SDF, 2019.

8.4.2 Areas of competition in the BRM

Given time constraints, it was not possible to engage with the BRM to the same extent as SBM. As a result, the consolidation of a map that represents true competition was not achieved, and the same rules applied in the Saldanha Bay case study were applied in the portion of the study domain that falls within the BRMA. Engagements with pertinent stakeholders for this area will be undertaken within the review period of the EMF. In the interim, it was concluded that the urban edge would be reflected for the settlement of Velddrif, but that more nuanced discussions around the most appropriate landuse for an area would be required in the near future.

8.4.3 The following principles apply in areas of conflicting land use:

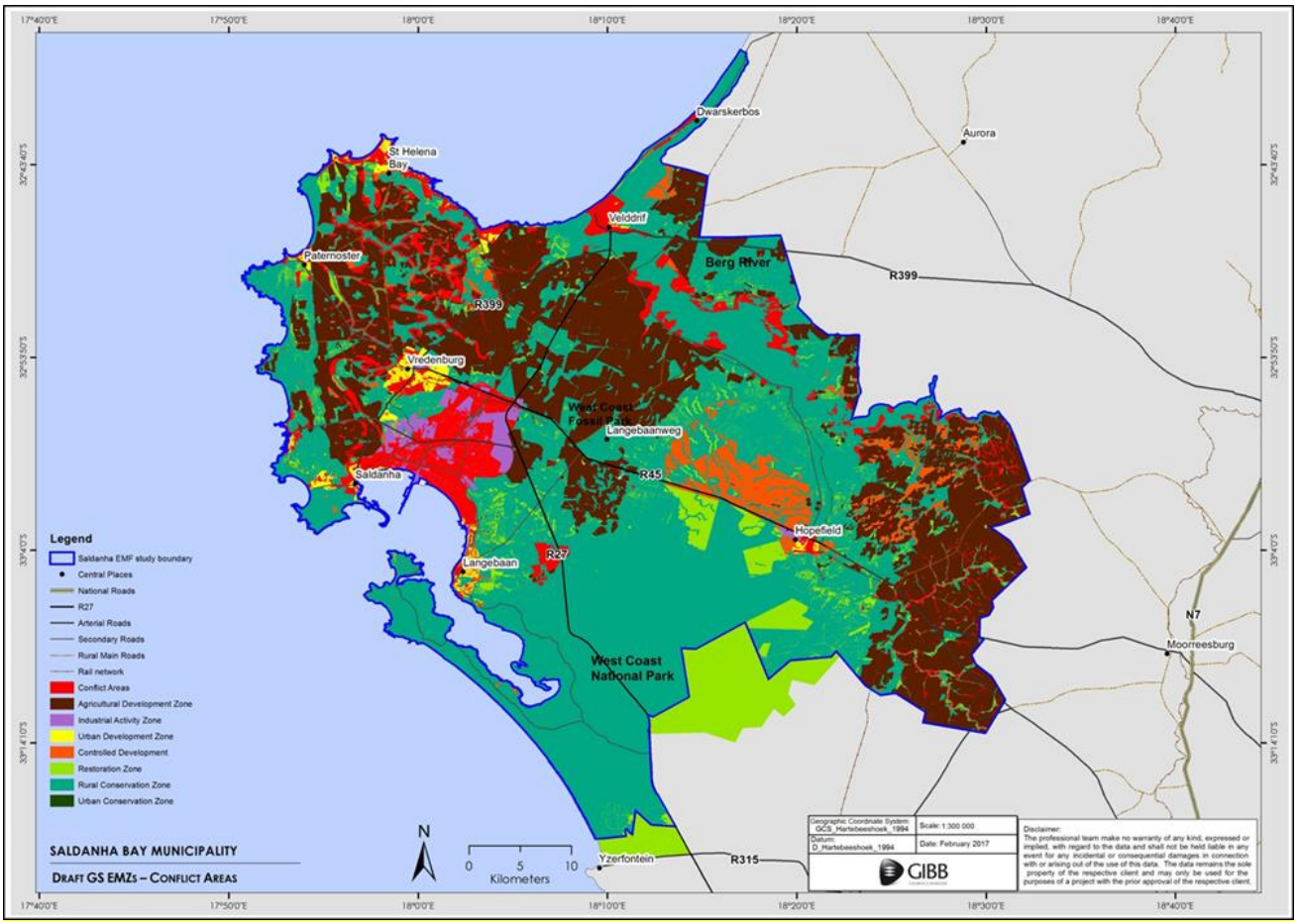
The environmental implications of developing in areas of competing land uses should be addressed as soon as possible in the project planning process and before significant resources have been allocated to a project. This requires a cooperative and transparent approach to these areas, as well as the consultation with key role players.

Proactive and timeous search for the best practicable alternative is required. The application of this principle is dependent on the significance of the potential impact when viewed in the context of the

broader strategic intent of the EMF. Also, if trade-offs are required, development in highly sensitive or significant natural environments is generally undesirable, and where possible, must be avoided.

If an environmentally sensitive area has to be developed or transformed, an assessment should -

- Maximise the retention of intact natural habitat and ecosystem connectivity (i.e. avoidance of impacts)
- Avoid fragmentation of natural habitat and aim to maintain spatial components of ecological processes (e.g. ecological corridors and vegetation boundaries)
- Minimise unavoidable impacts by reducing the project footprint and determining the least damaging layouts of the proposed development and its accompanying infrastructure (e.g. by concentrating disturbance in degraded areas)
- Remedy habitat degradation and fragmentation through rehabilitation.
- In certain instances (particularly where on-site mitigation is limited or not possible) investigate the use of biodiversity offsets as a mitigation measure. This may involve making resources available to secure and manage an alternative piece of land of the same ecosystem type or conservation of a proportion of the property in situ.



Map 35. Competition Areas in EMF Geographical Area

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 rely 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.

- In the consideration of **Need and Desirability**:
  - Need and Desirability applies to all three previous tools. The need for and the desirability of a proposed development forms a key component (and a legal requirement) of any EIA application (DEA, 2017). In essence, the need and desirability requirement ensures that the strategic context provided by the EMF (and planning instruments) are considered as part of project planning, assessments and the regulatory decision-making processes.
  - Need and desirability must be determined by considering the broader community's needs and interests as reflected in EMF (and other relevant plans), and as determined by the EIA. The 2010 EMF Regulations state that EMFs must, inter alia, "*(…) indicate the kind of developments or land uses that would have a significant impact on those attributes and those*

that would not (…)and indicate the kind of developments or land uses that would be undesirable in the area or in specific parts of the area".

- It is important to note that whilst the EMF (or any other plan or framework) does not ultimately determine if a regulatory application for development should be refused or granted, the EMF must be considered as part of an EIA process (i.e. the content of the must be taken into account when considering the merits of any application). Put differently, and EIA process must provide socio-economic and socio-ecological information on impacts in order to be able to consider the need and desirability merits of the application. In instances where development proposals are not consistent with the EMF, the burden of proof falls on the applicant (and the EAP) to show why the impacts associated with the deviation are justifiable.

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 'fatal flaws' at an early stage is invaluable. These would be these issues that have significant potential for the rejection of the proposed development by I&APs and/or that have a high risk of having unacceptable detrimental environmental consequences that would not receive environmental authorisation. 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 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.

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 No. 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

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	• 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

Protected Species List (GNR 1187 of 14 December 2007).	

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.

Table 16. Key relevant legislation

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.
- DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa
- DEA&DP Guidelines for involving specialists in the EIA process. A series of documents make up these guidelines including heritage, economic and biodiversity specialists.
- DEA&DP EIA Guideline and Information Document Series March 2013.
- DEA&DP Guideline on Environmental Management Plans.
- DEA&DP Guideline for the Management of Development on Mountains, Hills and Ridges in the Western Cape.
- DEA&DP Guideline on the Application of the EIA Regulations to Structures Associated with Communications.
- DEA&DP Guidelines for Golf Courses, Golf Estates, Polo Fields and Polo Estates in the Western Cape.
- DEA&DP Rural Land Use Planning & Management Guidelines (2009)
- DEA&DP Generic Environmental Best Management Practice Guideline for Aquaculture Development.
- DEA&DP PSDF (2009 and 2014).
- DEA&DP A Guide to Reporting and Estimating Emissions.
- DEA&DP West Coast District Municipality Coastal Management/Set-back Lines.
- DEA&DP Rural Land Use Planning & Management Guidelines (2019)
- DEA&DP Western Cape Biodiversity Spatial Plan Handbook (2017)
- DEFF (formerly Department of Environmental Affairs) Integrated Environmental Management Information Series. This comprises a series of documents that deal with various aspects of the EIA process.
- DEFF (formerly Department of Environmental Affairs): South African Manual for Outdoor Advertising Control.
- CapeNature stewardship guidelines.
- CapeNature BSP handbook.
- Berg River Estuary Management Plan, C.A.P.E. Estuary Management Programme.
- West Coast Biosphere Reserve SDP.
- South African National Standards 241 – South African Drinking Water Standard.
- South African National Standards 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.

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.
- Interested and Affected Parties

The respective roles and responsibilities of the above-mentioned parties are shown in Table 17 below.

ROLE	RESPONSIBILITY
DEA&DP, DEFF, and the Department of Mineral Resources – competent authority for issuing environmental authorisation	**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.
DEA&DP (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 undertaken. - **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 loss of CBAs/CESAs/FEPAs triggers a revision of associated biodiversity plans and re-assessment of areas needed to meet conservation targets, when and where practicable.
DEA&DP (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 a unified vision of sustainable development is achieved between the EMF and the SDF. This is critical in the development of exclusions in terms of NEMA.

	• **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 Basic Assessments or Scoping and Environmental Impact Reporting processes. The EMF serves as a guide for the location of development proposals. It also provides assistance in 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 the impact assessment process, there is a high probability that these reports will be rejected.

Table 17. Roles and responsibility in respect of the EMF

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 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. The lack of ability of project level assessments (including EIAs) and decision making to consistently deliver sustainable development outcomes is also a persistent discourse (Bond et al, 2014, and Bond et al, 2018). This is particularly pertinent in South Africa and its emphasis on balancing development priorities with sustainable use of resources.

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, such 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.

11.1. Decision-making (sustainability) criteria and need and desirability

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.

Of relevance when considering the application of the sustainability criteria, is the application of Need and Desirability requirements in project planning and decision making. The 2014 EIA Regulations set

specific requirements for the consideration of the need and desirability for the proposed developments, including the need and desirability of activities in the context of preferred locations. The Need and Desirability Guideline (DEA, 2017) provide important guidance in this regard, as it poses various questions that are aimed at assessing need and desirability, as well as applying the NEMA principles to EIA processes and decision making. Importantly, need and desirability as dealt with in the guideline also poses relevant questions that link project level assessments to the strategic context within which such assessment is situated. This EMF provides such a strategic context that the Need and Desirability Guideline (through the questions it poses), must consider in EIA processes and decision making.

	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	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		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.

	capital in ways that do not compromise future generations).	economic and social development.	(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 options for future generations are kept open.		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.

5	**Efficiency in use of natural resources and available capacity** Ensures 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.

Table 18. Linking the Sustainability Criteria proposed for use in the EMF to the Constitution of South Africa and the National Environmental Management Act, 1998 (Act No. 107 of 1998)

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, sensitive social systems, vulnerable economies).

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 vulnerability, in that there are no fragile attributes, the nature of the development would have a greater weighting in determining 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 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 vulnerable and irreplaceable resources exist within the existing urban and industrial areas that require additional protection and must be avoided where possible. For this reason, all of the areas beyond existing urban areas fall into either a 'Conservation' or a 'Controlled Development' EMZ, while highly vulnerable resources under considerable development pressure within the urban and industrial areas fall within the '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 possible, development should strive to take advantage of opportunities to make a net positive contribution to the 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 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.
- 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
- Social improvement

It is envisaged that these indicators would be incorporated into the performance management system of the DEA&DP 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.

12.1.1. 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.

12.1.2. 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.
- The number and type of projects authorised where green technology has been applied to reduce emissions.

12.1.3. 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 NEM: PAA 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.

12.1.4. 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).

12.1.5. 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.

12.1.6. 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.

12.1.7. Hazards

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

12.1.8. Social improvement

- Number of inhabitants within the Greater Saldanha Bay region.
- Number of households with access to toilets.
- Number of households with access to potable water.
- Type of dwelling occupied by inhabitants.
- Number of inhabitants per dwelling.
- Average household income.
- Number of household members employed including their gender and age.
- Number of household members at school, including an indication of the highest level of education for each household member.
- Average income per capita in the study domain
- Gini Coefficient for the study domain.
- Descriptive statistics of the economy of the Greater Saldanha Bay area, including:
    - The areas GDP
    - The sectoral composition of the GDP
    - Trends within the economy.

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 the Municipal Spatial Development Framework.

13.1. Updating the EMF

As a minimum, the EMF must be updated every **five** years. However, in the case of SBM, it is recommended 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 DEA&DP in consultation with the relevant municipality/ies.
2. The DEA&DP should inform the DEFF of the EMF revision process.
3. The DEA&DP 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 with the municipality, the potential to integrate the EMF and the SDF. An integrated EMF / SDF would be the first choice.
    - 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 resource 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. An IDP adopted by the council of a municipality is "the principal strategic planning instrument which guides and informs all planning and development." The IDP must be "compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation." 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. At this stage, an EMF adopted during the previous year, must be considered and may be integrated with the SDF.

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

In the case of the Greater Saldanha Area EMF, the Department and the SBM has gone a step further to move towards an integrated SDF / EMF. The intention is to have one integrated SDF / EMF in future and significant strides have already been taken. The reason is that it is important to have one vision of sustainable development to promote consistent decision-making. The municipality has thus, for example, in the SDF already started including information from the EMF and indicating where there are differences. Similarly, the EMF uses the some of the SDF information as baseline information and starts to ensure that the Environmental Management Zones are comparable with the Spatial Planning Categories of the SDF.

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