FINAL ENVIRONMENTAL IMPACT REPORT

For

THE PROPOSED RESIDENTIAL DEVELOPMENT ON ERF 3122, HARTENBOS HEUWELS, MOSSEL BAY

Prepared for:

Mr Schalk Cilliers
Afrikaanse Taal- en Kultuurvereniging **(ATKV)**
P.O Box 4586
Randburg
2125

Submitted to:
Western Cape - Department of Environmental Affairs and Development Planning
4th Floor, York Park Building
93 York Street
George
6529

Prepared by:

Strategic Environmental Focus (Pty) Ltd
14 Kloof Street,
Cape Town
8001
Tel: +27 21 469 9159

June 2016

WC - DEA&DP REF NO: 16/3/1/2/D6/18/0007/13
SEF Project Code: 504632

PURPOSE OF DOCUMENT

A period of **21 calendar days (Friday, 1st July 2016 to Thursday, 21st July 2016)** has been provided for the review and commenting phase of the Final Environmental Impact Report (EIR). All Interested and Affected Parties (I&APs) as well as State Departments have been notified of this review period.

The commenting period on this Final EIR will run concurrently with the **Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP)** review of the Final EIR towards an Environmental Authorisation. Thus, **all comments on this Final EIR must be submitted directly to WC DEA&DP and all communication must highlight WC DEA&DP's Reference Number (i.e.: 16/3/1/2/D6/18/0007/13)**. Comments can be submitted to the following contact person:

Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP) - Contact Person: Ms Francini van Staden
Tel: +27 44 805 8600
Fax: +27 44 874 2423
Email: Francini.VanStaden@westerncape.gov.za
Postal Address: Private Bag X6509, George, 6530
Physical Address: 4th Floor, York Park Building, 93 York Street, George, 6529

Please copy SEF in all communication to the **WC DEA&DP**.

Strategic Environmental Focus - Contact Person: Mrs Natalie Ritsch
Tel: +27 21 469 9159
Fax: +27 21 424 5571
Email: natalie@sefsa.co.za
Physical Address: 14 Kloof Street, Cape Town, 8001
Postal Address: P.O. Box 3965, Cape Town, 8000

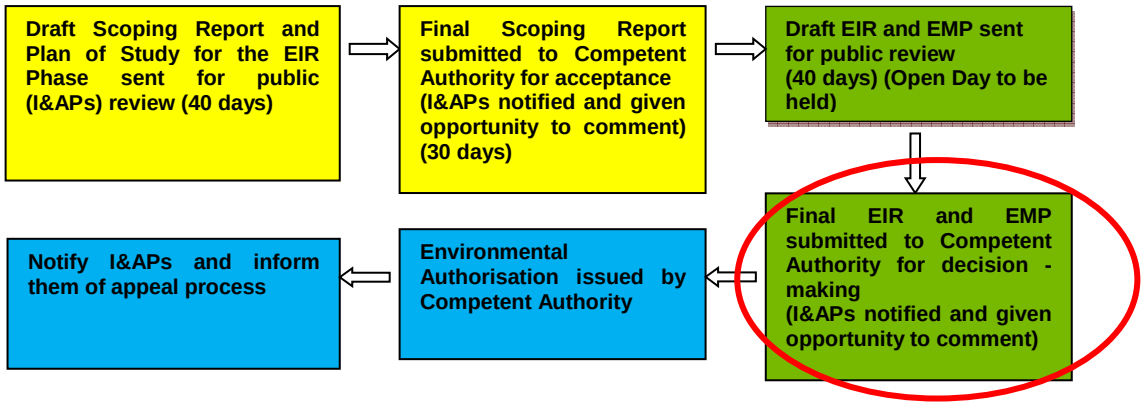
The **WC DEA&DP** will make a decision and grant or refuse authorisation (in terms of the National Environmental Management Act, Act No. 107 of 1998) - Regulations 35(1)(a) and 35(1)(b) respectively). All registered I&AP's will be notified of the decision (i.e. Environmental Authorisation). This notification will also detail the appeal procedure should I&APs disagree with the decision.

A hard copy of the Final EIR and Environmental Management Programme (EMPr) can be viewed at this venue:

Name of public venue	Name of Contact Person	Contact Number	Viewing Times
Hartenbos Public Library Witwatersrand Road Hartenbos	Eldri Van Dyk	(044) 606 5271	Monday: 13:00 - 17:00 Tuesday - Friday: 09:30 - 17:00 Saturday: 09:00 - 12:00

Should you wish to participate in the EIR process by contributing issues of concerns/comments, please register as an I&AP by completing the enclosed Registration and Comment Sheet or you can visit SEF's website at http://www.sefsa.co.za. To register as an I&AP or comment on the project, click on "Stakeholder Engagement". Select your own username and password and click on the "register" button and complete the compulsory fields to register. Once registered, click on the stakeholder engagement tab, login using your username and password and you may then view the Final Environmental Impact Report for the proposed **504632 Residential Development on Erf 3122, Hartenbos Heuwels** and associated appendices. Should you have any problems in obtaining the information from the Internet, please feel free to contact SEF for assistance.

The flow diagram below highlights the phases in the project where I&APs have the opportunity to participate within the process.



PROJECT SUMMARY	
Project Name	Proposed Residential Development on Erf 3122, Hartenbos Heuwels, Mossel Bay
Preferred Site	Erf 3122
Surveyor-General 21 Digit Code	Area not surveyed / NO DATA
Development Footprint	Approximately 60.5ha
Site Photographs	Refer to Appendix 2
Confirmation of Supply:	
Water (Construction & Operational Phases)	Construction Phase = To be supplied by Contractor Operational Phase = 455kl/day Supplier: Mossel Bay Local Municipality
Sewage (Construction & Operational Phases)	Construction Phase = To be supplied by Contractor Operational Phase = 364m^3/day Supplier: Mossel Bay Local Municipality
Electricity (Construction & Operational Phases)	Construction Phase = To be supplied by Contractor Operational Phase = 1,850 kVA Supplier: Mossel Bay Local Municipality
Solid Waste (Construction & Operational Phases)	Construction Phase = To be supplied by Contractor Operational Phase = 1.5 ton per day Receiver: Mossel Bay Local Municipality landfill site

ENVIRONMENTAL ASSESSMENT PRACTITIONER

SEF is one of Africa's largest multi-disciplinary consultancies, offering sustainable development solutions to private and public sector clients. Our dynamic team of dedicated professionals delivers customised products and quality services, supporting the sustainable development and management of natural, built and social environments across all sectors.

Vision:

SEF is a national sustainability consultancy that provides integrated social, biophysical & economic solutions by forging strategic stakeholder relationships, underpinned by SEF's core values.

Mission: SEF offers holistic sustainable solutions in response to global change.

SEF has significant in-house teams of specialist scientists and professionals that provide innovative, industry-specific solutions and resource management which talks to Environmental Impact Assessments and related services. Our Built Environment specialists provide integrated solutions in the context of architectural and landscape design whilst our GIS team provides spatial analysis models. SEF manages all aspects of social services projects and is dedicated to the transformation of the mining and production industries. Other areas of expertise include Integrated Waste Management as well as energy-related impact assessments and planning studies. The water quality and bio-monitoring team assists in implementing water quality and quantity monitoring programmes and audits.

SEF staff are members of various professional associations, including the International Association for Impact Assessment (IAIA), Professional Landscape Architect with the South African Council for the Landscape Architectural Profession (SACLAP), South African Council for the Architectural Profession (SACAP), GISSA Gauteng & Kwa-Zulu Natal, The Association of Southern African Professional Archaeologist (ASAPA), South African Council for Natural Scientific Professions (SACNASP), Zoological Society of Southern Africa and South African Institute for Architects (SAIA).

SEF commits itself to comply with the requirements and the implementation of a Quality Management System. The Quality Management System will be reviewed and implemented to continually improve efficiency and effectiveness of the organisation.

In terms of the Broad Based Economic Empowerment Act and its associated enterprise definitions, an enterprise with a turnover greater than R5 million (five million rand) and less than R35 million (thirty five million rand) is defined as a Qualifying Small Enterprise (QSE). In terms of the aforementioned statement, a QSE's score is assessed on either the four categories which the

measured entity itself chooses to be assessed on, or on the four categories in which it scores its highest number of points. Each category of assessment carries 25 points.

SEF has been measured as a QSE and attained a Level 2 certificate in 2014 and our clients are entitled to accredit 156% of their spend. In terms of Historically Disadvantaged Individuals (HDI), SEF has an HDI of 60% in terms of management and 70.8% in terms of its total staff compliment.

SEF uses a "green" approach to anything we embark on. We believe in using technology to our and the environment's best advantage. We encourage the use of green alternatives such as telephone and video conferencing instead of travelling for workshops and meetings and Compact Discs (CDs) instead of printed material, where possible.

The following project team members are involved in this S&EIR application process (Refer to Appendix 7 for relevant CV's).

Table 1: Project Team Members

Name	Organization	Project Role
Natalie Ritsch	SEF	Project Manager
Hanlie Van Greunen	SEF	Environmental Manager
Karin van der Walt	SEF	Ecological Specialist
Willem Lubbe	SEF	Wetland Specialist

Natalie Ritsch

Project Manager

Natalie Ritsch has been an EAP for more than 10 years, and has been involved in the environmental science field for almost 14 years. She has been exposed to the government, parastatal and private sectors in her career thus far, which involved the supervision of junior staff, reviewing of documentation and compilation of various reports from small-scale BA's to large-scale EIA's. She provides support and oversight to staff, project leadership and quality assurance on all projects. Natalie is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400130/05), and is a member of the International Association for Impact Assessment – south African affiliate (IAIAsa).

Hanlie van Greunen

Environmental Manager

Hanlie van Greunen has 8 years of professional experience as a Landscape Technologist and holds a BSc LArch degree. She also completed a BSc Hons degree in Environmental Monitoring and Modeling in 2010. Hanlie spent 5 years in the UK working as a Landscape Architect at a charitable environmental regeneration organisation where she gained skills in community consultation along with the design and implementation of community led landscape projects. Hanlie is currently an Environmental Manager at SEF and has 3 years' experience in environmental management. She is involved in the compilation of Basic Assessments, Scoping Reports, EIA's and EMPr's in terms of NEMA and the MPRDA. Hanlie also conducts visual impact assessment studies (VIA's) for various types of development.

Karin van der Walt

Ecologist

Karin van der Walt has more than 10 years' experience in the field of Nature Conservation. After working as a wilderness trails ranger in the Kruger National Park for five years, she was employed to manage a project on threatened and medicinal plants in South Africa. Through this she was exposed to extensive fieldwork, plant population assessments, threat assessments and biodiversity management plans. She has presented nationally and internationally on ecological and conservation issues. Currently, as a specialist ecologist for SEF, she is doing faunal and floral assessments, ecological management plans, impact assessments and mitigations.

Willem Lubbe

Wetland Specialist

Willem Lubbe has been an ecologist for more than 5 years with experience within the environmental sciences for more than 8 years. Currently, as a senior natural scientist for SEF, the majority of his work consists of wetland delineations and functional assessments ranging from micro catchment to regional level. As a terrestrial ecologist he has extensive experience carrying out ecological studies for Environmental Impact Assessments and Scoping studies which include flora and faunal assessments, sensitivity mapping; Red Data floral and faunal searches, strategic assessments as well as advice on ecosystem processes and landscape ecology.

Table 2: Contact Details of Environmental Assessment Practitioner

Name	Contact Details	Approval for Release
Natalie Ritsch	Tel: +27 21 469 9159 Fax: +27 21 424 5571 Email: natalie@sefsa.co.za Physical Address: 14 Kloof Street, Cape Town, 8001 Postal Address: P.O. Box 3965, Cape Town, 8000	

.

EXECUTIVE SUMMARY

1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by the Afrikaanse Taal- en Kultuurvereniging (ATKV) to undertake an environmental application process for the proposed residential development on Erf 3122 of Hartenbos Heuwels in the Western Cape.

A Scoping and Environmental Impact Reporting (S&EIR) process is being conducted for this project based on triggered listed activities within the Environmental Impact Assessment (EIA) Regulations of 2010 (Government Notice (GN) No's 543; 544; 545 and 546) promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended.

The Scoping Phase for the proposed project has been completed and the Final Scoping Report (FSR), including the Plan of Study for the EIR, was submitted to the **Western Cape Department of Environmental Affairs and Development Planning (WC - DEA&DP)** on 18 July 2014. WC – DEA&DP approved the FSR on 14 August 2014.

The Draft Environmental Impact Report (EIR) was submitted to the competent authority on 9 March 2015 and comments were received on 2 June 2015. Following receipt of these comments, amendments were made to some of the specialist studies as well as the layout and the report has now been updated and finalised

The Final EIR is being circulated from Friday, 1st July 2016 to Thursday, 21st July 2016. The purpose of the Final EIR was to provide all interested and affected parties (I&APs) and relevant State Departments with an opportunity to comment and provide input into the final report. All comments received during the previous review and commenting phases have now been incorporated into the Final EIR for consideration by the competent authority, WC - DEA&DP.

2 BRIEF PROJECT DESCRIPTION

The study area is located on Erf 3122 of Hartenbos Heuwels (on the corner of Kameeldoring- and Geelhout Avenue) approximately 1.5km west of the centre of Hartenbos town, in the Mossel Bay Local Municipality. The study area falls within Quarter Degree Grid Cell (QDGC). The N2 highway as well as the R102 provincial road between Hartenbos and Mossel Bay is situated to the east of the study area while the R328 provincial road between Hartenbos and Oudshoorn is situated to the north (Refer to Figure 1: Locality Map).

The footprint of the proposed development is approximately 60.5 ha. The current vacant land will be converted into a residential township that will include the following:

Use Zone	Erven	% of Area	Details of Development Area
Single residential	153	20	153 dwelling units
Retirement village (special zone)	131	8	131 dwelling units
Institution	3	5	11502m^2 floor area including: • 144 bed nurses accommodation • 2876m^2 medical centre/clinic • 240 frail care beds
Local business	1	1	2632m^2 GLA convenience centre
Local government	1	1	Reservoir
Streets	N/A	12	71686m^2 public and private streets

Use Zone	Erven	% of Area	Details of Development Area
Open space	7	1	3651m^2 private open space
Conservation	7	52	314560m^2 conservation

The proposed development will also support other land uses such as a business park and sport grounds.

3 KEY IMPACTS

The following key impacts were identified during the Scoping Phase and have been assessed and evaluated in this Final EIR.

Biophysical Impacts:

- Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with vegetation clearance, topsoil stripping and the establishment of hard surfaces;
- Potential impacts on soil, surface and ground water quality
- Potential destruction of riparian wetland habitat;
- Destruction of flora within the proposed area, stemming from activities such as vegetation clearance, topsoil stripping and ongoing maintenance; and
- Faunal displacement and/or destruction (including avi-faunal species).

Socio-Economic Impacts:

- Increased dust and noise generation during earthworks in the construction phase;
- Potential impacts on cultural, archaeological and/or paleontological heritage resources;
- Change in the visual character of the area;
- Increased income for the Local Municipality (i.e. rates and taxes) (+)
- Job creation during the construction and operational phases of the proposed project (+)

Cumulative Impacts:

- Transformation (development) of open space areas within the region; and
- Influx of residents into the area resulting in an increase in traffic.

4 PROJECT ALTERNATIVES

To give effect to the principles of NEMA and Integrated Environmental Management (IEM), an EIA should assess a number of reasonable and feasible alternatives that may achieve the same end result as that of the preferred project alternative. The following alternatives have been identified as part of this Scoping exercise:

Alternative 1: Site/ Location Alternatives:

The ATKV are the owners of Erf 3122 of land therefore site alternatives are not deemed viable and no further site/location alternatives will be investigated.

Alternative 2: Layout/ Design Alternatives:

The layout/ design of the residential development has changed from the original layout/design (decreased in size and increased in density) in order to compensate for the two National Freshwater Ecosystem Priority Areas (NFEPA) wetlands located to the south east as well as a patch of undisturbed vegetation classified as Mossel Bay Shale Renosterveld which is an Endangered vegetation type. Initially the development boundary was to include both wetland areas and create an ecological belt, however it has now been decided that the boundary will be decreased to exclude most of the wetland area. A small remaining portion of wetland area included in the development boundary will become part of the ecology belt. The proposed new alternative will therefore be applied for.

Provision has also been made in the design for two ecological corridors in order to ensure ecological connectivity between the High and Medium sensitivity areas present on the proposed site.

Original Alternative

Alternative 2

(note change in layout including two ecological corridors, increased ecological areas on the Eastern section to include wetland systems)

Alternative 3 (Preferred Alternative)
(note further changes in layout to accommodate ecological corridors, and further increased ecological areas on the Eastern section to include wetland systems)

Alternative 3: Technology Alternatives:
Not considered

Alternative 4: No Development Alternative:
This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the WC - DEA&DP decline the application, the 'No-Go' option will be followed and the status quo of the site will remain.

5 CONCLUSIONS AND RECOMMENDATIONS

In accordance with GN No. 543, the Environmental Impact Phase is aimed at identifying and assessing potential impacts caused by the proposed development. The ability to mitigate any of the identified impacts are also addressed and summarised into a working / dynamic Environmental Management Programme (EMP) for consideration by I&APs and ultimately by the WC - DEA&DP.

Comments and/or concerns identified by Interested and Affected Parties (I&APs) during the review period of the Draft Environmental Impact Report will be incorporated into the Final Environmental Impact Report which will then be submitted to the WC - DEA&DP for consideration. Having assessed all the potential environmental impacts associated with the proposed development it is the opinion of the EAP that the proposed Hartenbos Heuwels Residential Development on Erf 3122 is issued with a positive Environmental Authorisation from WC - DEA&DP for the following reasons:

- The Erf 3122 is currently is zoned as “Housing” in the Hartenbos Sub-Regional Structure Plan. The existing adjacent land use (to the north, east and south) is also zoned as Housing and is already developed;
- The site (Erf 3122) contains previously disturbed parts (about 40 ha) that was transformed through agriculture (possibly grazing).
- The relevant vegetation type (Mossel Bay Renosterveld) that was identified is considered unsuitable as arable land due to the stone nature and high permeability;
- The proposed development will offer an opportunity to formally conserve all High conservation value habitats on Erf 3122. This would be best achieved by rezoning them as Open Space and possibly by incorporating them into a formal Contract Nature Reserve with CapeNature;
- The proposed development will also offer the opportunity to fund and implement an Operational Environmental Management Plan (OEMP) as part of the Environmental Management Programme (EMPr) throughout the remaining natural portions of the site, focussing on alien vegetation control and fire management;
- Ecological connectivity between High and Medium sensitivity areas will be promoted through the implementation of ecological corridors. These corridors (at least 100m in with) will be maintained as part of the OEMP which will be important for ecological integrity. The development Layout was altered in order to accommodate the above ecological corridors and also to avoid the “undisturbed areas” of Mossel Bay Shale Renosterveld which is an Endangered vegetation type (all “undisturbed areas” is buffered by 15m in the proposed Layout);
- The wetland assessment revealed that if no erosion control is implemented to halt the existing gully erosion processes advancing towards the wetlands, the wetlands could potentially deteriorate dramatically within the next five years (due to the close proximity of gully erosion to the wetlands). The proposed development will offer an opportunity to address these existing issues through the implementation of attenuation facilities as recommended by the wetland specialist (diffusion release channels);
- The existing road infrastructure as well as service delivery capacity was questioned by a number of Interested and Affected Parties (mostly Residents from Hartenbos) throughout the Scoping Phase. The Traffic Impact Assessment that was carried out by Route 2 / KBS Consulting Engineers JV (Appendix 7) as well as service delivery confirmation letters received from the Mossel Bay Local Municipality (Appendix 6) clearly demonstrates that capacity constraints will not be experienced as a result of the proposed development;
- Revenue collected by the Mossel Bay Local Municipality, through rates and taxes, will increase which will allow the Municipality to improve its basic service delivery to the entire community;
- Temporary as well as permanent employment opportunities will be created through implementation of the proposed development; and
- Although a number of potential negative biophysical and social impacts where identified, it was determined that with appropriate and recommended mitigation, there are no fatal flaws that should prevent the proposed development from proceeding. Refer to a summary of impact significance ratings both before and after recommended mitigation measures below:

Impact significance ratings before and after mitigation

Impact	Significance without mitigation	Significance with mitigation
Construction Phase Impacts:		
Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with vegetation clearance and topsoil stripping	Medium to High	Low to Medium
Potential impacts on soil, surface and ground water quality	Medium to High	Low to Medium
Potential destruction of riparian wetland habitat	High	Low to Medium
Destruction of flora within the proposed area, stemming from activities such as vegetation clearance and topsoil stripping.	Medium to High	Medium
Faunal displacement and/or destruction (including avi-faunal species).	Medium to High	Medium
Increased dust and noise generation.	Medium	Low
Potential impacts on cultural, archaeological and/or paleontological heritage resources.	Medium	Low to Medium
Temporary change in the visual character of the area.	Medium	Low to Medium
Temporary job creation (+)	-	Medium to High Positive
Operational Phase Impacts:		
Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with hard surfaces during high rainfall events.	High	Medium
Destruction of flora through ongoing maintenance activities	Medium to High	Medium
Faunal displacement and/or destruction (including avi-faunal species).	Medium to High	Medium
Permanent change in the visual character of the area.	Medium to High	Medium
Increased income for the Local Municipality (i.e. rates and taxes) (+).	-	High Positive
Permanent job creation (+).	-	High Positive
Cumulative Impacts:		
Transformation (development) of open space areas within the region	High	-
Influx of people into the area resulting in an increase in traffic	Medium to High	Medium

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

CHARM	Centre for Heritage and Archaeological Resource Management
DEA	Department of Environmental Affairs (previously DEAT)
DEAT	Department of Environmental Affairs and Tourism
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Reporting
EMP	Environmental Management Programme
GN	Government Notice
Ha	Hectares
I&Aps	Interested and Affected Parties
IEM	Integrated Environmental Management
IRP	Integrated Resource Plan
kL	Kilo Litre
kV	Kilo Voltage
m.a.m.sl.	Metres Above Mean Sea Level
ME	Mitigation Efficiency
ML	Mega Litre
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
QDGC	Quarter Degree Grid Cell

SAHRA	South African Heritage Resources Agency
SEF	Strategic Environmental Focus (Pty) Ltd
SFM	Significance Following Mitigation
S&EIR	Scoping and Environmental Impact Reporting
SDF	Spatial Development Framework
WC –DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
WOM	Without Mitigation Measures
WM	With Mitigation Measures

GLOSSARY OF TERMS

Applicant	Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 19998 (Act No. 107 of 1998).
Ecology	The study of the interrelationships between organisms and their environments.
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment	Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.
Environmental Management Programme	A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.
Interested and Affected Party	Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.
Key Stakeholder	Any person who acts as a spokesperson for his/her constituency and/or community/organization, has specialized knowledge about the project and/or area, is directly or indirectly affected by the project or who considers himself/herself a key stakeholder.
Renosterveld	One of the major plant communities and vegetation types of the Cape Floristic Region. It is dominated by a species of grey-coloured plant called the Renosterbos.
Stakeholder	Any person or group of persons whose live(s) may be affected by a project.
Study Area	Refers to the entire study area encompassing all the alternatives as indicated on the study area or locality map.
Succession	The natural restoration process of vegetation after disturbance.
State Department	Any department or administration in the national or provincial sphere of government exercising functions that involve the management of the environment.

SECTION A: INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by the Afrikaanse Taal- en Kultuurvereniging (ATKV) to undertake an environmental application process for the proposed residential development on Erf 3122 of Hartenbos Heuwels in the Western Cape.

A-1 DESCRIPTION OF PROPOSED ACTIVITY

A-1.1 Locality

The study area is located on Erf 3122 of Hartenbos Heuwels (on the corner of Kameeldoring- and Geelhout Avenue) approximately 1.5km west of the centre of Hartenbos town, in the Mossel Bay Local Municipality. The study area falls within Quarter Degree Grid Cell (QDGC). The N2 highway as well as the R102 provincial road between Hartenbos and Mossel Bay is situated to the east of the study area while the R328 provincial road between Hartenbos and Oudshoorn is situated to the north (Refer to Figure 1).

The entire property is 310 ha in size and the proposed development will be approximately 50 ha. There are currently two access points to the property; one at the gate on the south-eastern side of the property (at the corner of Kameeldoring-and Geelhout Avenue) and the second from the R328 road on the northern side of the property.

A-1.2 Surrounding Land Use

To further place the site in context, the land uses within all four major compass directions are described in the table below.

Table 3: Surrounding Land Use Table

Direction	Land Use	Description and distance
North	Residential	Sonskyn Valley (north)
	Road Infrastructure	R328 (highway/main road) – 944m
	Mining	2 Operations: 1079m and 2739m respectively
North-east	Residential	Hartenbos city centre - 1590m
	Residential	Monte Cristo low-density estate
East	Electrical Infrastructure	Runs adjacent to the site
	Residential	Existing Hartenbos Heuwels Residential Development - 772m
	Road Infrastructure	N2 highway - 1063m
	Residential	Bay View - 3270m
	Steam Locomotive Yard (cultural land)	2170m
South	Residential land	Menkenkop and Seemeeupark
	Farming land	Aalwyndal smallholding area
West	Agriculture/Cultivation land	Directly adjacent

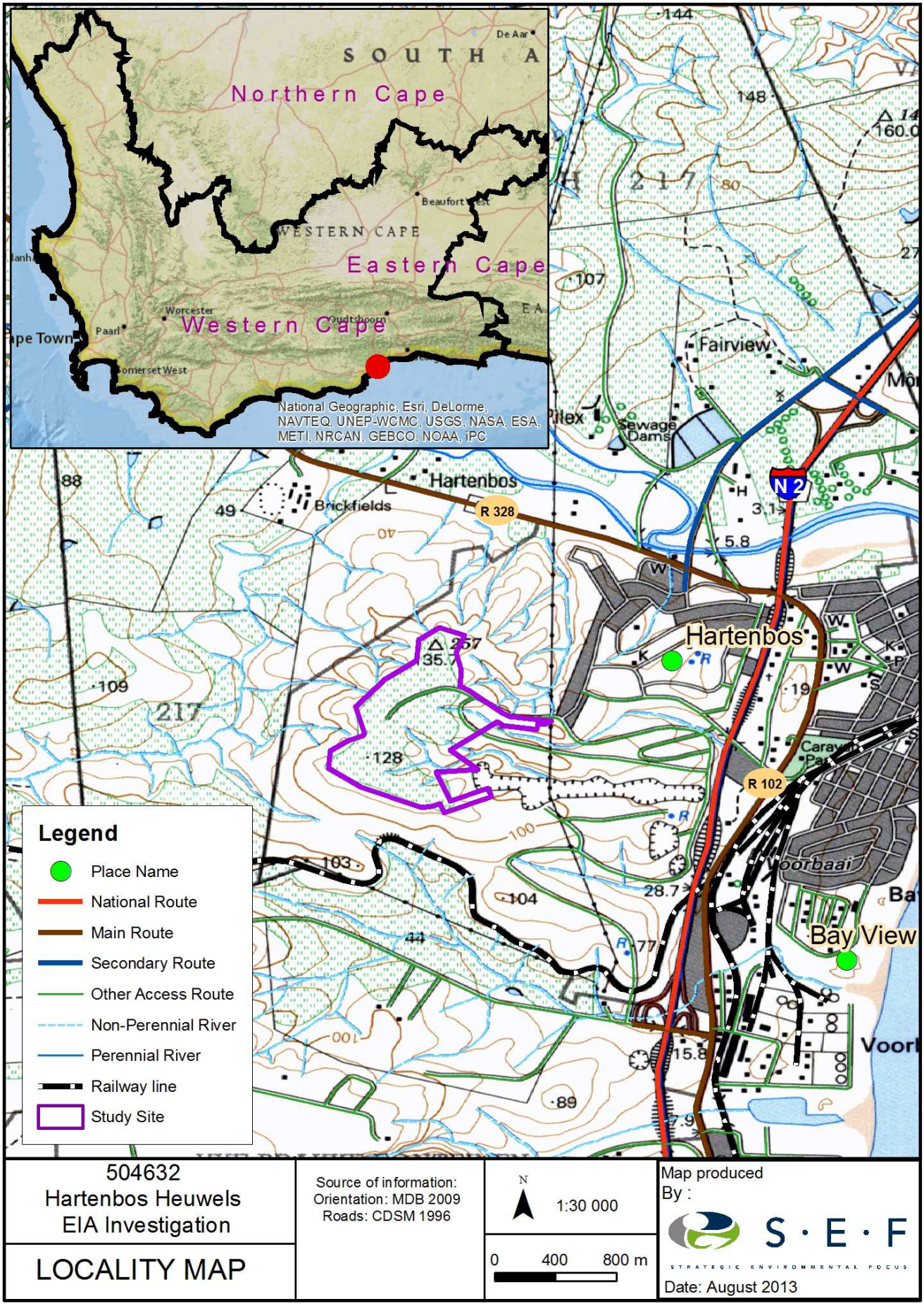


Figure 1: Locality Map

A-1.3 Details of the Project

The ATKV focuses (amongst other objectives) on establishing resorts and retirement villages for which there is an increasing demand. The good climate as well as the location (on the garden route and next to the coast) makes Hartenbos popular for retirement. The proposed development aims to be a retirement village/nursing home but will also have a number of residential units. Although there is currently little activity in the property market, there remains a growing demand for properties, especially in coastal towns such as Mossel Bay and Hartenbos. Erf 3122 is too small to operate as an economic farming unit and is situated so that it forms a natural extension of the existing town of Hartenbos.

The proposed development will consist of the following:

Use Zone	Erven	% of Area	Details of Development Area
Single residential	153	20	153 dwelling units
Retirement village (special zone)	131	8	131 dwelling units
Institution	3	5	11502m^2 floor area including: • 144 bed nurses accommodation • 2876m^2 medical centre/clinic • 240 frail care beds
Local business	1	1	2632m^2 GLA convenience centre
Local government	1	1	Reservoir
Streets	N/A	12	71686m^2 public and private streets
Open space	7	1	3651m^2 private open space
Conservation	7	52	314560m^2 conservation

A-1.4 Services

A-1.4.1 Electricity

An electrical report was compiled by BDE Consulting Engineers (Appendix 7) and a summary of the findings are outlined below:

- The electricity demand generated by the proposed development will approximately be 1,850 kVA;
- Electricity will be supplied to the proposed development via an 11kV underground cable;
- The installation of energy saving systems the will enable the proposed development to save up to 40% of electricity.
- The Mossel Bay Local Municipality confirmed in writing that they have capacity to supply the proposed development with electricity from the Sonskyn substation. Refer to Appendix 6.

A-1.4.2 Civil Services

A service delivery report was compiled by Uhambiso Cunsult (Pty) Ltd in September 2010 (Appendix 7). A summary of the findings of this report are outlined below:

Water Supply:

- The average daily water demand of the proposed development is approximately 455kl/day.
- A 3.5Ml water reservoir, belonging to the Mossel Bay Local Municipality, is situated at the highest point of the proposed site. The ATKV is currently funding this reservoir and it has been calculated that the reservoir has enough capacity to supply the development. If it is found that the demand exceeds the capacity, a 20m high water tower will be constructed next to the existing reservoir.
- The Mossel Bay Local Municipality confirmed in writing that the formal water supply system also has enough capacity to supply water to the proposed development. Refer to Appendix 6.

Sewage:

- The average daily sewage flow for the proposed development will be 80% of the daily water use (i.e. 364m^3/day);
- Due to the high elevation of Erf 3122, a gravitational sewage system in compliance with the "Red Book Standards" is proposed;
- The Mossel Bay Local Municipality confirmed that the local Waste Water Treatment Works (WWTW) will have enough capacity to receive sewage generated by the proposed development. Refer to Appendix 6.

Stormwater:

- The proposed development is located at the top of the stormwater catchment and will not receive stormwater from any adjacent areas.
- Stormwater generated by the property flows to a natural drainage line in the centre of Erf 3122.
- An internal stormwater network will be designed for the proposed development and will comply with the "Red Book Standards".
- In order to protect lower, adjacent properties stormwater diffusion trenches is considered – refer to the Wetland Impact Assessment and the Draft Stormwater Management Plan (Appendix 7).

Roads:

- The proposed project will be accessed from Kameeldoring- and Geelhout Avenue in the east and will also be connected to the proposed adjacent Highlands development in the south. Refer to Appendix 3 for the Layout Plan.

A-2 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

SEF registered the proposed residential development with the WC-DEA&DP and the project has been assigned the reference number: **16/3/1/2/D6/18/0007/13**. The legislation, guidelines and policies applicable to this project are as follows:

A-2.1 NEMA and the Environmental Impact Assessment Regulations

The EIA Regulations, promulgated under NEMA, focus primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

In terms of the EIA Regulations of 2010 and activities listed in GN No. 544, 546 and GN No. 545, the listed activities as outlined in Table 4 are deemed by the EAP to be applicable to the proposed Hartenbos Heuwels

development based on the information provided by the project proponent and their consulting engineers and specialists.

South Africa's new environmental impact assessment (EIA) regulations came into effect on Monday, 8 December 2014. In terms of the GN R 982 of 2014, Regulation 52 (1) 2014 the following regulation is relevant for the process going forward:

"*Any actions undertaken in terms of the previous NEMA regulations and which can be undertaken in terms of provisions of these Regulations must be regarded as having been undertaken in terms of the provision of these Regulations".*

In order to comply with the abovementioned condition of GN R 982 of 2014, a comparison of relevant activities listed under the 2010 EIA Regulations and the 2014 Regulations is made in Table 4. Site specific activities are also listed.

It must be noted that activities requiring a Basic Assessment process, as well as activities requiring a S&EIR process are triggered by the proposed development. Therefore, according to the below listed activities, a situation arises, whereby the legal requirements of the activity listed in terms of GN No. 545 of 2010 supersede those of the activities listed in terms of GN No. 544 and 546 of 2010, and as such **this application has undergone a S&EIR process**.

Table 4: Listed Activities

Relevant Listed Activities under the 2010 EIA Regulations	Corresponding Listed Activity under the 2014 EIA Regulations	Project implications
GN R 544, 18 June 2010: Activity 9 **The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water;** **(i) with an internal diameter of 0,36 meters or more; or** **(ii) with a peak throughput of 120 litres per second or more.**	**GN R 983, 4 December 2014: Activity 9** **The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;** **(i) with an internal diameter of 0,36 metres or more; or** **(ii) with a peak throughput of 120 litres per second or more.**	**The average daily sewage flow for the proposed development will be 80% of the daily water use (i.e. 364m^3/day which will require pipes with a diameter of 0.36m or more.** **Stormwater infrastructure will also exceed this diameter.**
GN R 544, 18 June 2010: Activity 10 **The construction of facilities or infrastructure for the transmission and distribution of electricity** **i. outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or** ii. inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	**GN R 983, 4 December 2014: Activity 11** **The construction of facilities or infrastructure for the transmission and distribution of electricity** i. **outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;** or ii. inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	**An underground electricity cable will be installed from the existing Sonskyn Substation to the proposed development. Electricity to be supplied by the Mossel Bay Local Municipality.**
GN R 544, 18 June 2010: Activity 11 **The construction of:** (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; or **(xi) infrastructure or structures covering 50 square metres or more** where such construction occurs within a watercourse or within 32	**GN R 983, 4 December 2014: Activity 12** **The development of:** (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 (v) square metres in size; (vi) weirs, where the weir, including infrastructure and water surface area, exceeds 100 (vii) square metres in size; (viii) bulk storm water outlet structures exceeding 100 square metres in size; (ix) marinas exceeding 100 square metres in size; (x) jetties exceeding 100 square metres in size; (xi) slipways exceeding 100 square metres in size; (xii) buildings exceeding 100 square metres in size;	**The proposed residential development and associated infrastructure will have a footprint of greater than 50 square metres and will be situated within 32 meters of a wetland.**

metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line	(xiii) boardwalks exceeding 100 square metres in size; or **(xiv) infrastructure or structures with a physical footprint of 100 square metres or more;** **where such development occurs-** a) within a watercourse; b) in front of a development setback; or **c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;** **excluding-** aa) the development of infrastructure or structures within existing ports or harbours that; bb) will not increase the development footprint of the port or harbour; where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; **dd) where such development occurs within an urban area; or** ee) where such development occurs within existing roads or road reserves.	
GN R 544, 18 June 2010: Activity 22 **The construction of a road, outside urban areas,** i. with a reserve wider than 13.5 meters; or ii. **where no reserve exists where the road is wider than 8 meters,** or iii. for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	**GN R 983, 4 December 2014: Activity 24** **The development of-** (i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or **(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.**	**An access road (wider than 8 meters) will provide access to the proposed development from Kameeldoring- and Geelhout Avenue in the east and will also be connected to the proposed adjacent Highlands development in the south.**
GN R 545, 18 June 2010: Activity 15 **Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20**	**GN R 984, 4 December 2014: Activity 15** **The clearance of an area of 20 hectares or more of indigenous vegetation,** excluding where	**An area of approximately 29 hectares of undeveloped land will be transformed.** **Existing indigenous vegetation will be cleared for the development footprint.**

hectares or more. except where such physical alteration takes place for: i. linear development activities; or ii. agriculture or afforestation where activity 16 in this Schedule will apply.	such clearance of indigenous vegetation is required for- i. the undertaking of a linear activity; or ii. maintenance purposes undertaken in accordance with a maintenance management plan.	
GN R 546, 18 June 2010: Activity 14 **The clearance of area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.** **In the Western Cape Province**: All areas outside urban areas	**GN R 985, 4 December 2014: Activity 12** **The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.** **In the Western Cape Province:** i. Within any critically endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; **ii. Within critical biodiversity areas identified in bioregional plans;** iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**More than 5 hectares of indigenous vegetation will be cleared to make way for the proposed development.** **The Mossel Bay Critical Biodiversity Areas (CBA) map indicated that several aquatic critical biodiversity features exists within the study area.**

A-2.2 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.

Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

Due to the proximity of the proposed development to a wetland a Water Use License Application may be required in terms of Section 21 of the NWA:

21(c) impeding or diverting the flow of water in a watercourse; and
21(i) altering the bed, banks, course or characteristics of a watercourse.

A-2.3 Other Legal Requirements

A-2.3.1 Acts

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

This Act is applicable to this application for environmental authorisation, in the sense that it requires the project applicant to consider the protection and management of local biodiversity.

National Environmental Management: Air Quality Act No. 39 of 2004
Reforms the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.

National Environmental Management: Waste Act No. 59 of 2008
Reforms the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

National Heritage Resources Act, 1999 (Act No. 25 of 1999)

This Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa has major implications for environmental management. The main effects are the protection of environmental and property rights, the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the *locus standi* of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

Everyone has the right –

- To an environment that is not harmful to their health or well-being; 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 and use of natural resources while promoting justifiable economic and social development.

Promotion of Access to Information Act, 2000 (Act No. 2 of 2000).

The Promotion of Access to Information Act, 2000 (Act No. 2 of 2000) recognises that everyone has a Constitutional right of access to any information held by the state and by another person when that information is required to exercise or protect any rights. The purpose of the Act is to foster a culture of transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their rights.

Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000).

This Act gives effect to the right to administrative action that is lawful, reasonable and procedurally fair. Its main purpose is to:

- Promote efficient administration and good governance; and
- Create a culture of accountability, openness and transparency in the public administration or in the exercise of a public power or the performance of a public function, by giving effect to the right to just administrative action.

National Road Traffic Act No. 93 of 1996

Provides for road traffic matters which shall apply uniformly throughout the Republic and for matters connected therewith.

A-2.3.2 Provincial Policies and/or Guidelines

Integrated Environmental Management (IEM)

IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The DEA Integrated Environmental Management Information Series guidelines are also considered during this S&EIR application process.

National Spatial Biodiversity Assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Protected species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

A-3 DETAILS OF THE APPLICANT

The details of the project applicant are:

Name of Applicant	Postal Address	Relevant Numbers
Mr Schalk Cilliers Afrikaanse Taal- en Kultuurvereniging (ATKV)	P.O Box 4586 Randburg 2125	Tel: 011 789 3639 Fax: 011 789 4193

A-4 NEED AND DESIRABILITY OF THE PROJECT

The proposed project is to be driven by the ATKV. The ATKV was established in Cape Town in 1930 by twelve people as an organisation where people can enjoy the Afrikaans language with each other. Today it is the Afrikaansculture-house with about 70 000 principal members and 30 cultural projects per year that generates nearly 55,000 entries and more than 220 000 people who are directly involved.

The ATKV focuses (amongst other objectives) on establishing resorts and retirement villages for which there is an increasing demand. The good climate and health benefits that goes along with it, as well as the accessible location (on the garden route and next to the coast) makes Hartenbos popular for retirement.

The proposed development aims to be a retirement village/nursing home but will also have a number of residential units. Although the property market in South Africa still needs to fully recover from the 2008/09 depression, there remains a growing demand for properties in this part of the Western Cape. The Hartenbos and Mosselbay area is also viewed as “more affordable” than some of the other coastal towns in this region.

The Mossel Bay Local Municipality will collect revenue from the proposed Hartenbos Heuwerls development in the form of Rates and Taxes which will allow the Municipality to improve its basic service delivery to the entire community.

The Mossel Bay area also currently has a high unemployment rate (approximately 22.9%). The proposed Hartenbos Heuwels development will not only stimulate the local economy but also create several temporary employment opportunities, during construction, as well as permanent employment opportunities once operational.

Spatial Development Framework (SDF) for the Mossel Bay Local Municipality

The Mossel Bay SDF will amongst others strive to:

- Promote sustainable development by means of ensuring that development is within the financial, institutional and administrative means of the Mossel Bay Municipality
- Further the establishment of viable communities

- Develop a spatial growth management framework that focuses on:
    - the timeous identification and securing of appropriate land for housing development
    - the containment of urban sprawl
    - the densification and compaction of settlements
    - urban integration and regeneration.
- Promote the equitable distribution of public facilities and services throughout the Mossel Bay Municipal Area
- Support the conservation of the architectural and cultural-historical character of Mossel Bay, as well as the surrounding coastal and rural nodes / settlements
- Integrate and support the application of bioregional planning principles
- Encourage appropriate development in the Mossel Bay Municipal Area, within the confines of acceptable environmental impact.

According to the Mossel Bay SDF the proposed property is located within the urban edge and future residential expansion on Erf 3122 is envisaged.

Section 9.1 of the Mossel Bay SDF identifies the existing Hartenbos Heuwels development as a “Middle and High income residential development area” and states that 384 erven was permitted here. It further states that, “due to potential Environmental constraints” only 50% of the available land parcel size was used for calculation of permissible number of units / erven”.

The proposed site, Hartenbos. Erf 3122 is also already zoned as “Housing” in the Hartenbos Sub-Regional Structure Plan, is considered as being too small to operate as an economic farming unit and is situated so that it forms a natural extension of the existing town of Hartenbos.

SECTION B: THE RECEIVING ENVIRONMENT

In order to, with any level of confidence, assess the potential impacts of the proposed residential development on the receiving environment, one need to first assess the baseline conditions found over the study area. Using this *Status Quo* one can then, broadly speaking, determine the likely impacts that will emanate from a specific development typology on a well-defined receiving environment.

B-1 BIOPHYSICAL ENVIRONMENT

B-1.1 Climate

In a botanical survey and sensitivity assessment compiled by Bergwind Botanical Surveys and Tours CC (Appendix 7), Hartenbos Heuwels has a Mediterranean-type climate ameliorated by its proximity to the coast and falls within the zone of all-year-round rainfall. The climate is similar to that of nearby Mossel Bay. The average annual rainfall is 460 mm per annum. The distribution of rainfall shows a tendency towards being bimodal with peaks in April and August. Average temperatures do not range widely with the June, July and August being the coolest months (daily minimum ± 10° C, daily maximum ± 15° C) and December and January the hottest (daily minimum ± 15° C, daily maximum ± 25° C).

B-1.2 Geology and Geotechnical Suitability

The geology comprises of recent sediments that formed when the sea level was much higher than it is today. As the sea level retreated, this resulted in a wave cut terrace between the Outeniqua Mountains and the coast. The site consists of sediments, smooth rounded stone and pebbles in a matrix of sand. This indicates that this portion of the terrace was part of a wide river bed (Hartenbos Erf 3122 Visual Assessment, Cave Klapwijk and Associates).

This terrace has been cut into by drainage ways both minor and significant that has left a landform that resembles a hill with undulating rounded landforms between the drainage lines. The layout of the erven utilises the flatter top of the remnant terrace. This landform is higher than the surrounding land as this falls away to the east and west beyond the sites boundaries. Hartenbos Heuwels lies squarely on the sediments of the Uitenhage Group, Enon Formation. This formation of sediments consists of silty mudstones interspersed with rounded cobbles of quartz and gravels that were deposited by rivers into marine environment on the coastline during the Cretaceous (Norman & Whitfield 2006). The geology over the whole of the study area is therefore fairly uniform and erosio7 through the gravely conglomerates has resulted in the valleys that are seen in the area today. Drainage from a large part of Erf 3122 ultimately flows into the Hartenbos River and although a relatively small area it is still part of the hydrological system that sustains the river.

B-1.3 Soils and Agricultural Potential

In general, the soils in the study area consisted of shallow sandy loams with an underlying conglomerate formation consisting of numerous rounded pebbles and stones, supported in a matrix of silt, clay and loamy sand. The vast majority of soil samples augered within the study area consisted of terrestrial Clovelly and Mispah soil forms with a few red apedal B horizon-containing Hutton soils towards the highest topography surrounding the water reservoir (Refer to Figure 2). Soil profiles on the plateau area indicated soil disturbances (mixed orthic A and apel B horizons) which confirms

historic cultivation as soil scarification marks are clearly visible on Google earth imagery of 2010. According to DWAF (2005), the permanent zone of a wetland will always have either Champagne, Katspruit, Willowbrook or Rensburg soil forms present, as defined by the Soil Classification Working Group (1991). The seasonal and temporary zones of the wetlands will have one or more of the following soil forms present (signs of wetness incorporated at the form level): Kroonstad, Longlands, Wasbank, Lamotte, Estcourt, Klapmuts, Vilafontes, Kinkelbos, Cartref, Fernwood, Westleigh, Dresden, Avalon, Glencoe, Pinedene, Bainsvlei, Bloemdal, Witfontein, Sepane, Tukulu, Montagu. Alternatively, the seasonal and temporary zones will have one or more of the following soil forms present (signs of wetness incorporated at the family level): Inhoek, Tsitsikamma, Houwhoek, Molopo, Kimberley, Jonkersberg, Groenkop, Etosha, Addo, Brandvlei, Glenrosa, Dundee (DWAF, 2005). The only hydric soil form sampled within the study area were a few shallow Pinedene's in the south of the study. No permanent or seasonal soil forms were sampled within the study area.

Portions of Erf 3122 had previously been used for agriculture. This, however, is no longer evident in the landscape, which now primarily retains rural landscape characteristics, leaving the land unsuitable as arable land due to the stoney nature and high permeability. The intermediate slopes of the valleys were most likely left as indigenous bush. This information was obtained from the botanical survey and sensitivity assessment done by Bergwind Botanical Surveys and Tours CC.

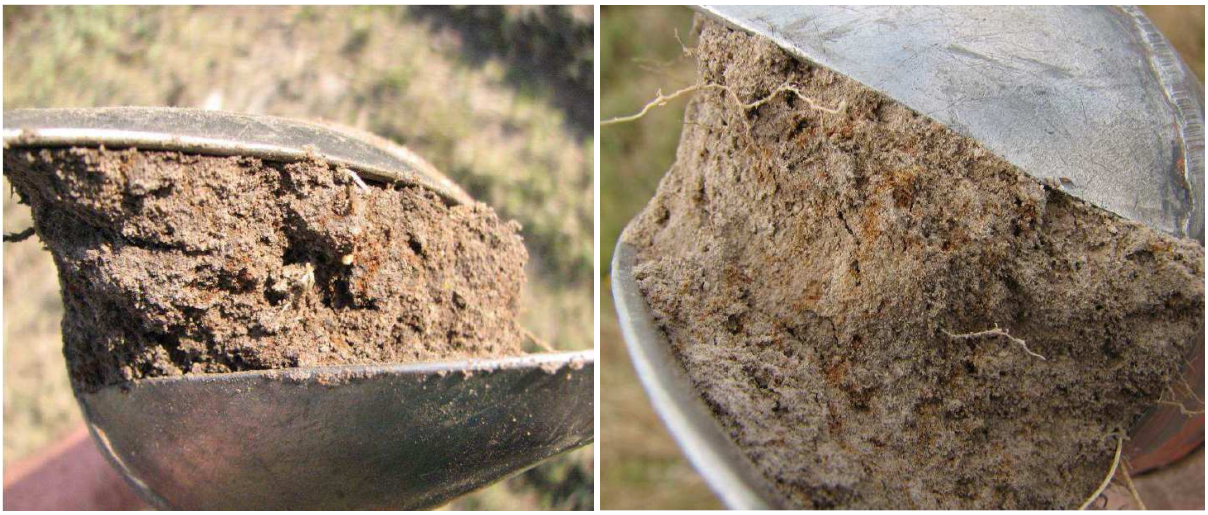


Figure 2: Red and orange mottles observed within soil matrix of delineated wetland area

B-1.4 Topography and Hydrology

The study area has a central plateau that is fairly flat and has an average elevation of 120 meters above main sea level (mamsl). Topographic maps indicate that the land use for the plateau area is agriculture. To the south, the plateau drops away as uniform slopes with a moderate gradient to the southern boundary near the railway line. On the southeast to northeast side the landscape is dissected by some valleys that are not very deep but do have slopes with distinctly north- and south-facing aspects. These valleys drain east into canals and pipes which are likely to daylight south of Bayview and north of the Oil depot site into an unnamed FEPA estuary. The elevation of the valleys is around 60 mamsl. with the difference in altitude between the deepest valley floor and the central plateau being approximately 60 m. The Hartenbos water reservoir is situated at the highest point on the property at 139.6 mamsl. The slopes north of the reservoir, with a northerly aspect, are moderately steep, dropping evenly to the north with valleys draining into the Hartenbos River. The western slopes drop away from the central plateau also with a moderate gradient and also have a series of valleys that drain to the west into a stream which eventually flows into the Hartenbos River.

A series of gravel roads and tracks that are aligned mainly on the central plateau and along the ridges and crests above the valleys link the different parts of the area and provide ready access to them. Some of the tracks have been constructed to provide access for the maintenance of the high voltage power line that traverses the property from south to north close to the eastern boundary. The roads and tracks are in good condition and there is no evidence of erosion resulting from them.

The study area is located in the Cape Fold freshwater ecoregion within Quaternary Catchments K10B of the Coastal Gouritz sub-management area of the Gouritz water management area 16 (Driver et al., 2011; FEOW, 2014;). According to Kleynhans (2007), the study area is located within the Southern Coastal belt Level 1 Ecoregion. Water draining west and north from the study area from non-perennial watercourses drains into the Hartenbos River and estuary. Water draining east and south from the study area drain into an unknown tributary through culverts which drains into a unamend (Driver et al., 2011).

B-1.5 Wetlands

The Mossel Bay Critical Biodiversity Areas (CBA) map aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. It serves as the common reference for all multi-sectoral planning procedures, advising which areas can be developed, and which areas of critical biodiversity value and their support zones should be protected against impacts. The broad objective is to ensure appropriate land use and planning for the best possible long-term benefits and to promote integrated management of natural resources. The main CBA Map categories are Critical Biodiversity Areas (Terrestrial and Aquatic), Ecological Support Areas (Critical and Other), Other Natural Remaining Areas and No Natural Remaining Areas (BGIS, 2014). Several aquatic critical biodiversity features are indicated within the study area including Critical Biodiversity Areas polygons 508, 509, 510, 511 and 513 of which 511 and 513 was identified as FEPA wetlands (Refer to Figure 3). Several Ecological Support Area Buffers are also indicated along drainage lines.

Two hydro-geomorphic units (HGM), namely a hillslope seepage wetland connected to a watercourse were delineated and classified within the study area. In addition to the wetland areas, numerous riparian areas were also delineated throughout the study area. Refer to Figure 4.

Both HGM units that were identified was found to be moderately modified with some loss of natural habitats (Present Ecological State Category C). Modifications to these systems included changes to their hydrology and geomorphology as a result of historic cultivation through large sections of the wetlands as well as in the majority of the wetlands catchment. Repeated cultivation has led to some soil compaction which would have had a considerable effect on the infiltration rate of water to the soils. Passive restoration has taken place over several decades but it is likely that a large amount of soil was lost as a result of cultivation practices. Head cut erosion processes was likely initiated during years of cultivation as a result of reduced basal cover and reduced surface roughness as well as inadequate contouring techniques.

Although cultivation has ceased for some time, the initiated gully erosion processes is threatening the wetlands present as it is advancing slowly upslope. Although the original primary vegetation has likely been lost, adequate basal cover by indigenous species has been achieved through several decades of passive restoration. Some invaders such as *Acacia saligna* was found in several areas but was not dominating yet. The anticipated trajectory of change is dependent on several land management factors such as burning regimes, active control of alien vegetation as well as erosion control. If no erosion control is implemented to halt gully erosion processes advancing towards the wetlands, the wetlands could potentially deteriorate dramatically within the next five years (due to the close proximity of gully erosion to the wetlands).

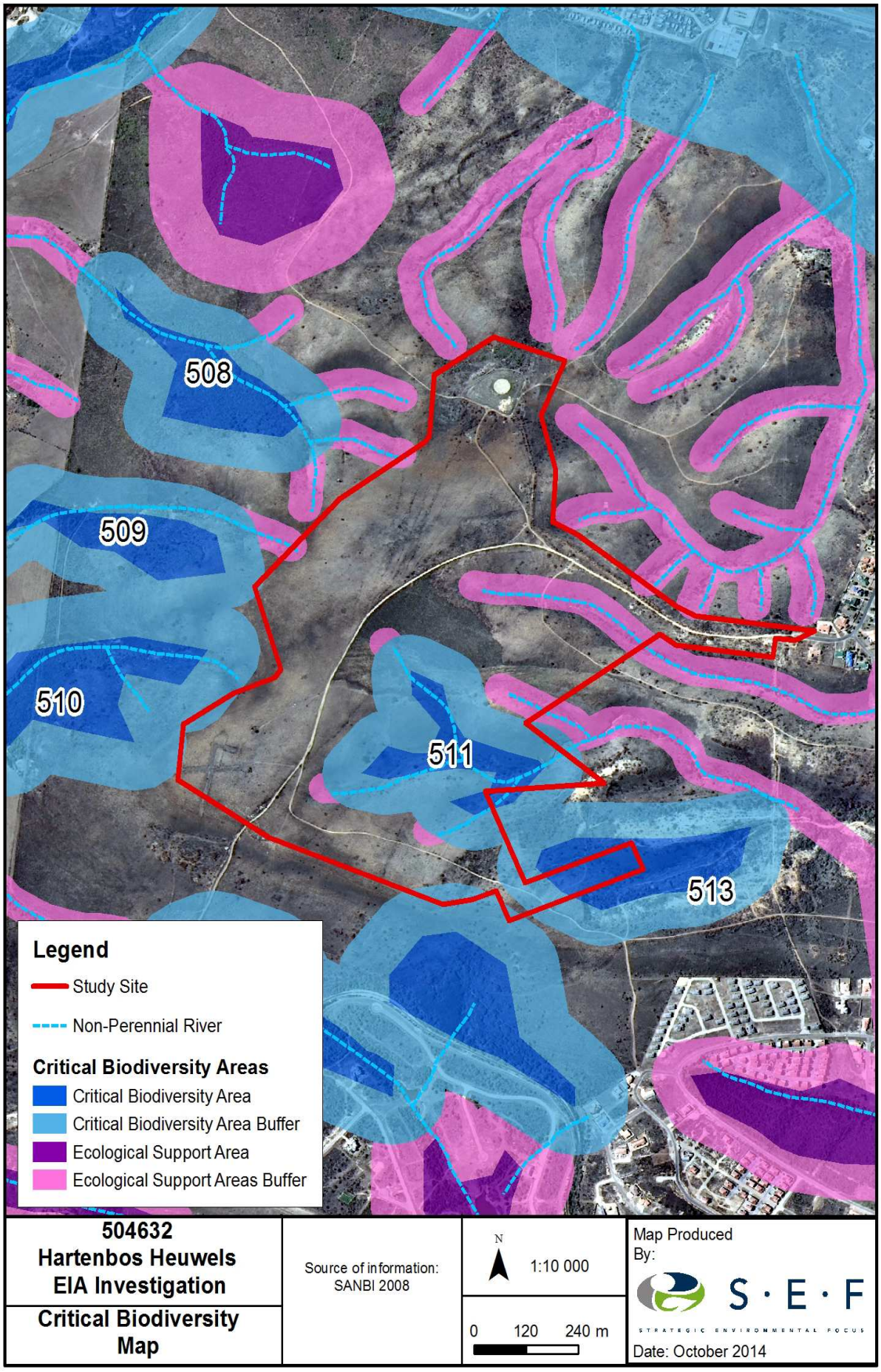

508
509
510
511
513
Legend
Study Site
Non-Perennial River
Critical Biodiversity Areas
Critical Biodiversity Area
Critical Biodiversity Area Buffer
Ecological Support Area
Ecological Support Areas Buffer
504632
Hartenbos Heuwels
EIA Investigation
Critical Biodiversity Map
Source of information:
SANBI 2008
N
1:10 000
0 120 240 m
Map Produced By:
S·E·F
STRATEGIC ENVIRONMENTAL FOCUS
Date: October 2014

Figure 3: Mossel Bay Municipality Critical Biodiversity Area map for the study area

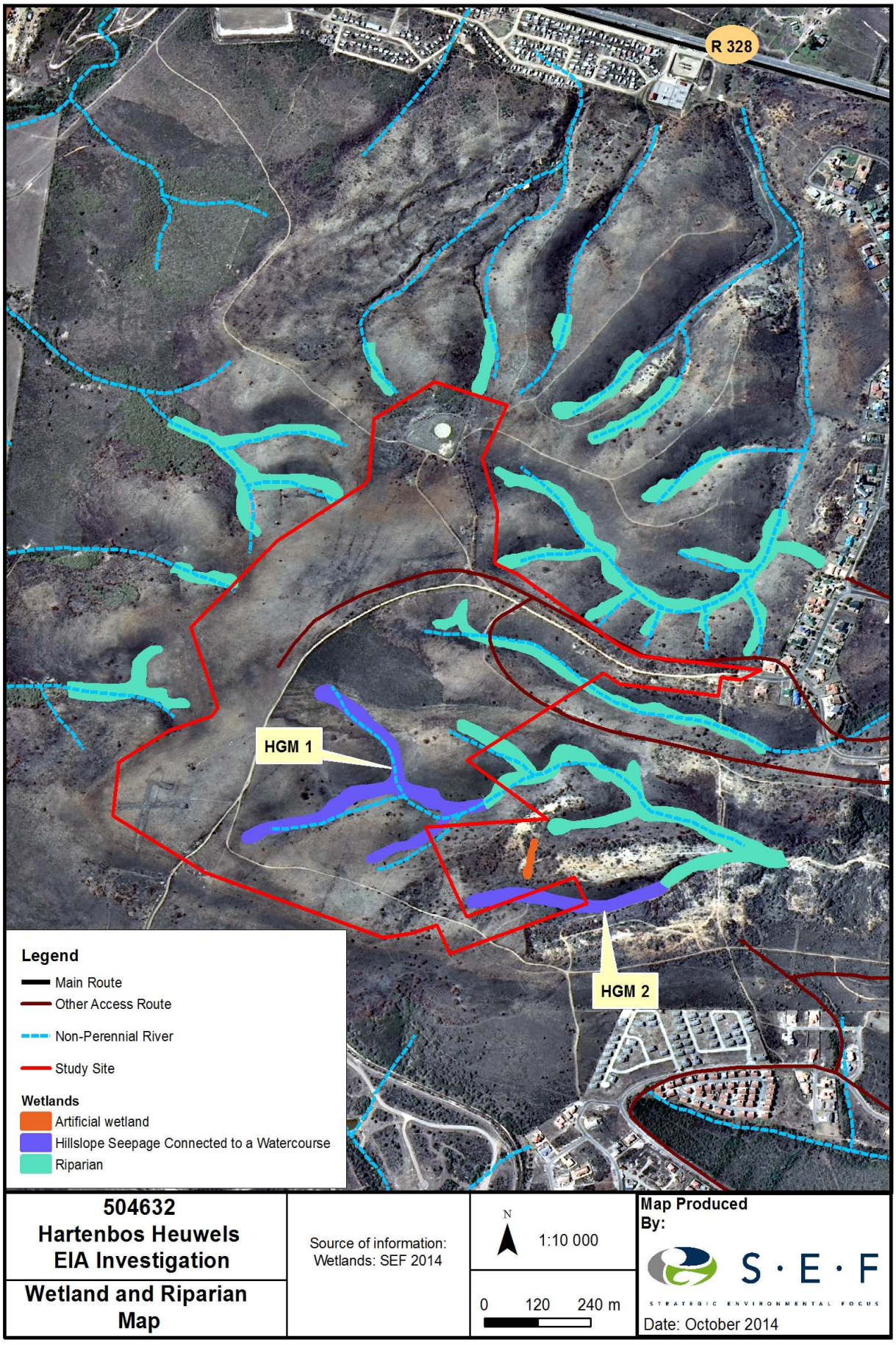


Figure 4: Wetland and Riparian delineation map

B-1.6 Ecology

B-1.6.1 Flora

Regional Vegetation

The study area is located in the Fynbos Biome which occupies most of the Cape Fold Belt as well as the adjacent lowlands between the mountains and the Atlantic Ocean. The Fynbos Biome is also a member of the global Mediterranean Biome which is located on the western shores of the continents of the world (Mucina & Rutherford, 2006). Furthermore, there are three major vegetation complexes within the Fynbos Biome namely Fynbos, Renosterveld and Strandveld. The study area is located within the Western Strandveld vegetation complex which consists of nine vegetation types, with one vegetation type, Groot Brak Dune Strandveld represented within the study area (Mucina & Rutherford, 2006). According to Mucina & Rutherford (2006), this vegetation type is currently listed as Endangered with no areas conserved and more than half of the area already transformed by cultivation, roads and infrastructure.

Local Vegetation

Renosterveld is the dominant vegetation type on Erf 3122. It is found on the central plateau and on the warm, dry westerly and northerly slopes. The soils are gravelly and have a clay-rich matrix. The cover of Renosterbos is from 80 – 90 % with other shrubs forming a much lower proportion of the cover. Renosterveld is well known for its diversity of geophytes.

The grassveld encountered at Hartenbos Heuwels is considered to be a 'sub- community' of the renosterveld. Species composition of the grassveld is very similar to that of the renosterveld proper except that there is a dominance of grasses, especially *Hyparrhenia hirta,* which occurs on well-drained north-facing and some west-facing slopes. Incidences of thicket patches occur within the renosterveld, thicket vegetation is dense, thorny and impenetrable.

In contrast to the renosterveld on the dry slopes the cooler south-facing slopes that are probably also moister support fynbos vegetation. The fynbos community has a cover of 80% with two layers and emergent shrubs up to 2m. Another striking aspect of the fynbos vegetation is the occurrence of a large number of plants of *Bobartia robusta* (Iridaceae) which have a relatively low cover but high abundance and are very obvious in the overall appearance of the fynbos in this area. The most important aspect of the fynbos vegetation is the occurrence of *Protea lanceolata* (Protea).

The floral study was conducted twice, once by Dr David J. McDonald from Bergwind Botanical Surveys and Tours (2011) and again more recently by Nick Helme from Nick Helme Botanical Surveys (2012). Refer to Appendix 7 for both studies.

B-1.6.2 Fauna

The faunal study was conducted by Karin van der Walt from SEF in 2013 (Refer to Appendix 7).

It was determined that the region displays a medium diversity of mammals with the study area falling within the distribution range of 76 mammal species according to the IUCN. Six faunal species were confirmed in the study area through sightings, sound or signs and included *Sylvicapra grimmia* (Common Duiker), *Hespestes pulverulentus* (Cape Grey Mongoose), *Ictonyx striatus* (Striped Pole Cat), *Genetta genetta* (Common Genet), *Lepus saxatilis* (Scrub Hare) and *Hystrix africaeaustralis* (Cape Porcupine). Furthermore, subterranean diggings likely to be *Cryptomys hottentotus* (African

Mole Rat) were also widely recorded throughout the higher laying areas while old evidence of *Orycteropus afer* (Aardvark) were also recorded.

Figure 5: Faunal habitat recorded within the study area

(**Faunal habitat recorded within the study area included drainage lines (top left), grassy slopes (top right), natural refugia such as termite mounds (bottom left) and artificial refugia such as building rubble (bottom right))**

A further 28 species were given a high probability of utilizing the study area based on the presence of suitable habitat. Fifty nine (59) species were confirmed during the site visit including (3) species of conservation concern (two of which are also listed on the Convention of Migratory Species). Thirty (30) reptile species have been confirmed to occur within the area. Only one species, *Bradypodion gutturale* (Karoo Dwarf Chameleon) was recorded during the field survey, but since temperatures experienced during the field survey was generally too low for reptile activity, this is not considered to be a true reflection of reptile diversity likely to be present within the study area. Furthermore, residents at Hartenbos indicated that tortoises are often observed within the study area, and according to SARCA, three tortoise species, *Chersina angulate* (Angulate Tortoise), *Homopus areolatus* (Parrot-beaked Tortoise) and *Stigmochelys pardalis* (Leopard Tortoise) have been recorded in the area.

According to FrogMAP, a continuation of the Southern African Frog Atlas Project (SAFAP, Minter et al, 2004)), ten (10) amphibian species have been confirmed to occur within QDGC 3422AA. None of these species are of conservation concern, while two species, *Vandijkophrynus angusticeps* (Sand Toad) and *Tomopterna delalandi* (Cape Sand Frog) are endemic to South Africa. One species, *Cacosternum boettgeri* (Common Caco) was recorded during the survey while *Vandijkophrynun angusticeps* (Sand Toad) was given a high probability of occurring in the study area based on the

presence of suitable habitat.

According to Henning et al. (2006), 236 *Lepidoptera* species (butterflies) have been recorded in the Western Cape of which 72 species are endemic and 20 species are of conservation concern (Mecenero et al, 2013). There are four species of conservation concern which have a medium or high probability of occurring in the study area.

Arachnids include spiders (Aranaea), pseudoscorpions, sunspiders, micro whipscorpions, tailless whipscorpions, harvestmen, mites & ticks, whipscorpions and ricinuleids. One Arachnid likely to be *Parabuthus capensis* from the family Scorpiones (Scorpions) was found under an old roof tile towards the centre of the study area. The conservation status of *Parabuthus capensis* has not yet been determined.

Bats are highly adaptable to their environment with 116 species recorded throughout South Africa. According to the IUCN, the study area falls within the distribution range of nine (9) bat species, although it is considered to be an under representation of the diversity likely to occur within the area, of these, five (5) species have a regional conservation status of Near Threatened. Three bat species which are of conservation concern were also given a medium to high probability of utilizing the study area for foraging.

The majority of the study area was classified as being of medium to high ecological sensitivity (Figure 6) due to the presence of natural habitat within the area. In a regional context, Groot Brak Dune Strandveld is classified as an Endangered vegetation type as well as an Endangered Ecosystem with large areas already transformed mostly due to infrastructure development. Furthermore, the study area provided a diversity of faunal habitats which included grassy slopes, drainage lines, short scrubveld and Renosterveld and although some areas have been infested by alien vegetation such as Acacia cyclops and Acacia mearnsii, high faunal activity was still present in these areas.

Three avifaunal species of conservation concern, namely *Circus maurus* (Black Harrier) and *Neotis ludwigii* (Ludwig's Bustard) currently listed as Vulnerable in South Africa and globally as Endangered as well as *Falco biarmicus* (Lanner Falcon) currently listed as Near Threatened, were recorded in the study area during the survey.

Although weather conditions experienced during the field survey were mostly unsuitable for reptiles and invertebrate activity, four *Lepidoptera* species which are of conservation concern were given a medium to high probability of occurring within the study area based on previous records from the QDGC as well as the presence of suitable habitat within the study area.

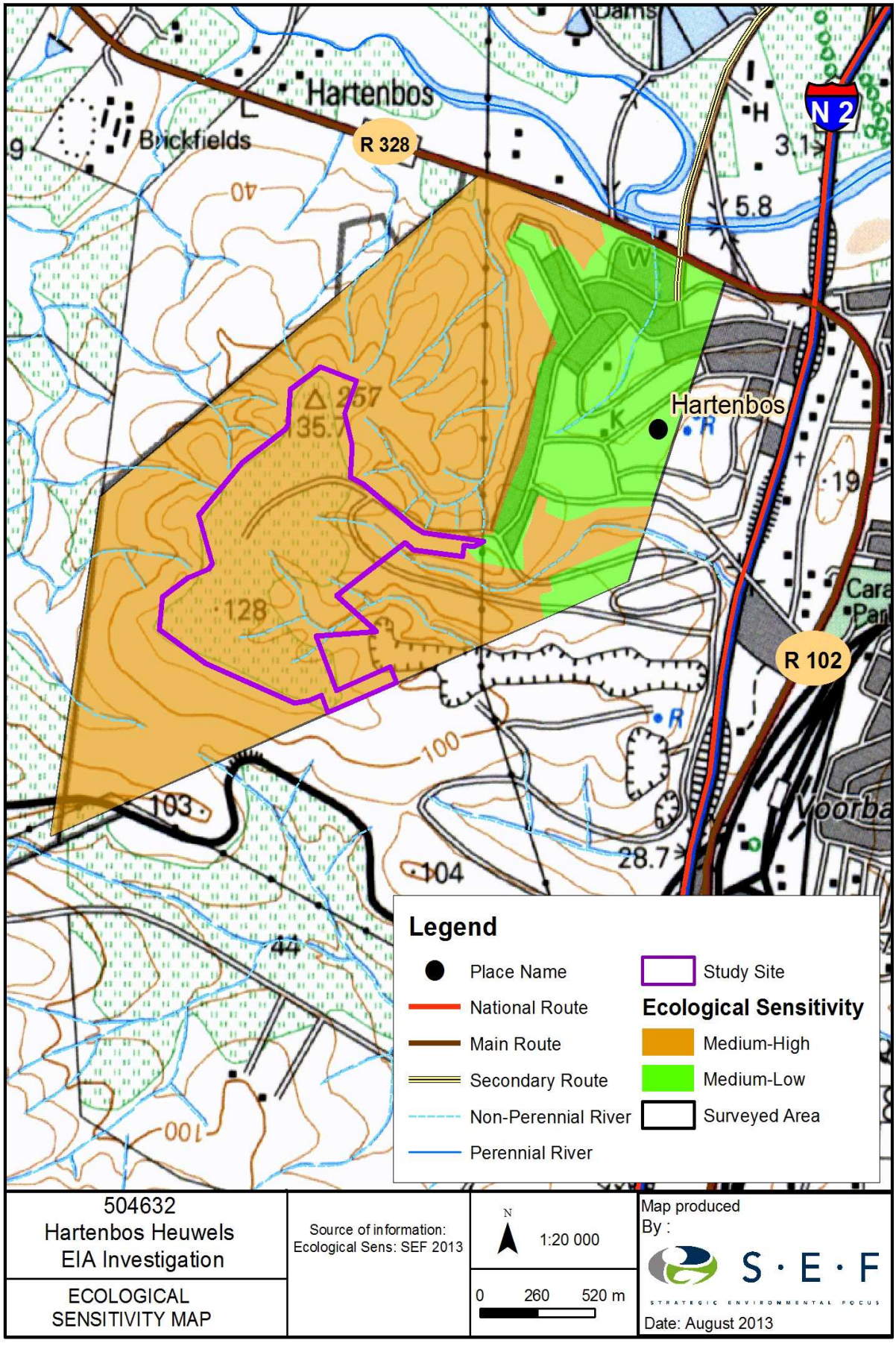


Figure 6: Ecological Sensitivity Map

B-1.6.3 Ecological considerations

According to the Botanical study conducted by Nick Helme in 2012 the site contains previously disturbed parts (about 40ha; 67% the site). These parts of the site correspond well to the flatter ground that was cultivated in some way. The loss of the disturbed area would therefore not have more than a Medium negative ecological impact on regional scale. The undisturbed areas on Erf 3122, however, should not be developed as they support patches of Mossel Bay Shale Renosterveld which is an Endangered vegetation type. According to Helme these areas should be buffered from any development by at least 15m to help avoid insidious edge effects such as invasion by alien grasses and allow for the development of a maintained firebreak around all development. Refer to Figure 7.

Figure 7: Disturbed and Undisturbed Areas

Ecological connectivity is important for the maintenance of ecological integrity in all habitats (de Villiers et al 2005). On Erf 3122 the High sensitivity areas are located to the east of the site and Medium sensitivity areas are located to the west. These areas should ideally be connected by at least two ecological corridors, of at least 100m width, across the plateau. The suggested position of these two corridors is shown in Figure 8.

Figure 8: Approximate location of proposed ecological corridors

The conservation status of the undisturbed areas on Erf 3122 as well as the position of the proposed ecological corridors was incorporated in the preferred Layout.

B-2 SOCIAL ENVIRONMENT

B-2.1 Demographics

Hartenbos falls under the Mossel Bay Local Municipality; the municipal area is 2007 km² in size. In the 2011 Census, the Mossel Bay Local Municipality had a total population of 89 430, 43.5 % of which were coloured people, 25,5% white people, with the other population groups making up the rest (31%) (Figure 9) Of the total population, 51.1% are female while 48.9% are male (Figure 10).

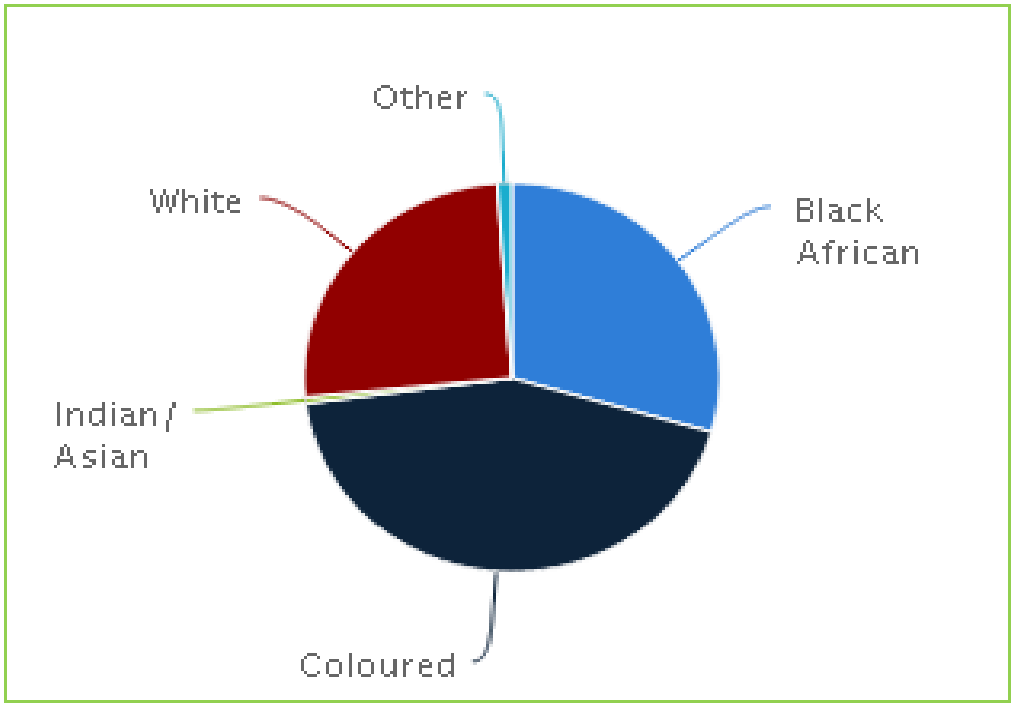


Figure 9: Population Groups

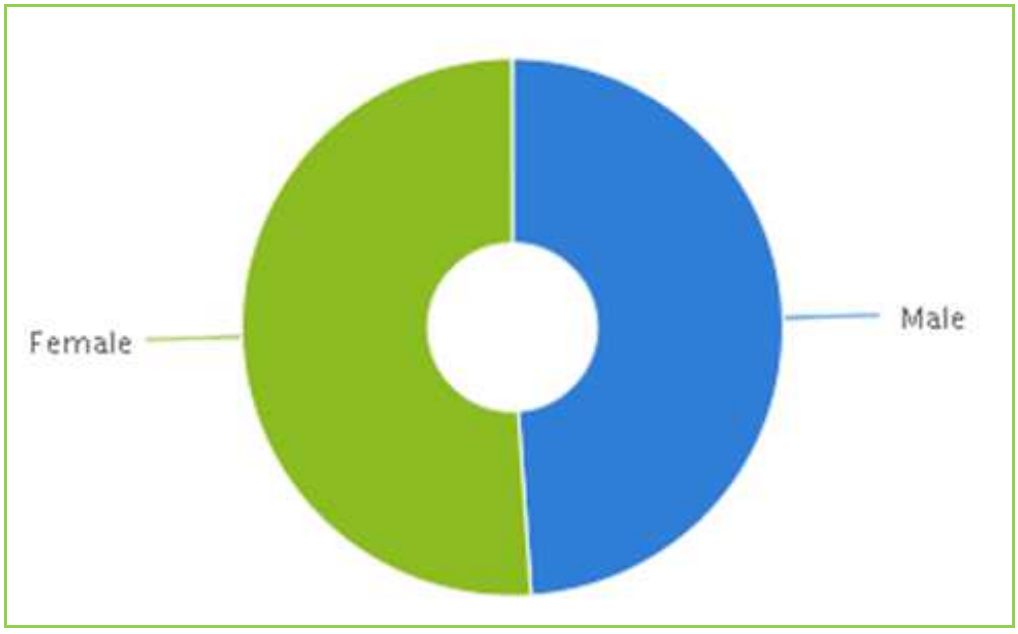


Figure 10: Sex Ratio

The language spoken the most is Afrikaans (66.4%) followed by IsXhosa (21.1%) and English (6.4%) (Figure 11).

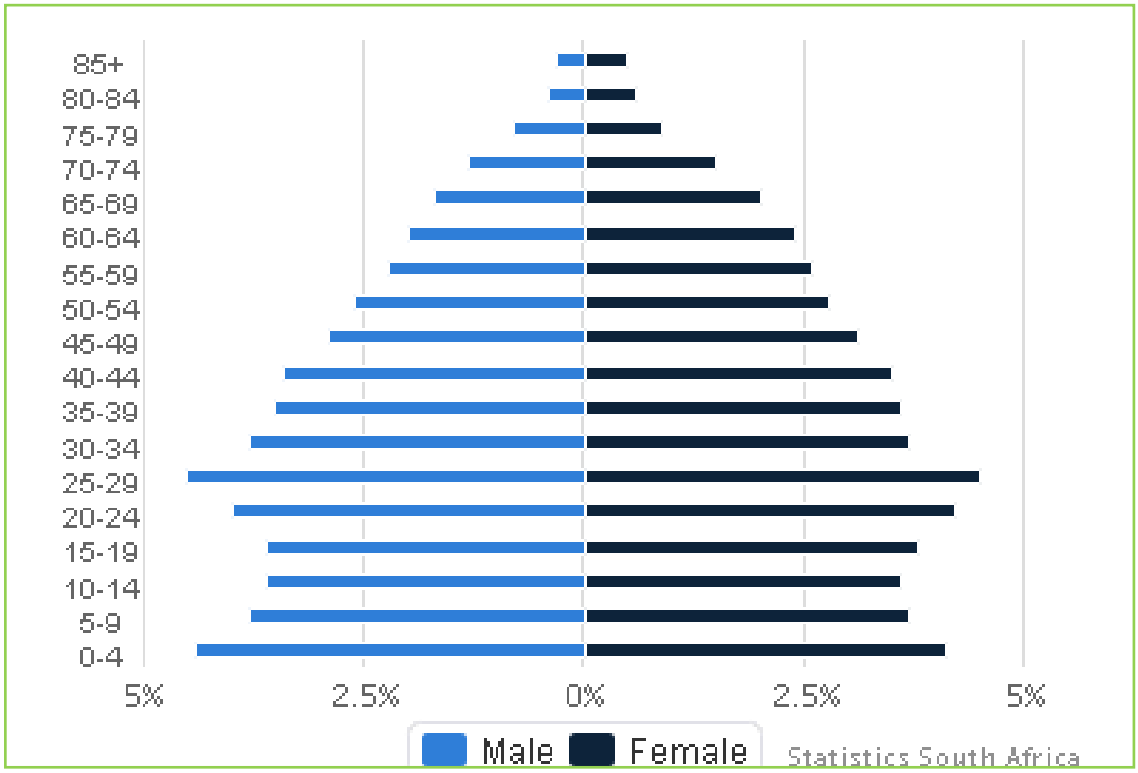


Figure 11: Languages Spoken

There are 34 901 economically active (employed or unemployed but looking for work) people in the Mossel Bay Local Municipality and of these 22.9% are unemployed. 29.9% of the 16 548 economically active youth (15-35 years) are unemployed (Figure 12).

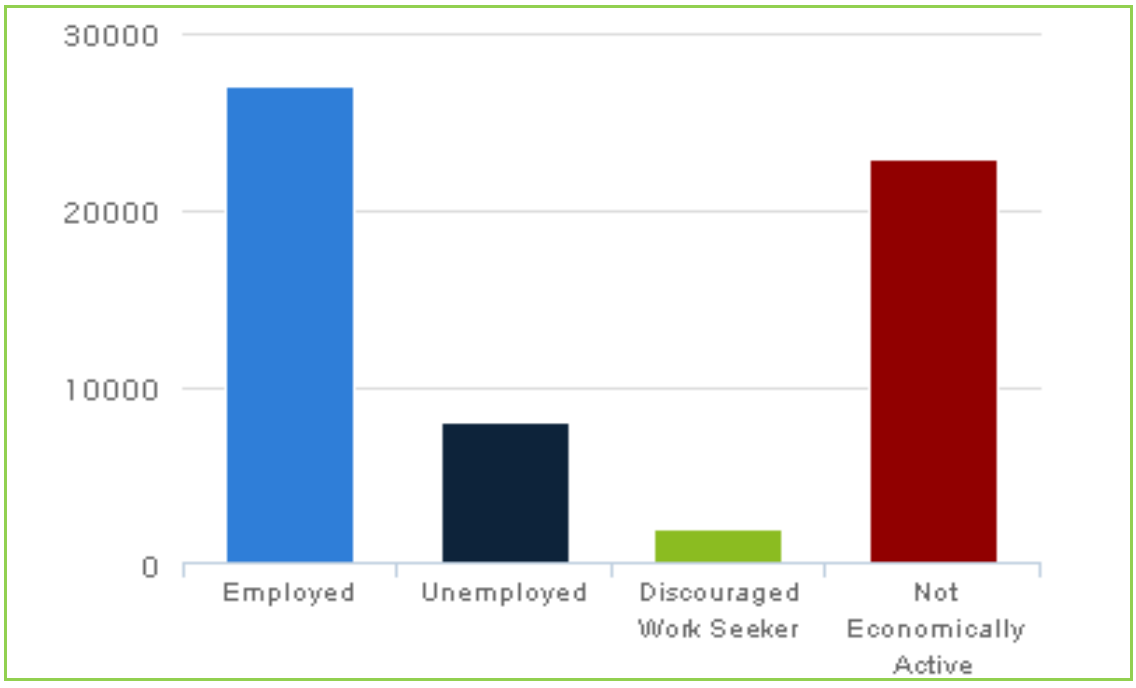


Figure 12: Employment for those aged 15-35

B-2.2 Heritage

Due to the size of the proposed development (exceeding 0.5 ha) a Phase 1 Heritage Impact Assessment (HIA) was required as per the National Heritage Resources Act, 1999 (Act No. 25 of 1999). This study was conducted by the Centre for Heritage and Archaeological Research Management (CHARM) in August 2010 (Appendix 7). In addition to the HIA a Paleontological Desktop Study was carried out by John Pether, a Geological and Paleontological Consultant. The findings of the above studies are discussed under the subsequent headings:

B-2.2.1 Cultural Heritage

Existing land uses within the proximity of the proposed site includes the Sonskynvallei residential area, R328 and some mining activities to the north; Monte Cristo low-density estate to the northeast; Hartenbos Heuwels, N2 and Hartenbos strand to the east; Menkenkop and Seemeeupark residential areas and Aalwyndal smallholding area to the south. West of the site, the predominant land use is agriculture/ cultivation.

With the exception of the foundations of a single modern structure next to a small former airstrip, on the easternmost portion of the property, no structures and/or ruins could be located. Also, no archival references to the origin and purpose of a neglected airfield could be found nor does it appear on the older aerial photography series (e.g. 1939, 1974, 1980 or 1991), available for the area. Given the dimensions of the two former runways (now overgrown by 1,5m high grass), measuring 120m and 102m respectively, the airfield was mostly likely used for small and microlight aircraft only. Nor the airfield or ruins of a small modern structure adjoining it are considered to be of cultural significance.

B-2.2.2 Archaeology

Earlier archaeological work in the surrounding environment of the affected property has relevance (e.g., Hart 2005, Nilssen 2005, 2006, 2009a & b and Thompson 2006). These studies showed that the area is rich in Stone Age archaeology, and in the immediate surroundings, materials are dominated by artefacts originating in the Early and Middle Stone Age periods.

An Archaeological Assessment was carried out in 2010 by Peter Nilssen from CHARM (Appendix 7). Altogether 136 archaeological occurrences were identified. These originated from the Stone Age and included isolated stone artefacts as well as low density scatters of stone artefacts. The materials were dominated by Middle Stone Age (MSA) specimens, followed by those of the Early Stone Age (ESA) and Later Stone Age (LSA) artefacts are rare. The contexts of these finds are mostly disturbed as a result of more recent land uses (agriculture and airfield). Refer to Figure 13 for images of the artefacts as documented.

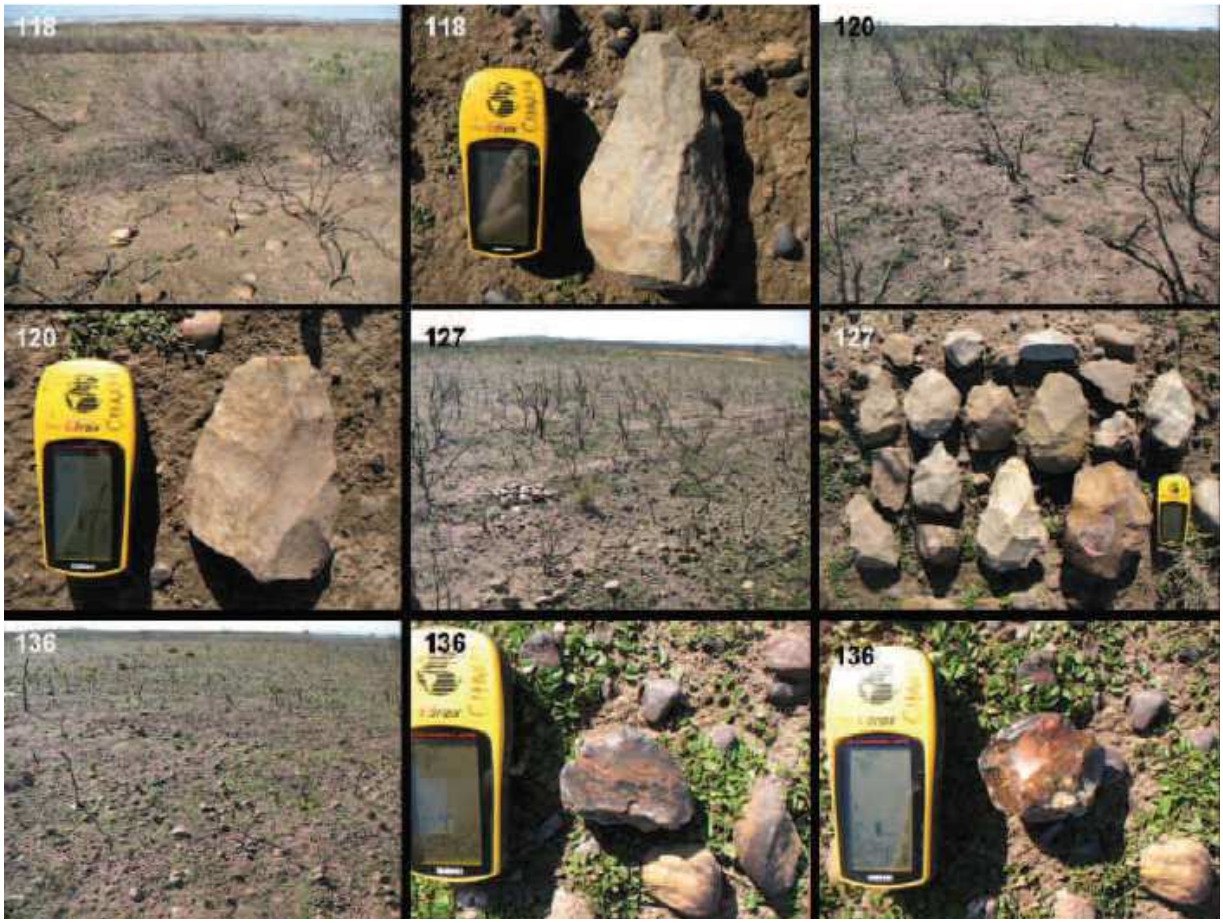


Figure 13: Archaeological artefacts found on Erf 3122

B-2.2.3 Paleontology

The Paleontological desktop study that was undertaken by John Pether (Appendix 7) basically outlines the nature of possible paleontological/fossil heritage resources in the subsurface of the affected area.

It is not possible to predict the buried fossil content of an area other than in general terms. In particular, the important fossil bone material is generally sparsely scattered in most deposits and much depends on spotting this material as it is uncovered during digging i.e. by monitoring excavations.

The hill upon which Erf 3122 is situated consists of Buffelskloof Formation alluvial fan conglomerates. In the east, the road corridor just extends onto the overlying sand and siltstones of the fluvio-deltaic lower Hartenbos Formation. These formations are the upper two in the late Jurassic to early Cretaceous Uitenhage Group.

The Buffelskloof Formation has low fossil potential, but it is comparable to the Enon Formation wherein identifiable teeth and bones are occasionally found. Fossil wood is the most common fossil material and includes lignified or petrified larger pieces such as logs. The likelihood of a major fossil occurrence in the Buffelskloof Formation is low. The Hartenbos Formation will only be encountered in a limited area in the east, but trenches for services may traverse that area and encounter fossil plant material. Fossil plant material is usually more abundant and easily collected. There seems little likelihood of fossiliferous marine deposits equivalent to the De Hoopvlei Formation being preserved on the dissected hill.

B-2.3 Visual

The site is situated on the top of a landform that is the remnant of the wave cut terrace between the beach and the Outeniqua Mountains. The proposed development has been placed on the gently sloping top of the terrace. The site is on the watershed of the drainage lines that flow west and eastward inland and seaward respectively. This provides the site with views of 360 degrees. The flatter landform of the top of the remnant terrace is suitable for the proposed development and good distant views will be possible from houses that are on the outer edge of the development. Conversely the houses on the edge will be visible from near and far. These houses will form the skyline in all views of the proposed development.

The agricultural / natural character of the site is defined by the coastal bush in a relatively remote setting. The particular sense of place of the site is created by sparse vegetation, high elevation in the landform and the extensive views in all directions from within the site but particularly from the edge. The Sense of Place is therefore one of partial remoteness of a windswept natural hill.

Earthworks for roads will be minimal and therefore there will be little or no visible scarring of the landform that will be seen from surrounding areas. The proposed development will be visible for a short distance from the south bound lane of the N2 situated north east of the proposed site.

The development will also be seen in its entirety from the higher ground in the area to the south-west along the Aalwyndal Road. The development, however, will not be seen from the sector east to south because the landform is lower than the site and there are existing houses that will block views. The views from the west, agricultural land use, will be of the housing that will be on the western edge of the site. The greatest visibility of the proposed residential development will be experienced from within the 1 km radial in the north-east sector and near the 1 km radial in the south-west sector.

It was determined by the Visual Specialist, Cave Klapwijk and Associates, September 2011 (Appendix 7) that the proposed development will due to its scale, extent and location have a moderate visual impact on the natural and social environments. Some risk sources have been identified;

- The construction of a new bulk supply transmission line on or near to the ridgelines that are near to or are located on the property. This is unlikely in the near future as there is a line that is south of the southern boundary.
- The inappropriate location of a local electrical substation and electricity lines on the property;
- The erection of any mast or water tank tower on the high points of the site;
- A significant change in the landform to accommodate the platforms for buildings and roads on the steep side slopes of the drainage ways near the eastern boundary; and
- Structures having a height of greater than 3 storeys.

B-2.4 Traffic

The Traffic Impact Assessment, conducted by KSB Consulting Engineers JV (Appendix 7), investigates the flow conditions of the existing traffic as well as additional traffic that will be generated by the proposed development. Trip generation rates were derived using the South African Trip Generation Rates as published by the Institute of Transport Engineers.

The development is located to the north and west of TR33/1 (Louis Fourie Road) which is a provincial Class 2 road under the jurisdiction of the Provincial Government of the Western Cape. The speed limit

along this section of TR33/1 is 80km/hr. It is assumed that the regional trip distributions for the proposed development will be 40% via Waboom Street and 60% via Boekenhout Street.

The predicted peak hour traffic to and from the proposed development is summarised in Table 5 below.

Table 5: Peak Hour Trip Generation

AM		ORIGIN						
		Single unit dwellings	Retirement estate	Frail care centre	Medical centre / clinic	Shopping centre	External	Sum
DESTINATION	Single unit dwellings	4	1	1	7	5	20	38
	Retirement estate	1	1	0	1	2	13	18
	Frail care centre	1	1	0	1	1	7	11
	Medical centre / clinic	13	3	1	0	2	33	52
	Shopping centre	15	8	1	2	0	9	35
	External	81	14	3	24	9	0	131
	Sum	115	28	6	35	19	82	285

PM		ORIGIN						
		Single unit dwellings	Retirement estate	Frail care centre	Medical centre / clinic	Shopping centre	External	Sum
DESTINATION	Single unit dwellings	4	3	1	13	32	54	107
	Retirement estate	1	0	1	3	10	8	23
	Frail care centre	1	1	0	1	1	6	10
	Medical centre / clinic	5	3	3	0	6	18	35
	Shopping centre	12	4	3	8	0	124	151
	External	23	12	6	27	102	0	170
	Sum	46	23	14	52	151	210	496

	Internal trips

With regards to the traffic generation and impact, it is estimated that the proposed development could generate up to 389 typical weekday peak hour trips. The analysis for the existing traffic scenario indicated that the additional traffic to be generated by the proposed development could easily be accommodated within the existing road network and that no intersection upgrades would be required at present.

The Traffic Impact Assessment concluded that from a traffic engineering point of view that the proposed township is served by a comprehensive hierarchy of roads, as well as a public transport system and that the proposed layout is suitable to develop a road network that can effectively, conveniently and safely serve the proposed township. From a traffic engineering perspective it is recommended that the proposed township layout should be authorised for implementation in terms of the relevant environmental legislation.

SECTION C: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

C-1 APPROACH TO THE EIA

An Environmental Impact Assessment (EIA) is an effective environmental planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998) [NEMA] and the NEMA EIA Regulations, 2010 of the DEA. The guiding principles of an EIA are listed below.

Definition of the term "environment"

The term "environment" is used in the broadest sense in an environmental impact assessment. It covers the physical, biological, social, economic, cultural, historical, institutional and political environments.

C-2 GUIDING PRINCIPLES FOR AN EIA

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be on-going consultation with Interested and Affected Parties (I&APs) representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should finally be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

The eight guiding principles that govern the entire process of EIA are as follows (see Figure 14 below):

- **Participation:** An appropriate and timely access to the process for all interested parties.
- **Transparency:** All assessment decisions and their basis should be open and accessible.
- **Certainty:** The process and timing of the assessment should be agreed in advanced and followed by all participants.
- **Accountability:** The decision-makers are responsible to all parties for their action and decisions under the assessment process.
- **Credibility:** Assessment is undertaken with professionalism and objectivity.
- **Cost-effectiveness:** The assessment process and its outcomes will ensure environmental protection at the least cost to the society.
- **Flexibility:** The assessment process should be able to adapt to deal efficiently with any proposal and decision making situation.
- **Practicality:** The information and outputs provided by the assessment process are readily usable in decision making and planning.

An S&EIR process is considered as a project management tool for collecting and analysing information on the environmental effects of a project. As such, it is used to:

- Identify potential environmental impacts;
- Examine the significance of environmental implications;
- Assess whether impacts can be mitigated;

- Recommend preventive and corrective mitigating measures;
- Inform decision makers and concerned parties about the environmental implications; and
- Advise whether development should go ahead.

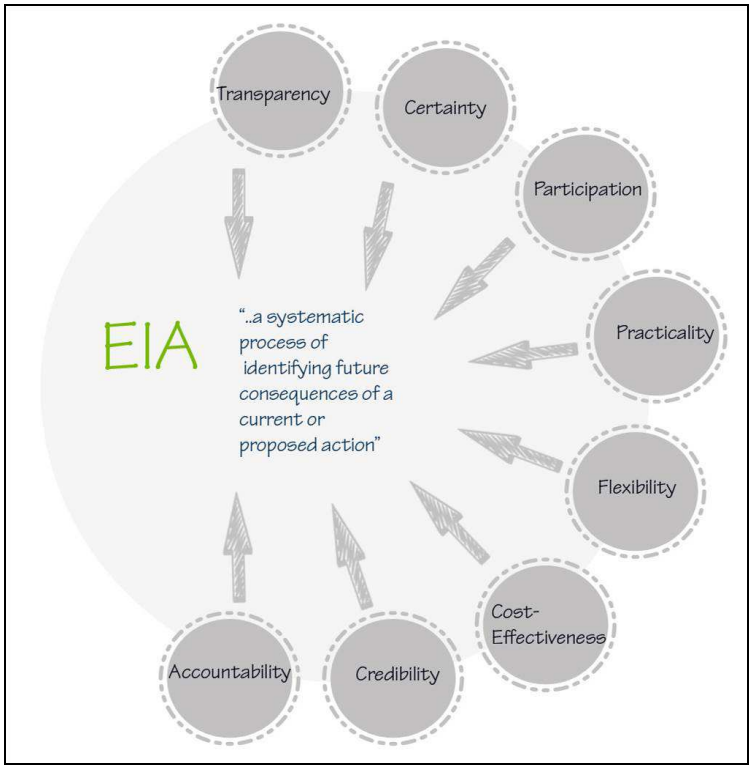


Figure 14: The eight guiding principles for the EIA process

An S&EIR process typically has four phases, as illustrated in Figure 15 below. The Public Participation process forms an integral part of all four phases and is discussed in greater detail in Section C – 4 of this Draft EIR.

C-3 S&EIR TECHNICAL PROCESS

This section provides a summary of the technical process to be followed for this S&EIR process.

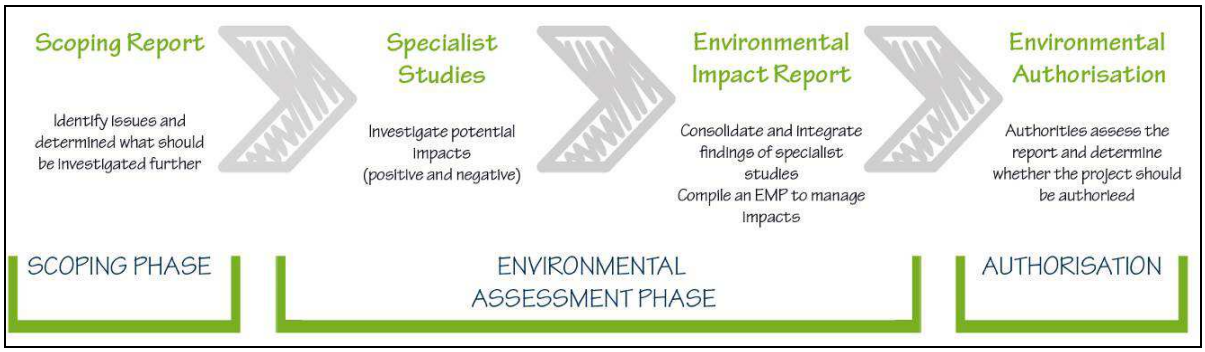


Figure 15: Flow diagram of the Scoping and EIR process

C-3.1 Pre-application Consultation with the DEA&DP

A pre-consultation meeting was held between SEF and WC-DEA&DP on the 3rd of December 2012 in George Office. The EAP (SEF) conducting the S&EIR process on behalf of the Applicant (ATKV) is deemed to have a good understanding of the information requirements of the Department for the proposed residential

development. It was agreed that the initial Environmental Application will be withdrawn and that a new project with a new layout alternative (this Application) will be submitted to WC-DEA&DP for consideration.

C-3.2 Application for Authorization

The application form informing the Department of intent to obtain an environmental authorisation was submitted to the WC-DEA&DP on 06 November 2013. The project was subsequently registered and assigned the reference number DEA Ref: 16/3/1/2/D6/18/0007/13.

C-3.3 Information Gathering

Early in the EIA process, the technical specialists identified the information that would be required for the impact assessment and the relevant data was obtained. In addition, the specialists sourced available information about the receiving environment from reliable sources, I&APs, previous documented studies in the area and previous EIA Reports.

C-3.4 Specialist Studies

The following specialist studies were identified to be undertaken / verified during the current EIR phase (Refer to Appendix 7):

- Botanical Survey and Sensitivity Assessment by Dr David J. McDonald from Bergwind Botanical Surveys and Tours (2011);
- Botanical Survey by Nick Helme Botanical Surveys (2012, updated 2016);
- Faunal (including Avifaunal) Assessment by Karin van der Walt from SEF (2013);
- Fire Management Plan by Christiaan Pool and Salmon van Zyl (2011, updated 2016);
- Phase 1: Heritage Impact Assessment by CHARM (2011);
- Archaeological Impact Assessment by CHARM (2011);
- Paleontological Desktop Study by CHARM (2010);
- Visual Impact Assessment Report by Cave and Klapwijk and Associates (2011);
- Traffic Impact Assessment by KSB Consulting Engineers JV (2011, updated 2016); and
- Wetland Delineation and Functional Assessment, by Willem Lubbe from SEF (2014)

C-4 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of the S&EIR process, including consultation with I&APs. These principles include the provision of sufficient and transparent information to I&APs on an on-going basis, to allow them to comment; and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The principal objective of public participation is thus to inform and enrich decision-making. This is also the key role in the scoping phase of the process.

C-4.1 Identification of Interested and Affected Parties

I&APs representing the following sectors of society have been identified in terms of Regulation 55 of the EIA Regulations R543 of 2010 (see Appendix 5 for a complete I&AP distribution list):

- Provincial Authorities;
- Local Authorities;
- Ward Councillors;

- Parastatal/ Service Providers;
- Non-governmental Organisations;
- Local forums/ unions; and
- Adjacent Landowners.

C-4.2 Public Announcement of the Project

The project was announced on **Tuesday, 21 January 2014** in the following manner (see Appendix 5 for evidence of public announcement):

- Publication of media advertisements in two local newspapers (the Mossel Bay Advertiser and the Home Ads);
- On-site notices advertising the S&EIR process were placed on and around the site, and
- Distribution of letters by fax/ by hand/ post/ email to I&APs including Registration and Comment Sheets.

C-4.3 Draft Scoping Report

I&APs and relevant State Departments had the opportunity to raise issues either in writing, by telephone or email on the Draft Scoping Report (DSR) for a period of 40 days **(Tuesday 21 January 2014 to Monday 30 March 2014).** The availability of the DSR was announced by means of personal letters to all the registered I&APs on the distribution list, and by adverts placed in the above mentioned newspapers.

In addition, the DSR was distributed for comment as follows:

- Left in public venues (Hartenbos Public Library);
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at http://www.sefsa.co.za.

C-4.4 Final Scoping Report

A period of **30 calendar days (Friday, 30 May 2014 to Monday, 30 June 2014)** has been provided for the review and commenting phase of the Final Scoping Report (FSR). The FSR was updated with comments and/or concerns raised by I&APs during the DSR review period. The FSR was submitted to the WC - DEA&DP and registered I&APs simultaneously for review and comment. Registered I&APs have been advised to submit any additional comments on this FSR directly to the WC-DEA&DP prior to the lapsing of the 30 day review period **(on or before Monday, 30 June 2014)**. WC – DEA&DP approved the FSR on 14 August 2014.

All the comments and concerns raised by I&APs during the Scoping Phase were captured and addressed in the Comment and Response Report (C&RR). Refer to Appendix 5.

C-4.5 Draft Environmental Impact Report

The findings of the Impact Assessment Phase are presented in this Draft Environmental Impact Report (EIR) and Environmental Management Programme (EMPr) and is currently available for public review and comment.

A period of **40 calendar days (Friday, 6th March 2015 to Monday, 20th April 2015)** was provided to the general public and State Departments for the review and commenting phase of this Draft EIR and EMPr. The availability of the Draft EIR was announced by means of personal letters to all the registered I&APs on the

distribution list.

In addition, the Draft EIR was distributed for comment as follows:

- Left in a public venue (Hartenbos Public Library);
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at http://www.sefsa.co.za

C-4.6 Final Environmental Impact Report

The C&RR was updated with comments and/or concerns raised by I&AP's during the review period of the Draft EIR. The Final EIR will be submitted to the WC-DEA&DP and registered I&APs simultaneously for review. Registered I&APs will be advised to submit any additional comments on the Final EIR directly to the WC-DEA&DP for their consideration.

SECTION D: ALTERNATIVES

D-1 IDENTIFICATION OF ALTERNATIVES

The EIA procedures and regulations stipulate that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. During the EIR phase of the project, the identified alternatives will be assessed, in terms of environmental acceptability as well as socio-economic feasibility. To define the term alternatives as per Government Notice No. 543 of the NEMA EIA Regulations 2010 means:

"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

(a) The property on which or location where it is proposed to undertake the activity;
(b) The type of activity to be undertaken;
(c) The design or layout of the activity;
(d) The technology to be used in the activity;
(e) The operational aspects of the activity; and
(f) The option of not implementing the activity."

The alternatives below will be further investigated during the EIR phase of the project:

Alternative 1: Site/ Location Alternatives:
The ATKV are the owners of Erf 3122 of land therefore site alternatives are not deemed viable and no further site/location alternatives will be investigated.

Alternative 2: Layout/ Design Alternatives:
The layout/ design of the residential development has changed from the original layout/design (decreased in size and increased in density) in order to compensate for the two National Freshwater Ecosystem Priority Areas (NFEPA) wetlands located to the south east as well as a patch of undisturbed vegetation classified as Mossel Bay Shale Renosterveld which is an Endangered vegetation type. Initially the development boundary was to include both wetland areas and create an ecological belt, however it has now been decided that the boundary will be decreased to exclude most of the wetland area. A small remaining portion of wetland area included in the development boundary will become part of the ecology belt. The proposed new alternative will therefore be applied for. Provision has also been made in the design for two ecological corridors in order to ensure ecological connectivity between the High and Medium sensitivity areas present on the proposed site.

Alternative 3: Technology Alternatives:
Not considered

Alternative 4: No Development Alternative:
This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the WC - DEA&DP decline the application, the 'No-Go' option will be followed and the status quo of the site will remain.

SECTION E ASSESSMENT CRITERIA

E-1 IMPACT IDENTIFICATION AND ASSESSMENT

The environmental impacts as identified during the Scoping phase were quantified and the significance of the impacts assessed according to the criteria set out below. The EAP made a statement based on the environmental impacts of the construction and operational phases of the proposed development. The EAP also qualified the suite of potential environmental impacts identified in the study and assessed the significance of the impacts according to the criteria set out below. Each impact was assessed and rated. The assessment of the data was mostly made based on accepted scientific techniques. Where this was not possible, the EAP and relevant Specialists made judgements based on their professional expertise and experience.

E-1.1 Assessment Procedure: Proposed Impact Assessment Methodology

For the purpose of assessing impacts during the EIR phase, the project was divided into two phases from which impacting activities could be identified, namely:

Construction Phase: All the construction related activities on site, until the contractor leaves the site.

Operational Phase: All activities, including the operation and maintenance of the proposed development.

The activities arising from each of these phases were included in the impact assessment tables. This was done in order to identify activities that require certain environmental management actions in order to mitigate the impacts arising from them.

Assessment of the impacts was conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Table 6: Impact Assessment Table

Extent The physical and spatial scale of the impact.	Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
	Site	The impact could affect the whole, or a significant portion of the site.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
	National	The impact could have an effect that expands throughout the country (South Africa).
	International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.

Duration The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.	Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
	Short-Medium Term	The impact will be relevant through to the end of a construction phase.
	Medium Term	The impact will last up to the end of the development phases, where after it will be entirely negated.
	Long Term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
Intensity Is the impact destructive or benign, does it destroy the impacted environment, alters its functioning, or slightly alter the environment itself?	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability The likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).
	Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.
	Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.
	Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.
	Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

Mitigation **–** The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

Determination of Significance – Without Mitigation **–** Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as "positive". Significance will be rated on the following scale:

No significance: The impact is not substantial and does not require any mitigation action;

Low: The impact is of little importance, but may require limited mitigation;

Medium: The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels; and

High: The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

Determination of Significance – With Mitigation – Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation will be rated on the following scale:

No significance: The impact will be mitigated to the point where it is regarded as insubstantial; Low: The impact will be mitigated to the point where it is of limited importance;
Low to medium: The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;
Medium: Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw;
Medium to high: The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels; and
High: The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Assessment Weighting – Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it will be necessary to weigh and rank all the identified criteria.

Ranking, Weighting and Scaling – For each impact under scrutiny, a scaled weighting factor will be attached to each respective impact. The purpose of assigning such weightings serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance (See Figure 16 below: Weighting description).

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 16: Description of bio-physical assessment parameters with its respective weighting

Identifying the Potential Impacts Without Mitigation Measures (WOM) – Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1: Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

Identifying the Potential Impacts With Mitigation Measures (WM) – In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

Mitigation Efficiency (ME) – The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2: Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency
Or
WM = WOM x ME

Significance Following Mitigation (SFM) – The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact will, therefore, be seen in its entirety with all considerations taken into account.

E-1.2 Integration of Specialist's Input

In order to maintain consistency in the impact assessment, it was suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example shown below. The assessment parameters used in the table were applied to all of the impacts and a brief descriptive review of the impacts and their significance were provided in the text of the specialist reports and consequently in the EIR. The implications of applying mitigation are reviewed in Section E.1.3 below.

Table 7: Example of an Impact Table

Nature			
Impact source(s)			
Magnitude	*Extent*		
	Intensity		
	Duration		
	Reversibility		
	Probability		
Significance	*Without mitigation*		**H**
	With mitigation		**L**
Confidence			

E-1.3 Mitigation Measures

Mitigation measures were recommended in order to enhance benefits and minimise negative impacts and they will address the following:

- Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an "educated guess" based on his/ her professional experience;

- Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;
- Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and
- Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

E-1.4 Approach to the Assessment of Cumulative Impacts

Cumulative impacts can arise from one or more activities. A cumulative impact may result in an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified.

Possible cumulative impacts of the project, in conjunction with other projects / interventions, are evaluated in this EIR.

E-1.5 Steps in Assessing Cumulative Impacts

The assessment of cumulative impacts were done separately from the assessment of other impacts. Cumulative impacts however, tend to have different time and space dimensions and therefore require specific steps. This may even mean that some of the actions in the assessment process, that preceded general impact identification, may have to be revisited after potential cumulative impacts have been identified. This will ensure that the scope of the EIR process is adequate to deal with the identified cumulative impacts.

Three (3) general steps, which are discussed below, were recommended to ensure the proper assessment of cumulative impacts.

E-1.5.1 Determining the Extent of Cumulative Impacts

To initiate the process of assessing cumulative impacts, it is necessary to determine what the extent of potential cumulative impacts will be. This will be done by adopting the following approach:

- Identify potentially significant cumulative impacts associated with the proposed activity;
- Establish the geographic scope of the assessment;
- Identify other activities affecting the environmental resources of the area; and
- Define the goals of the assessment.

E-1.5.2 Describing the Affected Environment

The following approach is suggested for the compilation of a description of the environment:

- Characterise the identified external environmental resources in terms of their response to change and capacity to withstand stress;
- Characterise the stresses affecting these environmental resources and their relation to regulatory thresholds; and
- Define a baseline condition that provides a measuring point for the environmental resources that will be impacted on.

E-1.5.3 Assessment of Cumulative Impacts

The general methodology which is used for the assessment of cumulative impacts should be coherent and should comprise of the following:

- An identification of the important cause-and-impact relationships between proposed activity and the environmental resources;
- A determination of the magnitude and significance of cumulative impacts; and
- The modification, or addition, of alternatives to avoid, minimize or mitigate significant cumulative impacts.

SECTION F ASSESSMENT OF IMPACTS

F-1 IDENTIFICATION OF IMPORTANT ENVIRONMENTAL IMPACTS

The key environmental impacts listed in the following section have been determined through:

- Legislation; and
- Experience of the Environmental Assessment Practitioner (EAP).

The following issues were initially identified during the Scoping phase and are now being assessed during the EIR phase.

F-1.1 Biophysical Impacts

- Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with vegetation clearance, topsoil stripping and the establishment of hard surfaces;
- Potential impacts on soil, surface and ground water quality
- Potential destruction of riparian wetland habitat;
- Destruction of flora within the proposed area, stemming from activities such as vegetation clearance, topsoil stripping and ongoing maintenance; and
- Faunal displacement and/or destruction (including avi-faunal species).

F-1.2 Socio-Economic Impacts

- Increased dust and noise generation during earthworks in the construction phase;
- Potential impacts on cultural, archaeological and/or paleontological heritage resources;
- Change in the visual character of the area;
- Increased income for the Local Municipality (i.e. rates and taxes) (+)
- Job creation during the construction and operational phases of the proposed project (+)

F-2 IDENTIFICATION OF CUMULATIVE IMPACTS

Cumulative impacts, as illustrated below, occur as a result from the combined effect of incremental changes caused by other activities together with the particular project. In other words, several developments with insignificant impacts individually may, when viewed together, have a significant cumulative adverse impact on the environment (see Figure 17 below).

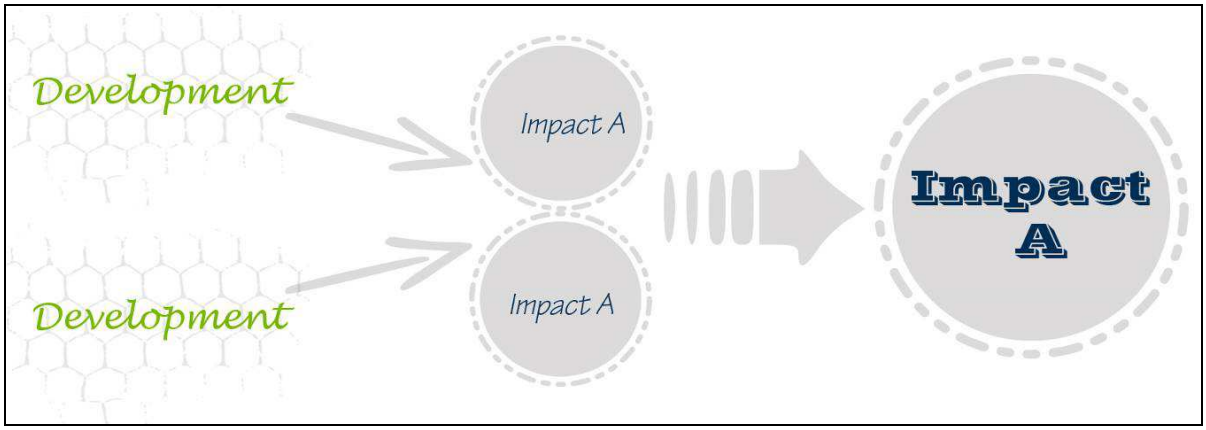


Figure 17: The identification of Cumulative Impacts

The following cumulative impacts were identified during the Scoping phase and were assessed in more detail during the assessment phase:

- Transformation (development) of open space areas within the region; and
- Influx of new residents into the area resulting in an increase in traffic.

F-3 CONSTRUCTION PHASE IMPACTS

F-3.1 Biophysical Impacts

F-3.1.1 Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with vegetation clearance and topsoil stripping

Source and nature of the impact:

Water draining west and north from the study, via from non-perennial watercourses, drains into the Hartenbos River and Estuary. Water draining east and south from the study area drain into an unknown tributary through culverts. Construction activities such as vegetation clearance and topsoil stripping could cause erosion which will lead to high volumes of sediment entering the above watercourses. This could again lead to increased silt loads entering the Hartenbos River and Estuary and unknown watercourse to the south-east.

Table 8: Potential impacts on surface water resources

Impact source(s)	• Accelerated erosion caused by vegetation clearance and topsoil stripping; and • A reduction in streamflow through increased silt loads caused by accelerated erosion.		
Nature of impact	Potential impacts on surface water resources that occur in close proximity of the proposed development during the construction phase.		
Magnitude	*Extent*	Regional -3	
	Intensity	High– 5	
	Duration	Short – Medium Term - 2	
	Probability	Likely – 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+2+3) x 5 = 65 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 65 x 0.4 =26 Low - Medium	**L - M**

Mitigation Measures:

- The key stormwater infrastructure facilities must be built and completed before other construction activities are allowed to commence, including attenuation, retention and diffuse release infrastructure;
- Vegetation and soil must be retained in position for as long as possible, and removed immediately ahead of construction and/or earthworks in that area;
- Backfill must be compacted to form a stabilised and durable blanket;
- All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. It should also only be stored for the minimum amount of time necessary;
- Silt traps and culverts should be regularly maintained and cleared so as to ensure effective drainage;
- Re-vegetation of disturbed areas must be undertaken with site indigenous species and in accordance with the instructions issued by the ECO. Areas where soil compaction or ruts developed should be rehabilitated;
- Site access and internal construction roads must not be deviated from during construction; and
- Runoff from roads must be managed to avoid erosion and pollution problems. Where excessive

loose sediment is created, attenuation swales and / or soils screens should be installed.

Significance of construction impacts on surface water through erosion:

The significance of the potential impact that the proposed development will have on increased surface water runoff and soil erosion is regarded as medium to high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low - medium.***

F-3.1.2 Potential impacts on soil, surface and ground water quality

Source and nature of the impact:

Hydrocarbons-based fuels or lubricants spilled from construction vehicles, construction materials that are not properly stockpiled, and litter deposited by construction workers may pollute the soil surface water and ground water resources. Should appropriate toilet facilities not be provided for construction workers at the construction crew camps, the potential exists for surface water resources and surroundings to be contaminated by raw sewage. While it is acknowledged that the impacts associated with the proposed activities will be negligible, every effort should still be taken so as to limit contributions; especially taking into consideration of downstream FEPA's including estuaries.

Table 9: Potential impacts on the quality of soil, surface and ground water resources

Impact source(s)	Hydrocarbon (oil, petrol and diesel) spills and/or leakages from construction vehicles and/equipment.		
Nature of impact	Decrease in soil, surface and ground water quality due to Hydrocarbon and other chemical spillages.		
Magnitude	*Extent*	Regional - 3	
	Intensity	High – 5	
	Duration	Short – Medium Term - 2	
	Probability	Likely – 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+2+3) x 5 = 65 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 65 x 0.4 =26 Low - Medium	**L - M**

Mitigation Measures:

- Make use of existing roads and tracks where feasible, rather than creating new routes through vegetated areas;
- Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants;
- A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas;
- Storage of potentially hazardous materials should be above any 100-year flood line, or as agreed with the ECO. These materials include fuel, oil, cement, bitumen etc.;
- Sufficient care must be taken when handling these materials to prevent pollution;
- Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils;
- Oil residue shall be treated with oil absorbent such as Drizit or similar and this material removed to an approved waste site;
- Concrete and tar shall only be mixed on mixing trays and in areas which have been specially demarcated for this purpose;
- All concrete and tar that is spilled outside these areas shall be promptly removed by the Contractor and taken to an approved dumpsite;

- After all the concrete / tar mixing is complete all waste concrete / tar shall be removed from the batching area and disposed of at an approved dumpsite;
- Storm water shall not be allowed to flow through the batching area. Cement sediment shall be removed from time to time and disposed of in a manner as instructed by the Consulting Engineer;
- All construction materials liable to spillage are to be stored in appropriate structures with impermeable flooring;
- Portable septic toilets are to be provided and maintained for construction crews;
- Maintenance must include their removal without sewage spillage;
- Portable septic toilets are to be located outside of the 1:100 year floodline;
- Under no circumstances may ablutions occur outside of the provided facilities;
- No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority;
- In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) must be informed immediately;
- Where construction in close proximity to sewer lines is unavoidable then excavations must be done by hand while at all times ensuring that the soil beneath the sewer lines is not destabilised;
- Store all litter carefully so it cannot be washed or blown into any of the water courses within the study area;
- Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed;
- The construction site should be cleaned daily and litter removed;
- Conduct ongoing staff awareness programs so as to reinforce the need to avoid littering;
- The current load above the sewer lines must at no time be exceeded; and
- Emergency plans must be in place in case of pollutant spillages.

Significance of construction impacts on soil and water quality:

The significance of the potential impact that the proposed development will have on soil, surface and ground water quality is regarded as medium to high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low - medium.***

F-3.1.3 Potential destruction of riparian wetland habitat

Source and nature of the impact:

The proposed footprint of buildings, new roads and stormwater infrastructure could infringe or destroy wetland or riparian habitat and associated biota through removal of hydrophytic vegetation and or hydric soils if the development layout is not adjusted or uncontrolled construction processes are allowed.

Table 10: Potential construction impacts on wetland habitat

Impact source(s)	Earthworks and construction activities of buildings roads, bridges and stormwater infrastructure within wetland or riparian habitat.		
Nature of impact	Potential impacts on wetlands by physical destruction of wetland or riparian habitat to make way for the development.		
Magnitude	*Extent*	Regional - 3	
	Intensity	High – 5	
	Duration	Permanent- 5	
	Probability	Likely – 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+5+3) x 5 = 80 High	**H**
	With mitigation	*WOM x ME = WM* 80 x 0.4 =32 Low - Medium	**L - M**

Mitigation Measures:

- No construction activities are allowed within wetland habitat, riparian habitat or a 30m buffer zone from the edge of a wetland and riparian habitat. The preliminary proposed lay-out should therefore be revised to include the no-go areas within the design (Refer to Figure 18);
- In order to avoid negative impacts on the 30m buffer (which should remain natural), an initial 40m to 50m buffer should be demarcated (depending on available space);
- The design of stormwater drainage systems must ensure there is no contamination, eutrophication or increased erosion of wetland or riparian habitat;
- Drainage systems should be maintained regularly;
- The construction of surface stormwater drainage systems during the construction phase must be done in a manner that would protect the quality and quantity of the downstream system. For example, the use of swales which could then be grassed for the operational phase;
- Stormwater outflows should not enter directly into a wetland, drainage line or 30m buffer zone. The velocity of water that may reach the buffer zone should be slowed before it is intercepted by virgin soils using a siltation and erosion control structure such as attenuation swales and be released in a diffused manner;
- The Contractor should inform all staff of the need to be vigilant against any practice that will have a harmful effect on wetlands and riparian habitat. This information shall form part of the Environmental Education Programme to be effected by the Contractor;
- All no-go areas (wetlands and buffer areas) must be demarcated with red tape / fencing under guidance of the ECO;
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering;
- Infilling, excavation, drainage, dumping of building material and hardened surfaces (including buildings and asphalt) should not occur in any of the wetland, riparian or within the 30m buffer zone as a minimum, but should preferably be done as far away as practically possible from these areas;
- Imported fill material should be monitored during and after construction for the presence of any alien species. Any such species should be removed immediately;
- Erosion control of all banks must take place so as to reduce erosion and sedimentation into riparian channels or wetland areas.
- A wetland monitoring program should be initiated at the start of the construction phase. The monitoring program should be designed in situ with construction and rehabilitation plans by a wetland specialist. A wetland monitoring program must also ensure that all wetland protection infrastructure and storm-water systems are properly installed and that all affected wetland areas are adequately rehabilitated;
- The Environmental Control Officer should be briefed by a wetland specialist on specific monitoring issues. Appropriate mitigation needs to be implemented after consultation with relevant specialist if any problems are detected.

Significance of construction impacts on Wetlands:

The significance of the potential impact that the proposed development will have on possible destruction of wetlands is regarded as high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low - medium.***

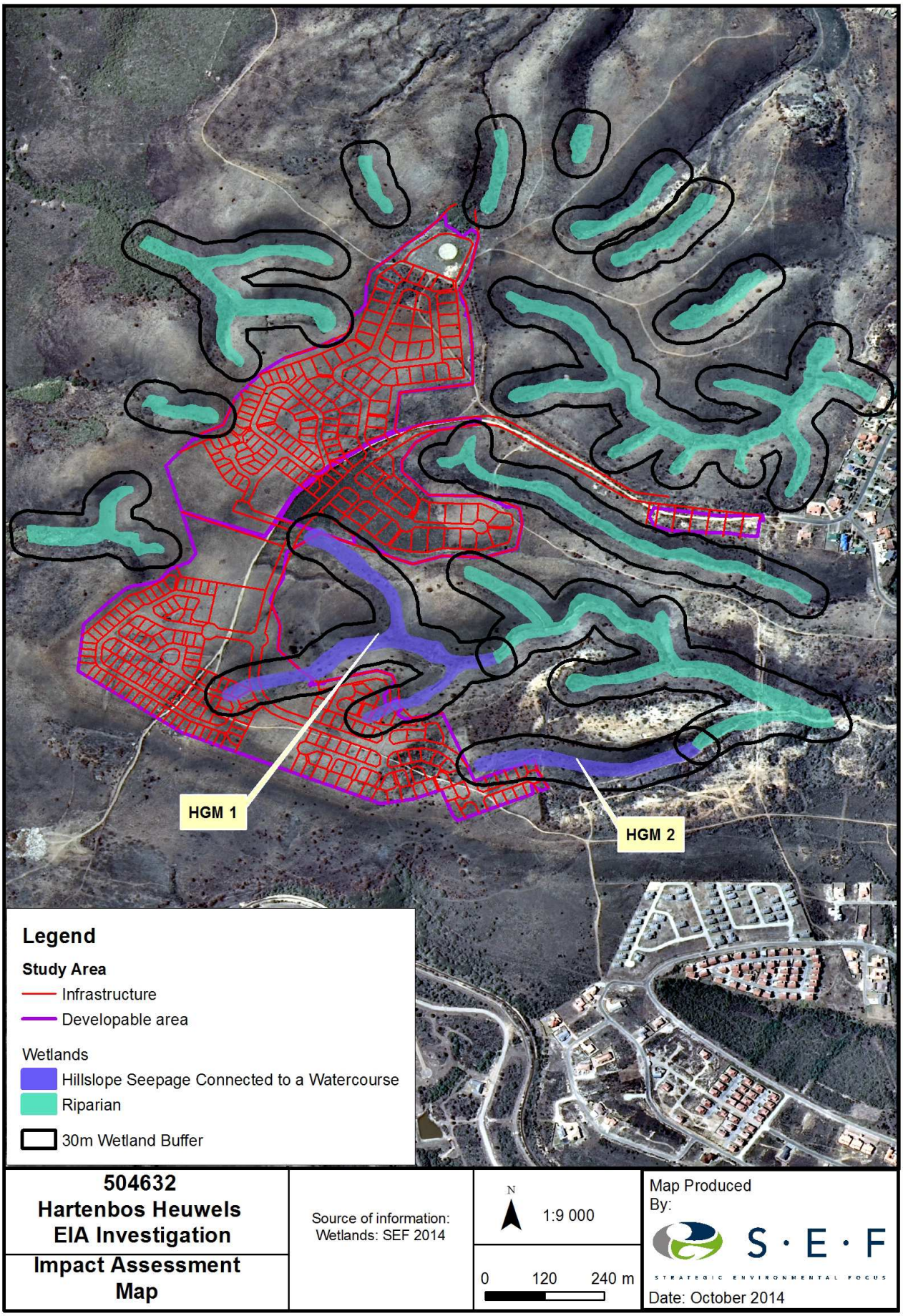


Figure 18: Wetland Mitigation Map (Note that the preferred alternative does not encroach on the wetland buffers to the same extent)

F-3.1.4 Destruction of flora within the proposed area, stemming from activities such as vegetation clearance and topsoil stripping

Source and nature of the impact:

No rare or localised plant species were recorded on Erf 3122, but this does not mean that none are present, and there is deemed to be a medium to high likelihood that a few such species are in fact present on site, most likely within the undisturbed parts of the site (Refer to Figure 7). Mossel Bay Shale Renosterveld is known to support a number of rare and threatened *Haworthia* species (Bayer 1999; Mucina & Rutherford 2006), and these highly cryptic succulent plants could well be present on the undisturbed parts of Erf 3122,

During the construction phase direct loss of an Endangered vegetation type (Mossel Bay Shale Renosterveld) will occur to make way for the proposed development footprint and associated infrastructure. Other local populations of various Species of Conservation Concern could also be cleared.

Table 11: Destruction of flora within the proposed area during construction

Impact source(s)	Vegetation clearance and topsoil stripping in order to make way for the proposed development footprint and associated infrastructure.		
Nature of impact	Destruction of vegetation.		
Magnitude	*Extent*	Regional -3	
	Intensity	Medium – 3	
	Duration	Permanent – 5	
	Probability	Highly Likely – 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+4) x 5 = 75 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 75 x 0.6 = 45 Medium	**M**

Mitigation Measures:

- No development should be undertaken in areas of mapped High conservation value, and all these areas should be buffered from any development by at least 15m (Refer to Figure 7).
- Prior to any development of the site the approved development area must be demarcated on site by surveyors, and the development boundary must then be indicated by coloured rope stretched between fence droppers, which should be placed every 10-20m. No disturbance, dumping or earthmoving may take place outside the designated areas.
- Search and Rescue should be undertaken for any translocatable plant species in the development footprint, notably succulents and bulbs (geophytes), prior to bulk service installation. The rescued material should be moved to a suitable receiving area that should have a similar soil type, and it should be an area in need of rehabilitation. It is recommended that public areas and roadsides be selected for this purpose. This work must be undertaken by an independent horticultural contractor, in liaison with the botanist.
- An ECO should be on site at least every second day during the bulk infrastructure construction phase of the project and must be responsible for ensuring compliance with all environmental conditions imposed.
- A construction and operational phase EMPr should be compiled prior to commencement of bulk earthworks, which outlines all environmental management requirements for the site.
- The landscape development plan should incorporate the above elements

Significance of construction impacts on Flora:

The significance of the potential impact that the proposed development will have on natural vegetation occurring on site is regarded as medium to high without mitigation, however, if the above mitigation measures

are implemented successfully, the significance will be reduced to ***medium.***

F-3.1.5 Faunal displacement and/or destruction (including avi-faunal species)

Source and nature of the impact:

The construction of the proposed residential area on Erf 3122 at Hartenbos Heuwels as well as the associated infrastructure will lead to the destruction of natural vegetation including faunal habitat. At least two avifaunal species of conservation concern, *Circus maurus* (Black Harrier) which is currently listed as Vulnerable and *Neotis ludwigii* (Ludwig's Bustard) which is currently listed as Endangered (Globally), will be displaced by the development. These two species utilizes large open areas which were recorded at the higher laying areas in the study area and will not use the study area once development has taken place. Furthermore, four (4) *Lepidoptera* species which are of conservation concern were given a medium to high probability of occurring within the study area based on the presence of suitable habitat.

The presence of the construction site may result in negative faunal interactions that could be associated with construction personnel including poaching, trapping and hunting of faunal species, as well as possible collisions of fauna with construction vehicles. Furthermore, construction will result in high levels of noise and vibrations and the operation of floodlights, should construction continue at night and this could affect faunal species. This will disturb the faunal species utilising the surrounding vegetation, especially nocturnal species, and could result in a localised decrease in biodiversity as species move away from the disturbance into the surrounding areas. Hazardous materials which are likely to be used in the study area include oil and fuel for construction vehicles, chemicals or products used for wood preservation and herbicides as well as pollution and rubbish. These hazardous materials have the potential to pollute the natural environment through direct contamination or leaching.

Table 12: Faunal displacement and/or destruction

Impact source(s)	Destruction of faunal habitat as well as disturbances such as noise, vibration and pollution during the construction phase.		
Nature of impact	Migration and possible mortality of animals.		
Magnitude	*Extent*	Regional -3	
	Intensity	High – 5	
	Duration	Medium Term - 3	
	Probability	Highly likely - 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+3+4) x 5 = 75 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 75 x 0.6 =45 Medium	**M**

Mitigation Measures:

- Although the area was mostly classified as medium to high ecological sensitivity it is recommended that all developments are restricted to the areas adjacent to current houses at Hartenbos Heuwels as well as the area west of Geelhout Road which provides current access to the site;
- Since the presence or absence of threatened Lepidoptera species could not be confirmed within the study area at the time of the survey due to the weather conditions, it is recommended that a Lepidoptera specialist study is conducted during a more suitable time period to determine if these species are present within the study area and also develop a habitat management plan where needed;
- Landscaping should be done with floral species that occur naturally within the study area and the use of any exotic species should be strictly prohibited. The recommendations made based on Lepidoptera studies should also be included in the landscaping plan for the development;
- Bat and owl nesting boxes should be used to encourage these species to reside within the study

area. This will also provide a natural control method for rodents and invertebrates;

- All alien vegetation currently within the study area should be removed and these areas should be rehabilitated to prevent erosion;
- To prevent the transmission of diseases or faunal injury or mortality, no dogs or cats should be allowed to enter the natural areas surrounding the development;
- Access to the natural areas surrounding the development should be restricted to prevent poaching and snaring of wild life.
- Construction should be restricted to the winter months when faunal breeding activities are generally low;
- Construction should only be conducted during day light hours and the use of artificial lights should be prevented as far as possible;
- An education programme should be compiled for all contractors, subcontractors and workers to ensure compliance to all aspects of the EMPr as well as educating personnel in the safe and proper conduct within areas of natural habitat;
- No wild animal may under any circumstance be handled, removed or be interfered with by construction workers;
- No wild animal may be fed on site;
- No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of;
- To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit of 30 km/h should be adhered to;
- All food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins located around the infrastructure should have tightly fitting lids to prevent faunal species raiding the bins and thereby becoming habituated to humans.
- If any wooden poles are used within the study area, these poles should be treated with environmentally safe chemicals;
- The used of any herbicides or pesticides is strongly discouraged;
- All domestic waste and building rubble should be disposed of at official dump sites and should not be dumped in the natural areas surrounding the development.
- Although some alien species are already present within the study area, it is recommended that these species are removed from the development footprint as well as the adjacent natural vegetation and these areas should be rehabilitated to prevent erosion. In addition to this, the following is recommended:
    - During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation;
    - Surrounding natural vegetation should not be disturbed to minimize chances of invasion by alien vegetation;
    - All alien seedlings and saplings must be removed as they become evident for the duration of construction and operational phase;
    - Manual / mechanical removal is preferred to chemical control;
    - All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction site. This should be verified by the ECO;
    - An alien invasive eradication and monitoring plan must be compiled and implemented whereby all emergent invasive species are removed during construction. The monitoring plan must also ensure that the re-emergence of invasive species is monitored continuously.

Significance of construction impacts on Fauna:

The significance of the potential impact that the proposed development will have on faunal species (including

avifauna) is regarded as medium to high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***medium.***

F-3.2 Socio-Economic Impacts

F-3.2.1 Increased dust and noise generation

Source and nature of the impact:

Construction activities, such as transportation vehicles travelling on exposed surfaces, earthworks as well as wind, will result in elevated ambient dust levels within the area. Increased dust levels may adversely affect persons residing and/or working in the nearby area.

Construction activities and movement of construction vehicles will increase the ambient noise levels within the area during the construction phase. This may impact on adjacent landowners as well as sensitive faunal species within the study area.

Table 13: Increase in ambient dust and noise levels

Impact source(s)	Construction activities: Transportation vehicles travelling over exposed surfaces, earthworks and the wind.		
Nature of impact	Increased levels of ambient dust and noise		
Magnitude	*Extent*	Regional -3	
	Intensity	Medium – 3	
	Duration	Short to Medium term – 2	
	Probability	Highly likely – 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+2+4) x 4 = 48 Medium	**M**
	With mitigation	*WOM x ME = WM* 48 x 0.4 =19.2 Low	**L**

Mitigation Measures:

Dust:

- Appropriate dust suppression methods must be applied;
- Exposed soil stockpiles shall be covered, kept damp or protected using organic binding agents or alternative techniques that are not water intensive.
- The clearing of vegetation must be kept to a minimum and only where required;
- Avoid unnecessary movement of construction vehicles; and
- Vehicles travelling on unsurfaced roads must travel at a speed that creates minimal dust entrainment (30km/h is recommended).

Noise:

- All diesel powered equipment must be regularly maintained and kept at a high level of maintenance. This must particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment must serve as trigger for withdrawing it for maintenance;
- During the planning and design stages of the project, possibly related noise aspects should always be kept in mind;
- Site noise sources away from community areas if possible.
- Construction should be limited to normal working hours (07:00 – 17:00)
- Develop a mechanism to monitor noise levels, record and respond to complaints and mitigate impacts.

- It is recommended that, as far is as practicable, that construction activities be limited to day-time hours since noise impacts are most significant during the night; and
- Complaints and noise levels in this area should be recorded and monitored and results communicated to interested and affected parties.

Significance of the impact caused by dust and noise:

The significance of the potential impact that the proposed development will have on adjacent landowners as a result of elevated ambient dust and noise levels is regarded as medium without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low.***

F-3.2.2 Potential impacts on cultural, archaeological and/or paleontological heritage resources

Source and nature of the impact:

Although no cultural heritage resources could be identified, archaeological occurrences were identified on Erf 3122. Artefacts found originate from the Stone Age and included isolated stone artefacts as well as low density scatters of stone artefacts. The materials were dominated by Middle Stone Age (MSA) specimens, followed by those of the Early Stone Age (ESA) and Later Stone Age (LSA) artefacts that are usually very rare. It was evident, however, that the study area was previously cultivated and several disturbances were noted. Due to the geological sequence and depth of disturbances – particularly that of ploughing – it is not expected that in situ archaeological materials will be encountered during earthmoving activities associated with the proposed development.

The hill upon which Erf 3122 is situated consists of Buffelskloof Formation alluvial fan conglomerates and Hartenbos Formation in a limited area in the east. The Buffelskloof Formation has low fossil potential, but it is comparable to the Enon Formation wherein identifiable teeth and bones are occasionally found. It is also common to encounter fossil plant material in Hartenbos Formation.

Construction activities such as demolition, topsoil stripping and earthworks can potentially destroy the abovementioned precious heritage resources.

Table 14: Impacts on heritage resources

Impact source(s)	Construction activities such as demolition, topsoil stripping and earthworks		
Nature of impact	Impacts on heritage resources (surface stone artefacts from the MSA, ESA and LSA as well as potential insitu plant material fossils)		
Magnitude	*Extent*	Site – 2	
	Intensity	Medium – 3	
	Duration	Permanent - 5	
	Probability	Highly likely - 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+5+4) x 4 = 56 Medium	**M**
	With mitigation	*WOM x ME = WM* 45 x 0.4 =22.4 Low to Medium	**L - M**

Mitigation measures:

Archaeology

- Because the Early and Middle Stone Age artefact scatters at waypoints 127 and 34 are considered to be of medium significance, their extents and contents should be mapped (via GPS) and the materials recorded in more detail than presented in the Archaeological Impact Assessment (Appendix 7). Due to the disturbed context of these finds, however, it is not considered necessary to collect the artefacts under a permit from Heritage Western Cape.
- If archaeological materials are exposed during vegetation clearing and/or earth moving activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the Applicant.
- In the event of exposing human remains during construction, the matter will fall into the domain of Heritage Western Cape or the South African Heritage Resources Agency and will require a professional Archaeologist to undertake mitigation if needed.

Palaeontology

- Monitoring by on-site personnel is recommended during construction of excavations. The Paleontological Impact Assessment (Appendix 7) outlines monitoring by construction personnel as well as general Fossil Find Procedures. In the event of fossil finds a Palaeontologist must assess the information and liaise with the manager and the ECO and a suitable response will be established.
- Should potential fossil material be found, it is proposed that Dr Peter Nilssen (Author of the Paleontological Impact Assessment) should be contracted to carry out the initial field assessment and liaise with the appointed Palaeontologist as to its context, significance and appropriate actions.

Significance of the impact caused by dust and noise:

The significance of the potential impact that the proposed development will have on precious heritage resources such as stone artefacts and plant material fossils is regarded as medium without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low - medium.***

F-3.2.3 Temporary change in the visual character of the area

Source and nature of the impact:

The rural character of the site will change once construction of the development commences. Large areas of exposed soil will define the construction area. The construction site will appear disorganised and dispersed with construction equipment, material stockpiles and ancillary components. Heavy construction equipment such as cranes will be visible from great distances. Earthworks will be necessary to grade the site and potential dust clouds, that will also be visible from far, may be generated by these activities.

Table 15: Visual impact of construction activities on visual receptors

Impact source(s)	Construction activities including construction camps, material lay-down yards, stockpiles, cranes, scaffolding, delivery vehicles, and dust.		
Nature of impact	Views of the above mentioned construction activities which are out of character with the surrounding landscape and which will affect the sense of place negatively.		
Magnitude	*Extent*	Regional – (3)	
	Intensity	Medium – (3)	
	Duration	Short – Medium Term – (2)	
	Probability	Highly Likely – (4)	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+2+4) x 4 = 48 Medium	**M**

	With mitigation	*WOM x ME = WM* 48 x 0.8 =38.2 Low to Medium	**L - M**

Mitigation measures:

- The Fynbos area of the site needs to be retained where possible and practical so that the residential units can fit visually more easily into the site and thereby retain some of the visual quality that exists in the undeveloped state of the site.
- Enclose the construction site and stockyards with a dark green or khaki brown shade cloth of at least 20% density.
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance.
- Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements.
- Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agents.
- If practically possible, locate construction camps in areas that are already disturbed or where it is not necessary to remove established vegetation.
- Exposed soil must be covered or 'camouflaged' using a biodegradable soil mat and vegetation cover to reduce the duration of visible scarring of the landscape.
- Rehabilitation of all stripped and damaged areas must be implemented as soon as practically possible.
- It is suggested that construction should start and stop during normal working hours without starting too early or continuing until late into the night to avoid night-time visual impacts, also avoid working over weekends and holiday periods.
- Construction after hours will not be permitted on site.

Significance of the temporary visual impact:

The significance of the potential impact that the proposed development will have on the existing landscape character during construction is regarded as medium without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low - medium.***

F-3.2.4 Temporary job creation (+)

Temporary employment opportunities will be created during the construction phase, via construction related activities. This will positively impact on the surrounding community and local economy due to possible skills development and income generation. This impact is predicted to have a **medium positive significance**.

F-4 OPERATIONAL PHASE IMPACTS

F-4.1 Biophysical Impacts

F-4.1.1 Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with hard surfaces during high rainfall events

Source and nature of the impact:

Due to infrastructure development such as roads, residents and stormwater infrastructure which increases impermeable surfaces, there is an associated increase in flow velocities and erosion potential for wetland and riparian habitats. Runoff from especially road surfaces and stormwater infrastructure could enter into the associated watercourse, resulting in higher catchment runoff, wetland/riparian scouring and increased flooding and erosion of downstream areas. The existing erosion processes present within the riparian habitat of the study area would therefore likely be accelerated. The supporting hydrological characteristics of the catchment

to the wetlands are also likely to change significantly unless predevelopment hydrological pathways to the wetland are mimicked.

Table 16: Potential impacts surface water and wetlands

Impact source(s)	Increased surface runoff and changes to existing hydrological pathways.		
Nature of impact	Potential impacts on surface water and wetlands through increased erosion as a result of prevention of infiltration.		
Magnitude	*Extent*	National -4	
	Intensity	High – 5	
	Duration	Permanent - 5	
	Probability	Likely – 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (4+5+5+3) x 5 = 85 High	**H**
	With mitigation	*WOM x ME = WM* 85 x 0.6 =51 Low - Medium	**L - M**

Mitigation Measures:

- An ecologically-sensitive stormwater management plan should be developed that does not allow concentrated stormwater to enter into a wetland or watercourse directly, but instead makes use of flow diffusers and retention and attenuation areas (such as artificial wetland areas, attenuation swales/ponds, retention areas, baffles and gabion structures). The stormwater plan must include adequate attenuation facilities to ensure that peak flows do not cause negative impacts on wetlands or riparian areas. More specifically as a guideline:
    - Post development flows for frequent, average every afternoon type storm event 6 mm over 2 hours, will not exceed pre development flows.
    - Post development velocities associated with the 1:5 year return event storm will be within 25% of predevelopment velocities.
    - Stormwater release structures must be designed to release diffusely, mimicking seepage wetlands outside of the watercourse.
- Attenuation and stormwater infrastructure must be established outside of the 30m buffer zone or maximal available distance from the buffer zone where possible.
- The attenuation and retention facilities should retain stormwater runoff and then allow the water to diffusely enter the buffer zone at a slower velocity through appropriate infrastructure such as flow diffusers and reno-mattresses. The stormwater infrastructure should therefore be designed to prevent erosion processes from being initiated within wetlands and riparian habitat, allow for sediment deposition within the swales / attenuation / retention facilities, redistribute water movement evenly within the buffer zone, mimicking pre development runoff received by drainage lines. One way of achieving the above is through designing and implementation of diffuse release channels that are placed on contour outside of the 30m buffer zones (Figure 18). Water from attenuation facilities could be released into the diffuse release contour channels and or the size of the diffuse release contour channels could be increased to serve as combined attenuation and diffuse release infrastructure. It is cardinal that the diffuse release channels are constructed exactly on contour as to spread the water evenly along the whole length of the infiltration channel. The horseshoe-shaped diffuse release channels depicted in does not need to be a continuous channel but could be placed in an intermittent pattern as to compliment biodiversity corridors and access if needed.
- Current erosion processes within riparian habitat should be addressed through the design and implementation of a rehabilitation program. The placement of thirty five gabion mattresses are proposed to halter head cut and gully erosion within riparian areas (Figure 19). However, proposed placement positions are only preliminary, final design and placement of each required gabion basket should be established through a thorough on site assessment.
- Alien vegetation composition and distribution should also be assessed during the onsite

assessment with appropriate recommendation for alien vegetation management to be included in the rehabilitation program.

Figure 19: Conceptual design for diffuse release channels

Significance of operational impacts on surface water:

The significance of the potential impact that the proposed development will have on watercourses and wetlands due to increased surface water runoff and soil erosion is regarded as high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***low - medium.***

F-3.1.2 Destruction of flora through ongoing maintenance activities

Source and nature of the impact:

Ecological connectivity is important for the maintenance of ecological integrity in all natural habitats (de Villiers et al 2005), and on this site the High sensitivity areas should ideally be connected.

Potential indirect ecological impacts that may occur during the operational phase includes fragmentation of natural habitat, loss of current ecological connectivity, disruption of optimal fire regime, and edge effects such as increased ease of alien plant invasion.

Table 17: Destruction of flora within the proposed area through ongoing maintenance activities

Impact source(s)	Ongoing operational maintenance activities during the operational phase.		
Nature of impact	Destruction of vegetation, fragmentation of natural habitat, disruption of optimal fire regime and increased alien plant invasion.		
Magnitude	*Extent*	Regional -3	
	Intensity	Medium – 3	
	Duration	Permanent – 5	
	Probability	Highly Likely – 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+4) x 5 = 75 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 75 x 0.6 = 45 Medium	**M**

Mitigation Measures:

- Fifteen meter wide firebreaks should be located within these buffer areas, and the firebreaks should be bushcut annually. Obviously certain access roads and bulk services will need to cross some of these High sensitivity areas, but in these areas the disturbance corridor width must be minimised.
- A fire management plan has been prepared for the High conservation value areas, as the vegetation in these areas requires a fire once every 12 -15 years for optimal ecological functioning. (Refer to Fire Management Plan – Appendix 7).
- At least two ecological corridors (each at least 100m wide) across the plateau area must be maintained, and the positions of these are indicated in Figure 8. A two lane access road (plus buried bulk services) may cross the corridors, but no other infrastructure should intrude on these corridors.
- All of the Remainder of Portion 4 of Farm 217, and all High conservation value areas on Erf 3122 should be formally conserved by means of a Contract Nature Reserve agreement with CapeNature (which would also carry with it financial incentives in terms of a Municipal Rates rebate). This should be undertaken within one year of any project approval, and would help compensate for the loss of mapped Critical Biodiversity Areas on Erf 3122, and would significantly improve the chances of development proposal approval.
- All invasive alien vegetation on the Open Space parts of the site must be removed within one year of any project authorisation. Ongoing alien vegetation management must be undertaken in the Open Space areas thereafter on an annual basis.
- All alien vegetation removal should be undertaken using Working for Water approved methodology, and no heavy machinery may be used except within the authorised development footprint. All

invasives should be felled as close as possible to ground level, and all cut stumps must be painted with a suitable dye treated Triclopyr containing herbicide, within 5 minutes of being cut, in order to prevent resprouting. No spraying of herbicide should be undertaken in the Open Space areas as it has a negative impact on nearby nontarget species.

- No alien invasive vegetation (as listed in CARA) should be allowed in private or public open space on this site. In this context it is particularly important that no Pennisetum clandestinum (kikuyu grass) be allowed on any erven or public areas bordering natural areas, as it is highly invasive. Stenotaphrum secundatum (buffalo grass) or Cynodon dactylon (kweek grass) are suitable non-invasive alternatives.
- The HoA should be responsible for ensuring that homeowners do not dump unwanted plant material over garden fences or walls into the Open Space areas, as this will degrade the natural habitat in these areas.
- The developer is responsible for ensuring that adequate funds are available for implementation of all required environmental management on the site, and they may decide whether this is to be via a levy administered by the HoA or via whatever other means is deemed appropriate.
- The implementation of all ecological requirements must be audited by an independent botanist or CapeNature representative every year for the first five years after commencement of development of any approved development application, and an audit report submitted to the WC DEA&DP.
- A landscape management plan should be implemented and guide operational and maintenance activities.

Significance of the operational impacts on Flora:

The significance of the potential impact that the proposed development will have on natural vegetation occurring on site is regarded as medium to high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***medium.***

F-4.1.3 Faunal displacement and/or destruction (including avi-faunal species)

Source and nature of the impact:

Large bodied wandering birds such as cranes, bustards, herons and egrets are particularly vulnerable to collision with high voltage power lines which are not clearly visible to these species and due to their large size can't make quick turns to avoid collisions. Furthermore, these birds often fly to and from feeding and nesting sites during periods of low visibility such as at dusk and dawn increasing the risk of collision. One such species which has been confirmed within the study area, *Neotis ludwigii* (Ludwig's Bustard), currently globally listed as Endangered, is particularly vulnerable to collisions with power lines and even smaller telephone lines since these birds are heavy bodied and usually fly at fairly low altitudes. Furthermore, a study which was done in the 1990's in the eastern Karoo, recorded two *Neotis ludwigii* (Ludwig's Bustards) collisions per kilometer of high voltage power line per year (Jenkins and Smallie, 2009). Research into bird flappers installed on power lines in sections which are considered to pose a high collision risk has indicated that these devices are successful in limiting collisions of mostly crane species while it does not seem to be successful in avoiding collisions by *Neotis ludwigii* (Ludwig's Bustard).

Raptors are more likely to suffer electrocution from power lines since they are likely to use these structures to perch or roost. Medium to low voltage power lines or distribution lines are more likely to electrocute species due to the birds making a connection between live components.

Table 18: Faunal displacement and/or destruction

Impact source(s)	Destruction of faunal as a result of construction.	
Nature of impact	Migration and possible mortality of animals.	
Magnitude	*Extent*	Regional -3
	Intensity	High – 5
	Duration	Medium Term - 3

	Probability	Highly likely - 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+3+4) x 5 = 75 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 75 x 0.6 =45 Medium	**M**

Mitigation Measures:

- Power lines should be placed parallel to land features such as ridges, valleys and where possible drainage lines and should not cut across them;
- Where feasible, the thin neutral or earth wire above the high voltage transmission line should be removed or when it is not possible to remove this, the line should be marked to make it more visible;
- High voltage wires should be bundled to increase visibility;
- The vertical spread of the power lines should be minimised since having the lines in a horizontal plane, significantly reduces the collision risk;
- Care should be taken not to establish areas which might attract large numbers of birds to the area such as waste water treatment plants and solid waste dumps;
- High impact areas should be marked with bird deflectors to increase the visibility of the lines. There are various deflectors and devices available Refer to the Faunal Impact Assessment – Appendix 7.
- A monitoring programme should be developed to determine the effects of the newly constructed power lines. This monitoring should be conducted by a suitably qualified avifaunal specialist or ecologist and the data/results should be made available to the EWT. Furthermore, any collisions recorded within the area should be reported to the Wildlife & Energy Interaction Group at wep@ewt.org.za.
- To reduce the risk of electrocution the following mitigation measures are recommended (adapted from Migratory Soaring Birds Project):
    - Insulators should be hanged under the cross arms and poles if the distance between the area which are likely to be used as a perch and the energised parts are at least 70cm;
    - Upright insulators should be capped with a nonconductive material;
    - Cables should be insulated close to the poles (at least 70cm on both sides and around the perching area) and in cases where large soaring birds are present, these distances should be increased to 140cm;
    - If the poles are made of steel, the conductor lines should be insulated;
    - Safe nesting and perching platforms should be provided above the poles at a minimum of 70cm above the energized components (or higher if larger species are present);
    - Spacing between conductors should be not less than 140cm and 70cm between perching sites and live components; and
- A monitoring programme should be developed by a suitably qualified avifaunal specialist or ecologist to record any avifaunal mortalities within the study area due to electrocution. The data should include the date, species involved and number of individuals and the results should be made available to Birdlife South Africa and EWT.

F-4.2 Socio-Economic Impacts

F-4.2.1 Permanent change in the visual character of the area

Source and nature of the impact:

The visual character of the site will be changed from a fynbos covered plateau to a residential development with a line of houses forming the skyline. The landform will need to be substantially altered in areas where the housing is on steep slopes to accommodate the internal roads and access to erven. The central open spaces will retain some character of the site if it remains in its natural state.

Table 19: Visual impact of operation activities on visual receptors

Impact source(s)	The completed residential development and associated infrastructure which will change the existing visual character and skyline of the hill on Erf 3122.		
Nature of impact	Views of the above mentioned development and associated infrastructure that will permanently change the rural sense of place.		
Magnitude	*Extent*	Regional – (3)	
	Intensity	Medium – (3)	
	Duration	Permanent – (5)	
	Probability	Highly Likely – (4)	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+4) x 4 = 60 Medium - High	**M - H**
	With mitigation	*WOM x ME = WM* 60 x 0.8 =48 Medium	**M**

Mitigation measures:

Buildings on Slopes

- In order to avoid the visually out of place 'dark area' under buildings that are supported on 'columns' the area will need to be stabilised with a stone rip rap. Low shrubs should be planted on the edge of the area to afford some screening of the void;
- Consideration should be given to removing the erven on the steep slopes of the drainage line and the plateau edge. A new layout in these areas may be necessary;
- The concept of how buildings on steeper slopes should be designed and shown in sections should be considered in the Architectural Guidelines. This will ensure that only one storey and not two storey structures are constructed above the road level on the down-slope side of the road;
- All cut and fill soil surfaces should be adequately protected from erosion either by vegetation or a combination of block retaining walls and vegetation or rock cladding;
- Where it is necessary to clear dense vegetation near structures as a precaution against fire reaching the houses, retain or plant groups of low growing species to visually connect the space cleared with the rest of the vegetation;

Colours for Roofs and Buildings

- Avoid bright reflective or contrasting colours for roofs and buildings;
- Tones and tints of selected complementary colours that fit the setting should be considered;
- Subdued and complimentary natural shades and tints blend easily into a landscape setting.

Roads and Pathways

- Roads and pathways should be paved with a durable brick of brown/sand colour. The light brown colour is a similar colour to the exposed earth in the area. The light colour will also not generate high surface temperatures as an asphalt or dark surface would.
- The cut and fill slopes should not be steeper than 1:2 vertical to horizontal as this allows vegetation to establish more easily. This will reduce erosion of the soil surface.

Surface Water Drainage

- A detailed surface drainage management plan to slow water velocities before discharge into natural drainage lines must be produced early in the design phase so that these elements (e.g. porous paving and retention areas) are incorporated in the contract documentation. This plan will avoid erosion of surfaces and existing drainage lines. Erosion of any form is also a visual intrusion and will affect the character and sense of place of the development.

Lighting

- External lights will increase the visual impact of the project at night therefore attention should be given to their selection for the specific function.
- All lighting therefore should be carefully considered with regard to the extent of illumination, the intensity and colour of lights and the luminaire.
- It is recommended that lighting is designed by a lighting engineer in collaboration with the landscape architect for the project. The aspects of the lighting solution should include the following:
    - Light fittings should have shields to eliminate sight of the light source;
    - Down lighting of areas is preferred to up lighting;
    - Any perimeter lights are to be directed downwards and inwards;
    - Emitted light colour should be a softer light than sodium (yellow) or mercury halide (blue-white). The light colour should also be chosen with knowledge of what colour will attract insects. It is important that a colour type and spread of light will not cause insects to be attracted to it and in so doing deplete the insect diversity of the region. For this purpose an entomologist familiar with the effect of light frequencies on insects should be consulted;
    - The use of flood lights to illuminate structures, large areas or features should not be considered. Rather incorporate concealed lights to shine downwards. Darker areas on the building elevations will provide a less visually noticeable structure;
    - No light fittings should spill light upwards or be directed upwards from a distance towards the area or building to be illuminated;
    - The lighting plan should strive to maximise the light energy use. This should include a hierarchy of light function. The function will determine the best light type to use. Some may be switched on only when needed;
    - Security lights should not flood the area with light continuously but should be activated by a motion sensor;
    - It is now accepted practice that lighting of new projects should be subdued and energy efficient.

The Water Tank Tower

- The visual impact mitigation is limited to the designed form and the colour. The colour should be as light as possible. The light grey of the concrete will help to reduce the visual image against the sky. The form should be curvilinear where possible to reduce rectilinear shadow areas.

Significance of the permanent visual impact:

The significance of the potential impact that the proposed development will have on the existing landscape character during the operational phase is regarded as medium to high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***medium.***

F-4.2.2 Increased income for the Local Municipality (i.e. rates and taxes) (+)

The proposed development involves a formalised residential development which will consist of 445 single plots and 4 group plots. Future owners of these properties will be required to pay standard rates and taxes to the Mossel Bay Local Municipality. Revenue generated through rates and taxes is utilised for the maintenance and improvement of service delivery (i.e. roads, water, sewage, refuse collection etc.). An increase in revenue can therefore be viewed as an impact of **high positive significance** for the Hartenbos community.

F-4.2.3 Permanent job creation (+)

Permanent jobs will be created during the operational phase of the proposed development. This will positively

impact on the surrounding community and local economy due to possible skills development and income generation. This impact is predicted to have a **high positive significance.**

F-5 CUMULATIVE IMPACTS

F-5.1 Transformation (development) of open space areas within the region

Source and nature of the impact:

The study area falls within the Groot Brak Dune Strandveld regional vegetation type which is currently listed as Endangered according to Mucina & Rutherford (2006). Furthermore, it forms part of the Groot Brak Dune Strandveld Ecosystem which is also listed as Endangered in terms of Section 52 of NEMBA (Government Gazette, 2011). The original extent of this ecosystem is 20 000ha with approximately 52% remaining of which 0% is protected in statutory reserves. At least six plant species of conservation concern have been recorded from this ecosystem. The area which was assessed during the impact phase is approximately 300ha in extent and consists of vegetation representative of the Groot Brak Dune Strandveld vegetation type. The proposed development and associated infrastructure will transform approximately 50 ha of this vegetation type.

Table 20: Cumulative impact of transformation of open spaces within the region

Impact source(s)	The completed development and associated infrastructure will cover an area of approximately 50 ha along the higher laying plateau.		
Nature of impact	The completed residential development will contribute towards transformation of the Endangered Groot Brak Dune Strandveld regional vegetation type and ultimately the Groot Brak Dune Strandveld Ecosystem.		
Magnitude	*Extent*	National – (4)	
	Intensity	High– (5)	
	Duration	Permanent – (5)	
	Probability	Highly Likely – (4)	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (4+5+5+4) x 5 = 90 Medium to High	**M - H**
	With mitigation	*WOM x ME = WM* 60 x 0.8 =48 Medium	**M**

Mitigation measures

This cumulative impact can only be mitigated if the “No-go Alternative” is followed.

Significance of the cumulative impact of development of open spaces in the region:

The significance of the cumulative impact that development has on transformation of open spaces (Groot Brak Dune Strandveld) within the region is considered to be high and can only be mitigated if the “No-go Alternative” is followed and the status quo remains.

F-5.2 Influx of residents into the area resulting in an increase in traffic

Source and nature of the impact:

With regards to the traffic generation and impact, it is estimated that the proposed development could generate up to 389 typical weekday peak hour trips. The analysis for the existing traffic scenario indicated that the additional traffic to be generated by the proposed development could easily be accommodated within the existing road network and that no intersection upgrades would be required at present.

With future development and densification planned for the Hartenbos Huewels area, Seemeeu Park and Menken Kop, however, a 4% annual growth in traffic can be expected. With this potential growth in mind provision should be made for the upgrading of the Waboom / TR331 (Louis Fourie Road) intersection to a signal controlled intersection. It is also recommended that alternative access be investigated to the above residential areas via the link road from Aalwyndal.

Table 21: Increase in traffic caused by an influx of residents to the area

Impact source(s)	Increased in traffic caused by and influx of residents to the area		
Nature of impact	Delays in travel time (especially through peak hour times), increase in accidents, elevated ambient noise levels and less available parking.		
Magnitude	*Extent*	Regional – (3)	
	Intensity	Medium – (3)	
	Duration	Permanent – (5)	
	Probability	Highly Likely – (4)	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+4) x 4 = 60 Medium to High	**M - H**
	With mitigation	*WOM x ME = WM* 60 x 0.8 =48 Medium	**M**

Mitigation measures:

- Refuse removal facilities should be provided on the site;
- That the provision of parking should be in accordance with the parking standards;
- The site layout plan should indicate the on-site circulation, provision of parking as well as refuse removal;
- Provision of traffic signals at the Waboom / Louis Fourie intersection should be made; and
- Investigation of an alternative access via Aalwyndal / Seemeeu Park to Hartenbos Heuwels / Menken Kop / New Development (Erf 3122), as part of a mobility strategy for the area by 2015.

Significance of influx of people and increased traffic in the area:

The significance of the impact caused by an increase in traffic as a result of the proposed development (by 2015) is regarded as medium to high without mitigation, however, if the above mitigation measures are implemented successfully, the significance will be reduced to ***medium.***

SECTION G: CONCLUSION AND RECOMMENDATIONS

In accordance with GN No. 543, the Environmental Impact Phase is aimed at identifying and assessing potential impacts caused by the proposed development. The ability to mitigate any of the identified impacts are also addressed and summarised into a working / dynamic Environmental Management Programme (EMP) for consideration by I&APs and ultimately by the WC - DEA&DP.

Comments and/or concerns identified by Interested and Affected Parties (I&APs) during the review period of the Draft Environmental Impact Report will be incorporated into the Final Environmental Impact Report which will then be submitted to the WC - DEA&DP for consideration.

Having assessed all the potential environmental impacts associated with the proposed development it is the opinion of the EAP that the proposed Hartenbos Heuwels Residential Development on Erf 3122 is issued with a positive Environmental Authorisation from WC - DEA&DP for the following reasons:

- The Erf 3122 is currently is zoned as “Housing” in the Hartenbos Sub-Regional Structure Plan. The existing adjacent land use (to the north, east and south) is also zoned as Housing and is already developed;
- The site (Erf 3122) contains previously disturbed parts (about 40 ha) that was transformed through agriculture (possibly grazing).
- The relevant vegetation type (Mossel Bay Renosterveld) that was identified is considered unsuitable as arable land due to the stone nature and high permeability;
- The proposed development will offer an opportunity to formally conserve all High conservation value habitats on Erf 3122. This would be best achieved by rezoning them as Open Space and possibly by incorporating them into a formal Contract Nature Reserve with CapeNature;
- The proposed development will also offer the opportunity to fund and implement an Operational Environmental Management Plan (OEMP) as part of the Environmental Management Programme (EMPr) throughout the remaining natural portions of the site, focussing on alien vegetation control and fire management;
- Ecological connectivity between High and Medium sensitivity areas will be promoted through the implementation of ecological corridors. These corridors (at least 100m in with) will be maintained as part of the OEMP which will be important for ecological integrity. The development Layout was altered in order to accommodate the above ecological corridors and also to avoid the “undisturbed areas” of Mossel Bay Shale Renosterveld which is an Endangered vegetation type (all “undisturbed areas” is buffered by 15m in the proposed Layout);
- The wetland assessment revealed that if no erosion control is implemented to halt the existing gully erosion processes advancing towards the wetlands, the wetlands could potentially deteriorate dramatically within the next five years (due to the close proximity of gully erosion to the wetlands). The proposed development will offer an opportunity to address these existing issues through the implementation of attenuation facilities as recommended by the wetland specialist (diffusion release channels);
- The existing road infrastructure as well as service delivery capacity was questioned by a number of Interested and Affected Parties (mostly Residents from Hartenbos) throughout the Scoping Phase. The Traffic Impact Assessment that was carried out by Route 2 / KBS Consulting Engineers JV (Appendix 7) as well as service delivery confirmation letters received from the Mossel Bay Local Municipality (Appendix 6) clearly demonstrates that capacity constraints will not be experienced as a result of the proposed development;
- Revenue collected by the Mossel Bay Local Municipality, through rates and taxes, will increase which will allow the Municipality to improve its basic service delivery to the entire community;

- Temporary as well as permanent employment opportunities will be created through implementation of the proposed development; and
- Although a number of potential negative biophysical and social impacts where identified, it was determined that with appropriate and recommended mitigation, there are no fatal flaws that should prevent the proposed development from proceeding. Refer to a summary of impact significance ratings both before and after recommended mitigation measures (Table 22).

Table 22: Impact significance ratings before and after mitigation

Impact	Significance without mitigation	Significance with mitigation
Construction Phase Impacts:		
Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with vegetation clearance and topsoil stripping	Medium to High	Low to Medium
Potential impacts on soil, surface and ground water quality	Medium to High	Low to Medium
Potential destruction of riparian wetland habitat	High	Low to Medium
Destruction of flora within the proposed area, stemming from activities such as vegetation clearance and topsoil stripping.	Medium to High	Medium
Faunal displacement and/or destruction (including avi-faunal species).	Medium to High	Medium
Increased dust and noise generation.	Medium	Low
Potential impacts on cultural, archaeological and/or paleontological heritage resources.	Medium	Low to Medium
Temporary change in the visual character of the area.	Medium	Low to Medium
Temporary job creation (+)	-	Medium to High Positive
Operational Phase Impacts:		
Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with hard surfaces during high rainfall events.	High	Medium
Destruction of flora through ongoing maintenance activities	Medium to High	Medium
Faunal displacement and/or destruction (including avi-faunal species).	Medium to High	Medium
Permanent change in the visual character of the area.	Medium to High	Medium
Increased income for the Local Municipality (i.e. rates and taxes) (+).	-	High Positive
Permanent job creation (+).	-	High Positive
Cumulative Impacts:		
Transformation (development) of open space areas within the region	High	-
Influx of people into the area resulting in an increase in traffic	Medium to High	Medium

REFERENCES

- BBE Consulting Engineers (2010), Electro Technical Report for the External and Internal Services: Proposed New Development on Erf 3122, Hartenbos.
- Cave, A. (2011), Proposed Township Development Hartenbos Erf 3122, Visual Assessment Report.
- De Kock, S & Schulz, K (2011), Draft Phase on Heritage Impact Assessment for proposed urban expansion Erf 3122, Hartenbos Heuwels, Mossel Bay District.
- Department of Environmental Affairs and Tourism. 2001. ENPAT. Pretoria: DEAT.
- Helme, N. (2016), Botanical Assessment of Erf 3122 and Remainder of Portion 4 of Hartenbos 217, Hartenbos, Western Cape.
- Lubbe, W (2014), Hartenbos Heuwels Residential Development Wetland Assessment.
- McDonald, D. (2006), Botanical Survey and Sensitivity Assessment of Erf 3122, Hartenbos Heuwels, Western Cape.
- Mucina, L. and Rutherford, M.C. (2006): The vegetation of South Africa, Lesotho and Swaziland, Strelitzia 19, Pretoria: South African National Biodiversity Institute.
- Nilssen, P. (2010), Archaeological Impact Assessment: Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos, Mossel Bay, Western Cape Province.
- Nilssen, P. (2010), Scoping Heritage Impact Assessment Heritage Statement: to accompany HWC NID Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos Heuwels, Mossel Bay, Western Cape Province.
- Nilssen, P. (2011), Paleontological Impact Assessment (Desktop Study) Proposed rezoning, subdivision and residential development: Erf 3122, Hartenbos, Mossel Bay, Western Cape Province.
- Pool, C & van Zyl, S (2016), Fire Management Plan Erf 3122 Hartenbos.
- Route 2 / KBS Consulting Engineers JV (2010), Traffic Impact Study Retirement and Residential Development on Erf 3122, Hartenbos.
- Route 2 / KBS Consulting Engineers JV (2016), Traffic Impact Study Supplementary Report, Hartenbos.
- Uhambiso Consult (Pty) Ltd (2010), Civil Engineering Services Report Erf 3122 Hartenbos.
- Van der Walt, K. (2013), Hartenbos Heuwels Residential Development Faunal Assessment.

Internet Resources:

http://beta2.statssa.gov.za/?page_id=993&id=mossel-bay-municipality
(Date Accessed: 16 October 2013)

APPENDICES

Appendix 1: Locality Map

Appendix 2: Photograph Plate

Appendix 3: Layout Plan

Appendix 4: Authority Correspondence

Appendix 5: Public Participation

Appendix 6: Service Confirmation Letters

Appendix 7: Specialist Studies

Appendix 8: Environmental Management Programme