Environmental Impact Assessment for the proposed
Motherwell NU 31 housing development

Draft Environmental Impact Report

Case No.: ECm1/387/M/09-45

October 2011
J29020/7231/001
## ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED MOTHERWELL NU 31 HOUSING DEVELOPMENT

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1 EXECUTIVE SUMMARY

The Nelson Mandela Bay Municipality has resolved to provide the basic living necessities for poverty stricken households largely in the informal areas of Nelson Mandela Bay. Identified low or no income households have been earmarked for relocation and integration into the northern parts of Motherwell in the proposed neighbourhood unit (NU) 31. The proposed NU 31 housing development is located in Motherwell and forms part of a broader Motherwell Urban Renewal Programme (MURP) aimed at poverty alleviation, human resource development, enterprise development, enhancement of capacity of local authorities, economic and social infrastructure and strengthening of crime prevention and reduction strategies and initiatives. Arcus GIBB (Pty) Ltd (GIBB) has been appointed to undertake an application for environmental authorisation through an Environmental Impact Assessment (EIA) for the proposed housing development.

The Motherwell NU31 housing development is situated entirely within the boundaries of portion 2 of farm 316, Uitenhage in Motherwell. It is located approximately 4.5 km north of the Swartkops River mouth. The developable area available for the NU 31 development equates to approximately 148 ha and represents approximately 33 % of the total area within portion 2 of farm 316.

The NMBM proposes to subdivide and rezone the proposed site into a total of 5202 erven. The majority of the erven will accommodate residential houses. In addition, several large and smaller community sites are provided throughout the proposed development area. Some residential erven have been consolidated to create a large site for the multi-purpose centre next to the Motherwell reservoir, which it is envisaged may include a resource centre/community hall, sports fields, clinic, administrative offices, library and other institutional facilities. Preliminary design indicates that stormwater from the north- and south-eastern sections of the proposed development will successfully be drained to the proposed stormwater infrastructure in NU 31, which in turn will tie into existing stormwater infrastructure in the Motherwell NU 29 and NU 30 developments. It is further proposed that stormwater originating from the north-western portion of NU 31 be drained via a stormwater canal discharging in the Swartkops River estuary. Sewage and sanitation, water supply and electricity for the NU 31 development will tie into existing infrastructure located in the vicinity of the site. Spare capacity is available for all bulk services.

Identified project alternatives include site, technology, activity alternatives and the No-Go option. Site alternatives revolve around the position of the proposed stormwater canal from NU 31 to the Swartkops estuary, as well as pumping stormwater collected in the western portion of NU 31 to existing infrastructure to the east of the development. Technology alternatives propose that either the construction of the stormwater canal must include the development of an artificial wetland or of a bioretention system, or both to mitigate any potential pollution in the stormwater discharging. Activity alternatives include the implementation of a 50 m buffer zone on the south-western boundary of the site, or the construction of a fence along the south-western boundary of site, supported by strategic development layout as an alternative to the 50 m buffer alternative. The third activity alternative includes the densification of the proposed development layout. The No-Go option proposes that the site remain as it currently is with no development occurring.

The vegetation type on the proposed development site is classified as Motherwell Karroid Thicket in the Nelson Mandela Bay Municipality's Metropolitan Open Space...
System (NM MOSS). Motherwell Karroid Thicket is classified as an endangered vegetation type and was found relatively intact with a high number of protected and other locally threatened species. A large number of avifauna, faunal and invertebrate species may be found on the development site. The only species of conservation significance found on site was the Grey mongoose, Peregrine Falcon and the Lanner Falcon, both of which have a Near Threatened status, and a number of invertebrates that are protected under the Eastern Cape Nature Conservation Ordinance 19 of 1974.

A site inspection during scoping phase and public participation process highlighted the existence of a group of urban stock farmers occupying the land immediately south of the Motherwell reservoir. A social impact assessment revealed that the group of subsistence farmers don't reside on the development site, but in the different NUs of Motherwell. These farmers are in support of the proposed development, but require alternative land with basic amenities to continue their farming practises. For many of them subsistence farming is the only reliable source of income. Long term solutions may be difficult to find as the NMBM has not drafted a policy document on how to address subsistence farming in an urban context. Temporary relocation to a suitable area is thus the likely short term solution. The short term solutions for housing these farmers' livestock could involve temporary fenced areas on the adjacent electrical servitude, the housing of livestock on fenced and grassed stormwater retention ponds, and/or the housing of livestock on the earmarked open space and large community sites within NU 31.

Archaeological and palaeontological impact assessments of the study site were conducted by respective specialists in these fields. The area has been highly disturbed in the past and currently, therefore it is unlikely that any in situ archaeological sites/remains, and human remains would be uncovered during construction. Palaeontological assessment of the proposed study site revealed that the Sundays River Formation is the only formation that is likely to contain significant fossilised remnants. Such fossil remnants are further only likely to be exposed if substantial excavations are made. Both specialist studies concluded that the development may proceed if identified mitigation measures are followed and implemented.

Cumulative impacts resulting from the proposed development being implemented have been identified and mainly revolve around the loss of the Motherwell Karroid Thicket and thus potential ecosystem services, and the relocation and integration of beneficiaries and other affected parties such as the subsistence farmers. A potentially striking advantage of the relocation of communities out of the informal areas next to the Swartkops River is that pollution loads to the surrounding environment may notably decrease in the NMBM, given that unsuitable informal areas where beneficiaries are relocated from have undergone rehabilitation and further informal settlement is prevented. This should result in a detectable improvement in the water quality and health of the Swartkops estuary over time.

The proposed development is predicted to have a number of negative and positive environmental impacts on the surrounding environment. The most notable negative impacts are the destruction of the surrounding thicket vegetation, relocation of subsistence farmers from the proposed development site and unwanted stormwater impacts on the downhill areas and pollution in the Swartkops estuary. The potential stormwater and pollution impacts on the surrounding environment and Swartkops estuary can however be effectively mitigated through implementation of the proposed artificial wetland and bioretention system. The main positive impact of the proposed development includes possibly substantial economic benefits to the area and
beneficiary communities, and reduced pollutants entering the environment, especially the Swartkops estuary. Besides the obvious benefit of a formal and serviced house, residents will also benefit from a number of public amenities such as shops, local businesses and service providers, employment, public transport, etc. which will create functional communities.

Considering that almost all of the identified potential impacts of the proposed development on the environment can be effectively mitigated, and the substantial benefits to individuals, communities and the environment, the EAP recommends that the proposed NU 31 housing development receive environmental authorisation provided that the stipulations in this EIA and EMP are adhered to at all times. The EAP further recommends implementation of site alternative 1 in conjunction with technology alternative 1 at a minimum. It is advisable that both technology alternatives 1 and 2 be implemented, however the EAP acknowledge that implementation of both options are dependent on availability of subsidies and funding. Lastly, the EAP recommends the implementation of activity alternative 2 to minimise impact on the endangered Motherwell Karroid Thicket.
2 INTRODUCTION

2.1 Project overview

The Nelson Mandela Bay Municipality, as with other municipalities around South Africa, has embarked to provide the basic living necessities for poverty stricken households largely in the informal areas of Nelson Mandela Bay. Low or no income families that qualify for government housing subsidy have been identified by ward councillors across the metro as recipients of low income housing. These identified recipients are, amongst others, victims of the 2006 floods in the Swartkops flood plain, occupants of informal settlements situated within retention ponds, in the servitude areas under power lines, living within the road reserves of roads earmarked for upgrade, and recipients living in and around the dump sites, such as the New Brighton and Walmer dump sites.

The proposed NU 31 housing development is located in Motherwell and a forms part of a broader Motherwell Urban Renewal Programme (MURP) aimed at poverty alleviation, human resource development, enterprise development, enhancement of capacity of local authorities, economic and social infrastructure and strengthening of crime prevention and reduction strategies and initiatives. MURP is fully integrated into the municipality’s IDP and SDF, providing the basis for co-operation and integration in the implementation of projects. The NMBM SDF also identifies ‘Strategic Development Areas’ as far as future residential expansion is concerned, of which Motherwell is one.

2.2 Purpose of the report

Arcus GIBB (Pty) Ltd (GIBB) has been appointed to undertake an application for environmental authorisation through an Environmental Impact Assessment (EIA) for the proposed housing development known as the Motherwell NU 31 housing development. The proposed development is situated between the Swartkops and Coega River valleys some 20 km to the north of Port Elizabeth's city centre. The project involves the development of land, services and top structures in Motherwell to accommodate poor and disadvantaged people in need of housing. The project proponent is the Nelson Mandela Bay Municipality (NMBM), who has appointed GOBA Consulting Engineers & Project Managers (Pty) Ltd (GOBA) to act as project managers to help alleviate the housing backlog in the municipality. A Scoping Report was submitted to the Department of Economic Development and Environmental Affairs (DEDEA) on 14 August 2009. This Scoping Report and Plan of Study were accepted by the DEDEA on 20 October 2009.

This document represents the Draft Environmental Impact Report (DEIR), which documents an Environmental Impact Assessment (EIA) process that has been undertaken to assess the environmental impacts of the proposed housing development at the proposed study site. This EIA was registered with the DEDEA before the new EIA regulations and ‘listing notices’ came into effect in 2010, and as a result the preceding EIA will be concluded under the previous regulations and ‘listing notices’ of 2006. The DEIR will be placed in the public domain for public review and comment. In terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) and associated EIA regulations (Government Notice Numbers R 385, 386 and 387 of 2006), listed activities included in these regulations require environmental authorisation before they can proceed.
3 EIA IN SOUTH AFRICA

3.1 The EIA process

This EIA process was initiated in 2009. This application is therefore submitted under Regulations published in Government Notices No. R. 385, R. 386 and R. 387 and associated guidelines promulgated in terms of Chapter 5 of the National Environmental Management Act (Act 107 of 1998).

Figure 1. Scoping and EIA procedure (NEMA, 1998)
Three phases to the EIA process are typically recognized (Figure 1):
1. Application phase;
2. Scoping phase; and

3.2 Details of all role players

Details of the proponent, competent authority and EAP are as follows:

3.2.1 Details of the proponent

Name: Schalk Potgieter
Address: Assistant Director: Strategic Planning
         Human Settlements Directorate
         Nelson Mandela Bay Municipality
         17th floor, Lillian Diedericks Building,
         Goven Mbeki Avenue
         Port Elizabeth
         6000
Telephone Number: 041 506 2168
Fax Number: 041 506 3469
E-mail: spotgiet@mandelametro.gov.za

3.2.2 Details of the case officer handling the application

Name: Mr Andries Struwig
Address: Department of Economic Development and Environmental
         Affairs
         Collegiate Provincial Building
         Cnr Belmont Terrace and Castle Hill
         Central
         Port Elizabeth
         6000
Telephone Number: 041 508 5800
Fax Number: 041 585 1958
E-mail: Andries.struwig@deaet.ecape.gov.za

3.2.3 Details of the Environmental Assessment Practitioner (EAP)

Name: Dr Norbert Klages, Arcus Gibb (Pty) Ltd
Address: 2nd Floor, Greyville House
         Cnr Greyville and Cape Roads
         Greenacres
         6045
         PO BOX 63703
         PORT ELIZABETH
         6057
Tel: 041 392 7500
Fax: 086 545 8835
E-mail: nklages@gibb.co.za
3.2.4 Expertise of the EAP to carry out the EIA procedures

Dr Norbert Klages is a registered Professional Natural Scientist (Ecological Science) with the South African Council for Natural Scientific Professions (Pr.Sci.Nat). No. 400412/04). He holds a Bachelor of Science Degree: Hanover University, Germany, 1976, Master of Science (cum laude): Kiel University, Germany, 1979 and Doctor of Natural Sciences (cum laude): Kiel University, Germany, 1983. A natural scientist with more than 30 years of experience, Dr Norbert Klages specialises in coastal and marine environmental consulting and contract research. Please refer to Appendix B for a detailed CV.

3.2.5 EIA support team

The EAP was supported in this EIA by GIBB staff Mathys Vosloo, Jesse Jegels and Inge Schovell (Table 1). Mathys Vosloo, who has an MSc in biology and five years of experience in environmental management, drafted all reports required for the EIA, liaised with the client and handled all mapping work (GIS). Jesse Jegels, who has 8 years of experience in the environmental sciences, managed the independent specialists during the EIR phase. He was assisted by Inge Schovell, who has a National Diploma in Nature Conservation and is currently studying towards a degree in Nature Conservation. The EIA team involved in this EIA is listed in Table 1.

3.2.6 Independent specialists

The Final Scoping Report and Plan of Study for EIA approved by DEDEA on 20 October 2009 identified the need for specialist studies. Specialists that have provided inputs during the EIA process are listed in Table 1.

Table 1. Names, affiliations and roles of the members of the EIA team

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<thead>
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<th>Name</th>
<th>Organisation</th>
<th>Role</th>
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<tbody>
<tr>
<td>Dr Norbert Klages</td>
<td>GIBB</td>
<td>Project leader</td>
</tr>
<tr>
<td>Mathys Vosloo</td>
<td>GIBB</td>
<td>Project scientist</td>
</tr>
<tr>
<td>Jesse Jegels</td>
<td>GIBB</td>
<td>Public participation</td>
</tr>
<tr>
<td>Inge Schovell</td>
<td>GIBB</td>
<td>Public participation</td>
</tr>
<tr>
<td>Dr Belinda Clarke</td>
<td>CEN</td>
<td>Vegetation specialist</td>
</tr>
<tr>
<td>Mark Marshall</td>
<td>Sandula Conservation</td>
<td>Fauna specialist</td>
</tr>
<tr>
<td>Dr John Almond</td>
<td>Natura Viva</td>
<td>Palaeontology specialist</td>
</tr>
<tr>
<td>Dr Johan Binneman</td>
<td>Albany Museum</td>
<td>Archaeology specialist</td>
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<tr>
<td>Dr Deon Pretorius</td>
<td>Development Partners</td>
<td>Social specialist</td>
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3.2.7 Registration number of application

DEDEA has issued an acknowledgement of receipt in acceptance of the EIA application on 15 May 2009. The reference number for the EIA is ECm1/387/M/09-45.

3.3 Application phase

The Application phase consists of completing the appropriate registration form by the EAP and the proponent and the subsequent submission and registration of the project with the permitting authority. An application form was completed and submitted to DEDEA, Port Elizabeth office, on 23 April 2009.
3.4 Scoping phase

The Scoping Phase aims to identify the key project issues raised by the proponent, consultants and the public; consider project alternatives; and through public participation, ensure consensus is reached regarding the process to be followed in the EIA Phase. At the end of the Scoping Phase a Scoping Report is compiled. Prior to submission of the final Scoping Report to the authorities the public is provided with an opportunity to further comment on the matter.

3.4.1 Draft Scoping Report

The aim of this Scoping Report is to document the outcome of the Scoping Phase. The report includes:

- Details of the Environmental Assessment Practitioners undertaking the EIA;
- Details of the proposed project;
- Details on alternatives to the proposed project;
- Description of the legislation and guidelines applicable to the proposed activity;
- A description of the receiving environment;
- A register of Interested and Affected Parties;
- Documenting the process and outcome of public participation;
- An identification of environmental issues and impacts associated with the project proposal and alternatives;
- A description of the issues that require further investigation;
- A description of the methodology to be used in the assessment of impacts; and
- A Plan of Study for Environmental Impact Assessment which will include a description of the public participation process and terms of reference for the identified specialist studies required in the EIA phase.

3.4.2 Final Scoping Report

Once Interested and Affected Parties (I&APs) have reviewed the draft Scoping Report, any further comments are collated and the report is amended and finalised. The final Scoping Report is submitted to the DEDEA together with a Plan of Study for Environmental Impact Assessment phase.

The Department of Economic Development and Environmental Affairs (DEDEA) approved the final scoping report and plan of study for the Motherwell NU 31 housing development on 20 October 2009, subject to consideration of the Spatial Development Framework (SDF) of the NMBM and how this proposed development fits within the urban edge of the NMBM.

3.5 EIA phase

After the final Scoping Report and the Plan of Study for EIA have been accepted by DEDEA, the project will proceed into the EIA phase with specialist investigation. This phase includes the following tasks:

1. The specialist studies, which include the specialist assessments identified in the Scoping Report and any additional studies required by the authorities. This requires the appointment of specialists to gather baseline information in
their fields of expertise, and to assess the impacts and make recommendations to mitigate negative impacts and optimise benefits.

2. The Environmental Impact Report, which synthezes and evaluates relevant environmental information, potential impacts, considers mitigation measures and alternative options. The draft EIR is made available for public and authority review.

3. The Issues & Comments Report, which presents comments, issues and concerns raised by I&APs and the authorities and the relevant responses to these comments.

4. The Environmental Management Programme informs the client and the technical team of the guidelines that will need to be followed during the lifetime of the project (construction, operation, decommissioning) to ensure the environmental sustainability of the project from cradle to grave.

The EIR will be submitted to the DEDEA for their consideration and, if found acceptable, for authorisation of the proposed housing development.

3.6 Identification of ‘Listed Activities’

The NEMA section 24(5) stipulates that "listed activities" require environmental authorisation by way of a full Environmental Impact Assessment. Government Notices R. 386 and 387 (July 2006 EIA Regulations) identify the following listed activities pertinent to this proposed development as having a potentially detrimental effect on the environment:

Government Notice 387, 2: Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.

Government Notice 387, 5: The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before the publication of this notice and which has not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006, where –

(a) it is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);
(b) it is a road administered by a provincial authority;
(c) the road reserve is wider than 30 metres; or
(d) the road will cater for more than one lane of traffic in both directions.

Government Notice 386, 1: The construction of facilities or infrastructure, including associated structures or infrastructure, for (k) the bulk transportation of water in pipelines with –

(i) an internal diameter of 0.36 metres or more; or
(ii) a peak throughput of 120 litres per second or more.

Government Notice 386, 1: The construction of facilities or infrastructure, including associated structures or infrastructure, for (m) any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including -

(i) canals;
(ii) channels.
Government Notice 386, 2: Construction or earth moving activities in the sea or within 100 metres inland of the high-water mark of the sea, in respect of -

(d) embankments;
(e) stabilising walls;
(g) infrastructure.

Government Notice 386, 4: The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.

Government Notice 386, 5: The removal or damaging of indigenous vegetation of more than 10 square metres within a distance of 100 metres inland of the highwater mark of the sea.

Government Notice 386, 6: The excavation, moving, removal, depositing or compacting of soil, sand, rock or rubble covering an area exceeding 10 square metres in the sea or within a distance of 100 metres inland of the high-water mark of the sea.

Government Notice 386, 12: The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

Government Notice 386, 14: The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding - (a) masts of 15 metres and lower exclusively used (i) by radio amateurs; or (ii) for lighting purposes, (b) flag poles; and (c) lightning conductor poles.

Government Notice 386, 15: The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres.

Government Notice 386, 16: The transformation of undeveloped, vacant or derelict land to (b) residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare.

Government Notice 386, 18: The subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less.

No previous Environmental Impact Assessment (EIA) studies have been conducted on the property in question.
4  LEGISLATIVE CONTEXT

4.1 The Constitution of South Africa (Act 108 of 1996)

The legal reference source for environmental law in South Africa is found in the Constitution of the Republic of South Africa, Act 108 of 1996. All environmental aspects should be interpreted within the context of the Constitution. The Constitution has enhanced the status of the environment by virtue of the fact that environmental rights have been established (Section 24) and because other rights created in the Bill of Rights may impact on environmental management. An objective of local government is to provide a safe and healthy environment (Section 152) and public administration must be accountable, transparent and encourage participation (Section 195(1) (e) to (g)). Specific to this EIA, Section 26 asserts the right of everyone to have access to adequate housing.

4.2 The National Environmental Management Act (Act 107 of 1998)

The National Environmental Management Act (Act 107 of 1998), commonly known as “NEMA”, is South Africa’s overarching framework for environmental legislation. NEMA provides for 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 organs of state.

It sets out a number of principles that aim to implement the environmental policy of South Africa. These principles are designed, amongst other purposes, to serve as a general framework for environmental planning, as guidelines by reference to which organs of state must exercise their functions and to guide other law concerned with the protection or management of the environment.

The principles include a number of internationally recognized environmental law norms and some principles specific to South Africa, i.e. the:

- Preventive principle;
- Precautionary principle;
- Polluter pays principle; and
- Equitable access for the previously disadvantaged to ensure human well-being.

Chapter 5 of NEMA is designed to promote integrated environmental management. Environmental management must place people and their needs at the forefront of its concerns and serve their physical, psychological, developmental, cultural and social interests equitably. Development must be socially, environmentally and economically sustainable. Sustainable development therefore requires the consideration of all relevant factors including the following:

- The disturbance of ecosystems and loss of biological diversity is avoided, or minimised and remedied;
- The pollution and degradation of the environment are avoided, or minimised and remedied;
- The disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or minimised and remedied;
- That waste is avoided, or minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
• The use and exploitation of non-renewable natural resources should be utilised responsibly and equitably;
• The development, use and exploitation of renewable resources and the ecosystem of which they are part of do not exceed the level beyond which their integrity is jeopardised;
• A risk-averse and cautious approach is applied; and
• Negative impacts on the environment and on the peoples’ environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.


EIA guidelines published under NEMA

The following guidelines have been considered in the drafting of this Scoping Report:

4.3 The Housing Act (Act 107 of 1997)

The Housing Act, as amended, lays down general principles applicable to housing development in all spheres of government. In terms of section 2(1)(a) of the Housing Act, 1997, national, provincial and local spheres of government must give priority to the needs of the poor in respect of housing development, and must promote the establishment of socially and economically viable communities and of safe and healthy living conditions. The Act further promotes higher density in respect of housing development to ensure the economical utilisation of land and services.

4.4 The Social Housing Act (Act 16 of 2008)

The establishment and promotion of a social housing environment that is sustainable forms a key objective of the Social Housing Act. To this end, the following general principles must be observed:
• The social, physical and economic integration of housing development into existing urban and inner-city areas through the creation of quality living environments must be achieved;
• The economical utilisation of land and services must be ensured;
• Social, community and recreational facilities close to social housing development must be provided; and
• Social housing stock must be located at suitable locations with respect to employment opportunities.

4.5 The National Water Act (Act 36 of 1998)

The National Water Act (Act 36 of 1998) is the fundamental law for managing South Africa’s water resources. The purpose of the Act is to ensure that water resources of the nation are protected, used, developed, conserved and controlled. It is concerned with the allocation of equitable access and the conservation of water resources within South Africa. The National Water Act (Act 36 of 1998) repeals many of the powers and functions of the Water Act (Act 54 of 1956).

Key aspects of the National Water Act:
• Catchment Areas - Any disturbance to a watercourse such as the construction of a dam or weir type facility requires authorisation from the Minister of Water Affairs and Forestry.
• Water Supply - Under the National Water Act, a developer is required to obtain the necessary permits for water usage and the disposal of wastewater from the authority responsible for the administration of the Act, namely the Department of Water Affairs & Forestry (DWAF).
• Any private well or borehole sunk for the abstraction of groundwater has to be reported and registered with the regulatory authority.
• Wastewater - The National Water Act is the principal piece of South African legislation governing wastewater management. Under the Act there are several important issues relating to wastewater to note:
  - It is generally prohibited to allow stormwater to enter sewer systems;
  - It is an offence to wilfully or negligently pollute surface water or groundwater;
  - In the event of a pollution incident, the offending party is obliged to report the incident to the regulatory authority; and
  - The regulatory authority can take the necessary steps to prevent the pollution of water resources and can recover the costs of clean up from the polluter.

4.6 NEM: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) provides for the management and conservation of South Africa’s biodiversity within the framework of the NEMA. This Act allows for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources and the establishment and functions of the South African National Biodiversity Institute.

Key elements of the Act are:
• The identification, protection and management of species of high conservation value;
• The identification, protection and management of ecosystems and areas of high biodiversity value;
• Biodiversity Initiatives such as the STEP (Subtropical Thicket Ecosystem Plan) and CAPE (Cape Action plan for People and Environment) may become accepted as bioregional plans and are thus implemented as legislation;
• Alien invasive species control of which the management responsibility is directed to the landowner; and
• Section 53 of the Act identifies that any process or activity that is regarded as a threatening process in terms of a threatened ecosystem, requires environmental authorisation via a full Environmental Impact Assessment (Government Notice No. 387).

Applicable guidelines related to biodiversity conservation considered in this draft Environmental Impact Report are taken from Stewart et al. (2005).

4.7 National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act (Act 25 of 1999) aims to promote the good management of the national estate of South Africa. The national estate can include:

• Places, buildings, structures and equipment of cultural significance;
• Places to which oral traditions are attached or that are associated with living heritage;
• Historical settlements and townscapes;
• Geological sites of scientific or cultural importance;
• Archaeological and palaeontological sites;
• Graves and burial grounds, including:
  – Ancestral graves;
  – Royal graves and graves of traditional leaders;
  – Graves of victims of conflict;
  – Graves of individuals designated by the Minister by notice in the Gazette; and
  – Historical graves and cemeteries.
• Other human remains not covered in terms of the Human Tissue Act, 1983 (Act No 65 of 1983); and
• Sites of significance relating to the history of slavery in South Africa.

In terms of Section 38 of the Act, the South African Heritage Resources Agency (SAHRA) must be notified during the early planning phases of a project for any development that includes the following activities:

• The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
• Any development or other activity which will change the character of a site exceeding 5 000 m² in extent; or
• Involving three or more existing erven or subdivisions thereof;
• Involving three or more erven or divisions thereof which have been consolidated within the past five years; and
• The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
• The re-zoning of a site exceeding 10 000 m² in extent; and
• Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

4.8 Municipal Systems Act (Act 32 of 2000)

The Municipal Systems Act (Act 32 of 2000) provides for the core principles, mechanisms and processes that are necessary to enable municipalities to provide for community participation and for the integration of all activities for the overall social and economic upliftment of communities in harmony with their local natural environment. It also states that a fundamental aspect of the new local government
system is the active engagement of communities in the affairs of municipalities of which they are an integral part.

The Act requires the implementation and monitoring of Integrated Development Plans, the setting of targets and key performance indicators, including environmental targets, as well as the preparation of by-laws and policies that deal with environmental issues.

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

The Promotion of Access to Information Act (Act No. 2 of 2000) makes provisions and conditions specifically for right of access and application for access to information and records.

4.10 The Prevention of Illegal Eviction and the Unlawful Occupation of Land Act, No. 19 of 1998

The Prevention of Illegal Eviction and Unlawful Occupation of Land Act protects South Africans from being unlawfully evicted from the land or property they live on. It sets out the procedure for the eviction of unlawful occupiers of land and states that no person may be arbitrarily evicted from their home. According to the Act, the circumstances of the person being evicted must be taken into account and the law should be carried out in a fair manner. The Act also puts a duty on the court to give special consideration to the rights of the elderly, disabled persons and particularly households headed by women. Act 19 of 1998 was promulgated in recognition of Section 26 (3) of the Constitution and that it is desirable that the law should regulate the eviction of unlawful occupiers from land in a fair manner.

4.11 Policy guidelines (IDP, SDF, NM MOSS)

4.11.1 Integrated Development Plan

Municipalities are faced with a complexity of legal obligations to safeguard the environment in all land use planning, land development and subdivisions. Through the Constitution and the National Environmental Management Act, and more specifically the Municipal Systems Act (No. 32 of 2000), NMBM is obligated to take all reasonable measures to manage the environment and its sustainability.

The Municipal Systems Act sets out the legislation guiding developmental local government. According to the definitions in Chapter 1, ‘environmentally sustainable’ means the provision of a service that aims to ensure that risks of environmental harm and risks to human health and safety are minimised to the extent reasonably possible under the circumstances, and the potential benefits in these areas are maximised to a similar extent, while legislation intended to protect the environment and human health and safety is complied with. Chapter 5 requires that municipalities develop an Integrated Development Plan (IDP) as the principle strategic planning instrument guiding and informing all planning, budgeting, management and decision-making in the municipality. An IDP should be based on a long-term vision through integrating planning and management across people, economy and the environment.

Hence, the Integrated Development Plan 2008 – 2012 of the Nelson Mandela Bay Metropolitan Municipality, 7th Edition, was extensively consulted in this EIA process.
4.11.2 Metropolitan Spatial Development Framework

The Nelson Mandela Bay Municipality Metropolitan Spatial Development Framework of 2007 (NMBM SDF) also formed an important policy document for this EIA process. The MSDF is a plan outlining the desired spatial development of the metropolitan area as contemplated in Section 25(e) of the Municipal Systems Act (Act 32 of 2000). It also highlights priority investment and development areas and will serve as a guide to decision-makers and investors. It should be emphasised that the MSDF is an integral component of the IDP and translates this plan into its spatial implications to provide broad, overall development guidelines.

The NMBM SDF identifies ‘Strategic Development Areas’ as far as future residential expansion is concerned, of which Motherwell is one. Other major ‘Strategic Development Areas’ that have been identified include Walmer (Gqeberha), KwaNobuhle, Uitenhage East, Wells Estate and Hunters Retreat (end of Walker Drive). The development of these areas has been phased based on the availability of bulk service infrastructure. Housing developments at all these precincts will have to take place in order to meet the very substantial housing demand in the Metro.

The NMBM SDF was subjected to a Strategic Environmental Assessment (SEA) (Stewart & van Gend 2008). The study addresses conservation planning at a fine scale and seeks to provide a framework for the conservation of a representative proportion of the biodiversity endemic to the metropolitan area in addition to identifying economic and social opportunities. As the SEA provides updated information on the conservation status of the vegetation types occurring within the NMBM, it was extensively consulted in this EIA process.

4.11.3 Motherwell Urban Renewal Programme (MURP)

The broad objectives guiding the Motherwell Urban Renewal Programme (MURP) are poverty alleviation, human resource development, enterprise development, enhancement of capacity of local authorities, economic and social infrastructure and strengthening of crime prevention and reduction strategies and initiatives. The Motherwell Urban Renewal Programme is fully integrated into the municipality’s IDP, providing the basis for co-operation and integration in the implementation of projects.
5 DESCRIPTION OF THE DEVELOPMENT PROPOSAL

5.1 Location of the proposed activity

The Motherwell NU31 housing development is situated entirely within the boundaries of portion 2 of farm 316, Uitenhage (SG no: C07600000000003160002), in Motherwell. It is located approximately 4.5 km north of the lower Swartkops Estuary (Figure 2) and is approximately 147.67 ha in extent. It is bordered in the north by the MR460 road connecting Uitenhage and Addo. The new developments of NU29 and NU 30 are situated along the eastern border of NU 31.

Figure 2. Regional map showing the position of the site within the NMBM

Zoning is controlled in terms of the Motherwell Town Planning Scheme and the remainder of farm 316 is currently zoned as Undetermined. A rezoning and subdivision application must therefore be lodged with the NMBM. This may only continue after a positive Record of Decision has been issued by the Department of Economic Development and Environmental Affairs (DEDEA). The proponent has proposed to rezone the remainder of Farm 316 into a sub divisional area to enable the development of a mixed and integrated residential area.
5.2 Development proposal

5.2.1 Developable area

The developable area available for the NU 31 development equates to approximately 148 ha and represents approximately 33% of the total area within portion 2 of farm 316 (Figure 3). The western section of portion 2 of farm 316 consists of low lying areas where stormwater may accumulate and are prone to flooding, making these areas unsuitable for development.

It is proposed to subdivide and rezone the developable area into a total of 5202 erven (Table 2). The majority of the erven will accommodate residential houses. In addition, several large and smaller community sites are provided throughout the proposed development area. Some residential erven have been consolidated to create a large site for the multi-purpose centre next to the Motherwell reservoir, which it is envisaged may include a resource centre/community hall, sports fields, clinic, administrative offices, library and other institutional facilities. Figure 3 represents the conceptual layout of Motherwell NU 31. A map of the proposed greater development layout (i.e. including NU29, NU30, and part of NU12) is available in Appendix D1.

Table 2. Land use, zoning and number of units proposed for the Motherwell NU 31 development.

<table>
<thead>
<tr>
<th>Type</th>
<th>Zoning</th>
<th>No of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single unit dwellings</td>
<td>Residential 1 &amp; 3</td>
<td>4203</td>
</tr>
<tr>
<td>Walk-ups</td>
<td>Residential 4</td>
<td>945</td>
</tr>
<tr>
<td><strong>Residential units</strong></td>
<td><strong>5148</strong></td>
<td></td>
</tr>
<tr>
<td>Business units</td>
<td>Business 1 &amp; 4 (mixed use)</td>
<td>9</td>
</tr>
<tr>
<td>Institutional</td>
<td>Institutional</td>
<td>3</td>
</tr>
<tr>
<td>Community facilities</td>
<td>Community 1</td>
<td>9</td>
</tr>
<tr>
<td>Public open space</td>
<td>Open Space 1 &amp; 2</td>
<td>33</td>
</tr>
<tr>
<td>Roads</td>
<td>Transport 1</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5202</strong></td>
<td></td>
</tr>
</tbody>
</table>

The proposed layout for NU31 has been designed in line with the concept of sustainable human settlements. The proposed development will thus include areas zoned for mixed use with the aim to establish development corridors. Based on this a number of larger and smaller business sites are provided throughout the neighbourhood unit. It is envisaged that the development corridors will accommodate convenience retail for groceries and other day to day services, specialist shops, business, take away outlets, public transport facilities, industrial type services for local repair, parking, and high density residential units, amongst other. These areas will be located along the main roads, prominent junctions, closer to the centre of neighbourhoods and within the main business node. These mixed use developments shall typically comprise residential units behind and/or above business premises depending on the scale and building costs associated with a multi-storey development.
Figure 3. Proposed layout for the Motherwell NU 31 housing development, indicating zonation.
The mixed use development can occur on a single property or in a single building and may include three-storey blocks dependant on whether parking will be located in the basement or next to the building, depending on the affordability profile of the target population. Erven along the MR460 have been identified as the main development corridor for mixed use. The MR460 shall remain a high speed and high capacity road. Road junctions will be spaced sufficiently to ensure traffic safety and free traffic movement. It is also proposed that access to properties adjacent to the MR460 be limited to major signalised intersections at appropriate distances (±250 metres). Pedestrian bridges over the MR460 shall be provided where appropriate, subject to the availability of funds. Public roads in NU 31 have a design width of 8 m. A large number of the neighbourhood blocks in NU 31 will terminate in cul-de-sacs to minimize through traffic in these residential enclaves. These measures have been included in the development layout to improve pedestrian safety and provide more evenly distributed public spaces and squares.

A variety of housing types have been allowed for in the proposed NU 31 housing development. Housing type categories include free standing units, semi-detached units and walk-ups (Figure 3). A range of erven sizes have been identified for the proposed development and specific housing types will be associated with each category of erven sizes.

5.2.2 Alignment with the NMBM's IDP and SDF

The current housing shortage has been highlighted from the outset in the situational analysis of the NMBM's Integrated Development Framework (IDP) as a key challenge that must be addressed. The IDP further states that the NMBM has moved its focus from simply providing shelter to establishing integrated sustainable human settlements and providing good quality housing. In addressing this, the first two, amongst several, key issues the IDP identifies as requiring action are the provision of integrated service delivery and human settlements and the elimination of the housing delivery backlog of 87,000 units through the provision of quality housing and the structured upgrading of informal settlements. Attempts to achieve this have resulted in the identification of the Motherwell area as a strategic development area and urban renewal node. This has resulted in the establishment of the Motherwell Urban Renewal programme (MURP) where the three spheres of government, with support from international partners such as the European Union, work together to eradicate poverty and unemployment.

The Spatial Development Framework forms part of the NMBM's Integrated Development Plan (IDP). Where policies, strategies or actions identified in the IDP have a spatial dimension, these need to be accounted for in the Spatial Development Framework. Leading from the IDP, Motherwell has been identified as a strategic development area in the NMBM SDF, earmarked as one of the major precincts for future residential expansion. The expansion of the Motherwell precinct north-westwards of the Swartkops River has been justified by the fact that this land is not too steep for development, not affected by servitudes, and is not part of the Metropolitan Open Space System (MOSS). According to the SDF, expansion into this area further carries the best potential for future housing development as development opportunities along the main Port Elizabeth - Uitenhage Road are becoming limited. Future expansion from Motherwell North extending westwards toward Uitenhage is foreseen in the short to medium term (i.e. between 2010 to 2020). The SDF is provided in Appendix D2. The proposed Motherwell housing development also falls completely within the expanded urban boundary as identified in the NMBM SDF.
5.3 Roads

5.3.1 Existing roads

The existing roads of metropolitan significance serving the proposed NU 31 development include Tyinira Street traversing NU 12, and the MR460 connecting Uitenhage and Addo. Tyinira Street is to be upgraded by resurfacing the existing tarred road. The road reserve is to be increased to 40 m to allow for future widening as part of the integrated transport plan for the Motherwell area. **However, this future widening of the Tyinira Street will not form part of this EIA application and will be dealt with in a separate application at a future date.** Provision is made in the NU 12, NU 29 and NU 30 layouts for road links from the developed portion of NU 10 to NU 12 to the east of Tyinira Street. These links will be extended to NU31 to improve connectivity and accessibility. A north-south major escarpment arterial from Dibanisa Road connecting to the MR460 is proposed in the future to service NU 31. Three east-west road corridors connecting to the road network of NU 29 and NU 30 are proposed to extend westward from the escarpment arterial to serve the interior residential blocks and roads of NU 31.

5.3.2 NMBM Integrated Transport Plan

The development of the NMBM comprehensive integrated transport plan (2010) was informed by the latest Municipal Spatial Development Framework, which identified the achievement of three focal points as critical to realize restructuring, integration and sustainability in the NMBM. These focal points are:

- The development of sustainable community units (SCUs) that can promote socio-economic integration and provide for economic activities and employment opportunities. All SCUs in Nelson Mandela Bay are to be linked by a public transport network that will ensure that all areas are accessible to all communities by means of public transport.
- The development of corridors along major routes that have the potential for integrated mixed land use development, supported by improved public transport services.
- The promotion of economic growth and development through, amongst others, the linking of residents in the metro to opportunities.

The transport plan proposed improvements to the following sectors and services that include the suburb of Motherwell (Figure 4). These improvements include:

1. The Transport Master Plan identified the need for an Integrated Rapid Public Transport Network (IRPTN), and has identified potential IRPTN routes which will run predominantly through previously disadvantaged areas connecting Motherwell, Kwamagxaki and Cleary Park with Korsten, Greenacres and the Inner City CBD. Three principal routes were identified for the first phase of implementation, one of which includes the so-called Motherwell loop and Motherwell to Uitenhage connection.
2. In addition to the IRPTN routes, express bus services will be provided to reduce travel time where needed. One example is from Motherwell to the CBD where travelling along the IRPTN route via Njoli Square will take almost one hour compared to less than half an hour for the express route along the N2 freeway. The Motherwell express services will also be linked to Greenacres/Newton Park joining the IRPTN system along Kempston Road from the N2 freeway.
3. Main bus lines are defined to provide direct services between important destinations not covered by either the IRPTN or express bus systems. These
are routes such as Motherwell to CBD via Deal Party, which is an important work destination.

4. In the National Rail Plan, the Passenger Rail Association of South Africa (PRASA) has indicated that in 3 to 5 years the Motherwell commuter rail extension could be constructed. However, an extended railway service will not be justified before 2015, except for a possible extension into Motherwell. The Rail Plan further identified a number of corridors that will form the basis of the long term rail network. These include, amongst others, the Motherwell Corridor and the northern Motherwell - Uitenhage link. Development and implementation of the Motherwell Loop is further regarded as the highest planning priority for implementation.

A Strategic Environmental Assessment (SEA) of the draft Spatial Development Framework (SDF) for Nelson Mandela Bay was completed in 2008 (Stewart & van Gend 2008). The SEA included an assessment of the impact that roads proposed in the short- and medium-term, as part of the NMBM Transportation Plan (2006), would have on biodiversity habitat (vegetation types), ecological processes, and Species of Special Concern (SSC) at a strategic level in Nelson Mandela Bay. Suggestions made in the SEA led to amendments in the flawed road alignments and layouts identified in the SEA. These amendments have subsequently been made to the Long Term Transport Network (LTTN) for Nelson Mandela Bay, both in terms of changes to the alignment of proposed routes as well as the inclusion of new proposed routes. No realignment of routes potentially affecting the Motherwell NU 31 housing development in the mid-term was identified in the SEA for the NMBM SDF.

A 2004 travel survey revealed that at the time of the survey walking was the predominant mode of travel in the low income areas of Ibhayi, Kwanobuhle/ Rosedale and Motherwell. The travel survey results further illustrated that as household income increases for low income categories, there is a shift from walking to use of public transport, which is the dominant mode in the R18 000 – R42 000 per annum income category, where after private transport use becomes increasingly dominant. This trend is currently still expected in these in the mentioned areas. In light of this and the conclusions of the NMBM's comprehensive integrated transport plan, it can be assumed with high confidence that residents that will be relocated to the NU31 housing development will fall into this low income resident category and that the main mode of transport will thus be walking or the use of public transport. **No significant traffic impacts from increased or high motor vehicle traffic by use of personal vehicles is thus expected.**

Ultimately the long term transportation network, of which the transportation and road layouts that informed the Motherwell NU12-29-30-31 housing development is part of, has been optimised through the SEA for the NMBM SDF and the NMBM Transport Master Plan.
Figure 4. Long Term Transport Network for the NMBM.
5.4 Bulk services

5.4.1 Stormwater management

The Motherwell area contains land-locked pans separated by localised ridges that retain stormwater. Initial preliminary investigation of the natural flows from the proposed development area indicates that the Motherwell reservoir is situated on a high lying area. The thicket vegetation on the northern, north-western and western boundaries of the Motherwell water reservoir naturally traps a large proportion of the runoff draining towards the Cerebos salt works. Natural depressions further aid this trapping function. Natural drainage lines indicate that runoff in the north-eastern section of the proposed development will drain towards the north and north-east, whereas runoff draining the south-eastern sector of the proposed development drains east- and south-eastwardly (Figure 5). It is expected that measurably more stormwater runoff will drain from the proposed NU 31 development due to the removal of vegetation and hardening of the soil surface. A good indication of the envisaged amount of stormwater will only be known once designing engineers have investigated the stormwater aspects of NU31 in detail.

Figure 5. Preliminary assessment of the natural stormwater flow through the proposed NU 31 development. Brown coloured areas indicate high lying areas, while blue coloured areas indicate low lying areas.

Preliminary design indicate that stormwater originating from the north- and south-eastern sections of the proposed development will successfully be drained to the
proposed stormwater infrastructure in NU 31, which in turn will tie into existing stormwater infrastructure in the Motherwell NU 29 and NU 30 developments. Stormwater in the north-western, western and south-western sections of the proposed development cannot successfully be drained through gravity feed to existing stormwater infrastructure to the east of the proposed development. As a result, stormwater runoff to the west will have to be accommodated by other means.

It has been proposed that a stormwater canal be constructed from the western boundary of the proposed development towards the western low lying areas, eventually discharging in the Swartkops River estuary. No preliminary stormwater designs have been developed as a service provider has not yet been appointed by the NMBM. However, consultation with a stormwater design and engineering specialist at GOBA Consulting Engineers (GOBA is also the project leader of the Motherwell NU 29, 30, 31 and 12 housing development project) have provided expert advice on the viable options and any potential alternatives that may prove viable.

5.4.2 Sewage and sanitation

The study area falls into the catchment area of the Fishwater Flats Treatment Works. A 350 mm diameter bulk sewer pipeline has already been installed to serve NU 29 to NU 31. Internal sewerage infrastructure to service households in NU 31 will be installed during the construction phase and will be tied into the existing bulk sewage infrastructure. Detailed design of bulk sewage infrastructure for NU 29, NU 30 and NU 31 were completed in light of the existing pressure on the bulk sewage infrastructure and designing engineers are confident that the Fishwater Flats sewerage system has the capacity to successfully incorporate additional sewage loads.

5.4.3 Water supply

NU 31, as well as adjacent NU 29, 30 and 12, will largely be served by the Motherwell water reservoir located approximately in the centre of the proposed NU 31 development. The parts of NU 31 immediately surrounding the Motherwell reservoir, however, will be serviced from the proposed Amanzi reservoir, which will be located immediately north of the MR460, and the existing Coegas Kop reservoir. The top water level of the Motherwell reservoir is 109 m. The capacity of the Motherwell reservoir is 34Mℓ, 23Mℓ of which was constructed in 1986 and the remaining 11Mℓ in 2006.

5.4.4 Electricity

A significant Eskom electrical transmission line linking the Grassridge and KwaMagxaki substations traverses the NU29 and NU30 housing developments. Electricity for the new NU 31 development will thus be sourced directly from this 132 kV powerline linkage via an existing substation close to the proposed development.

5.4.5 Lighting

It is proposed that high mast lighting will be incorporated into the proposed development to provide lighting for the interior of the development area. Further, it is proposed that street lights will be erected along the main roads and transportation axes to provide lighting along the roads.
5.4.6 Solid waste management

The municipal solid waste removal system including transfer stations will be introduced into the proposed development on completion as in the rest of Motherwell.
6 PROJECT ALTERNATIVES

6.1 Consideration of reasonable and feasible alternatives

The EIA Regulations require that alternatives to a proposed listed activity be considered. Alternatives are different means of meeting the general purpose and need of a proposed activity. This may include the assessment of site alternatives, activity alternatives, process or technology alternatives, temporal alternatives and/or the no-go alternative. The EIA Regulations indicate that alternatives that are considered in an assessment process be reasonable and feasible.

Alternatives considered in this Draft Environmental Impact Report include:

- Site alternatives
- Technology alternatives;
- Activity alternatives; and
- The no-go option.

6.2 Site alternatives

The identified site alternatives revolve around the identification of the most economic and environmentally acceptable means of dealing with the stormwater emanating from the western part of the proposed development. All site options will have associated with it the development and construction of stormwater ponds to attenuate and aid in treating stormwater runoff. In the event that detailed stormwater design identifies one of the site alternative options that include the release of stormwater into the Swartkops estuary, a water use licence application will have to be lodged with the Department of Water Affairs. Such an application is not included in this EIA as any option involving stormwater release into the Swartkops estuary can only be confirmed through detailed design and the required information to complete the application is resultantly not available at the time of submission of the this EIA authorisation application.

6.2.1 Site alternative 1: Stormwater canal position 1

Site alternative 1 proposes the construction of a shaped and grassed earth, or part earth, stormwater canal leading from the north-western boundary of the proposed development to the Swartkops estuary. The location of the potential stormwater canal (alternative) 1 leading from the western boundary of the proposed development towards the Swartkops estuary has been optimised to minimise intrusion into the protected Zwartkops Nature Reserve (Figure 6).
Detention ponds will likely be located within the development footprint of NU 31 and will most likely be incorporated into public open spaces or erven zoned for institutional purposes where they can also serve as a sports field associated with a school, for example. These stormwater detention ponds must be designed to contain at least a 1:50 year design flood and must release stormwater into the proposed stormwater canal at pre-development flow rates to prevent erosion of the proposed canal (if constructed as an earth canal). Stormwater detention ponds must contain screens to remove solid waste entering the detention ponds from the stormwater infrastructure.
The advantage of site alternative 1 is that it will be located along an existing servitude where destruction of natural vegetation will be minimal. The position of the canal will also minimise intrusion into the Zwartkops Nature Reserve. A disadvantage may be that the canal may create a physical barrier that may limit or diminish the movement of fauna from and to the Zwartkops NR. Proposed measures to mitigate the physical barrier include the provision of several “animal bridges” at existing ground level across the canal to allow movement of fauna between the reserve areas. Polluted stormwater discharge into the Swartkops estuary is a further concern and has been highlighted by I&APs during the scoping phase of this EIA. These impacts however can be largely eliminated through effective mitigation. Proposed mitigation measures for this site alternative are discussed in more detail in the in the draft EMP (Appendix H). Site alternative 1 should be considered in conjunction with the technology alternative 1 and/or 2, and proposed mitigation measures in this section and the draft EMP (Appendix H).

The proposed stormwater canal is set to cross private land belonging to the Cerebos salt works and the viability of this alternative will also depend on successful negotiations with Cerebos to construct the stormwater infrastructure across their property. The proposed stormwater canal will be designed to intercept all stormwater emanating from NU 31 to prevent contamination of the Cerebos salt works and operations.

The proposed location where stormwater will discharge into the Swartkops River will be located approximately 6.7 km upstream from the Redhouse Yacht Club. This location is very close to the head of the estuary where tidal influence is minimal. It is not expected that the volume of stormwater will influence the flow velocities in the upper part of the Swartkops estuary given the relatively small size of the section of NU 31 drained. The terrain through which the proposed canal in site alternative 1 (green line) will traverse is very flat before reaching the slope of the escarpment (Figure 7).

![Figure 7. Elevation vs distance for each of the site alternatives. S1 – site alternative 1, S2 – site alternative 2, S3 – site alternative 3.](image-url)
6.2.2 Site alternative 2: Stormwater canal position 2

The location for the stormwater canal (alternative) 2 is based on the position of a potential stormwater canal within the major transmission line servitude via the nearest slope down to a point in the Swartkops estuary where the distance from bank to the foot of the low plateau is shorter when compared to alternative 1. This alternative will also cause minimal destruction and disturbance of intact natural vegetation. The potential impact of the proposed alternative 2 on the migration of fauna across the barrier and negative impact on the Swartkops estuary also exists to the same degree as in site alternative 1. Mitigation of the potential negative impacts are the same as for site alternative 1, and this alternative should also be read in conjunction with the most optimum technology alternative and proposed mitigation measures in the draft EMP (Appendix H). The proposed stormwater canal will be designed to intercept all stormwater emanating from NU 31 to prevent contamination of the Cerebos salt works and operations.

6.2.3 Site alternative 3: Stormwater canal position 3

Site alternative 3 proposes the construction of the stormwater canal largely inside the boundary of the Motherwell NU 31 housing development, stretching from the north-western boundary of the development along the perimeter of the site to the southernmost tip of the development, where it leaves the development footprint. It is proposed that from there it enters the transmission line servitude and follows this servitude the edge of the escarpment before running downhill and discharging into the Swartkops estuary.

The advantage of this alternative is that the canal will not be constructed on the privately owned Cerebos land, but will be located on municipal property. The disturbance to natural vegetation is also expected to be minimal as is the case in the other two alternatives. The disadvantage of this alternative is that the length of the canal to be constructed will be approximately 5300 m, making the construction very costly. Further, the successful drainage of the north-western portion of the development will require a gravity feed, which will mean that the canal, or bulk stormwater infrastructure, may require a depth in the central area of the development in excess of 10 m to accommodate the gravity feed.

The potential impact of the proposed alternative 3 on the migration of fauna across the barrier and negative impact on the Swartkops estuary also exists to the same degree as in the first two alternatives. Mitigation of the potential negative impacts remains the same as for the first two alternatives, and this alternative should also be read in conjunction with the most optimum technology alternative and proposed mitigation measures in the draft EMP (Appendix H). The proposed stormwater canal must be designed to intercept all stormwater emanating from NU 31 before it leaves the development site. This should prevent contamination of the Cerebos salt works and operations.

6.2.4 Site alternative 4: Redirecting stormwater towards existing stormwater infrastructure in the east

This alternative, although not considered viable, represents the only other potential option to manage stormwater coming from the western portion of the proposed NU 31 housing development. This option proposes that all stormwater will need to be captured and stored temporarily in a stormwater pond. From there it will have to be pumped through a rising main to the existing infrastructure in NU 29 or NU 30. The disadvantage of this option is that the construction and operation costs will be hugely
expensive and will very likely not be able to be accommodated within the subsidiary budget earmarked for the greater NU 29, 30, 31 and 12 housing development. Further the temporary stagnant water may have health implications to the surrounding residents. The advantage of this option is that it will not create another discharge point for stormwater into the Swartkops estuary, but stormwater will make its way along the existing stormwater infrastructure and be discharged into the Swartkops estuary via the existing Motherwell stormwater canal. A secondary disadvantage of this alternative is that the longer distance the stormwater travel from the western parts of NU 31, whether via an open stormwater canal or closed stormwater infrastructure, the greater the potential for the stormwater to become contaminated with heavy metals and biological contaminants before discharging into the Swartkops estuary.

6.2.5 Future alternatives

In the event that the above alternatives are found not to be viable after the issuing of a positive record of decision, and the appointed specialist stormwater engineer identifies or develops another alternative, the newly identified alternative must be assessed by an environmental assessment practitioner in an amendment to the RoD.

6.3 Technology alternatives

6.3.1 Technology alternative 1: Artificial wetland system and screen network

It is proposed that excess pollutants be removed before stormwater enters the Swartkops estuary. This technology alternative will serve as an alternative to not implementing a water management and purification system associated with the proposed stormwater canal.

A constructed artificial wetland is well suited to act as a stormwater treatment system. The constructed wetland removes pollutants from the stormwater as the water progresses through the wetland. The wetland further removes total suspended solids, nutrients and other contaminants of concern by physical and biological processes. The artificial wetland system must be preceded by a series of screens to capture solid matter and waste entering the canal with the stormwater. These screens shall have to be maintained and cleaned on a regular basis by the proponent. The planning and design of the proposed artificial wetland must be conducted according to best international and national management and operational practices and guidelines.

6.3.2 Technology alternative 2: Bioretention system

This alternative proposes the implementation of a bioretention system within the proposed development footprint and/or within the proposed stormwater canal(s) discussed in section 6.2. The bioretention system can be incorporated with the proposed stormwater infrastructure on the flat areas within the development footprint where it can be constructed to effectively drain stormwater during minor rain events, thus decreasing the volume of stormwater draining towards the Swartkops estuary.

In a bioretention system, stormwater is filtered through a prescribed media before being collected by an underlying perforated pipe. In this kind of system stormwater pollutants are removed by a combination of physical and biological processes. An advantage is that bioretention systems can be constructed to suit the landscape requirements and stormwater harvesting practices can harvest stormwater for landscape maintenance where it proves to be viable. A disadvantage of the bioretention system is that it will likely only accommodate runoff during low flow
conditions. Also, costs to implement such a system may not be viable for low cost housing developments where the implementation of the housing development is highly dependent on the availability on government funding and grants. The planning and design of the proposed bioretention system must be conducted according to best international and national management and operational practices.

6.4 Activity alternatives

6.4.1 Activity alternative 1: Implementation of a 50 m buffer zone on the south-western boundary of the site

This activity alternative was proposed by the vegetation specialist in response to potential edge effect impacts of the proposed development on the adjacent intact natural vegetation. It is proposed that a 50 m buffer zone be implemented along the western and south-western boundary of the proposed development to mitigate any potential edge effect impacts. This alternative will ultimately create a buffer zone of 73750 m² (1750 m x 50 m) along the western to south-western boundary. The advantage of this alternative is that it creates a buffer area between the proposed development and the Cerebos boundary and sensitive vegetation adjacent to the development. The disadvantage of this alternative is that this buffer area may create an unwanted "recreational" area frequented by vagrants. This may cause continued illegal dumping in this area and increased incidences of petty crime as this area will not be regulated. It will also not have standard vehicular access making it even more difficult to patrol by law enforcement officials. The question has also arisen as to who will take responsibility over this area. The proposed buffer zone will also have an unwanted impact on the proposed development as a number of living units may be lost and further densification in the remaining development footprint may be necessary.

6.4.2 Activity alternative 2: Construction of a fence along the south-western boundary of site, supported by strategic development layout

This activity alternative is proposed as an alternative to activity alternative 1 above. This alternative proposes the construction of a palisade-type fence along the western to south-western boundary of the proposed development (Figure 8). The internal layout of the proposed development has been optimised so that the housing units located in this section of the development will be largely bank financed housing catering for a slightly more exclusive and quiet suburban lifestyle. The entire development will also aim to promote a well balanced development with landscaped public open spaces, shopping, community and institutional facilities to create and support a well defined sense of place. Road access to the boundary fence will largely be eliminated as housing units will be located against the boundary fence in most places. Units for institutional and community facilities, and public open space was further strategically located along this boundary, where some degree of control can be exercised most of the time.

The advantage of this option is that the fence will form an effective barrier between the development and the adjacent land and vegetation without occupying a large area. The fence will also aid in the protection of the housing units located on the fringe of the development against criminal activity, thereby making these bank financed units more attractive to potential buyers. The palisade-type fence should be constructed to allow the free movement of small mammals across the boundary. A disadvantage of this option is that it may be costly to construct and depending on the material used for construction of the fence, parts of the fence may be subject to theft.
The impact of including a palisade-type fence along the edge of the development is expected to be very low.

6.4.3 Activity alternative 3: Densification of the proposed development layout

This alternative is proposed in light of the impact of the proposed development on the Motherwell Karroid Thicket vegetation. It is proposed that the internal layout be densified through the design of more double story and walk up units thereby creating more space along the edges of the development site where the endangered vegetation types can be left intact. This may also necessitate the reduction of the erf sizes to effect more space saving. The advantage of this alternative is that a reasonable chance exists that it may translate into enough space to preserve a meaningful area of the endangered Motherwell Karroid Thicket.

The disadvantage of this activity alternative is that the concept of densification has been wholly rejected by most beneficiary communities in the metro, and instances have already been reported where such rejection of densification proposals have caused notable delays in housing and service delivery in the Motherwell area. The concern also exists that potential densification of the layout may not create a significant enough area that will result in a notable ecological benefit, which may result in the decrease or removal of some of the community or open plan sites to make the benefit from the densification viable. This may ultimately influence the economic benefits and the sense-of-place perceived by the beneficiary community.
6.5 No-Go alternative

The No-Go alternative proposes that no development occurs on the proposed site. The development site will therefore be left intact with no vegetation disturbance occurring as a result of construction activities. Alternative activities on this portion of land, in the event that the development does not go ahead, may include potential rehabilitation of the proposed vegetation types. It is however unknown what degree of rehabilitation success may be expected. The disadvantages of this alternative are that the NMBM will not fulfil the terms of its mandate to provide housing to qualifying beneficiaries in the short term. Service delivery will continue to remain a point of discontent amongst poor informal residents. Further, the development of the greater NU 29, 30, 31 and 12, depends on the cumulative subsidies for all four neighbourhood units in order to subsidise bulk service infrastructure installation and provide the necessary public amenities. Therefore successful and timely completion of NU 29, 30 and 12 is likely to be affected.
7 NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT

7.1 Recipients of government subsidised housing

The Motherwell housing project aims to provide serviced low cost housing for low to no income families that qualify for government housing subsidy and have been identified by ward councillors across the metro as recipients of low income housing. These identified recipients are, amongst others, victims of the 2006 floods in the Swartkops flood plain, occupants of informal settlements within retention ponds, in the servitude areas under power lines, living within the road reserves of roads earmarked for upgrade, and recipients living in and around the New Brighton tip site.

7.2 Health and environmental concerns

Many informal settlements located within the Swartkops River flood plain are not serviced and the residents mostly use the bucket system to dispose of their sewage. Consequently, residents often empty their buckets into the stormwater drains, drainage channels or vegetated areas. This poses a major health and environmental threat to the people residing in the flood plain and the Swartkops River and estuarine ecosystems. Raw sewage entering the Swartkops Estuary causes the introduction of high nutrient levels into the estuary, which may lead to eutrophication of the estuary. Eutrophication is one of the principal threats to coastal ecosystems, especially urban estuaries, and may cause changes in the community structure and biodiversity patterns of the Swartkops Estuary. Eutrophication also decreases the water quality for the affected system and could thus negatively impact the recreational function of the Swartkops Estuary.

7.3 Government responsibility towards social upliftment

The Motherwell housing projects are rooted in the ANC Freedom Charter of 1955, which proclaims “Slums shall be demolished, and new suburbs built where all have transport, roads, lighting, playing fields, crèches and social centres”. Recognizing that previous township schemes failed to create functioning communities, the Motherwell Project aims to provide much more than shelters. By building houses of different layout and market value as well as providing all necessary amenities, the project hopes to attract a variety of different income groups to the new suburb thereby establishing a functional community where its basic needs are catered for.
8 DESCRIPTION OF THE RECEIVING ENVIRONMENT

8.1 Introduction

This chapter provides a description of the receiving environment within the study area and its immediate surrounds. Four components have been taken into consideration during the investigations:

- Physical environment;
- Biological environment;
- NMBM demographics (socio-economic status);
- Demographics of the affected wards (socio-economic status);

The severity of the potential impacts is largely determined by the present state and sensitivity of the receiving environment.

8.2 Physical environment

8.2.1 Terrain

The proposed development is situated on a low hill rising to a height of 109 m at the bulk water reservoir situated centrally (Figure 9). The lowest point at 86 m is located in the south of the development area. Low-lying pans are located outside the developable area to the southwest and west. The largest of these pans is currently used by Cerebos Salt to harvest natural salts.
Figure 9. Locality and topography of the proposed housing development indicating the current landuse and basic infrastructure on site.
8.2.2 Geological setting and soil characteristics

Port Elizabeth is situated at the eastern end of the Cape Fold Belt, a wide band of folded mountains of Triassic to Jurassic age, striking east – west. The Kirkwood Formation of Upper Jurassic age underlies the northern part of the city in which the study area falls. It consists of brightly coloured terrestrial or estuarine mudstones and sandstones with bands and lenses of grit and conglomerates. Motherwell NU 31 is situated on the Uitenhage and Algoa Groups of rocks.

SRK Consulting Engineers and Scientists were appointed by the proponent to conduct a Phase 1 and Phase 2 geotechnical investigation at Motherwell NU 29 (Figure 10). They excavated 20 test pits by means of a back-acting excavator to approx. 1.5 m depth or to the depth of refusal. The soil was found to be generally soft up to between 1.1 and 1.5m. Softpan calcrite was encountered in the study site between 0.3 - 1.3 m, while hardpan calcrite was encountered at 5 test pits where it caused refusal of the TLB at about 1.1m. The soil was also found to be dense to very dense in the study site. SRK consequently concluded that the soil and underlying geology was suitable for the construction of low income housing. The geotechnical report of SRK Consulting is included in the Appendix G.

Given the close proximity to the geotechnical study site and test pits, it was taken that the soil and immediate underlying geology would not differ substantially from the findings of SRK. It was thus assumed that the soil and immediate underlying geology would be suitable to allow low cost housing development in Motherwell NU31.

Figure 10. Locations of the test pits where SRK Consulting conducted their geotechnical investigations in NU 29. NU 31 is located directly adjacent to the western boundary of NU 29.
8.2.3 Climate

The climate is mild and generally frost-free in winter. The summers can be very warm. Rainfall has a peak in autumn and spring with a maximum of not more than 500 mm (Table 3). Desiccating, fresh winds from the southeast and the southwest that blow in most months further contribute to the aridity of the area. The weather of the NMBM area is mainly dependent on atmospheric depressions that move over the region in an easterly direction followed by anticyclones (Stone et al. 1998). In winter, the approaching depression is preceded by a coastal low-pressure system accompanied by a north-easterly wind, changing either to northerly or north-westerly berg winds. Following the low-pressure system, the westerly to south-westerly wind brings cooler weather with low cloud. As the depression passes, there is a tendency for more wind and rain to occur. Winds are often strong, sometimes giving rise to gales and rain lasting from 12 to 36 hours. In summer, the passage of coastal low pressure systems are followed by cloudy, occasionally rainy weather brought about by following cells of high pressure. Temperature inversions are commonly observed during winter mornings above the study area and have the tendency to inhibit vertical air pollution dispersion.

Table 3. Climate data for the study area. Monthly averages for the 30-year period 1961-1990 (South African Weather Service)

<table>
<thead>
<tr>
<th>Month</th>
<th>Temperature (°C)</th>
<th>Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highest Recorded</td>
<td>Average Monthly</td>
</tr>
<tr>
<td></td>
<td>Daily Maximum</td>
<td>Average Daily Minimum</td>
</tr>
<tr>
<td>January</td>
<td>39</td>
<td>25</td>
</tr>
<tr>
<td>February</td>
<td>38</td>
<td>25</td>
</tr>
<tr>
<td>March</td>
<td>41</td>
<td>25</td>
</tr>
<tr>
<td>April</td>
<td>39</td>
<td>23</td>
</tr>
<tr>
<td>May</td>
<td>35</td>
<td>22</td>
</tr>
<tr>
<td>June</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>July</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>August</td>
<td>34</td>
<td>20</td>
</tr>
<tr>
<td>September</td>
<td>39</td>
<td>20</td>
</tr>
<tr>
<td>October</td>
<td>39</td>
<td>21</td>
</tr>
<tr>
<td>November</td>
<td>36</td>
<td>22</td>
</tr>
<tr>
<td>December</td>
<td>36</td>
<td>24</td>
</tr>
<tr>
<td>Year</td>
<td>41</td>
<td>22</td>
</tr>
</tbody>
</table>

Winds at Port Elizabeth reflect the seasonal variation of the atmospheric circulation systems and the influence of coastal lows. Westerly to south-westerly winds are the most prevalent, but during the summer months, easterly to south-easterly winds are almost as frequent. During winter, offshore (north-westerly) winds occur more frequently than in summer. This region of the South African coast experiences strong winds and occasional gales regardless of the season. The prevailing direction of these winds is west-south-west to south-west (Figure 11). Fresh winds (of >8 m·s⁻¹) are fairly frequent, with the highest prevalence of strong winds in September to December (Stone et al. 1998).
8.3 Biological environment

8.3.1 Flora

Historically the entire study area was covered with Motherwell Karroid Thicket, a mosaic type of Valley Thicket occurring in a matrix of succulent karoo. This vegetation type is characterised by asbossie (*Pteronia incana*) and soon after fire, rooigras (*Themeda triandra*). Characteristic species include local endemic succulents such as *Euphorbia meloformis* (Pierce 2003). It provides ideal microclimates for geophytes and succulents, many of which are rare or localised endemics such as *Apodolirion macowanii*, *Aloe bowiea* and *Euphorbia meloformis*. It also seems to be the favoured habitat of several tortoise species, e.g. Parrot-beak Tortoise and Angulate Tortoise (Wren *et al.* 2008). Motherwell Karroid Thicket is restricted to the deep, red, loamy to clayey soils of the Alexandria and Bluewater Bay formations (Pierce 2003). Images of the surrounding environment may be view in Appendix F.

Originally, Motherwell Karroid Thicket mainly occurred in the Motherwell area and along the central interior of the NMBM just south of the Swartkops River. It covered 12232 ha in the metropolitan area, but by 2007 it had been reduced to 4840.4 ha giving it an ecosystem conservation status of *Endangered*. Stewart *et al.* (2004) define *Endangered* as: “Depending on constraints (such as avoidance of spoiling scenery or wilderness, or infra-structure limitations), Class II land can withstand only negligible loss of, or disturbance to, natural areas. Within the constraints, this class may be suitable for eco-friendly activities such as sustainable game farming and responsible ecotourism (hiking trails, etc.). In those areas which have undergone severe impacts, this Class II land presents opportunities for IDP projects for restoration”.

Current land use practices on site include informal settlement, subsistence farming, including cattle and goat herding, and illegal dumping of household, construction and other waste. These practices have significantly altered large areas south of the...
Motherwell reservoir transforming dense Motherwell Karroid Thicket into open, degraded areas. Already more than half of the Motherwell Karroid Thicket in the NU31 area is highly degraded. Only 26.27% of the natural vegetation found on site may be graded as fairly intact. This is found in the northwest of the site (Table 4).

Table 4. Status of natural vegetation within the study site.

<table>
<thead>
<tr>
<th>Status</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fairly intact</td>
<td>26.27</td>
</tr>
<tr>
<td>Fragmented and damaged</td>
<td>46.14</td>
</tr>
<tr>
<td>Fully degraded and non-restorable</td>
<td>75.51</td>
</tr>
<tr>
<td>Total</td>
<td>147.92</td>
</tr>
</tbody>
</table>

A vegetation specialist study was commissioned by GIBB which was conducted by CEN IEM Unit. The findings and conclusions of the specialist study are summarised in Chapter 12 and the full specialist investigation is presented in Appendix C1.

8.3.2 Fauna

A rapid faunal assessment of the proposed study site was conducted by a Sandula Conservation with the objective to catalogue the existing and potential species on the development site and to establish if the conservation status of any species warranted the need for a full faunal impact assessment. A number of mammal, avifauna, reptile, amphibian and invertebrate species was encountered on site and are summarised in the following sections.

(a) Mammals

A preliminary faunal survey, including mammals, of the study site was conducted in the proposed development area by walking through the site. This preliminary survey was further informed by a desktop study investigating species most likely to be on site. Mammal species identified are listed in Table 5. The Grey mongoose is the only protected species encountered.

Table 5. Mammal list for the study site

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Striped mouse</td>
<td>Rhabdomys pumilio</td>
</tr>
<tr>
<td>House mouse</td>
<td>Mus musculus</td>
</tr>
<tr>
<td>House rat</td>
<td>Rattus rattus</td>
</tr>
<tr>
<td>Common duiker</td>
<td>Sylvicapra grimmia*</td>
</tr>
<tr>
<td>Blue duiker</td>
<td>Cephalophus monticola*</td>
</tr>
<tr>
<td>Grysbok</td>
<td>Raphicerus melanotis*</td>
</tr>
<tr>
<td>Bushbuck</td>
<td>Tragelaphus scriptus*</td>
</tr>
<tr>
<td>Grey mongoose</td>
<td>Galerella pulverulenta</td>
</tr>
</tbody>
</table>

* Although these species are listed in this report, it is highly unlikely that they will occur on the site as they would have moved out of the area or have been poached by the residents from the nearby settlement.

(b) Avifauna

A total of 82 species occur or are expected to occur in the study area. The bird list (Table 6) was compiled from information provided by the South African Bird Atlas Project and from personal knowledge of the study area. No dedicated field work was conducted. Of the birds typically associated with Motherwell Karroid Thicket only the more resilient species are still present although the numbers of individuals are reduced.

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>No.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black-headed Heron</td>
<td>42</td>
<td>Terrestrial Brownbul (Bulbul)</td>
</tr>
<tr>
<td>2</td>
<td>Cattle Egret</td>
<td>43</td>
<td>Sombre Greenbul (Bulbul)</td>
</tr>
<tr>
<td>3</td>
<td>Hadeda Ibis</td>
<td>44</td>
<td>Olive Thrush (pre-split)</td>
</tr>
<tr>
<td>4</td>
<td>Black-shouldered (Winged) Kite</td>
<td>45</td>
<td>African (Common) Stonechat</td>
</tr>
<tr>
<td>5</td>
<td>Stepe (Common) Buzzard</td>
<td>46</td>
<td>Cape Robin-Chat</td>
</tr>
<tr>
<td>6</td>
<td>Jackal Buzzard</td>
<td>47</td>
<td>Karoo Scrub-Robin</td>
</tr>
<tr>
<td>7</td>
<td>Peregrine Falcon (Near Threatened)</td>
<td>48</td>
<td>Chestnut-ventled Tit-Babbler</td>
</tr>
<tr>
<td>8</td>
<td>Lanner Falcon (Near Threatened)</td>
<td>49</td>
<td>Cloud (Tink-tink) Cisticola</td>
</tr>
<tr>
<td>9</td>
<td>Kittlitz’s Plover</td>
<td>50</td>
<td>Le Vaillant’s (Tinkling) Cisticola</td>
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<tr>
<td>10</td>
<td>Crowned Lapwing (Plover)</td>
<td>51</td>
<td>Neddicky (Piping Cisticola)</td>
</tr>
<tr>
<td>11</td>
<td>Spotted Thick-knee (Dikkop)</td>
<td>52</td>
<td>Spotted Prinia (pre-split)</td>
</tr>
<tr>
<td>12</td>
<td>Rock (Feral) Dove (Pigeon)</td>
<td>53</td>
<td>Fiscal Flycatcher</td>
</tr>
<tr>
<td>13</td>
<td>Speckled (Rock) Pigeon</td>
<td>54</td>
<td>Cape Wagtail</td>
</tr>
<tr>
<td>14</td>
<td>Red-eyed Dove</td>
<td>55</td>
<td>African (Grassveld/Grassland) Pipit</td>
</tr>
<tr>
<td>15</td>
<td>Cape Turtle (Ring-necked) Dove</td>
<td>56</td>
<td>Cape (Orange-throated) Longclaw</td>
</tr>
<tr>
<td>16</td>
<td>Laughing (Palm) Dove</td>
<td>57</td>
<td>Common (Fiscal) Fiscal (Shrike)</td>
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<td>17</td>
<td>Namaqua Dove</td>
<td>58</td>
<td>Southern Boubou</td>
</tr>
<tr>
<td>18</td>
<td>Klaas’s Cuckoo</td>
<td>59</td>
<td>Southern Tchagra</td>
</tr>
<tr>
<td>19</td>
<td>Dideric (Diederik) Cuckoo</td>
<td>60</td>
<td>Bokmakier</td>
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<tr>
<td>20</td>
<td>Barn Owl</td>
<td>61</td>
<td>Common (European) Starling</td>
</tr>
<tr>
<td>21</td>
<td>Fiery-necked Nightjar</td>
<td>62</td>
<td>Pied (African) Starling</td>
</tr>
<tr>
<td>22</td>
<td>Common (European) Swift</td>
<td>63</td>
<td>Wattled Starling</td>
</tr>
<tr>
<td>23</td>
<td>African Black (Black) Swift</td>
<td>64</td>
<td>Southern Double-collared Sunbird</td>
</tr>
<tr>
<td>24</td>
<td>White-rumped Swift</td>
<td>65</td>
<td>Greater Double-collared Sunbird</td>
</tr>
<tr>
<td>25</td>
<td>Little Swift</td>
<td>66</td>
<td>Grey (Mouse-coloured) Sunbird</td>
</tr>
<tr>
<td>26</td>
<td>Speckled Mousebird</td>
<td>67</td>
<td>Amethyst (Black) Sunbird</td>
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<td>27</td>
<td>Red-faced Mousebird</td>
<td>68</td>
<td>Cape White-eye (pre-split)</td>
</tr>
<tr>
<td>28</td>
<td>European Bee-eater</td>
<td>69</td>
<td>House Sparrow</td>
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<tr>
<td>29</td>
<td>African Hoopoe</td>
<td>70</td>
<td>Cape Sparrow</td>
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<td>30</td>
<td>Rufous-naped Lark</td>
<td>71</td>
<td>Greyheaded Sparrow (pre-split)</td>
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<tr>
<td>31</td>
<td>Cape Clapper Lark (pre-split)</td>
<td>72</td>
<td>Spectacled Weaver</td>
</tr>
<tr>
<td>32</td>
<td>Red-capped Lark</td>
<td>73</td>
<td>Cape Weaver</td>
</tr>
<tr>
<td>33</td>
<td>Barn (European) Swallow</td>
<td>74</td>
<td>Southern Masked-Weaver</td>
</tr>
<tr>
<td>34</td>
<td>Greater Striped-Swallow</td>
<td>75</td>
<td>African (Blue-billed) Firefinch</td>
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<tr>
<td>35</td>
<td>Lesser Striped-Swallow</td>
<td>76</td>
<td>Common Waxbill</td>
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<tr>
<td>36</td>
<td>Black Saw-wing</td>
<td>77</td>
<td>Bronze Mannikin</td>
</tr>
<tr>
<td>37</td>
<td>Fork-tailed Drongo</td>
<td>78</td>
<td>Pin-tailed Whydah</td>
</tr>
<tr>
<td>38</td>
<td>Cape (Black) Crow</td>
<td>79</td>
<td>Brimstone (Bully) Canary</td>
</tr>
<tr>
<td>39</td>
<td>Pied Crow</td>
<td>80</td>
<td>Streaky-headed Seedeater (Canary)</td>
</tr>
<tr>
<td>40</td>
<td>White-necked Raven</td>
<td>81</td>
<td>Yellow-billed Kite</td>
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<tr>
<td>41</td>
<td>Cape Bulbul</td>
<td>82</td>
<td>Speckled Mousebird</td>
</tr>
</tbody>
</table>

All of the species listed in Table 6 have a conservation status listed as Least Concern except for the Peregrine Falcon (7) and the Lanner Falcon (8) which have a Near Threatened status. These two species do not breed on site.

(c) Reptiles and amphibians

The preliminary field survey and literature review of the reptiles and amphibians of the study site identified the occurrence of a number of species on the development
site. Table 7 shows a list of reptiles and amphibians that are most likely found in the area. The invasion of the Motherwell Karroid Thicket vegetation by human activity has most likely destroyed the habitat of many species.

Table 7. Reptile and amphibian list for the study site.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Snakes</strong></td>
<td></td>
</tr>
<tr>
<td>Cape cobra</td>
<td>Naja nivea</td>
</tr>
<tr>
<td>puffadder</td>
<td>Bitis arietans</td>
</tr>
<tr>
<td>Night adder</td>
<td>Causes rhombeatus</td>
</tr>
<tr>
<td>Rinkhals</td>
<td>Hemachatus hemachatus</td>
</tr>
<tr>
<td>Herald/Red-lipped snake</td>
<td>Crotaphopeltis hotamboeia</td>
</tr>
<tr>
<td>Olive house snake</td>
<td>Lamprophis inornatus</td>
</tr>
<tr>
<td>Brown house snake</td>
<td>Lamprophis fuliginosus fuliginosus</td>
</tr>
<tr>
<td>Spotted harlequin snake</td>
<td>Homoroselaps lacteus</td>
</tr>
<tr>
<td>Mole snake</td>
<td>Pseudapsis cana</td>
</tr>
<tr>
<td>Slugeater</td>
<td>Duberia lutrix lutrix</td>
</tr>
<tr>
<td>Crossmarked sandsnake</td>
<td>Psammophis crucifer</td>
</tr>
<tr>
<td>Cape Wolf Snake</td>
<td>Lycophidion capense</td>
</tr>
<tr>
<td>Black thread snake</td>
<td>Leptotyphlops longicaudus</td>
</tr>
<tr>
<td>Karoo whip snake</td>
<td>Psammophis notostictus</td>
</tr>
<tr>
<td>Aurora house snake</td>
<td>Lamprophis aurora</td>
</tr>
<tr>
<td>Spotted (Rhomic) skaapsteker</td>
<td>Psammophylax rhombeatus</td>
</tr>
<tr>
<td>Sundervall’s shovell snout</td>
<td>Prosymna sundervalli</td>
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<tr>
<td>Natal green snake</td>
<td>Philothamnus ornatus</td>
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<tr>
<td>Brown water snake</td>
<td>Lycodonmorphus rufulus</td>
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<tr>
<td>Rhombic egg eater</td>
<td>Dasypeltis scabra</td>
</tr>
<tr>
<td>Boomslang</td>
<td>Dispholidus typus</td>
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<tr>
<td>Cape skink</td>
<td>Mabuya capensis</td>
</tr>
<tr>
<td>Red sided skink</td>
<td>Mabuya homalocephala</td>
</tr>
<tr>
<td><strong>Lizards/geckoes/skinks/chameleons</strong></td>
<td></td>
</tr>
<tr>
<td>Southern Rock Agama</td>
<td>Agama atra</td>
</tr>
<tr>
<td>Spotted thick-toed gecko</td>
<td>Pachydactylus maculates</td>
</tr>
<tr>
<td>Cape dwarf gecko</td>
<td>Lygodactylus capensis</td>
</tr>
<tr>
<td>Cape Skink</td>
<td>Mabuya capensis</td>
</tr>
<tr>
<td>Red-sided skink</td>
<td>Mabuya homalocephala</td>
</tr>
<tr>
<td>Percival’s legless skink</td>
<td>Acontias percivali</td>
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<tr>
<td>Southern dwarf chameleon</td>
<td>Bradypodion ventrale</td>
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<tr>
<td><strong>Tortoises</strong></td>
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<tr>
<td>Angulate tortoise</td>
<td>Chersina angulata</td>
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<tr>
<td>Parrot-beak tortoise</td>
<td>Homopus areolatus</td>
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<tr>
<td><strong>Amphibians</strong></td>
<td></td>
</tr>
<tr>
<td>Raucous toad</td>
<td>Bufo rangeri</td>
</tr>
<tr>
<td>Leopard/Giant toad</td>
<td>Bufo pardalis</td>
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<tr>
<td>Common platanna</td>
<td>Xenopus laevis</td>
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<tr>
<td>Painted reed frog</td>
<td>Hyperolius marmoratus</td>
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<tr>
<td>Striped stream frog</td>
<td>Strongylopus fasciatus</td>
</tr>
</tbody>
</table>

All the species in Table 7 above are listed as Least Concern except for the Southern Dwarf Chameleon, which is an endangered species.

(d) Invertebrates
A preliminary survey of the common invertebrates of the study site was conducted in the proposed development area by Sandula Conservation by walking through the site and identifying species encountered (Sandula Conservation 2009).

Table 8. List of invertebrates found on site.
In terms of the Eastern Cape Nature Conservation Ordinance 19 of 1974, under the definition of “wild animal”, section 25, read with section 27(b), the above invertebrates (Table 8) are protected under the Ordinance.

On assessment of the preliminary field survey the EAP concluded that no further detailed faunal impact assessment was required and that generic and best practice guidelines and mitigating measures to minimise impacts of the proposed development on faunal species would be sufficient to minimise unacceptable loss of fauna during the construction phase.

### 8.4 Heritage resources

No structure older than 60 years are present on the study site. The only brick and mortar structure on site, the Motherwell water reservoir, was constructed in 1986 and thus is not considered a structure of heritage significance.

The Amanzi springs site is reportedly the only Early Stone Age site in the Eastern Cape which has been excavated. This site is located approximately 9 km northwest (as the crow flies) of the study site. Sediments of the Alexandria and the Sundays River Formations present at the proposed development site are known to contain both vertebrate and invertebrate fossils. In addition to plant fossils the formation reportedly contains reptile remains, as well as fossilized invertebrate shells of freshwater, estuarine and marine origin. The Sundays River formation was deposited under shallow marine or estuarine conditions and while fossilized molluscs are common, vertebrate remains are rare in these sediments. Additional fossilized features in these rocks include ripple marks, trace fossils and bioturbation. A variety of stone implements have been reported from the surrounding area. These include Early Stone Age (E.S.A.) artefacts of 2 million to 125 000 years in age. Many of the implements collected at the Amanzi site were preserved in a well defined chronological sequence by sediments from the springs. The presence of the Amanzi springs, historically a reliable source of water at the site, may have been motivation for many prehistoric peoples to utilize the area. This suggests that the site may also have further artefacts or sites of archaeological importance, including Middle Stone Age and Late Stone Age implements and features (Wren et al. 2008) closer to the proposed development site.

An Archaeological Impact Assessment (AIA) and desktop Palaeontological Impact Assessment (PIA) were commissioned by GIBB, which was conducted by specialists.
in their respective fields, namely Dr Johan Binneman and Dr John Almond, respectively. The findings and conclusions of the specialist studies are summarised in Chapters 15 and 16, and the full specialist investigations are presented in Appendix C2 and C3. The AIA and desktop PIA was presented to the South African Heritage Resource Agency (SAHRA) for their approval. Correspondence with the regulating authority can be viewed in Appendix E1.

8.5 Socio-economic aspects

The Nelson Mandela Bay Municipality (NMBM) has a population of 1.1 million people in 289,000 households and covers an area of 1,950 km$^2$ (StatsSA 2008).

8.5.1 Socio-economic trends in the NMBM

Decades of distorted development in the city has manifested in highly skewed distribution of income and wealth. The unemployment rate among the economically active sector of the community is approximately 38% (StatsSA 2008). The Municipality continues to provide relief to impoverished households through its Assistance to the Poor Scheme, increasing its monthly contribution from 6 kℓ of water to 8 kℓ of water and from 50 kWh of electricity to 75 kWh of electricity in 2007. Approximately 93,111 households receive free basic water, sanitation and refuse removal services, while 94,823 households receive free electricity every month (StatsSA 2008). The age and gender distribution in the NMBM reflects a very youthful population, with 55% of residents falling in the age group below 30 years, with a male:female ratio of 48:52.

8.5.2 Motherwell demographics

The area is a poor, low income area with approximately 34% of the households receiving no annual income according to the 2001 census. In the 2006 and 2008 surveys, detailed questions about social grants, various income sources, forms of work that may provide income, employment status, financial service, etc. revealed that between 2.9 and 3.2% of the households in Motherwell had no regular stream of household income (Everatt and Smith, 2008). According to Everatt and Smith (2008), 5.8% of households reported an annual income of less than R4,800 (i.e. less than R400 a month), and 18.0% reported earning less than R9 600 per year. This equates to more than half of the households in the node (58.9%) living on less than R800 per month. Almost a quarter (23.6%) of the population in Motherwell is functionally illiterate, but illiteracy levels are still lower than that of South Africa as a whole (31.5%), the province as a whole (39.0%). With regards to transport, more than half of the economically active households (56.4%) rely on walking to meet their daily transport needs. A fifth use public transport (21.3% use public busses) and 15.3% use taxis. Only 5.7% of the households rely on private cars as transport, with only 2.2% acting as the driver of the vehicle (Everatt and Smith, 2008).

8.5.3 Demographics of Ward 54 in Motherwell

The proposed development is positioned within Ward 54 in the Motherwell area. Within this ward there are 5,468 households according to statistics released by the Municipal Demarcation Board (2006). According to these stats approximately 15.5% of households in this ward consist of 6 people or more. The number of people with direct access to water is 10,797 (98.7%) with the remaining 1.3% of residents using natural or unregistered water resources (Municipal Demarcation Board, 2006).
8.5.4 Housing in Motherwell

Motherwell consists mostly of formal housing areas. The average house in Motherwell is a 40 square meter detached house on a 200 square meter plot. The residential areas all have similar appearances; there are no variation in scale, size and height. Most houses are located in small clusters along a “cul-de-sac” street or small “loop street”. Because of this the houses turn their entrances away from the main street.

The southern part of the Motherwell area was built largely through bank financed housing. This is clearly visible in Neighbourhood Unit 5 and Neighbourhood Unit 6 where the houses are of good standard. The more recently built parts are of a lower standard, so called subsidy housing, a 40 square meter house, provided by the municipality for families with a total household income below R 3,500 per month. The lowest standard of living is found in the shack areas, which occur on vacant land in the more recently built northern part of Motherwell.

The average density in Motherwell is approximately 19 units per hectare or 70 persons per hectare estimated for Motherwell as a whole. This is based on an estimated household size of four persons. The density is low as a result of the housing typology and large land provisions for public facilities such as school sites and public places. The low density is not sustainable to provide a critical mass, which supports public transport, facilities and retail in Motherwell (Everatt and Smith, 2008).

8.5.5 Motherwell Urban Renewal Programme (MURP)

The necessary infrastructure for recreation, basic amenities, and job creation has not kept pace with the changing needs of the community of Motherwell and with the growth of the area. There are 8 primary schools in the area with 7,100 learners and 9 high schools with 7,100 learners. The NMBM provides health services through 41 fixed and 15 mobile clinics. It is estimated that, to provide an adequate service, the NMBM would have to provide four new clinics per annum, redistribute mobile clinics to service remote areas, and employ an additional 93 nurses. The crime rate in the area is generally also higher than that in the rest of the metropole. Generally, the erosion of civic pride, environmental pollution, and an ineffective and poor public transport network characterizes the area. There is a lack of justice facilities; only one police station to service the area and traffic lawlessness is rife. Community Police Forums are established but do not function very well (Everatt and Smith, 2008).

Large strides however have been made in formalising informal settlements in Motherwell since 2001, with almost one third of all houses (in excess of 10,000 units) having been constructed using subsidies. Low developer activity has been experienced in the area, and is likely caused by a number of factors including limited amounts of reasonably priced land, high servicing and building costs, planning delays, affordability constraints and competing RDP products. Motherwell's lack of density, combined with the fact that there are no significant transport hubs in the area means that the viability of a great deal of commercial activity is doubtful. It also explains why only a small proportion of land zoned for commercial activities has been developed, and why residents frequently prefer to shop in the Port Elizabeth CBD (Everatt and Smith, 2008). These shortcomings will be addressed to some degree in the proposed NU 31 (in combination with NU 29, NU 30 and NU 12) housing development.
8.5.6 Existing NMBM resettlement programme

The NMBM has an existing programme that deals with the relocation of informal settlements in the metropole. This programme forms part of the 7-Year Housing Programme, is captured identified in the IDP and managed by the Human Settlements Directorate. One of the main objectives of this directorate is to improve the quality of life of poor communities within the metro through relocation of such communities away from health hazardous, undevelopable public open spaces and low lying areas to formal housing. This directorate also provides the relocated communities with education and other essential support services to ensure that these relocated communities are integrated into their new environment successfully and in a sustainable manner.

A formalised approach to the relocation of informal settlers has been developed over the years and has been successfully implemented by the project team on a number of occasions. The following approach thus represents the standard programme utilised by the NMBM for relocating communities located in areas unsuitable for housing.

The informal housing official will liaise with the Social Development, Education and Administration (SDEA) office to arrange service providers that will be used during relocation well in advance. The informal housing official will obtain lists of families to be relocated from the Ward Councillor’s office. This information will be communicated with the Informal Settlements Task Committees (ISTC). The informal housing official will then visit and clearly identify the households that need to be relocated. The informal housing official will also ensure that all documentation to be utilised during relocations is in order and that all parties are available to sign all documentation concerned. The informal housing official will be in constant communication with the affected households while preparing them for timely relocation. There will a series of consultation and confirmation meetings to ensure that the identified households are ready for relocation.

On the relocation day a service provider will provide a truck, driver and assistants to speedily load and transport the household’s belongings to the allotted house. The informal housing official will show the truck driver which household to load at the departure point. All necessary documentation will be signed on site or at the ward councillor’s office. Arrangements will be made should there be further relocations to be done during weekends and public holidays. An Informal Housing Official shall be available at the destination point so as to allocate the correct house to the relocated household. In the event of unfavourable weather conditions, relocations will be rescheduled. With the assistance of the disaster management office, weather forecast will be determined before the day of relocation by the informal housing official. After the successful relocation, the informal housing official will submit all documentation to the SDEA office to be checked. Once these are checked payment certificates will be prepared by the designated official.

8.5.7 Motherwell North housing development social facilitation

Given the integrated nature of the greater housing development project where approximately 12,400 housing units are to be constructed in NU29, 30, 31 and 12 collectively, successful delivery of this project will in part depend on effective facilitation of the specific social aspects of the project during and once construction has been completed. Recognising this need, GOBA Consulting Engineers have appointed Mr Lungile Mxube, a development specialist and social facilitator, to aid in overseeing the day to day management and facilitation of the social aspects of the
broader project and assisting the relevant directorates of the NMBM to ensure the project meets its objectives.

The Development Facilitator will be responsible for a basket of activities and processes, always with the end goal of real delivery in mind. The Development Facilitator will, for example, be involved in the planning and development of public amenities such as the construction of a school. In this case it is important to note that if a new school is planned and built, a chain of processes precedes the physical school construction and completion. This includes the training and supply of educators and managers, and provision of all necessary materials and equipment. All these processes need to be planned and executed well in advance. The Development Facilitator would therefore be expected to engage with all the relevant role players to ensure that not only is the school built, but that well qualified teachers equipped with the requisite tools are on hand to deliver education from day one.

The Development facilitator will have the following duties:

- In each project, be it a school, a clinic, a sports field, a shopping centre, a bonded housing development or a library the facilitator must aid in collection of all relevant details and requirements in conjunction with the professional team, the NMBM, the Provincial Government and the private sector where applicable;
- The full range of role players and stake holders is to be determined in each case;
- These role players and stake holders are to be contacted, informed and engaged on the project and its needs and will include project managers and key decision makers in:
  - Local Government
  - Provincial Government
  - National Government
  - Commercial Banks
  - Development Agencies and Companies
  - The Private Sector;
- Targeted presentations of the global and specific projects will be required;
- Agreement on the key projects is to be obtained, along with commitments to finance, time scales and personnel;
- Project budgets and programmes are to be established and agreed with the relevant authority or department;
- The facilitator is to ensure that appointments of relevant service providers and Contractors occurs in each case as a project is rolled out;
- The facilitator must monitor of the progress of the different projects and tasks;
- The facilitator must conduct regular reporting and feedback is required;
- Coordination of a Programme of Community Participation and Consumer Education in a variety of areas including housing choices;
- Engagement with financial institutions and developers, especially in the areas of affordable and gap housing provision;
- Capacity Building and Skills Development is desirable as part of this project, with the focus including adult basic education, job creation and training, consumer education and environmental awareness training. Although not directly involved in these processes, the Development Facilitator will engage with the relevant drivers in each case and ensure that activities are coordinated and harmonized.
9 PUBLIC PARTICIPATION

The EIA Regulations specify that a public participation process must be conducted as an integral part of the EIA. This requires public participation to be conducted during the Scoping phase and again during the EIR phase after completion of the specialist studies. Public participation during the Scoping phase was concluded successfully resulting amongst others in the acceptance of the scoping Report by the competent authority. The public participation during the scoping phase is briefly summarised below. Public participation during the EIR phase will commence once this draft EIR report is made available to the public for review.

9.1 Public participation during the scoping phase

9.1.1 Interested and Affected Parties

Section 56 (6) of the EIA Regulations stipulates that the EAP conducting the public participation process must ensure that information containing all relevant facts in respect of the application is made available to potential interested and affected parties (I&APs), and that participation by I&APs is facilitated in such a manner that all are provided with a reasonable opportunity to comment on the application in question.

A steering committee consisting of key stakeholders from the Nelson Mandela Bay Municipality, consulting engineers (GOBA), and sub-consultants drives the development and implementation of the project, while ensuring compliance to environmental, socio-economic and heritage resource regulations. The EAP also attends the steering committee meetings but remains an independent entity. During monthly steering committee meetings information regarding the engineering, social and environmental aspects of the project is discussed.

Organs of state were identified on the basis that they may have jurisdiction over one or more aspects of the proposed development. These are listed in (Table 9).

<table>
<thead>
<tr>
<th>Authority</th>
<th>Contact person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nelson Mandela Bay Municipality, Housing and Land Directorate</td>
<td>S. Potgieter, Assistant Director of Land Planning and Management</td>
</tr>
<tr>
<td>Nelson Mandela Bay Municipality, Directorate of Environmental Health</td>
<td>J. Mkosana, Director</td>
</tr>
<tr>
<td>Nelson Mandela Bay Municipality, Infrastructure and Engineering Directorate</td>
<td>Khaya Mconi</td>
</tr>
<tr>
<td>Nelson Mandela Bay Municipality, Social Development, Education &amp; Administration Directorate</td>
<td>Odwa Malamlela</td>
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<tr>
<td>Nelson Mandela Bay Municipality, Water Division</td>
<td>Stan Groenewald</td>
</tr>
<tr>
<td>Department of Economic Development and Environmental Affairs</td>
<td>Andries Struwig</td>
</tr>
<tr>
<td>SAHRA – East London</td>
<td>T. Lungile, Provincial manager</td>
</tr>
<tr>
<td>SAHRA – Cape Town</td>
<td>Dr. Antonieta Jerardino, Archaeological Heritage Impact Assessor</td>
</tr>
<tr>
<td>SAHRA – Cape Town</td>
<td>Colette Scheermeyer</td>
</tr>
<tr>
<td>SAHRA – Cape Town</td>
<td>Phillip Hine</td>
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<tr>
<td>EC Provincial Department of Housing and Safety and Liaison</td>
<td>S. Gcora</td>
</tr>
<tr>
<td>NMBM Ward Councillors (23, 53, 54, 55, 56, 57, 58, T. Barnes; T. Vusani; M. Madlazu; N.</td>
<td></td>
</tr>
</tbody>
</table>
Direct neighbours located within 100 m from the boundary of the proposed development (Table 10) were identified from property ownership records sourced from the NMBM.

<table>
<thead>
<tr>
<th>Direct neighbour</th>
<th>Contact person</th>
<th>Contact details</th>
<th>Method of notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nu-Way Housing Developments (Pty) Ltd on Coegas Kop no. 316</td>
<td>Mr. Jordan Mann</td>
<td>011 789 334, 082 775 0580, <a href="mailto:Jordan@nuway.co.za">Jordan@nuway.co.za</a></td>
<td>BID per email</td>
</tr>
<tr>
<td>to the north</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Salt Ltd (Cerebos) on Farm 434 Uitenhage in the west</td>
<td>Mr. Patrick Hill</td>
<td>041 403 6700, <a href="mailto:patrickh@cerebos.co.za">patrickh@cerebos.co.za</a></td>
<td>Hand delivered BID,</td>
</tr>
<tr>
<td>and in the south</td>
<td></td>
<td></td>
<td>meeting at Cerebos</td>
</tr>
</tbody>
</table>
| The remaining adjacent properties are owned by the applicant (NMBM).

A group of subsistence farmers are residing on cleared ground at the centre of the site near the Motherwell water reservoir. Several shacks, outbuildings and animal kraals have been established. These persons occupy the land with the temporary consent of the land owner and due to their presence they are a key affected party. This group of people was notified of the proposed development though verbal communication via the ward councillor’s office and they were personally visited by the EAP. These I&APs were consulted during two focus group meetings held on the 14 May 2009 and 19 June 2009 at the area of interest near the Motherwell reservoir in order to capture their comments and concerns.

Members of the general public with an interest in the proposed development were identified through the notification process (background information document, newspaper advertisements and on-site poster), where they were invited to register as Interested and Affected Parties by returning their comments or concerns together with full contact details including name, affiliation, address, contact numbers and email address. A comments page was included in the BID where I&APs could state their contact details and provide comments regarding the proposed development. A list of registered I&APs is provided in Appendix E2.

### 9.1.2 Notification of Interested and Affected Parties

Section 56 of the EIA Regulations (2006) outlines the requirements for the notification of all potential interested and affected parties. I&APs were notified in the following ways:

(a) Notice board

A notice board was erected on 3 April 2009 at the corner of the MR460 and Tyrina Street, which is at the junction of two major transport axes. Furthermore, the location serves as an informal taxi-rank where many of the residents of Motherwell NU 29, NU 30 and NU 12 are picked up or dropped off and can read the notice in full view. An A3 copy of the original A1 poster notification can be viewed in Appendix E5.
(b) Notification of landowners and authorities
The adjacent landowners were notified of the proposed development by means of personal visits. Organs of state were notified by sending the Background Information Document via electronic mail coupled with a request to raise any issues that they may have.

(c) Verbal notification of informal settlers near the Motherwell reservoir
Owners of the informal dwellings located just south of the Motherwell reservoirs were informed through background information documents handed to them personally by the EAP on 14 and 22 May 2009 (See Appendix E3 and E6). The proposed Motherwell housing development and how it would impact the informal dwellers was explained to them and they were given the opportunity to raise their concerns or deliver comment. Their comments were captured and were included in the issues and response report.

(d) Background information document
At commencement of the EIA (February 2009), a Background Information Document (BID) was prepared that provided a summary of the details of the proposed project as well as the EIA process at the time of commencement (See Appendix E3). The BID was distributed by email, fax and in hard copy to all relevant stakeholders on the 4th May 2009. The BID was written in English only.

(e) Newspaper advertising
Advertisements were placed in English only in two newspapers informing I&APs that the EIA process for the Motherwell housing development was occurring and therefore called for registration of all I&APs. The advertisement appeared in the following local newspapers:
- The Herald (1 April 2009); and
- Port Elizabeth Express (8 April 2009)
Refer to Appendix E4 for copies of the advertisements. The public were allowed 6 weeks to register as an Interested and Affected Party and comment on the proposed development.

(f) Availability of Scoping Report for inspection
The Draft Scoping Report was placed in the Motherwell Library, the Ward 54 councillor’s (Mr. Madlavu) offices and the Arcus GIBB offices in Greenacres in order to allow the public to view and comment as appropriate. The Draft Scoping Report was made available for a period of 4 weeks. The Draft Scoping report was further published on the Arcus GIBB website on the 26 June 2009, which is accessible to the public. Additionally, an electronic copy of the Draft Scoping Report was emailed to all the registered I&APs on the 29 June 2009.

9.1.3 Focus group meetings
The EAP met with the Councillors Forum on the 5th May 2009. Mr F. Frans, the secretary of this forum chaired this meeting. The attendance register for this meeting can be found in Appendix E6. The purpose of the meeting was to brief the councillors on the background of this housing project, describe the EIA process to be followed by the EAP and to get their feedback on the matter. A second focus group meeting between the EAPs and the subsistence farmers at the Motherwell water reservoir were held on 19 June 2009 (See Appendix E6).
9.1.4 Register of I&APs

A register of Interested and Affected Parties detailing contact information has been maintained and updated throughout this project. Refer to Appendix E2 for a copy of the register.

9.1.5 Comment register

No written comments, concerns and issues raised by I&APs and key stakeholders were received in hard copy and thus a register could not be compiled. However, the comments received during the Public Participation Process were recorded and are summarised in section 10.1 below.

9.1.6 Comments and response report

All I&AP comments received during the scoping phase was grouped into relevant issues, concerns and queries regarding the proposed development. A response to each comment was provided by Arcus GIBB and has been summarised in section 10.1 below.

9.2 Public participation during the EIR phase

The Public Participation Process during the EIR phase was be structured in the same manner as during the Scoping phase summarised above and according to the approved Plan of Study in the Scoping Report.
10 IMPACT IDENTIFICATION

All environmental impacts identified during the Scoping phase of the proposed development are summarised in this section.

10.1 Issues raised by I&APs and responses by EAP

10.1.1 Lack of water for farming practices

Subsistence farmers at the water reservoir generally make use of water from the reservoir or leaking water pipes near the entrance when the NMBM does not deliver water to them on a regular basis. The water is then collected in canisters and stored on the property for use throughout the day. The water collected is untreated and is therefore a health risk, but it was said that there is no other option.

_EAP response: The Economic Development and Recreational Services Directorate of the NMBM is aware of the discontent of the subsistence farmers at the proposed site. They are exploring all avenues to try and resolve the issues of the subsistence farmers and need for suitable agricultural land._

10.1.2 Fears that subsistence farmers will be forced to find alternate means to support themselves

Residents are concerned that the new development would not relate to their current way of living. It became obvious that change would be needed from their side which is a situation they would not like to entertain provision of alternative land and amenities.

_EAP response: The livestock farmers were informed by the NMBM that their occupation of the area south of the Motherwell water reservoir would only be temporary. The NMBM is exploring all avenues to secure suitable agricultural land for subsistence farmers in Nelson Mandela Bay._

10.1.3 Unwillingness to move to suitable farming location

The residents also queried whether they would have to move again and where they would be moved to. The affected parties do not object to moving, as long as they can continue their farming activities where there is enough water and as long as it is a permanent settlement.

_EAP response: The livestock farmers were informed by the NMBM that their occupation of the area south of the Motherwell water reservoir would only be temporary. The NMBM is exploring all avenues to secure suitable agricultural land for subsistence farmers in Nelson Mandela Bay._

10.1.4 Lack of communication

Subsistence farmers feel that there is a lack of communication between all the parties involved. The information they are receiving is inadequate and often contradicting.

_EAP response: the EAP has encouraged communication between the NMBM, councillors and the affected subsistence farmers during the public participation period. The NMBM is, however, currently engaged in sensitive consultation with the_
stock farmers and other relevant parties regarding the fate of the stock farmers at the Motherwell water reservoir.

10.1.5 Vandalism and theft at the Motherwell reservoir

Vandalism and theft of the fencing and wire mesh, and theft of water are the main issues noted at the water reservoir. Water valves are being broken allowing water to form shallow ponds. This is allegedly done to create watering points for cattle and goats grazing around the water reservoir. The key stakeholder (Water Division: NMBM) feels that this behaviour is likely to continue once the NU 31 development has been completed.

EAP response: Vandalism and theft in the area is an ongoing issue. The development layout design does reserve space for community amenities. The EAP thus suggest that, as a minimum, a satellite police station be included in the new development to efficiently serve NU 31, as well as NU 29 and NU 30.

10.1.6 Stormwater related issues

Three preliminary alternatives were introduced to Cerebos in order to deal with stormwater runoff draining westward towards their salt works in Motherwell. Cerebos is not in favour of the pond formalisation, but will consider relinquishing the ponds if the NMBM constructs a new pond elsewhere close to the salt works. Cerebos is further not in favour of the stormwater canal past the salt work and is concerned that pollution entrained in the stormwater will affect the water quality of the seawater extracted by the salt works plant. This has financial and quality implications for Cerebos. Lastly, Cerebos is not in favour of the land exchange alternative, but is willing to sell a section of their land at a market related price to the NMBM.

EAP response: The detailed stormwater investigation and design by the designing engineers is not yet available. Revised alternatives have been proposed during the EIR phase based on expert stormwater advice.

10.1.7 Safety and security

Cerebos is concerned that the general safety and security will be compromised if the Motherwell NU 31 development is implemented as proposed. Cerebos predicts that the development will lead to further informal extension of Motherwell NU 31 westward. This may result in safety and security issues, including related issues such as trespassing, vandalism and grazing of livestock on Cerebos land.

EAP response: The development layout design does reserve space for community amenities. The EAP thus suggest that, as a minimum, a satellite police station be included in the new development to efficiently serve NU 31, as well as NU 29 and NU 30.

10.1.8 Pollution into the Swartkops Estuary/River

The Zwartkops Trust regards the main cause of pollution in the estuary to be a consequence of the Motherwell stormwater canal. They strongly oppose the construction of a detention pond and stormwater canal discharging into the Swartkops Estuary. According to the Trust this should under no circumstances be allowed. They are further concerned about the Zwartkops Nature Reserve. This declared reserve is being degraded on all sides in the NU7 – 9 areas and care must be taken that the
area nearest to the proposed NU31 will not be degraded by the residents living in NU31.

EAP response: The proposed canal is likely to be constructed with, at a minimum, an artificial wetland system that will filter out waste originating from a small portion of the NU31 development. Resultantly, it is expected that the stormwater runoff and the contaminants associated with it will be significantly less. After completion of the development the EAP recommends the continuous monitoring of the stormwater runoff discharged from the canal to monitor the effectiveness of the artificial wetland areas.

10.2 Potential environmental issues identified by the EAP: Planning and design phase

Impacts during the design and pre-development phase are largely associated with the presence of the stock farmers on the proposed development site and the current land use of the area. Potential impacts are listed below.

10.2.1 Over-grazing of the open, disturbed areas by cattle, goats and other livestock

Potential overgrazing portions of the development site is likely as more than 400 heads of cattle is roaming in this area. Potential impacts include:
- Over-grazing of vegetation leading to,
- Loss of topsoil, and
- Dust nuisance

10.2.2 Minor environmental contamination through biological pollutants

The goat and cow herders of the stock farmers often reside on the proposed development site. There are however no formalised toilets and it is very likely that much of this human excrement is entering the environment.

10.2.3 Environmental pollution via illegal dumping

Illegal dumping is a recurring problem in the northern area of Motherwell and has mostly gone unabated to date. Illegal dumping may cause the following impacts:
- Smothering and mortality of natural vegetation species,
- Contamination of the soil and possibly groundwater,
- Fragmentation of the existing intact and endangered vegetation.

10.3 Potential environmental issues identified by the EAP: Construction phase

Several potentially negative and positive impacts have been identified by the EAP during assessment of the construction phase of the proposed development. These are listed below.

10.3.1 Removal of vegetation

More than half of an existing patch of disturbed, semi-intact Motherwell Karroid Thicket will be removed by the proposed NU 31 development. The eastern half of the existing patch of Motherwell Karroid Thicket has already been removed during the site preparation for the construction of the NU 29 housing infrastructure. Potential impacts associated with vegetation include:
- Loss of ecological function and biodiversity of the Motherwell Karroid Thicket,
• Loss of refugia and micro-habitat for local fauna and birds,
• Loss of species of special conservation concern,
• Possible establishment and spread of alien species in disturbed areas,
• Loss of soil moisture content and dust pollution
• Eradication of invasive alien species (positive).

This aspect of the EIA has been investigated by a vegetation specialist and rating of the identified impacts was conducted in the specialist study. A summary of the impacts and their rating is provided in chapter 12.

10.3.2 Stormwater management

Stormwater management during the construction phase of the Motherwell NU 31 development is likely to have minor impacts on the environment as the development area is very flat. Potential impacts that may be associated with stormwater management in the development area include:
- Increased quantities of stormwater runoff reaching the Cerebos Salt Works plant,
- Pollution of the surface waters within the development footprint.

10.3.3 Loss of topsoil

The loss of topsoil during construction is of major concern during this development. Although rehabilitation of thicket vegetation is very difficult or even thought to be impossible, some degree of rehabilitation is possible if the top soil is conserved during construction. The topsoil contains the seed bank for the thicket vegetation along with the correct soil mixtures and all the required nutrients and minerals needed for post construction rehabilitation and landscaping of the development area. Potential impacts may include:
- Loss of seed bank causing potential local extinction of species,
- Failed or expensive post construction rehabilitation,
- Sedimentation of the Cerebos Salt Works and/or the Swartkops Estuary is the worst case scenario.

10.3.4 Pollution of the environment and health risks to humans

Pollution of the environment is always a major concern in any development and may occur at any or all stages of a development. The contamination of the environment with raw sewage and household refuse has been an ongoing issue in informal settlements along the Swartkops River. Potential impacts may include:
- Pollution of water resources due to ineffective sewage, waste and hazardous material management during the construction phase,
- Illegal dumping of household refuse in the nearby area,
- Unacceptable health risks to residents and communities exposed to pollutants,
- Odour,
- Visual impact,
- Decrease in ecosystem resilience, stability and biodiversity,
- Decreased ecosystem functionality and benefits derived from ecosystem services,
- Increased incidences of aids related deaths due to exposure to disease-causing agents and poor health conditions.
10.3.5 Temporary jobs during construction

Construction of the using units in NU 31 will no doubt require semi-and unskilled labour. This will create promising short term employment for the people of Motherwell. Potential impacts may thus mainly be positive and will include:

- Employment opportunities for local unskilled, semi-skilled and skilled labour,
- Poverty alleviation,

10.3.6 Fire risks

During a large multifaceted project such as the Motherwell NU 31 development, several contractors may work in different areas at the same time. This makes the management of the construction site by the project manager and ECO very difficult. Open fires, e.g. for cooking, may cause bush fires. This in combination with windy conditions has the potential to cause runaway fires. Potential impacts may thus include:

- Damage to infrastructure and vegetation,
- Injury to or death of man or animals.

10.3.7 Dust

The clearing of vegetation and general construction activities on the proposed site during the construction phase will cause dust pollution. Coupled with strong winds the dust pollution may detrimentally affect the surrounding environment. Potential impacts may include:

- Settling of dust on the adjacent Cerebos salt ponds,
- Settling of dust on nearby thicket vegetation, potentially decreasing photosynthetic and carbon sequestering efficiency,
- Dust pollution nuisance experienced by construction staff and nearby residents.

10.3.8 Noise

Operating construction plant and equipment during the construction phase may cause noise pollution in the immediate vicinity of the development. Potential impacts may include:

- Noise pollution nuisance during work or after hours experienced by nearby residents,
- Impact on construction staff’s hearing if construction plant or equipment is not in good working order.

10.3.9 Trenching and fencing

Trenching, fencing and constructing stormwater canals could potentially trap fauna, especially reptiles and amphibians on site or in stormwater canals during the construction and operational phase. Potential impacts may include:

- Trapped fauna may cause harm of death to themselves as a result of the stressful environment,
- Injury to construction staff sustained from dangerous reptiles such as snakes.
- Disruption of migration of reptiles, amphibians and small mammals by the proposed stormwater canal to the Swartkops Estuary acting as a manmade barrier,
- A potential safety risk to residents and visitors who could fall into the canal.
10.3.10 Aesthetics of the development

Unpleasant visual impact due to dirty and unmanaged construction site is likely to lead to a general sense of apathy within the surrounding community towards their surroundings. The visual appearance of an area also influences human sense of place.

10.4 Potential environmental issues identified by the EAP: Operational phase

Several potentially negative and positive impacts have been identified by the EAP during assessment of the operational phase of the proposed development. These are listed below.

10.4.1 Stormwater management

Stormwater management in the Motherwell NU 31 development area will be very challenging in all respects. Potential impacts that may be associated with stormwater management in the development area include:

- Increased quantities of stormwater runoff reaching the Cerebos Salt Works plant,
- Pollution of the surface waters within the development footprint,
- Pollution of the Swartkops estuary if the stormwater is channelled into the estuary

10.4.2 Illegal hunting, snaring, fishing and plant collection

Illegal hunting, poaching and plant collection may become a serious issue especially in the Motherwell area. The communities living in the Motherwell area are predominantly poor and are thus dependent to some degree on the natural resources in their area of residence. Several traditional healers may be or will become active in the area collecting medicinal plants. The Swartkops Estuary serves as an important source of natural resources for poor communities around the estuary. Establishing new communities in Motherwell from far off places in the NMBM will increase the impact on natural resources even further. Potential impacts may thus include:

- Illegal hunting and snaring of animals in adjacent vegetation,
- Tree and plant collection for medicinal purposes and fire wood,
- Edge effect causing fragmentation and transformation of vegetation (cumulative),
- Impact on the fish and invertebrate resources of the Swartkops Estuary causing changes in fish and invertebrate community structures.

10.4.3 Jobs and economic investment

The development of communities in Motherwell NU 31 with a strong sense of self-sustainability will no doubt create sustainable employment opportunities in the long term. Long term employment opportunities will come from the business zones within the NU 31 development. Potential impacts may thus mainly be positive and will include:

- Employment opportunities for local unskilled, semi-skilled and skilled labour,
- Business opportunities for service providers, goods merchants and entrepreneurs,
- Increased economic benefits and growth on a local and provincial scale,
- Poverty alleviation,
• Establishment of functional community units creating a sense of place and civic pride for residents (cumulative).

10.4.4 Increased traffic volumes

The construction of the north-south main arterial dissecting NU 31, and the NU29/NU30 development may add to the traffic volumes experienced along the MR460 during the construction and operational phase of the proposed development. The need for traffic calming measures will have to be assessed as several connections to the MR460 is envisaged from the NU 31 development, as well as from NU 29 and NU 30. Potential impacts include:
• Traffic congestion,
• Increased risk of motorist accidents and harm to pedestrians due to speeding along the north-south arterial, MR460 and internal roads,
• Growth in small business potential along the arterial routes (positive).

10.4.5 Crime

Crime has always been associated with poverty and it is one of the main consequences thereof. Implementation of the proposed development will increase incidences of crime within the new development, in the adjacent developments of NU 29, NU 30 and NU 12, and as far as the Swartkops and Blue Water Bay communities. Possible impacts include:
• Increased incidences of crimes committed in the proposed development, as well as the existing adjacent communities,
• Trauma and increasing feelings of despondency by newly settled residents,
• Breakdown of healthy community relations and the emergence of feelings of community rejection.

10.5 Identification of specialist studies

Following the key issues that emerged through the scoping process and in Chapter 10 above, the following specialist studies were identified as necessary in the EIR phase:
• Vegetation impact study
• Socio-economic impact study
• Palaeontological and Archaeological Heritage impact study.

Other specialist studies that feeds into this EIA includes studies commissioned by the NMBM to assist in the development process. The studies include:
• Specialist geotechnical investigation
• Traffic impact assessment (TIA)
• Social and housing specialist/consultant

The specialist studies and plan of study was accepted by DEDEA on 20 October 2009 unconditionally.
11 ASSESSMENT OF THE IDENTIFIED IMPACTS

11.1 Identification of potential impacts and significance rating methodology

Potential impacts on the environment are identified by the EAP after consideration of all the proposed activities associated with the development during the design, construction, operational and decommissioning phases of the proposed development. Only impacts that may pose a notable threat to the environment are generally quantified by the EAP. Possible and perceived threats to the environment may also be identified by an Interested and Affected Party (I&AP) at any point during the public participation process (PPP). The EAP must take note of the identified potential impacts and must respond in writing to threats and issues raised by the EAP. These impacts are assessed according to a standard assessment procedure during the EIA, and is made available to all I&APs for comment.

Impacts are assessed in terms of the criteria presented in Table 11.

Table 11 Criteria used to determine the significance ratings

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial extent</td>
<td>The extent of impact describes the region in which the impact will be experienced:</td>
</tr>
<tr>
<td></td>
<td>• Site specific</td>
</tr>
<tr>
<td></td>
<td>• Local (&lt; 2 km from site)</td>
</tr>
<tr>
<td></td>
<td>• Regional (within 30 km of the site)</td>
</tr>
<tr>
<td></td>
<td>• National</td>
</tr>
<tr>
<td>Intensity or Magnitude of impact</td>
<td>The intensity describes the magnitude or size of the impact:</td>
</tr>
<tr>
<td></td>
<td>• High: Natural and/or social functions and/or processes are severely altered</td>
</tr>
<tr>
<td></td>
<td>• Medium: Natural and/or social functions and/or processes are notably altered</td>
</tr>
<tr>
<td></td>
<td>• Low: Natural and/or social functions and/or processes are negligibly altered</td>
</tr>
<tr>
<td>Duration</td>
<td>The duration is the time frame in which the impact will be experienced:</td>
</tr>
<tr>
<td></td>
<td>• Temporary (&lt;1 year)</td>
</tr>
<tr>
<td></td>
<td>• Short term (1 to 6 years)</td>
</tr>
<tr>
<td></td>
<td>• Medium term (6 to 15 years)</td>
</tr>
<tr>
<td></td>
<td>• Long term (15 to 30 years)</td>
</tr>
<tr>
<td></td>
<td>• Permanent</td>
</tr>
<tr>
<td>Probability</td>
<td>The probability of the impact occurring:</td>
</tr>
<tr>
<td></td>
<td>• Improbable (little or no chance of occurring)</td>
</tr>
<tr>
<td></td>
<td>• Probable (&lt; 50% chance of occurring)</td>
</tr>
<tr>
<td></td>
<td>• Highly probable (50% - 90% chance of occurring)</td>
</tr>
<tr>
<td></td>
<td>• Definite (&gt;90% chance of occurring)</td>
</tr>
</tbody>
</table>

The impacts are generally assessed (rated) in terms of their significance (high, medium, low), status and confidence through a synthesis of the criteria in Table 11. The rating system is outlined in Table 12 below.
Table 12. Method for rating impacts

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
</table>
| Significance   | • **High**: impacts of high magnitude locally for longer than 6 years and/or regionally and beyond. The impact results in major alterations to the environment even if effective mitigation measures are implemented and will have an influence on decision-making.  
  • **Medium**: impacts of moderate magnitude locally to regionally in the short term. The impact results in medium alterations to the environment and can be reduced or eliminated by the implementation of effective mitigation measures.  
  • **Low to very low**: impacts will be localised and temporary. Impacts result in minor alterations to the environment and can easily be alleviated by the implementation of effective mitigation measures.  
  • **No impact**: a potential concern or impact, which, upon evaluation, is found to have no significant impact at all. |
| Status         | The status is the overall effect on the environment:  
  • Positive - a ‘benefit’  
  • Negative - a ‘cost’  
  • Neutral |
| Confidence     | The degree of confidence in predictions based on available information and specialist knowledge:  
  • Low  
  • Medium  
  • High |

Impacts are further assessed both with and without suggested mitigation measures and presented in the format prescribed by way of example in Table 13. Suggested mitigation measures may be included in bullet form in the impact ratings table. Impacts will be evaluated for the construction, operation and decommissioning phases of the development. Further, the impact evaluation will, where possible, take into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area.

Table 13. Example of impacts and mitigation ratings table for the direct impacts during the construction phase.

<table>
<thead>
<tr>
<th>Construction Phase Direct Impacts</th>
<th>Impact and Mitigation</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact: Loss of habitat</td>
<td>Mitigation: Only footprints required for infrastructure should be disturbed.</td>
<td>Site specific</td>
<td>Moderate</td>
<td>Long term</td>
<td>Highly probable</td>
<td>Medium</td>
<td>Medium</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact:</td>
<td>Mitigation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Phase Indirect Impacts</td>
<td>Impact:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact:</td>
<td>Mitigation:</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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11.2 Assessment and rating of identified impacts

The potential impacts identified during the planning, construction and operational phase have been rated by the EAP in this section. It is envisaged that the housing development would not be decommissioned in the future as it will become part of an established residential development within the urban edge of the NMBM. Impacts identified in chapter 10 above that have been addressed in subsequent specialist studies has been removed from this general impact assessment and are reported on in the relevant chapters. These include impacts related to the removal of vegetation, social impacts and heritage impacts.

11.2.1 Impacts during planning and design phase

The rating of three potential impacts identified during the planning and design phase are provided in the table below. The most effective mitigation for all of the identified impacts is ultimately the construction and implementation of the proposed development. This will formalise sanitation in the area, create a hive of activity that will discourage illegal dumping in the area and create well maintained natural open spaces.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design/Pre-development phase: Direct impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact 1: Over-grazing of the open, disturbed areas by cattle, goats and other livestock</td>
<td>Local</td>
<td>Temporary</td>
<td>Low</td>
<td>Probable</td>
<td>Low</td>
<td>Very low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 2: Minor environmental contamination through biological pollutants</td>
<td>Site specific</td>
<td>Temporary</td>
<td>Medium</td>
<td>Improbable</td>
<td>Low</td>
<td>Very low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 3: Environmental pollution via illegal dumping</td>
<td>Local</td>
<td>Temporary</td>
<td>Medium</td>
<td>Improbable</td>
<td>Medium</td>
<td>Low</td>
<td>-</td>
<td>High</td>
</tr>
</tbody>
</table>

11.2.2 Impacts during the construction phase

The ratings of potential impacts identified during the construction phase are provided in the table below. Mitigation measures to all the identified impacts are provided in the draft EMP included in Appendix H.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction phase: Direct impacts</td>
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<tr>
<td>Impact 1: Impacts related to stormwater runoff, including erosion and sediment deposition</td>
<td>Site specific</td>
<td>Temporary</td>
<td>Low</td>
<td>Probable</td>
<td>Low</td>
<td>Very low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 2: Loss of topsoil.</td>
<td>Site specific</td>
<td>Permanent</td>
<td>Medium</td>
<td>Improbable</td>
<td>Low</td>
<td>Very low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 3: Pollution of the environment and health risks.</td>
<td>Local</td>
<td>Temporary</td>
<td>Medium</td>
<td>Improbable</td>
<td>Medium</td>
<td>Low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 4: Temporary jobs in construction</td>
<td>Regional</td>
<td>Temporary</td>
<td>Medium</td>
<td>Highly probable</td>
<td>Medium</td>
<td>High</td>
<td>+</td>
<td>High</td>
</tr>
</tbody>
</table>
Impact 5: Fire risks

| Local | Temporary | Medium | Improbable | Low | Very low | - | High |

Impact 6: Dust

| Site specific | Temporary | Low | Probable | Low | Very low | - | High |

Impact 7: Noise

| Site specific | Temporary | Low | Probable | Low | Very low | - | High |

Impact 8: Impacts associated with trenching and fencing

| Site specific | Temporary | Low | Probable | Medium | Low | - | High |

Impact 9: Aesthetics of the development

| Local | Temporary | Low | Probable | Low | Very low | - | High |

Construction phase: Indirect impacts

Impact 1: Health risks to humans due to pollution.

| Local | Temporary | Medium | Improbable | Medium | Low | - | High |

Impact 2: Injury or death to humans due to fires, dangerous reptiles in trenches or tampering with electrical infrastructure.

| Local | Permanent | Medium | Improbable | High | Low | - | High |

11.2.3 Impacts during the operational phase

The ratings of potential impacts identified during the operational phase are provided in the table below. Mitigation measures to all the identified impacts are provided in the draft EMP included in Appendix H.

Table 16. Ratings of potential impacts identified during the operational phase

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
</tr>
</thead>
</table>

Operational phase: Direct impacts

Impact 1: Impacts related to stormwater runoff, including erosion and sediment deposition

| Site specific | Site specific | Long term | Medium | Probable | Medium | Low | - | High |

Impact 2: Illegal hunting, snaring, fishing and plant collection.

| Local | Long term | Medium | Probable | Medium | Low | - | High |

Impact 3: Jobs and economic investment.

| Regional | Long term | Medium | Highly probable | Medium | High | + | High |

Impact 4: Increased traffic volumes and congestion

| Local | Long term | Low | Probable | Low | Very low | - | High |

Impact 5: Increased incidences of crime

| Local | Long term | Medium | Highly probable | Medium | Medium low | - | High |
12 IMPACTS ON VEGETATION

12.1 Introduction

CEN Integrated Environmental Management Unit was appointed by GIBB (Port Elizabeth) to undertake a specialist vegetation assessment as part of the EIA process for the proposed Motherwell NU 31 housing development in the Nelson Mandela Bay Municipality (NMBM). The full report is attached in Appendix C1. The terms of reference provided to the specialists were, in short:

1. The review of existing applicable studies and literature;
2. Review of the Scoping report containing the details of the proposed activity and identified impacts;
3. Assess the overall sensitivity of the vegetation at the proposed development site, including notes on relative conservation importance, SSC and rehabilitation potential;
4. A review of the potential ecosystem and/or ecological function of the remaining Motherwell Karroid Thicket;
5. Identification, reporting and mapping of conservation significant, rare, endangered, or SSC;
6. Assessment and description of the potential impact on fringe vegetation;
7. Compile a list of plant species occurring on the proposed development site, including declared alien invasive and protected plant species;
8. Identification of any plant species of cultural or historical significance within the study site, e.g. species that may be collected by herbalists;
9. Compile a basic Revegetation, Rehabilitation and Landscaping Plan, commenting on the most environmentally suitable species and approach to landscape the open space system included in the development plans;
10. Identify of any further impacts not identified during the scoping phase; and
11. Develop mitigation measures for inclusion into an Environmental Management Programme (EMP).

12.2 Approach to the study

The vegetation within the study site was surveyed on foot and assessed and described by members of CEN IEM Unit in March 2010. Zones of relative disturbance, intact areas of the various vegetation types and the location of species of special concern were demarcated using a hand-held GPS.

Plant species within the study site were identified and listed in the field by using available reference books. Samples of plant species that could not be identified were collected for further identification at the laboratory. The general sensitivity of the site was also observed and described. In addition, observations were also made on current land use activities in the area that may impact on or benefit from the remaining portions of Motherwell Karroid Thicket within the study site.

Seasonal changes in the vegetation type were not assessed due to the short assessment period. A further limitation was that the region has been in a drought for the past year or two, thus resulting in an under-representation of certain components of the vegetation type, especially those that were not flowering at the time of year when the survey was undertaken.
12.3 Vegetation and biodiversity

The vegetation type on the proposed development site is classified as Motherwell Karroid Thicket in the Nelson Mandela Bay Municipality’s Metropolitan Open Space System (NM MOSS). According to Stewart (2009), as cited by the specialist, only 39.6% of the original habitat remains within the metro, hence it is endangered.

The specialist classified the vegetation within the broad category of Sundays Thicket, as described by Mucina and Rutherford (2006, as cited by the specialist). The Sundays Thicket showed local changes in a south-westerly direction to vegetation that is more typical of Motherwell Karroid Thicket. Fine scale degradation of the Sundays Thicket was also noted by the specialist.

The specialist divided the study site into five broad areas based on on-site observations of vegetation type, level of degradation, land-use impacts; and species dominance and diversity (Figure 12). These categories are Sundays Thicket (ST), Motherwell Karroid Thicket (MKT), agricultural area, degraded area and dumping area. The Sundays Thicket is marked by informal tracks, illegal dumping and evidence of browsing and its conservation significance on a broader scale is limited due to fragmentation and separation from viable thicket corridors through agriculture and development.

Figure 12. Vegetation sensitivity and delineation of the study site into 5 broad zones (extracted from vegetation specialist report).

Motherwell Karroid Thicket is classified as an endangered vegetation type and was found relatively intact with a high number of protected and other locally threatened species. This area has potential to provide an important long-term ecological function because it is bordered on the south and south-west by a critical biodiversity area (Figure 13), connecting it to a viable conservation corridor. Vegetation in this area also provides important local ecosystem services, particularly in terms of stormwater management, soil stability, and erosion control.
The agricultural area is intensively used for browsing and grazing of animals, while the vegetation in the degraded area is dominated by *Agave* spp., *Cynodon dactylon*, *Aizoon* spp., *Atriplex semibaccata*, *Opuntia ficus-indica*, *Aloe africana*, *A. ferox* as well as many ruderal species. Both of these areas have very little conservation value, but some locally threatened and protected species are present in these areas and may be candidates for transplanting. The dumping area is characterised by intense illegal dumping of building rubble and general waste. The vegetation has consequently been transformed to weed species, ruderals, and some isolated remnants of Sundays Thicket. This area has little conservation value and provides no significant ecological function to the area.

Figure 13. Extract from the NMBM MOSS Plan (2009) indicating the location of the site (outlined in red) in relation to the CBA (extracted from vegetation specialist report).

### 12.4 Assessment of identified impacts

No impacts during the planning/design phase were identified. Further, it was envisaged that the housing development would not be decommissioned in the future as it will become part of an established residential development within the urban edge of the NMBM. Seven impacts were assessed during the specialist investigation. Three impacts were identified during the construction phase and four during the operational phase. These impacts are identified and assessed in Table 17 overleaf.
### Table 17. Impacts on vegetation and biodiversity identified and assessed with and without mitigation

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
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<tbody>
<tr>
<td><strong>Construction phase: Direct impacts</strong></td>
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<tr>
<td><em>Impact 1:</em> Loss of Motherwell Karroid Thicket and Sundays Thicket, and subsequent reduction in intrinsic biodiversity value</td>
<td>Site specific</td>
<td>Permanent</td>
<td>High</td>
<td>Definite</td>
<td>High</td>
<td>High</td>
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<tr>
<td>Mitigation:</td>
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<tr>
<td>1. A search and rescue operation must be done for ecologically important and protected plant species on site and species that are known to have good survival rates when transplanted should be stored in a nursery for post-construction rehabilitation,</td>
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<td>2. Permits must be obtained from the relevant authorities for the collection and storage of all threatened and protected species,</td>
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<td>3. Only indigenous vegetation that occurs naturally on site is to be planted in site rehabilitation and in landscaping activities within the development,</td>
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<td>4. A suitably qualified specialist must undertake the search and rescue operation, and to manage the nursery and re-planting activities,</td>
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<td>5. Should there be insufficient space on the site for re-planting of rescued species, these should be stored in a municipal nursery and used for planting in urban parks etc,</td>
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<td>6. Provide an information programme for contractors and site staff about the need to conserve flora of the area.</td>
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<td><strong>Construction phase: Indirect impacts</strong></td>
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<tr>
<td><em>Impact 2:</em> Removal of vegetation will result in soil exposure and increased erosion potential</td>
<td>Site specific</td>
<td>Temporary</td>
<td>Low</td>
<td>Probable</td>
<td>Medium</td>
<td>Low to very low</td>
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<tr>
<td>Mitigation:</td>
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<tr>
<td>1. The site must be cleared in phases to reduce the amount of exposed surfaces at one time,</td>
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<td>2. The size of required work areas must be restricted to the minimum required for efficient and effective work,</td>
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<td>3. Temporary stabilization measures must be used to prevent erosion of recently cleared areas until rehabilitation is successful and/or the site has been surfaced,</td>
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<td>4. Construction must be halted in excessive weather conditions that will exacerbate erosion,</td>
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<td>5. All disturbed sites should be re-vegetated and rehabilitated immediately after construction so as to limit the exposure of the disturbed areas to wind and water erosion.</td>
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<tr>
<td><em>Impact 3:</em> Loss of forage habitat and shelter for faunal species (Indirect)</td>
<td>Site specific</td>
<td>Permanent</td>
<td>Low</td>
<td>Definite</td>
<td>Medium</td>
<td>Low to very low</td>
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<tr>
<td>Mitigation:</td>
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<tr>
<td>1. Relocate herpetofauna found on construction sites to other localities with a suitable habitat close to the construction site. It is probable that small mammals and reptiles resident at the site will move away from the area as soon as construction begins,</td>
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<tr>
<td>2. Provide an information programme for contractors and site staff about the need to conserve fauna of the area,</td>
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<tr>
<td>3. Institute strict speed control limits for construction vehicles.</td>
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<tr>
<td><strong>Operational phase: Direct impacts</strong></td>
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</tr>
<tr>
<td><em>Impact 4:</em> Loss of ecosystem services provided by thicket</td>
<td>Site specific</td>
<td>Permanent</td>
<td>Medium</td>
<td>Definite</td>
<td>Medium</td>
<td>Low to very low</td>
<td>-</td>
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<tr>
<td>Mitigation:</td>
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<tr>
<td>1. Soil erosion must be prevented by implementing the mitigation measures identified under Impact 2 above,</td>
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<td>2. Medicinal plants can be stored at a nursery for use by traditional healers,</td>
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<td>3. A stormwater management plan must be developed for the site to control surface water flow,</td>
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<td>4. Provision must be made in municipal planning documents for commonage land for subsistence agricultural farmers.</td>
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<tr>
<td><em>Impact 5:</em> Habitat fragmentation and edge effect</td>
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</table>
Mitigation:
1. It is advisable that a buffer be instated on the southern boundary of the development where it borders on critical biodiversity areas (CBA) to prevent impacts of the development from extending into the CBA.

The mitigation measures discussed by the vegetation specialist were further incorporated into the proposed Environmental Management Programme discussed in Appendix H.

**12.5 Conclusions**

The majority of the proposed Motherwell NU 31 development site, and part of surrounds, have been largely transformed by agriculture and development in the area. Of the two vegetation types found within the development site, it is only Motherwell Karroid Thicket that could potentially fulfil a conservation purpose within the Nelson Mandela Bay Municipality. The impact of the loss of MKT on the metro's potential to meet its conservation target for MKT is judged to be HIGH. This rating is largely concluded as a loss of any pocket of MKT will be significant in terms of area coverage of the vegetation type in the NMBM regardless of its conservation potential or current natural state (intact or degraded). At present the metro will still achieve its conservation target for MKT, even with the loss of the portion in the study site, but if all the initiatives and plans proposed in the NMBM SDF and IDP are implemented MKT will eventually be pushed into the Critically Endangered Category. This will ultimately require reprioritisation or re-evaluation of some of the initiatives and plans proposed in the SDF and IDP if the NMBM is to conserve a conservation significant portion of MKT. This particular portion of Motherwell Karroid Thicket was not included in the NM MOSS. The proposed development site on which the MKT is located was, however, included in the development plans from the metro, and now forms part of the Motherwell Urban Renewal Programme identified in the MSDF as a priority development area. Responsible mitigation for the loss of MKT should include effective conservation of the MKT within the NM MOSS and other identified areas not earmarked for priority development.
13 IMPACTS ON WATER RESOURCES

13.1 Introduction

This section largely addresses the potential impact that any of the three proposed site alternatives described in section 6.2 may have on the Swartkops River and estuarine system.

13.2 Approach to the study

The proposed use of stormwater canals to drain the north-western part of NU 31 and discharge into the Swartkops estuary has emerged as a real possibility in terms of the identified viable and preferred alternatives. Therefore given the potential impact of such stormwater, especially if the stormwater is contaminated with pollutants before entering the Swartkops estuary, the EAP has decided to conduct a preliminary desktop assessment of the impact of the proposed alternatives on the estuary. The EAP modelled the ecosystem ecology and functioning of the Swartkops estuary, amongst other, during his post graduate studies. This assessment has taken into account the alternative technologies and mitigation measures proposed in chapter 6 of this study. The objective of the desktop assessment of the impact on water resources, especially estuaries, was to shed some light on potential significant impacts on the surrounding water resources and whether these impacts was of a significant enough nature to warrant a specialist investigation.

13.3 Swartkops estuary, hydrology and stormwater runoff management

A large proportion of literature and studies conducted on the Swartkops River and estuary seem to point to the fact that the Swartkops River system is a remarkably resilient system (Vosloo, 2004). It is not known exactly what mechanism is ensuring that the Swartkops system remains largely functional and is able to withstand high levels of long term pollution, but it is believed that a combination of factors is ensuring that the system has coped with the impacts to date. One of the possible contributing factors is the fact that the Swartkops estuary has a large number of faunal and floral species occurring in the system. This resultantly means that the ecosystem is supporting a high number of “redundant” species. This in turn ensures greater levels of interconnectivity among the different trophic levels and species of the ecosystem, thus making the system more resilient to perturbations. Another possible contributing factor could be the fact that the Swartkops estuary is very dynamic and has a strong tidal and current exchange with the adjacent ocean. This effectively ensures that the system generally remains a well-mixed (freshwater and seawater mixing thoroughly) system with generally short periods (days) of replacement of the tidal volume in the system. This effectively dilutes pollutants in the system before the pollutants are transported out of the system to the ocean within short timeframes (see Vosloo, 2004 and cited literature therein for discussions on the Swartkops estuary).

This however does not mean that the Swartkops estuary can continue to absorb copious amounts of pollutants while still remaining in a functional state in the long term. Caution with regards to designing and implementing new developments around the Swartkops River and estuary, as well as initiatives to minimise the input of harmful pollutants into the ecosystem is thus required to keep the system in a stable state. With regards to the design and implementation of the NU 31 housing development,
the EAP has recommend alternatives that employs the cautious principle to ensure that all potential pollutants can be effectively minimised before stormwater daylights into the Swartkops estuary. The size of the north-western part of Motherwell NU 31 and the fact that the NMBM does not as a rule develop on areas that cannot be effectively drained of its stormwater runoff suggests that the quantity of stormwater that will be discharged via a proposed new stormwater canal into the Swartkops estuary will be far less than currently being discharged via the existing Motherwell stormwater canal. Bulk stormwater infrastructure must be designed to incorporate green technologies such as artificial wetlands and bioretention systems to ensure that potential pollution is minimised at all times. The bulk stormwater infrastructure should further ensure that stormwater discharges occur at pre-development rates, even during notable rain events.

13.4 Assessment of identified impacts

The potential significant impacts the proposed housing development may have on the Swartkops ecosystem may include the pollution of Swartkops River and estuary, changes in community structure of environmentally sensitive faunal or floral species, and worst case scenario, the local extinction of sensitive species or taxa. The potential impacts are rated in Table 18 below.

Table 18. Potential impacts on the Swartkops River and estuary

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
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<tbody>
<tr>
<td><strong>Operational phase</strong></td>
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<tr>
<td>Impact 1: Pollution of the Swartkops River and estuary</td>
<td>Local</td>
<td>Medium term</td>
<td>Medium</td>
<td>Probable</td>
<td>Medium</td>
<td>Low</td>
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<td>Mitigation:</td>
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<tr>
<td>• The developer must implement at a minimum one of the technology alternatives proposed in this EIR,</td>
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<tr>
<td>• The developer must develop a long term monitoring programme to monitor stormwater discharge from a potential stormwater canal,</td>
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<td>• The developer must ensure regular maintenance of the proposed infrastructure to ensure it is working optimally.</td>
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<tr>
<td>Impact 2: Changes in community structure of environmentally sensitive faunal or floral species</td>
<td>Local</td>
<td>Medium term</td>
<td>Medium</td>
<td>Probable</td>
<td>Medium</td>
<td>Low</td>
<td>- ve</td>
<td>High</td>
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<td>Mitigation:</td>
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<td>Impact 3: Local extinction of sensitive species or taxa</td>
<td>Local</td>
<td>Long term</td>
<td>High</td>
<td>Improbable</td>
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<td>Mitigation:</td>
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<td>• The developer must implement at a minimum one of the technology alternatives proposed in this EIR,</td>
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<td>• The developer must develop a long term monitoring programme to monitor stormwater discharge from a potential stormwater canal,</td>
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<td>• The developer must ensure regular maintenance of the proposed infrastructure to ensure it is working optimally.</td>
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</table>
13.5 Conclusions and recommendations

Potential impacts from polluted stormwater runoff into the Swartkops estuary are largely known. With the proposed mitigation measures in place the impact of the proposed development on the Swartkops River and estuary is expected to be low. It is therefore recommended that if one of the proposed site alternatives are implemented one of the green technology alternatives in section 6.3 should be included in the detailed design and implemented as part of the bulk stormwater infrastructure.
14 SOCIO-ECONOMIC IMPACTS

14.1 Introduction

A site inspection during scoping phase and public participation process highlighted the existence of a group of urban stock farmers occupying the land immediately south of the Motherwell reservoir. Information gathered during Scoping Study found that the presence of the farmers on site is incompatible with the proposed Motherwell NU 31 housing development. At the same time, the land used by them sustains or complements their livelihoods and their own sense of self and worth.

Specific aspects to be assessed by the specialist included:

- Identification of affected parties (the urban farmers) on site;
- Establishing since when the farmers have been on site in the context of the Prevention of Illegal Eviction and the Unlawful Occupation of Land Act, No. 19 of 1998;
- Compiling a demographic profile of the farmers from a social and economic perspective to inform the EIA;
- Identification of the key social and economic issues in the local community which could be affected by the proposed housing project;
- Proposing of options (alternatives) for the mitigation of social and economic impacts arising from the presence of farmers on the site;
- Perform a social and economic impact assessment, including cumulative impacts, for each of the proposed alternatives, according to prescribed methodology;
- Formulate management guidelines and a monitoring framework, incorporating mitigation strategies to reduce the potential negative social impacts of the development and interventions to maximize the potential positive impacts.
- Assess the general impact of the housing development on the surrounding environment

14.2 Approach to the study

A Social Impact Assessment includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programmes, plans, projects) and any social change processes invoked by these interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment. In this instance, it was decided that an assessment of the specific situation of a “group of subsistence farmers” using the site for the grazing of their animals was required. Thus, the specific aim of the Socio-Economic Assessment is to find an approach to accommodate a group of “subsistence farmers” currently using the land earmarked for the Motherwell NU31 housing development.

As a backdrop to the above-stated specific assessment the study will also provide a general but selected socio-economic assessment of the impact of planned development.

The study was informed by a site visit, rapid desktop review of all available information, meetings with representatives of the NMBM, Motherwell Urban Renewal Programme and subsistence farmers/ livestock keepers, farmers adjacent to the
study site, NMBM councillors, and consideration and assessment of all information and stakeholder interactions.

14.3 **Assessment of identified impacts**

The proposed development, in terms of empowerment impact, will make an all round positive contribution to alleviate the subsidized housing shortage in the NMBM in general and in Motherwell in particular. However, the possible No-Go option regarding the proposed development means the aforementioned positive impact that may emanate from the proposed development will not occur, resulting in no contribution in alleviating the housing shortage in the NMBM.

Considering the size of the proposed development, a considerable number of employment opportunities will be created in the short term. The low educational status of people in Motherwell however points to the need and opportunity for skills development and transfer by the developer in order to benefit from the construction phase. Skills development and transfer will become even more needed after the construction phase.

The proposed development is almost certain to attract unemployed employment seekers, not only from Motherwell, but also from elsewhere in the NMBM and possibly beyond, which may result in tension and conflict between the two groups of employment seekers.

The proposed development and the current urban agricultural activity are incompatible. The construction of the proposed development will inevitably have a limiting impact on urban livestock keeping and urban agricultural activities currently practiced on the site for the planned development, and force the affected parties to source land elsewhere.

The farmers are in favour of the proposed development however they will have to be relocated to an alternative site where there will be enough space for them to keep at least 400 livestock and if the problems currently encountered with fencing, water and electricity can be solved in the process. They indicated that they have identified a piece of land that is approximately 3 km away from the current site. One would assume that the distance from the community will complicate transport to and from the alternative site and result in more being spent on transport by the farmers. An alternative site could perpetuate a negative / problematic situation if it is lacking in terms of the necessary enabling conditions to make farming possible. This would refer to fencing, water, electricity and technical urban agricultural support.

Impacts identified by the socio-economic specialist are provided in the Table 19 overleaf.
Table 19. Social impacts and ratings identified for the NU 31 housing development

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
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<td><strong>Construction phase</strong></td>
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<td>Impact 1: Empowerment of beneficiaries that were previously disadvantaged</td>
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<td>Region</td>
<td>Long term</td>
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<td>Mitigation:</td>
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<td>• The social facilitator identified by the project managers must take a leading role in the social interactions with beneficiaries to ensure optimal benefits arising.</td>
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<td>Impact 2: The proposed development is subject to the No-Go option</td>
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<td>Region</td>
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<td>Impact 3: Members of the local community is empowered with employment and marketable skills</td>
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<td>Region</td>
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<td>Mitigation:</td>
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<td>• The social facilitator identified by the project managers must take a leading role in the social interactions with beneficiaries to ensure optimal benefits arising.</td>
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<td>Impact 4: Conflict between unemployed members of the local community and employment seekers from elsewhere</td>
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<td>Local</td>
<td>Short term</td>
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<td>• The labour recruitment process must be biased towards using local labour and transferring any skills to the local community.</td>
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<td>Impact 5: Livelihood activity of affected parties are limited by the proposed development</td>
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<td>• In the long-term the Metro will require an Urban Agriculture Policy with specific reference to Urban Live Stock Keeping to determine the future of urban live stock keeping in the Metro.</td>
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<td>• In the absence of a long-term solution a short-term form of mitigation should be the identification of alternative land. Identifying substantial pieces of Municipality land on the urban periphery where controlled live stock keeping can occur would be preferable.</td>
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<td>Impact 6: Tension between live stock keepers and the NMB Municipality</td>
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<td>• The farmers have identified a piece of land further along the Uitenhage Road (MR460 road connecting Uitenhage and Addo) which meets their requirements in terms of proximity and assumed availability of water. The viability of this land for urban agriculture must be investigated by the NMBM.</td>
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<tr>
<td>• Effective communication between the Farmers and the NMB Municipality is a vital form of mitigation.</td>
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<td>Impact 7: The activities of the live stock keepers are negatively affected because the inadequacy of an alternative site due to the distance and lack of enabling conditions</td>
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<td>Mitigation:</td>
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<tr>
<td>• The municipality must attend to understanding and implementing an appropriate enabling function. Indications are that with the appropriate policy, planning and strategic mechanisms in place and with the appropriate support and enabling conditions it is possible to optimize this relocation scenario and similar urban agriculture situations in the long term future. With the appropriate planning and supportive action form significant other agencies it may even be possible to enhance agricultural activity to a level productive economic activity in alignment with a bigger Metro vision.</td>
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</table>
14.4 Conclusions and recommendations

The main issue stems from the presence of the urban farmers and their proposed relocation. This issue goes beyond the scope of this EIA and the NMBM is currently exploring all potential avenues to identify a suitable long term solution for the NU 31 stock farmers, as well as subsistence farmers across the metro. The NMBM and the Motherwell urban farmers, along with a mediator should sit together to find alternative land for these urban farmers.

In terms of maximising benefits to the local community, jobs and skills transfer should be invested in the immediate community. This would go a long way towards empowering people in the area.

The implementation of the NU 31 phase of the greater Motherwell north housing development (NU 29, 30, 31 and 12) will realistically only be implemented in 3 to 5 years from present, given the current financial climate and shortcomings on the ground. It is therefore expected that as the development progress towards the completion of the detailed design, short term and perhaps even long term solutions for the stock farmers will become more achievable. Currently the short term solutions for housing these farmers’ livestock could involve temporary fenced areas on the adjacent electrical servitude south-east of the development, the housing of livestock on fenced and grassed stormwater retention ponds in NU 29, 30 and 31, and/or the housing of livestock on the earmarked open space and large community sites within NU 31. The NMBM must in the interim provide these farmers with potable water for the livestock and their keepers on site.

It is further recommended that once such a site is identified the developer shall develop a relocation plan which will take into account and minimise any potential negative impacts at or surrounding such identified site, for approval by the DEDEA before relocation commences. This relocation plan must also identify all suitable mitigation measures to minimise the identified impacts to the satisfaction of the DEDEA.
15 ARCHAEOLOGICAL IMPACT ASSESSMENT

15.1 Introduction

The purpose of the study was to conduct a phase 1 archaeological impact assessment (AIA) of the proposed Motherwell NU 31 housing development situated within the boundaries of portion 2 of farm 316 in the Nelson Mandela Metropolitan Municipality.

The terms of reference provided to the specialists were:

1. An indication of the scope of, and the purpose for which, the report was prepared;
2. A description of the methodology adopted in preparing the report or carrying out the specialised process;
3. A description of any assumptions made and any uncertainties or gaps in knowledge;
4. A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;
5. Recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority;
6. A description of any consultation process that was undertaken during the course of carrying out the study;
7. A summary and copies of any comments that were received during any consultation process; and
8. Any other information requested by the competent authority.

15.2 Approach to the study

A survey was conducted to establish the range and importance of the exposed and in situ archaeological heritage materials and features, the potential impact of the development, and to make recommendations to minimize possible damage to these sites. The survey was conducted by two people on foot following the already existing service gravel roads and informal footpaths within the area. GPS readings were taken using a Garmin Plus II.

15.3 Summary of findings

The proposed area for development is situated about 20 km north of the Port Elizabeth city centre between the Swartkops and Coega River valleys, and lies approximately 4.5 km north of the lower Swartkops estuary and 9 km from the coastline. The area has in the past been highly disturbed by the construction of the Motherwell reservoir which is situated within the boundaries of the proposed area for the development. Informal housing/shacks have also been constructed around the reservoir. Service gravel roads, informal footpaths, power lines and underground pipelines have also caused disturbances in the past. Occasional surface scatters of predominantly Middle Stone Age (MSA) stone tools were documented over the entire area proposed for development. It is highly unlikely that the stone tool scatters are in situ and are, therefore, considered to be in a secondary context. Few Early Stone Age (ESA) stone tools were also documented, but not as much as those of the MSA. No sites containing any depth of deposit or other archaeological material associated with
the stone tool artefacts were observed within the area. The proposed area for development is considered as having a low cultural significance. GPS locations of the sites where surface scatters were found are shown in Figure 14.

Figure 14. Locations where surface scatters of Middle Stone Age tools were found during the field survey are shown in yellow.

15.4 Assessment of the identified impacts

No impacts during the planning/design and operational phase were identified. Further, it was envisaged that the housing development would not be decommissioned in the future as it will become part of an established residential development within the urban edge of the NMBM. A single impact was assessed during the specialist investigation. This impact are identified and assessed in Table 20 below.
Table 20. Impacts on archaeological heritage resources identified and assessed with and without mitigation

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
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<tbody>
<tr>
<td>Impact 1: Loss of Middle Stone Age (MSA) stone artefact surface scatters</td>
<td>Site specific</td>
<td>Permanent</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Very low</td>
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<td>Mitigation:</td>
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<tr>
<td>1. No phase 2 archaeological mitigation is required for the proposed development to proceed.</td>
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<td>2. If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/excavation can be undertaken.</td>
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<td>3. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.</td>
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The mitigation measures discussed by the Archaeological specialist were further incorporated into the proposed Environmental Management Programme discussed in Appendix H.

15.5 Conclusions and recommendations

The area is of a low cultural sensitivity and development may proceed as planned, although the following recommendations must be considered. The area has been highly disturbed in past and currently, therefore, it is unlikely that any in situ archaeological sites/remains, and human remains would be uncovered during construction. However, if concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation / excavation can be undertaken.
16 PALAEONTOLOGICAL IMPACT ASSESSMENT

16.1 Introduction

The purpose of the desktop investigation was to ascertain whether potential important palaeontological heritage resources would be impacted during the construction of the Motherwell NU 31 housing development.

The terms of reference provided to the specialist were:

1. A description of the methodology adopted in preparing the report or carrying out the specialised process;
2. A description of any assumptions made and any uncertainties or gaps in knowledge;
3. A description of the findings and potential implications of such findings on the impact of the proposed activity on the environment;
4. Recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority.

16.2 Approach to the study

A desktop impact assessment was conducted by an accredited member of PSSA and APHAP (Association of Professional Heritage Assessment Practitioners – Western Cape). The desktop impact assessment concerning fossil heritage resources in the Motherwell study area was based on:

- A review of relevant palaeontological and geological literature, including geological maps and previous heritage impact reports (notably the recent Coega IDZ study by Almond, 2010);
- Location and examination of fossil collections from study area (e.g. museums);
- Data on the proposed development provided by the developer.

16.3 Summary of findings

The western part of the development area is underlain by marine sandstones and clays of the Sundays River Formation (Uitenhage Group) (Figure 15). This formation contains a rich biota of estuarine to shallow marine fossils from the Early Cretaceous Period. These fossils mainly consist of concentrations of thick-shelled bivalve molluscs together with rarer gastropods, ammonites and minor invertebrate groups (e.g. corals) as well as locally abundant trace fossil assemblages. The majority of the shelly fossils occur within dense shell beds (coquinas) at the base of calcareous, storm-generated sandstones. Very rare vertebrate remains from the Sundays River Formation in the area include bones and teeth of plesiosaurs (an extinct group of large marine reptiles), lizards and dinosaurs. The central and eastern part of the development area is underlain by coastal limestones of the Neogene Alexandria Formation (Algoa Group) that is locally richly fossiliferous, with over two hundred recorded fossil taxa – mainly molluscs and other marine invertebrates as well as sharks’ teeth. However, field evidence suggests that much of this lime-rich succession has been considerably altered by post-depositional leaching and calcritization so that most new excavations expose few or no fossils of value. A
superficial mantle of pebbly residual deposits in this area (previously mapped as the Blue Water Bay Formation) is formed by weathering of the Alexandria Formation is of low palaeontological sensitivity.

The Alexandria Formation is also known to be richly fossiliferous, and a substantial number of the key fossil localities within this unit are situated in the Algoa Bay region. However, field evidence suggests that much of this lime-rich succession here has been diagenetically altered (e.g. by post-depositional leaching and calcretization) so that most new excavations expose few or no fossils of value.

The “Bluewater Bay” residual soils are largely unfoossiliferous, although they may be expected to contain occasional robust marine shells weathered-out from the underlying Alexandria Formation bedrock with an admixture of terrestrial snail shells.

![Figure 15. Extract from 1: 50 000 geology sheet 3325DC & DD, 3425BA Port Elizabeth (Council for Geoscience, Pretoria) showing approximate location of study area within the black rectangle. Geological units shown within this area include the Sundays River Formation (Ks, red), the Alexandria Formation (Ta, pink) and the Bluewater Bay gravelly residual soils (yellow with small circles)(extracted from Palaeontological specialist report).](image)

16.4 Assessment of the identified impacts

No impacts during the planning/design and operational phase were identified. Further, it was envisaged that the housing development would not be decommissioned in the future as it will become part of an established residential development within the urban edge of the NMBM. Three impacts were assessed during the specialist investigation. This impact are identified and assessed in Table 21 below.
Table 21. Impacts on archaeological heritage resources identified and assessed with and without mitigation

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
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<tr>
<td><strong>Construction phase: Direct impacts</strong></td>
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<td><strong>Impact: Loss of fossil heritage resources in the Blue Water Bay Formation</strong></td>
<td>Site specific</td>
<td>Permanent</td>
<td>High</td>
<td>Probable</td>
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<td><strong>Mitigation:</strong></td>
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<td><strong>Impact: Loss of fossil heritage resources in the Alexandria Formation</strong></td>
<td>Site specific</td>
<td>Permanent</td>
<td>Low</td>
<td>Probable</td>
<td>Low to high</td>
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<td><strong>Mitigation:</strong></td>
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<tr>
<td>1. If rich fossil accumulations are exposed, excavations are to be examined and sampled by professional palaeontologist while fresh bedrock is still exposed</td>
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<tr>
<td><strong>Impact: Loss of fossil heritage resources in the Sundays River Formation</strong></td>
<td>Site specific</td>
<td>Permanent</td>
<td>Low</td>
<td>Probable</td>
<td>Moderate to high</td>
<td>Medium</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td><strong>Mitigation:</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>1. Substantial excavations to be examined and sampled by professional palaeontologist while fresh bedrock is still exposed</td>
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</table>

Excavations made during construction of the proposed Motherwell NU 31 housing development will expose potentially fossiliferous sediments that are currently buried beneath the land surface or mantled by dense vegetation. Study and sampling of these sediments and their enclosed fossils while they are still exposed is necessary, before they are permanently sealed in by further development. If appropriate mitigation is carried out it will contribute to our understanding of the rich palaeontological heritage of the Algoa Basin.

The mitigation measures discussed by the specialist were incorporated into the proposed Environmental Management Programme discussed in Appendix H. The original mitigation measures proposed by the specialist are presented in the PIA in Appendix C3.

16.5 Conclusions and recommendations

Given the considerable potential for important new fossil finds in the study area the specialist recommends that: (a) the ECO for the housing development is alerted (e.g. through this report and the references therein) to the types of fossils that may occur here, their vulnerability to damage and the necessity of sampling and conserving as much fossil material as possible for scientific research; (b) where feasible, fossils exposed by development be set aside for examination by a professional palaeontologist; (c) the ECO contact a professional palaeontologist immediately should any obviously important fossil finds be made (e.g. vertebrate remains, dense concentrations of fossil shells), and (d) before development starts, site visit/s by a professional palaeontologist be commissioned so that new rock exposures may be sampled, accumulated fossils examined, and the ECO advised on any further mitigation necessary.

The assessment of the proposed study site revealed that the Sundays River Formation is the only formation that is likely to contain significant fossilised remnants. It is located in the western quarter of the study site. Such fossil remnants are further
only likely to be exposed if substantial excavations are made. Given the nature of the
development it is therefore likely that deep trenching during the installation of bulk
service infrastructure will be the main agent for uncovering potential fossils. It is
believed that the mitigations recommended by the specialist will adequately address
the potential impacts identified by the specialist.
17 CUMULATIVE IMPACTS

Cumulative impacts are those impacts that stem indirectly from direct impacts within a proposed development. Positive and negative cumulative impacts have been identified in the Motherwell NU 31 development by the EAP and vegetation specialist.

The cumulative impacts mainly revolve around the loss of the Motherwell Karroid Thicket and thus potential ecosystem services, and the relocation and integration of beneficiaries and other affected parties such as the subsistence farmers.

A potentially striking advantage of the relocation of communities out of the informal areas next to the Swartkops River is that pollution loads to the surrounding environment may notably decrease in the NMBM, given that unsuitable informal areas where beneficiaries are relocated from have undergone rehabilitation and further informal settlement is prevented. This should result in a detectable improvement in the water quality and health of the Swartkops estuary over time. Cumulative impacts identified and the ratings are presented in Table 22 below.

Table 22. Cumulative impacts identified for the proposed development

<table>
<thead>
<tr>
<th>Impact</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Probability</th>
<th>Significance without mitigation</th>
<th>Significance assuming mitigation</th>
<th>Status</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational phase: Cumulative impacts</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Impact 1: Reduced potential to meet NMBM conservation target for Motherwell Karroid Thicket</td>
<td>Regional (NMBM)</td>
<td>Permanent</td>
<td>Medium</td>
<td>Probable</td>
<td>High</td>
<td>Medium</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 2: Change in agricultural land use impacts on ‘way of life’ and subsistence income of local community</td>
<td>Regional (NMBM)</td>
<td>Permanent</td>
<td>Medium</td>
<td>Probable</td>
<td>Medium</td>
<td>Low to very low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 3: Social upliftment and stability in the general Motherwell region.</td>
<td>Local</td>
<td>Long term</td>
<td>Medium</td>
<td>Highly probable</td>
<td>High</td>
<td>High</td>
<td>+</td>
<td>High</td>
</tr>
<tr>
<td>Impact 4: Despondency by newly settled beneficiaries. This may be brought on by unanticipated crime, lack of employment or lack of community acceptance</td>
<td>Site specific</td>
<td>Long term</td>
<td>Medium</td>
<td>Probable</td>
<td>Medium</td>
<td>Low</td>
<td>-</td>
<td>High</td>
</tr>
<tr>
<td>Impact 5: Pollution loads to the surrounding environment may notably decrease in response to more formal housing being handed over to beneficiaries</td>
<td>Local</td>
<td>Long term</td>
<td>Medium</td>
<td>Probable</td>
<td>Medium</td>
<td>High</td>
<td>+</td>
<td>High</td>
</tr>
</tbody>
</table>
18 CONCLUSIONS AND RECOMMENDATIONS

18.1 Summary of impacts

The proposed development is predicted to have both negative and positive environmental impacts on the surrounding environment. The most notable negative impacts are the destruction of the surrounding thicket vegetation, relocation of subsistence farmers from the proposed development site and unwanted stormwater impacts on the downhill areas and pollution in the Swartkops estuary.

The main positive impact of the proposed development includes possibly substantial economic benefits to the area and beneficiary communities, and reduced pollutants entering the environment, especially the Swartkops estuary, as a result of formalisation of housing and sanitation. Besides the obvious benefit of a formal and serviced house, residents will also benefit from a number of public amenities such as shops, local businesses and service providers, employment, public transport, etc. which will create functional communities.

The potential stormwater and pollution impacts on the surrounding environment and Swartkops estuary can also be effectively mitigated through implementation of the proposed artificial wetland and bioretention systems. The relocation of the existing subsistence farmers on the proposed development site poses a challenge as this issue is a metro wide issue and is in the process of being addressed by the NMBM. The identification of suitable agricultural land is key, but is likely to take some time to identify and secure. This could mean that the subsistence farmer may have to be relocated to a temporary site where they can continue their livelihoods while suitable agricultural land is secured for them. Their existing occupation on the proposed development site is not ideal given shortages in water supply causing these farmers to allegedly vandalise the infrastructure of the water reservoir to provide a source of water to their livestock. And while relocation to a temporary site also may not be entirely ideal, it is ultimately argued that the urgent need for serviced and formal housing to accommodate the poor outweighs the potential discomfort that may be experienced by subsistence farmers as a result of relocating to a temporary site where they can continue their livelihoods in the interim.

The destruction and loss of the natural thicket vegetation cannot be easily mitigated and the vegetation specialist proposed no mitigation for this impact. The significance of this impact is slightly diminished by the fact that this area has been identified and earmarked for housing development in the NMBM SDF. This area was also subsequently excluded from the metropolitan open space system (NM MOSS). Future mitigation for the Motherwell Karroid Thicket loss from the area should be considered and involves redefining of the NM MOSS to include the remainder of the vegetation type as was identified by the strategic environmental assessment (SEA) of the NMBM SDF in 2007.

18.2 Environmental Impact Statement

Therefore, considering that almost all of the identified potential impacts of the proposed development on the environment can be effectively mitigated, and the substantial benefits to individuals, communities and the environment, the EAP recommends that the proposed NU 31 housing development receive environmental authorisation provided that the stipulations in this EIA and EMP are adhered to at all
times. The EAP further recommends implementation of site alternative 1 in conjunction with technology alternative 1 at a minimum. It is advisable that both technology alternatives 1 and 2 be implemented but the EAP recognise that the viability is dependent on availability of subsidies and funding. Lastly, the EAP recommends the implementation of activity alternative 2 to minimise impact on the endangered Motherwell Karroid Thicket.
**REFERENCES**


DOCUMENT CONTROL SHEET

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DATE :
REVISION :
19/10/2011

FILE ORIGINAL IN RELEVANT SECTION IN THE QUALITY FILE.

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