NKT CONSULTING SERVICES (PTY) LTD
WATER & ENVIRONMENTAL SERVICES

BASIC ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR THE PROPOSED CONSTRUCTION OF ADDITIONAL EIGHTEEN BROILER HOUSES ON PORTIONS 17 & 19 OF THE FARM MODDERBULT 511 IR, BALFOUR, DIPALISENG LOCAL MUNICIPALITY

PREPARED BY:

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ABBREVIATIONS AND ACRONYMS

DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity analysis
EMP	Environmental Management Plan/Programme
EN	Endangered
ESR	Environmental Scoping Report
Fax	Facsimile
GDP	Gross Domestic Product
Ha	Hectare
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
IRR	Issues and Response Register
IWUL	Integrated Water Use License
IWULA	Integrated Water Use License Application
IWWMP	Integrated Water and Waste Management Plan
LED	Local Economic Development
LM	Local Municipality

NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEM: WA	National Environmental Management: Waste Act
NT	Near Threatened
NWA	National Water Act (Act No. 36 of 1998)
PES	Present Ecological State
PPP	Public Participation Process
SAHRA	South African Heritage Resource Agency
SANBI	South African National Biodiversity Institute
SDF	Strategic Development Framework
WMA	Water Management Area
WULA	Water Use License Application

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1 INTRODUCTION AND PROJECT BACKGROUND

This report forms part of an application for an environmental authorisation for an additional eighteen (18) environmentally controlled chicken broiler houses on Portions 17 and 19 of the farm Modderbult 511 IR which is approximately 17km from the nearest town of Balfour, in Dipaleseng Local Municipality in the Mpumalanga Province

The application process is undertaken on behalf of the applicant, Modderbult Boerdery, by NKT Consulting. NKT Consulting was appointed, as independent environmental practitioner, to assist the applicant in complying with the 2014 EIA Regulations in terms of the National Environmental Management Act (Act 107 of 1998).

The development is an extension of an existing development of the same nature. An environmental authorisation for the existing development was issued in 2014 for both Portions 17 and 19 of Modderbult 511IR. The environmental authorisation however lapsed before they could construct on portion 19. They had only completed the construction of sixteen (16) houses as indicated in

Figure 1: Image showing existing broiler houses on portion 17 of Modderbult 115IR

1.1 Project Location

The project is located on Portions 17 and 19 of the farm Modderbult 511 IR in Modderbult, Dipaleseng Local Municipality in Mpumalanga Province as illustrated in Figure 2.

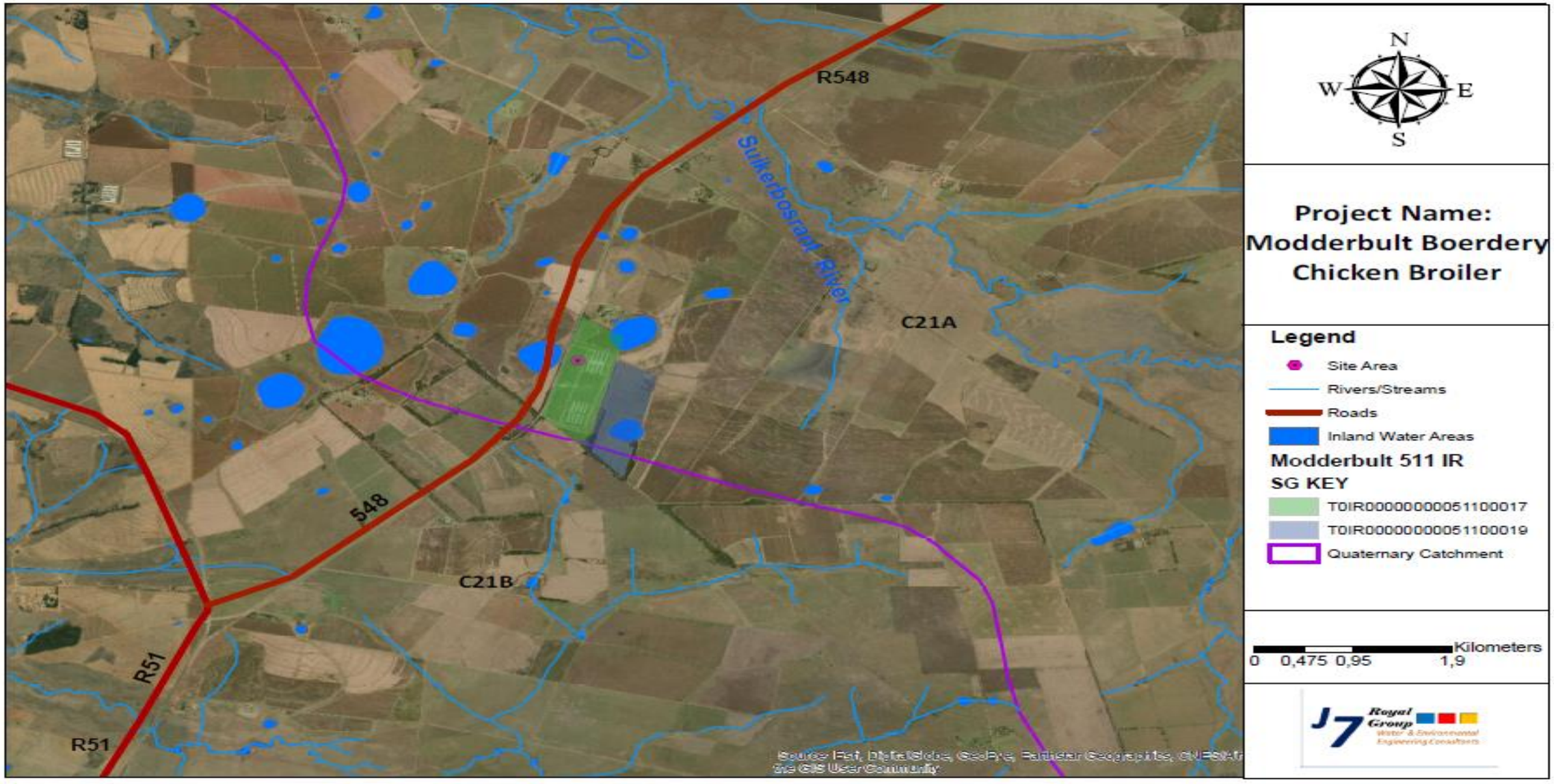

Figure 2: Locality map of the project area

1.2 Details of Environmental Assessment Practitioner

Name And Surname	Charles Gumisai
Name Of Company	NKT Consulting
Telephone Number	076 117 5750
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Charles Gumisai holds an honours degree in Environmental Management from the Midlands State University in Zimbabwe. Postgraduate Diploma in Water Supply and Sanitation from the Institute of Water Supply, Sanitation and Development in Zimbabwe. He holds SAMTRAC and he is currently finalizing his NEBOSH International Diploma in Occupational Safety and Health. He is a Senior SHE Consultant and a member of International Association of Impact Assessors (IAIA), South African Council for Natural Scientific Professions (SACNASP). Charles is a member of Institute of Waste Management in Southern Africa (IWMSA) and he is registered with the South African Council for Project and Construction Management Professions (SACPCMP) as a Construction Health and Safety Manager (CHSM). He has more than 10 years working experience in the field of Construction, Waste Management, Environmental Management and Environmental Management Systems (EMS) Implementation and Auditing and has published a paper in Geographical Information Systems (GIS) and Remote Sensing. He has worked on a number of municipality projects and herewith is selected few completed projects:

a) Integrated Waste Management Plan for Nkonkobe Local Municipality

b) Integrated Waste Management Plan for Tokologo Local Municipality

c) Integrated Environmental Management Plan for Xhariep District Municipality

d) Environmental Management Framework for Amajuba District Municipality

e) Integrated Waste Management Plan for Tubatse-Fetakgomo Local Municipality

Apart from doing municipality projects, Charles has also managed more than fifty (50) Environmental Impact Assessment Projects both in Zimbabwe and South Africa. He has also worked as a Construction SHE Advisor and Consultant on a number of major construction projects across South Africa, among them include the construction of multi-storey buildings in Mpumalanga and Limpopo Provinces; the construction of gas pipelines for Sasol in Gauteng, the

construction and upgrades of road networks in Limpopo Province as well the construction and upgrades of Bulk Water and Sewer Systems for Ekurhuleni Metropolitan Municipality and was also a Safety Advisor for Eskom Hendrina Power Station responsible for managing sub-contractor's safety officers.

1.3 Details of Applicant

Name And Surname	Petrus Johannes Reyneke
Name Of Company	Modderbult Boerdery
Cell Number	083 620 0001
Email Address	pierre@fixed.bz

2 LEGISLATIVE REQUIREMENTS

2.1 National Water Act

The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account, amongst other factors (National Water Act No. 36 of 1998, 1998), the following:

a) Meeting the basic human needs of present and future generations;
b) Promoting equitable access to water;
c) Promoting the efficient, sustainable and beneficial use of water in the public interest;
d) Reducing and preventing pollution and degradation of water resources;
e) Facilitating social and economic development; and
f) Providing for the growing demand for water use.

The NWA also provides for General Authorizations (GA) for certain water uses published by way of notices in the Government Gazette. Several GAs have been published under the NWA. Each specifies the Section 21 water use and the conditions under which such water use must be conducted.

2.2 National Environmental Management Act

NEMA provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith. This Act formulates a set of general principles to serve as guidelines for land development and it is desirable that:

a) The law develops a framework for integrating good environmental management into all development activities;
b) The law should promote certainty with regard to decision-making by organs of state on matters affecting the environment;
c) The law should establish principles guiding the exercise of functions affecting the environment;
d) The law should ensure that organs of state maintain the principles guiding the exercise of functions affecting the environment;
e) The law should establish procedures and institutions to facilitate and promote cooperative government and inter-governmental relations;
f) The law should establish procedures and institutions to facilitate and promote public participation in environmental governance; and
g) The law should be enforced by the State and that the law should facilitate the enforcement of environmental laws by civil society

2.3 Environmental Impact Assessment Regulations

In April 2017 the Minister of Environmental Affairs passed the Amended Environmental Impact Assessment Regulations (The Regulations) in terms of Chapter 5 of the National Environmental Management Act, 1998 (NEMA) (National Environmental Management Act No.107 of 1998, 1998). The Amended Regulations replaced the 2014 Environmental Impact Assessment (EIA) regulations, which were also promulgated in terms of the National Environment Management Act, 1998 (Act No. 107 of 1998). The new regulations came into effect in April 2017 and, therefore, all new applications must be made in terms of the New NEMA regulations and not in terms of the 2014 EIA Regulations of the NEMA. The purpose of this process is to determine the possible negative and positive impacts of the proposed development on the surrounding environment and to provide measures for the mitigation of negative impacts and to enhance

positive impacts. According to EIA regulations (Environmental Impact Assessment Regulations of 2014 as amended , 2017)the activities triggered are explained below:

GNR 923 Listing Notice 1

Activity 40: The expansion and related operation of facilities for the concentration of poultry, excluding chicks younger than 20 days, where the capacity of the facility will be increased by—

(ii) More than 5 000 poultry per facility situated outside an urban area

2.4 National Environmental Management: Air Quality Act (Act No. 39 of 2004)

The NEMA: Air Quality Act, 2004 serves to repeal the Atmospheric Pollution Prevention Act, 1965 (Act 45 f 1965). The Air Quality Act regulates air quality in order to protect the environment. It provides reasonable measures for the prevention of pollution and ecological degradation and for securing ecological sustainable development while promoting justification economic and social development (NEMA: Air Quality Act, 2004, 2004).

The purpose of the Act is to set norms and standards that relate to:

a) Institutional frameworks, roles and responsibilities;
b) Air Quality management planning;
c) Air Quality monitoring and information management;
d) Air Quality management measures;
e) General compliance and enforcement

The Act describes various regulatory tools that should be developed to ensure the implementation and enforcement of air quality management plans. These include:

a) Priority Areas, which are air pollution “hot spots”;
b) Listed activities, which are ‘problem’ processes that require an Atmospheric Emission License;
c) Controlled emitters, which include the setting of emission standards for ‘classes’ of emitters, such as motor vehicles, incinerators, etc.;
d) Control of noise;
e) Control of odours

Implications for the Proposed Development

Significant –faecal waste and dead carcases might impact on the ambient air quality of the area due to foul odours.

2.5 The National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA)

The NHRA requires Heritage Resources Impact Assessments for various categories of development stipulated in Section 38 of the Act. It also provides for the grading of heritage resources and the implementation of a three-tier level of responsibilities and functions for heritage resources to be undertaken by the State, Provincial Authorities, depending on the grade of the heritage resource. The Act defines cultural significance, archaeological and paleontological sites and materials (section 35), historical sites and structures (section 34), and graves and burial sites (section 36) that fall under its jurisdiction. Archaeological sites and material are generally those resources older than a hundred years, including gravestones and grave dressing. Procedures for managing graves and burial grounds are set out in Section 36 of the NHRA. Graves older than 100 years are legislated as archaeological sites and must be dealt with accordingly. Section 38 of the NHRA makes provision for application by developers for permits before any heritage resource may be damaged or destroyed (National Heritage Resources Act No. 25 of 1999, 1999).

Implications on the Proposed Development

Not Significant - Due to the highly disturbed and totally transformed state of the study area, it was not deemed necessary to conduct a Heritage Impact Assessment in terms of the requirements as provided for in Section 38 of the NHRA, 1999. No significant cultural/historical resources/features were identified on the study area and therefore it is subsequently anticipated that the impact on any cultural resources are regarded as low to neutral. However, the buildings/structures older than 60 years will require a demolition permit should these buildings be demolished for purpose of the proposed development. If any remains/cultural resources are exposed or uncovered during the construction phase, it should immediately be reported to the South African Heritage Resources Agency (SAHRA). Burial remains should not be disturbed or removed until inspected by an archaeologist.

2.6 National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003)

The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes, for the management of those areas in accordance to national norms and standards, as well as for the intergovernmental co-operation and public consultation in matters concerning protected areas. Protected areas are to be conserved for their biodiversity and ecological integrity (NEMA: Protected Areas Act No. 57 of 2003, 2003).

Implications for proposed development

Not significant- the area is not located within or close to a conservancy or protected area.

2.7 National Environmental Management: Waste Act, 2008 (Act 59 of 2008)

The National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA) is subsidiary and supporting legislation to NEMA. The NEM:WA is a framework legislation that provides the basis for the regulation of waste management in South Africa. The Act also contains policy elements and gives a mandate for further regulations to be promulgated. Subservient Regulations and Norms and Standards under the NEM:WA include:

a) Waste Classification and Management Regulations (GNR 634 of 2013);
b) National Norms and Standards for the Assessment of Waste to Landfill Disposal (GNR 635 of 2013);
c) National Norms and Standards for Disposal of Waste to Landfill (GNR 636 of 2013);
d) National Norms and Standards for the Storage of Waste (GNR 926 of 2013);
e) Revised definitions of waste contained in the National Environmental Management Waste Amendment Act 26 of 2014 (GNR 449 of 2014); and
f) List of activities that have, or are likely to have, a detrimental effect on the environment (GNR 921 of 2013 as

amended) – activities which require a Waste Management License (WML) (i.e. WML Regulations).

Waste management activities requiring a Waste Management (WML) are identified within GNR 921 of 2013, as amended. A person who wishes to commence, undertake or conduct a waste management activity listed under Category A, must conduct a Basic Assessment process as set out in the EIA Regulations 2014, as amended, as part of a WML application. A person who wishes to commence, undertake or conduct a waste management activity listed under Category B, must conduct a scoping and EIA as set out in the EIA Regulations 2014, as amended. Under the new Waste Management activities, animal manure is not regarded as waste and is defined as "*a by-product which is bio-degradable in nature and could further be used for fertilization purpose*" and therefore NEM: WA is not triggered thus the proposed facility does not enquire a WML.

Implications for proposed development:

Not Significant: The construction and operation of the proposed development are not subjected to any activity as listed in Category A and B of NEMA: WA, 2008

2.8 Environmental Conservation Act

The Environment Conservation Act (Act 73 of 1989) (ECA) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however Section 25 of the Act and the Noise Regulations (GNR 154 of 1992) promulgated under this section are still in effect. These regulations serve to control noise and general prohibitions relating to noise impact and nuisance.

The noise control regulations will need to be considered by the applicant in relation to the potential noise that may be generated during the construction of the proposed project. The two key aspects of the noise control regulations relate to disturbing noise and noise nuisance. Section 4 of the regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the regulations as 'a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.

Section 5 of the noise control regulations in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as 'any sound which disturbs or impairs or may disturb or impair the

convenience or peace of any person'. Noise nuisance is anticipated from the proposed project particularly to those residents that are situated in close proximity to the project site. South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with the ECA noise regulations (Mahlangu, 2017).

2.9 National Forest Act

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that ' no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'. No protected trees are anticipated within the vicinity of the proposed project due to the fact that the area has been disturbed through agricultural activities. However it is recommended that proper mitigation be implemented to protect those trees if encountered when selecting sites for construction camps and lay down areas.

2.10 National Environmental Management: Biodiversity Act

The National Environmental Management: Biodiversity Act (Act 10 of 2004)(NEMBA), 'provides for: the management and conservation of South Africa's biodiversity within the framework of the NEMA; 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; the establishment and functions of a South African National Biodiversity Institute (SANBI); and for matters conducted therewith".

In terms of the Biodiversity Act, the Applicant has a responsibility for:

a) The conservation of endangered ecosystems and restriction of activities according to the categorization of the area (not just by listed activity as specified in the EIA regulations);
b) Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity; and
c) Limit further loss of biodiversity and conserve endangered ecosystems.

Regulations published under the NEMBA also provide a list of protected species, according to the Act (GNR 151 dated 23 February 2007, as amended in GNR 1187 dated 14 December 2007).

Implications for proposed development

Not Significant. The portion is completely transformed and used for the growing Lucerne. There is no evidence of protected vegetation and animal species.

2.11 Conservation of Agricultural Resources Act

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorized according to one of the following categories, and require control or removal:

a) Category 1 plants: are prohibited and must be controlled;
b) Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread; and
c) Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

The provisions of this act have been considered and where relevant will be incorporated into the requirements of the EMPr.

3 DETAILS OF THE PUBLIC PARTICIPATION PROCESS

The principles of the National Environmental Management Act, 1998 (Act No 107 of 1998) and the Environmental Impact Assessment Regulations, April 2006 govern many aspects of Environmental Impact Assessments, including Public Participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment and ensuring the participation of previously disadvantaged people, women and youth. Effective public involvement is an essential component of many decision-making structures, and effective community involvement is the only way in which the power given to communities can be used efficiently. The Public Participation Process is designed to provide sufficient and accessible information to interested and affected parties (I&AP's) in an objective manner to assist them to:

a) Raise issues of concern and suggestions for enhanced benefits;

b) Verify that their issues have been captured;
c) Verify that their issues have been considered by the technical investigations; and
d) Comment on the findings of the Basic Assessment Report.

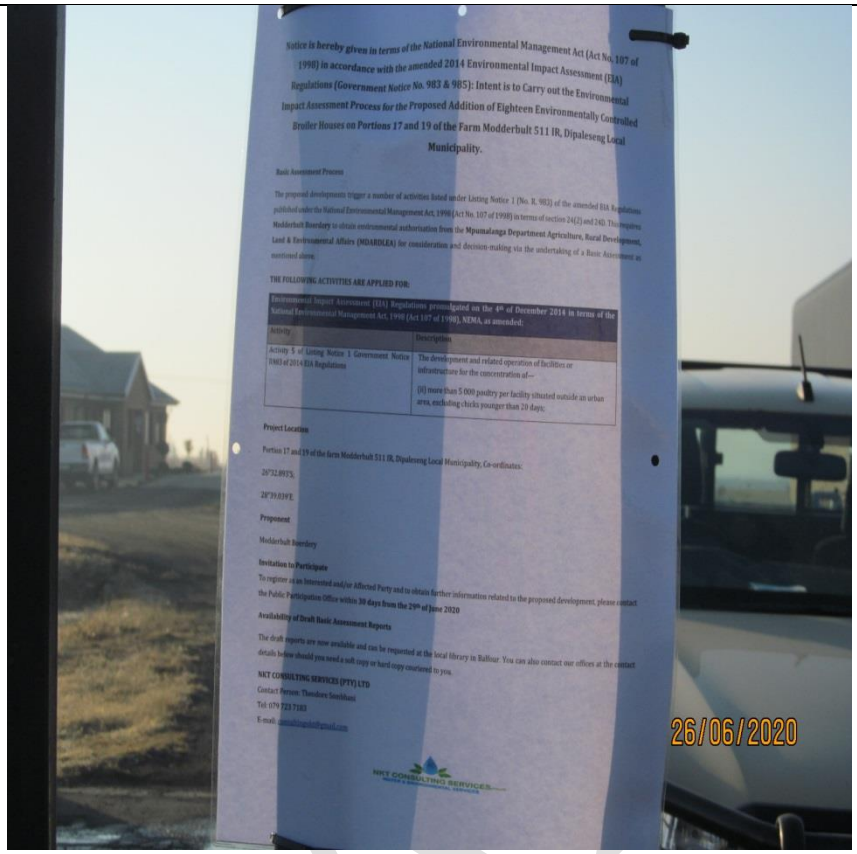
In terms of the Guideline Document for Environmental Impact Assessment (EIA) Regulations promulgated in terms NEMA, stakeholders (I&AP's) were notified of the Environmental Evaluation Process through:

a) A site notice that was erected (at prominent points on and around the study area)
b) A public notice was distributed in a 100m radius around the proposed site to all parties concerned**;**
c) An advertisement will be placed in the local newspaper.
d) A list of all persons, organisations and organs of state that were registered as interested and affected parties in relation to the application will be included in the final report

Table 1: Site Notice Locations

Location	**Coordinates**

Proposed Site	 Notice at the main entrance of the property

Proposed Site	 Notice put up on the site

3.1 Public Review

The draft BAR will be distributed to the interested and affected parties, local library and local municipality for access to the public. Soft copies will also be shared with affected government organs.

3.2 Assumptions and Limitations

General assumptions and limitations relating to the BA process are listed below:

a) The EAP hereby confirms that they have undertaken to obtain project information from the client that is deemed to be accurate and representative of the project;
b) Site visits have been undertaken to better understand the project and ensure that the information provided by the client is correct, based on site conditions observed;

c) The EAP hereby confirms their independence and understands the responsibility they hold in ensuring all comments received are accurately replicated and responded to within the assessment documentation;
d) The comments received in response to the public participation process, are representative of comments from the broader community; and
e) The competent authority would not require additional specialist input, as per the proposals made in this report, in order to make a decision regarding the application.

Notwithstanding these assumptions, it is the view of NKT Consulting that this BA report provides a sound description of the issues associated with the project and the resultant impacts.

4 PROJECT DESCRIPTION

The activity will entail the construction of 18 environmentally controlled chicken broiler houses (125m x 15m) to the existing facility, each with the capacity to hold up to 45 000 broiler chicks. The new addition will have the capacity to hold up to 810 000 broiler chicks. An area of 103 629.18m2 will be cleared for the project. The project will entail the following:

a) Earthworks and clearing of vegetation (planted pasture) on the site for erection of infrastructure.

b) Construction of 18 broiler houses (125m x 15m), that will accommodate approximately 45 000 chickens each, totalling approximately 810 000 birds.

c) Two boilers will be erected at the site to provide hot water for heating of houses.

d) The houses are state of the art broiler houses, with fully automated comprehensive climate control by means of coal heating and nozzle cooling, and they are completely sealed off from the outer environment.

e) Chickens will be housed for 33 – 37 days after which the houses will be cleaned out before the next cycle resumes. Days between placements will be on average 39 days.

4.1 Water Supply

The property currently has a total of four (4) boreholes which are supplying water to the existing broiler houses. The four boreholes will be enough to cater for additional houses. The

boreholes have a combined yield of 60 000litres per hour. One broiler housing requires between 10 000 – 11 000litres of water per day.

4.2 Waste Management

Waste removed from the broiler houses is currently used as manure and carcasses are collected on a daily basis by a company subcontracted and disposed of in Bronkhorstspruit. A total of 40tonne of waste is produced per cycle per house and the mortality rate is 4% per cycle for all the houses.

Figure 3: Image showing the collection of carcasses for disposal in Bronkhorstspruit

5 NEED AND DESIRABILITY

While the concept of need and desirability relates to the type of development being proposed, the concept can be explained in terms of the general meaning of its two components: where need refers to time and desirability refers to place, i.e. is this the right time and is it the right place for the type of land-use or activity that is being proposed? Need and desirability can be

equated to wise use of the land, in other words, what is the most sustainable use of the land (DEA&DP, 2010)? A need and desirability for this project is evident from the following perspectives.

5.1 Developer

Current demand for chicken in South Africa is not being met. Modderbult Boerdery plans to expand their broiler farm to meet current and future demands. The expansion will allow Modderbult Boerdery to earn more money through the sale of more chickens. The proposed project will entail the construction of an additional eighteen (18) environmentally controlled broiler houses. The houses will be identical to those at the existing clusters. The technology, design and process of the project were determined by the applicant to be the most economically, socially and environmentally sustainable option for this specific venture. The farm lies within an area designated as cultivated land. The land use is therefore considered to be in compliance with the SDF.

5.2 Local Community

Approximately 120 temporary employment opportunities will be created during the development and construction phase. At least 31 people will be permanently employed during the operational phase of the activity.

5.3 District and Provincial Benefit

A considerable amount of contract work is associated with the construction and operation of a free-range facility, thereby creating secondary employment in the broader local economy. Contract work can include:

a) Construction companies;
b) Delivery of chicks to the farm;
c) Chicken feed companies; and
d) Manure and mortality collection.

The proposed expansion will also increase the food security of South Africa.

6 ALTERNATIVES ASSESSESSMENT

The following definition of "alternatives" is given in the EIA Regulations of 18 June 2010: *"alternatives", in relation to the proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to-*

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

Typically, alternative assessments are conducted to assist in comparing various projects or attributes of projects that will occur. The most critical comparison is evaluating any proposed project against the No-Go option. The alternatives assessment then considers alternatives to project site selection for the proposed development; alternatives to layout of the development; and alternatives to construction methodologies and/or materials used for the development.

6.1 Location Alternatives

The following location alternatives have been identified and considered:

a) A new, undeveloped property.

It would not be financially feasible for Modderbult Boerdery to purchase a new property as they would then need to develop an entirely new site from scratch. As they already own a farm where they are raising broilers, certain infrastructures, such as roads, are already present and existing arrangements, such as the removal of litter and mortalities, are in place. Adding another cluster at this farm would therefore make logistical and financial sense and the purchasing of a new property is therefore eliminated as a viable alternative.

6.2 Scheduling Alternatives

The variability of rainfall as well as the high intensity events will affect the construction phase of the project. It could hinder construction activities with potential soaking of cement mixtures or foundation concrete during the early phases of the construction process. Construction should preferably be planned for the winter months to avoid construction delays that might have a

negative socio-economic impact on the development. It is recommended that construction take place during the drier months to avoid any complications in wet weather. No detailed information regarding the proposed timeframe for the project is available, but it is assumed that construction will start after the Environmental Authorisation has been received, should the authorisation be a positive one.

6.3 Design Alternatives

No design alternatives have been considered as the design of the current clusters will be replicated at the proposed site. The designs have been proven over a number of years to be optimal for the raising of the broilers.

6.4 No-Go Alternative

The no-go option entails that the development area stays in the current state (i.e. status quo). The proposed site is in a disturbed state (i.e. not a pristine natural environment) due to previous agricultural activities, mainly cultivation having taken place on the site. If the proposed development would not continue and the no-go option is pursued it will prevent the potential positive socio-economic activities in terms of job creation and investment opportunities, relating to the project, from occurring. In this instance, it is not recommended that the No-Go option be followed due to the potential loss of job opportunities for residents in the surrounding area that would result from the proposed project during both the construction and operational phase.

7 DESCRIPTION OF BASELINE ENVIRONMENT

7.1 Biophysical Environment

7.1.1 Climate

The study area is situated within the Highveld climatic zone. The Highveld is characterised by warm, rainy summers; while winters are typified by mild to warm days and cold, frosty nights. The area receives mean annual rainfall of about 400 to 900 mm. Mean maximum temperatures range from 21 to 24°C, and mean minimums range from 3 to 6° C, with temperatures sometimes reaching 38° C in the summer and -11°C in the winter (WWF, 2018). The area experiences strong winds during the month of August. The warmest months occur from October through to March; whereas the coolest months occur over the period of May to August Figure 4

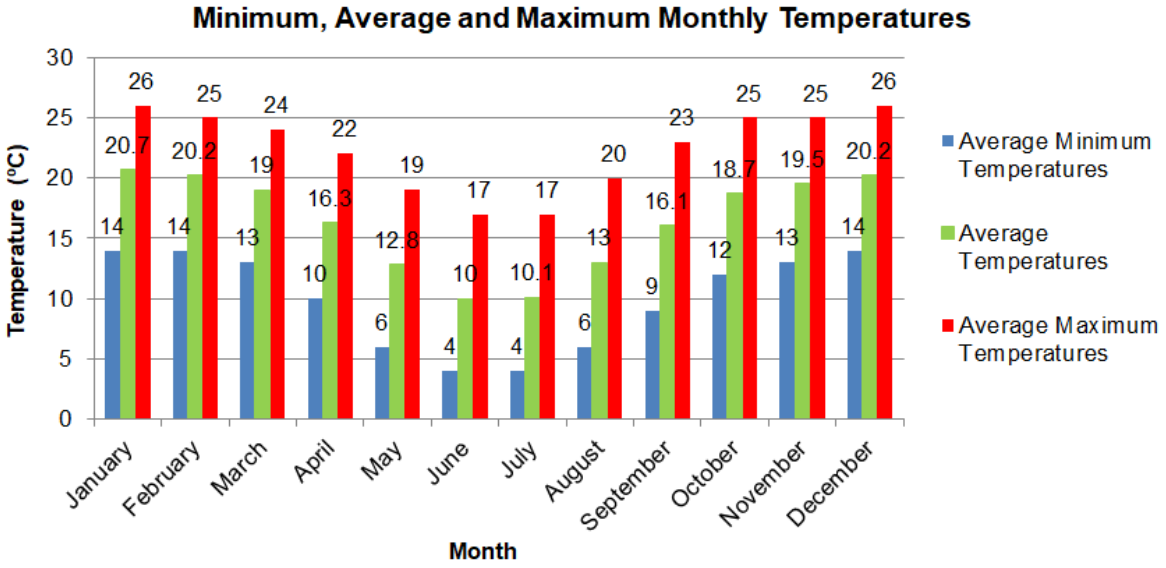


Figure 4: Minimum, average and maximum monthly temperatures for the Project

7.1.2 Topography

The Highveld inland plateau has an elevation varying from 1 400 m to 1 800 m. The local terrain morphology has been classified as undulating plains. The average slope on site ranges from 0.5& -0.9% and the maximum slope is 1.5% as illustrated in Figure 5.

The landscape of Dipaleseng consists of relatively flat areas and a fair amount of moderate to steep areas. Mountainous areas occur in the northern part alongside the Greylingstad - Balfour railway line and south of Greylingstad. Fairly flat areas occur in the south western part (the Vaal River catchment area) and the northern parts of the municipality. The Municipality's drainage is southwards towards the Vaal River in the south

Figure 5: Illustration of site slope and elevation

7.1.3 Regional Geology

A large portion (±46%) of Dipaleseng is underlain with Arenite. Dolerite (25%) and Andesite (18%) are the second most dominant geology type. The south western part is predominantly underlain with Arenite. The least occurring geology types are Quartzite, Shale and Lutaceous Arenite. The main area of Balfour is underlain with Andesite, Greylingstad is underlain with Dolerite and Grootvlei with Arenite.

7.1.4 Conservation Areas

There are currently no statutory protected areas in Dipaleseng. The Mpumalanga Biodiversity Conservation Plan indicates biodiversity categories from which Dipaleseng is has highly significant, important & necessary, least concern and no natural habitat remaining.

7.1.5 Flora and Fauna

The site is completely transformed. There is no evidence of wild animals and/or protected or threatened animal species. The portion is used for the cultivation of Lucerne which is sold to cattle farmers. There is no evidence of indigenous vegetation as illustrated in Figure 6 and Figure 7

Figure 6: Study area which is currently used for cultivation of Lucerne.

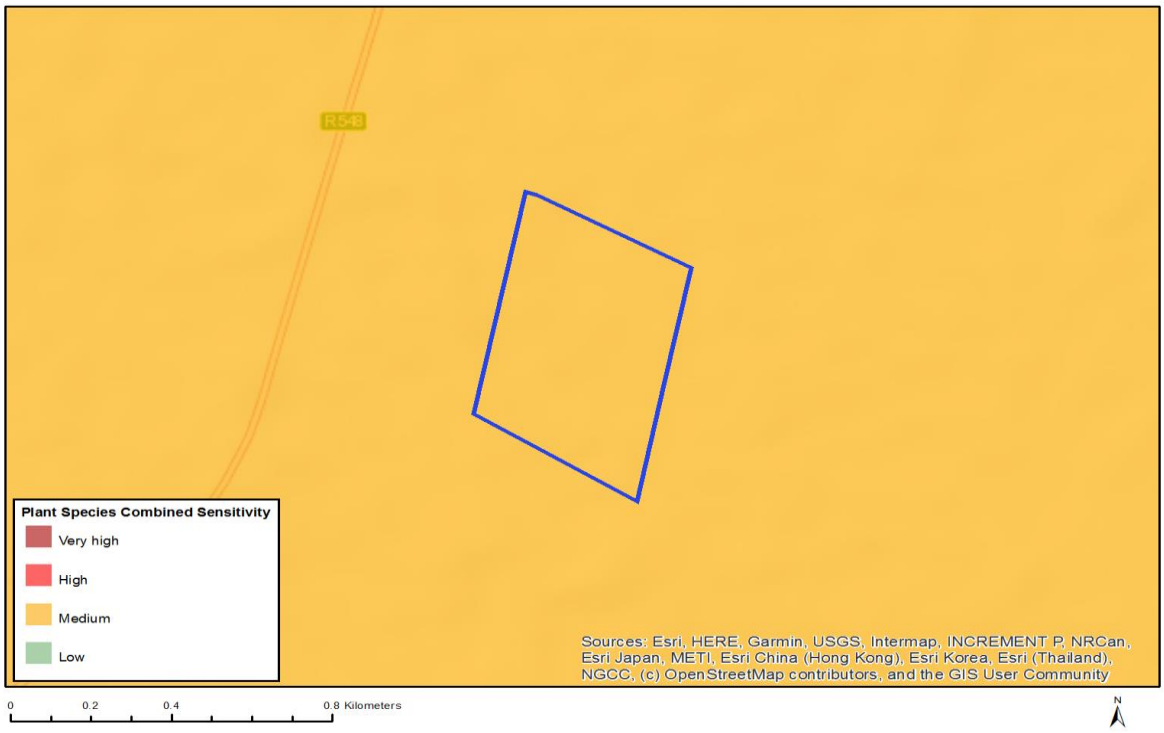


Figure 7: Map of relative plant species theme sensitivity

The plant species with the medium sensitivity comprise of Khadia beswickii.

7.1.6 Surface Water Bodies

There are no surface water bodies on site. The nearest river is the Suikerbosrant tributary, which falls under C21A Catchment and is approximately 6km from the site as illustrated in Figure 8.

There are five major water bodies that have been identified in Dipaleseng, namely:

a) The Vaal Dam and Vaal River are an important water resource;
b) The Grootvlei Dam;
c) The Waterval River;
d) The Grootspruit River;
e) The Petrus van Merwe Haarhof Dam.

Occasional pans and wetlands various parts of the municipality, but have been transformed due intensive agricultural activities. These wetlands are under threat from agricultural activities, erosion and draining of wetlands that disturbs the biodiversity of the wetlands.

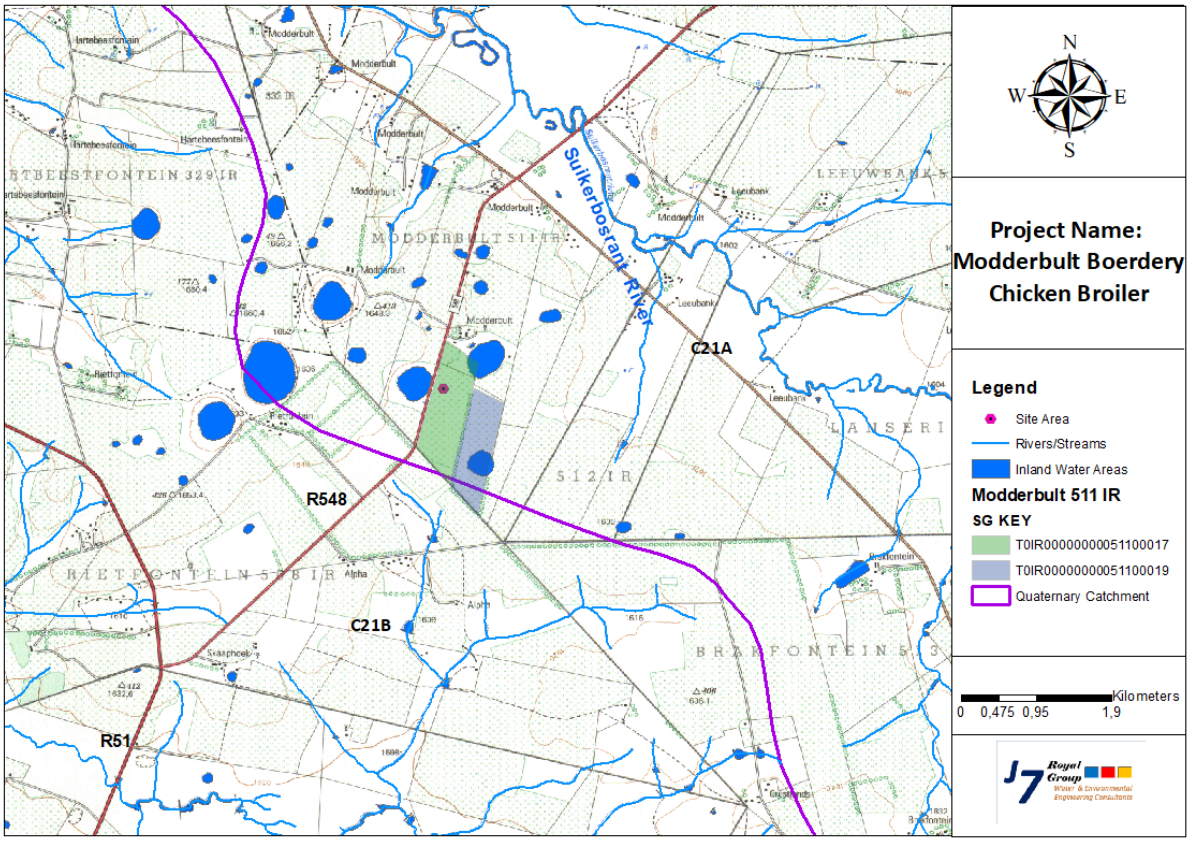


Figure 8: Hydrological map

7.1.7 Heritage and Archaeological Resources

Because the site is a brownfield, which was transformed and has been used for growing Lucerne, there are no graves or any structure on site. Consultation will be made with the South

African Heritage Resource Agency (SAHRA) regarding the archaeological significance of the area.

7.1.8 Air Quality

Numerous studies have found that air pollution in cities has a major negative impact on the health of both the environment and the surrounding communities. Repeated exposure to air pollutants over long periods of time may potentially cause several respiratory, cardiovascular, reproductive and gastrointestinal health problems (Mayer, 1999).

Particulate Matter (PM) exists in the atmosphere as either solid or liquid particles varying in chemical composition and size, these particles can be considered as either primary or secondary pollutants. Particles can be classified by their aerodynamic properties into coarse particles, PM10 and fine particles, PM2.5 (Harrison and Van Grieken, 1998). The fine particles contain the secondarily formed aerosols such as sulphates and nitrates, combustion particles and re-condensed organic and metal vapours. The coarse particles contain earth crust materials and fugitive dust from roads and industries (Fenger, 2002). It is the amount of fine dust and the chemical and mineralogical composition of the dust which will dictate the potential for health impacts (Schwegler, 2006).

The Proposed Project falls within the Highveld Priority Area (HPA) as illustrated in Figure 9. This area of South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occurring due to the concentration of industrial and nonindustrial activities.

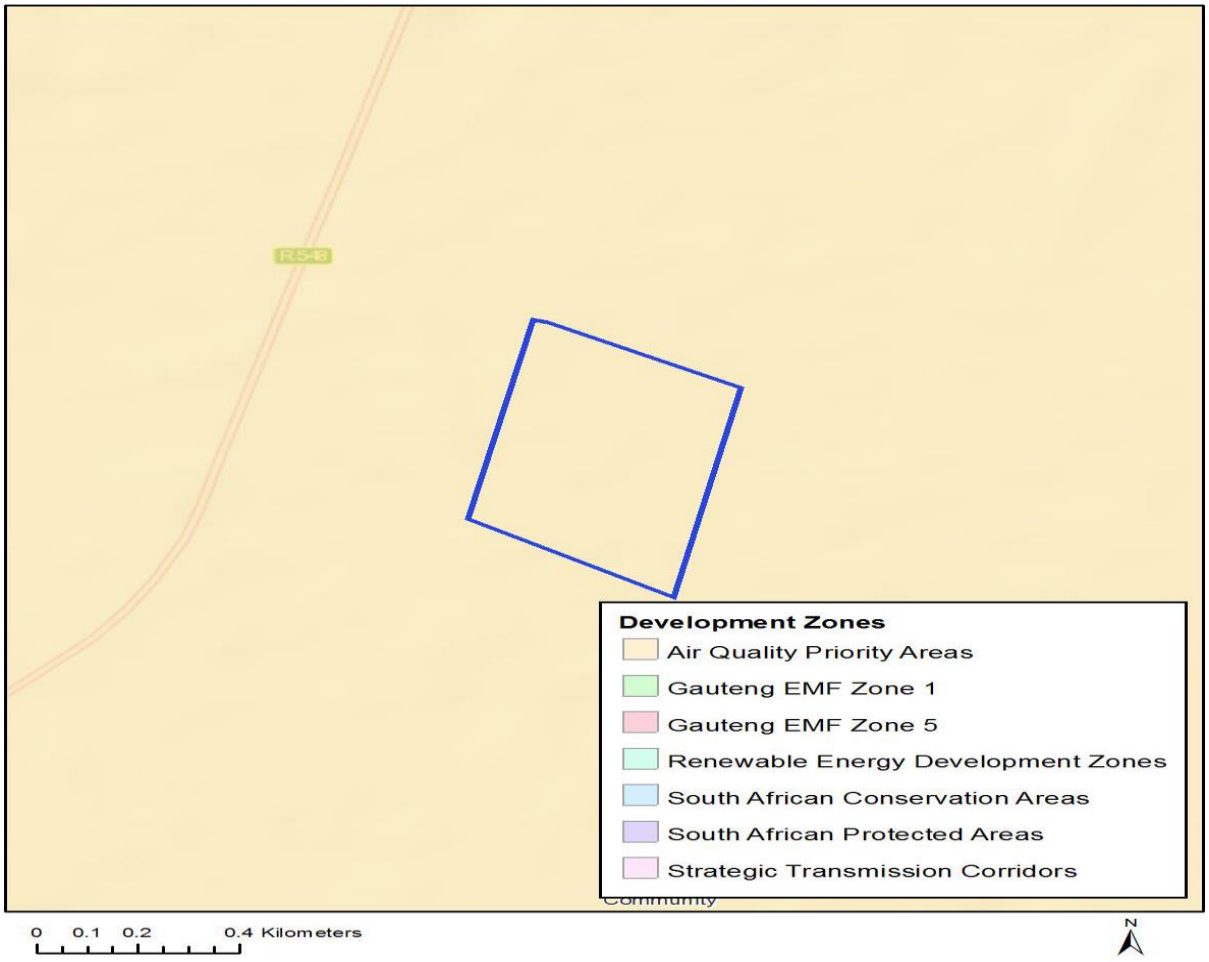


Figure 9: Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones

Emissions generated on broiler farm include:

a) Ammonia emissions from chicken manure;
b) Carbon dioxide, Carbon monoxide, Sulphur dioxide, Nitrous oxides and Particulate matter emissions from coal fired exothermic hot water generators;
c) Particulate matter (Dust) from trucks driving to and from clusters; and
d) Vehicles exhaust emissions.

7.2 Socio-Economic Environment

Dipaleseng the local municipality, has a relatively lower population growth rate of (0.2%) compared to Gert Sibande, its district municipality (1.3%), Mpumalanga, the province (3.4%) and South Africa (1.4%). One key contributor to this is the higher than national average rate of

HIV/AIDS Prevalence in the Municipality (13, 6% in 2010) compared with a national average of 10% per the 2013 mid-year estimates by Statistics South Africa. The high rate of unemployment (37, 2% for adults in general, 45,2% for youth in 2011) has also seen the out-migration of many young adult in search of employment opportunities elsewhere. The working age demographic (age 15 to 65) within the Municipality currently makes up 65.3% of the population. Approximately 66.6% of the male population can be categorized as being of working age which is higher than the female working age population of 63.9% in 2010. The reason for a higher male working population is as a result of more employment opportunities for males in Dipaleseng as a result of the economy's leniency towards Agriculture and Mining.

However, the overall picture of employment is not positive. Only 24% of the Community has a matric, which possibly contributes to the unemployment rate, which sits at 37.2% for the entire working age population and 45.2% for youth in particular. In these respects, Dipaleseng performs worse than Provincial and National averages, pointing towards deep, structural challenges. It is also revealed that only 32% of the community of Dipalseng is reliant on work for income (business profits, wages and salaries). The remainder depends on state support, loans and gifts (Dipaleseng Final IDP 2020-2021).

7.2.1 Demographics

Total Population: 42 390 (2011 Census)

Total Population: 45 232 (Community Survey)

Average annual population growth: 1.5% 2011-2016

Projected 2030 population: 55 715

Total number of households: 12 637

Table 2: Population per ward

Ward	**Population**
Balfour	3201
Dipaleseng NU	4047
Greylingstad	839

Grootvlei	5415
Nthoroane	6113
Siyathemba	22768

Source: Census 2011

Table 3: Demographic distribution

Young	0-14 (28.2%)
Working age	15-64 (66%)
Elderly	65+ (5.8%)

Source: Census 2011

Table 4: Gender distribution

Male	50.63%
Female	49.37%

Source: Census 2011

7.2.2 Employment Sector

Clearly the majority of people are involved in the agricultural sector, followed by electricity, wholesale and retail trade, transport and construction and then manufacturing.

a) Dipaleseng needs a strategy that will further diversify the economy, reducing dominance of agricultural in the employment per industry.
b) High unemployment is a serious concern as it leads to socio-economic problems such as alcohol and drug abuse, crime, early pregnancy

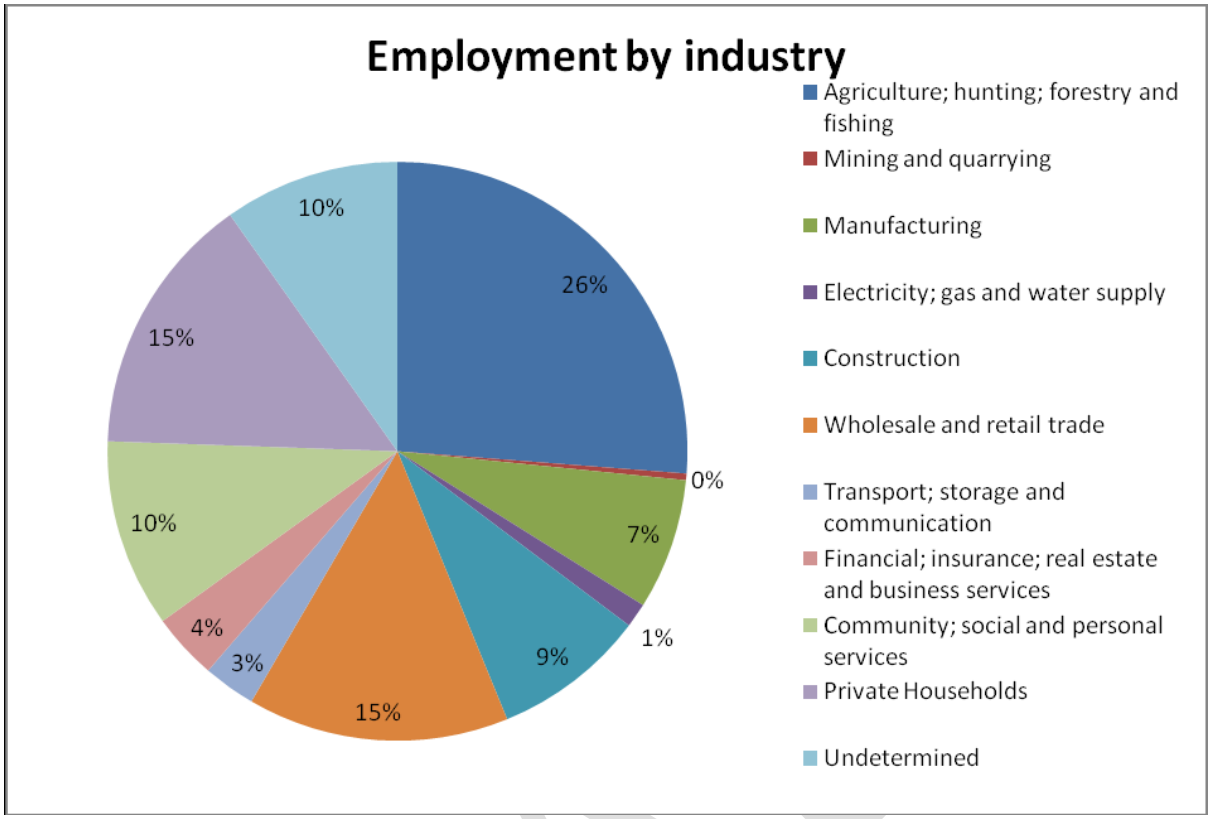


Figure 10: Employment distribution

7.3 Infrastructure and Services within the Municipality

7.3.1 Waste Management

The municipality has a refuse collection schedule used for the collection of waste in all three nodal points, refuse removal is rendered to 12 190 households out of a total of 14 877 households with a backlog of 1 687 households. The municipality has had a significant increase in the number of households, of new developments, that receive refuse removal services. The number of households that do not receive refuse removal service are informal settlements mainly in Nthoroane location but means have been put in place to ensure that waste is collected in those areas (informal settlements) with no proper road access, put their refuse along the main roads on collection days for collection as per the waste removal schedule (Dipaleseng Final IDP 2020-2021).

7.3.1.1 Waste Disposal

The municipality has three landfill sites within its jurisdiction, Grootvlei, Siyathemba and Greylingstad landfill sites and all three are licensed for operation. All three landfill sites are

experiencing operational problems in varying degrees, due to insufficient funding, from fencing, to in house electrifications, maintenance of cells, no weight bridge etc. Other challenges include the shortage of staff, uncontrollable waste reclaimers and insufficient equipment's and machinery. In all site there is no top soil available and there is no regular covering done on site. Waste in Grootvlei and Siyathemba Landfill site is disposed over a wide open area with no trenches and in all sites waste is not disposed in line with the minimum requirements of the licenses (Dipaleseng Final IDP 2020-2021).

7.3.2 Sanitation

Sanitation is often defined as disposal of waste. This has a direct link to various factors contributing into the cleanliness of the environment. Access to sanitation and backlog:

a) Total number of households as per 2016 community survey is 14 877
b) Number of Households with Access as per the 2016 community Survey is 13 976, which is 94%
c) Number of households without access to sanitation is 901 (6%)

8 ENVIRONMENTAL IMPACT ASSESSMENT

8.1 Description and Assessment of Environmental Impacts

The most significant anticipated environmental impacts associated with the development of the proposed application site are discussed in this section with reference to possible mitigation measures that will minimize negative impacts and enhance positive impacts.

8.2 Beneficial Construction Impacts

8.2.1 Socio-Economic

a) Creation of job opportunities

The proposed development would create job opportunities during the construction phase. The value that the jobs created by the construction industry should not be underestimated as it benefits lots of people that have no other work and further transfer skills.

b) Improved site security

24 Hour security measures will already be implemented during the construction phase and no taxis/trucks will be allowed to overnight or stop on the site. And it will also enhance security in general for everyone.

8.2.2 Biophysical Environment

a) Eradication of alien and invader plant species

All alien and invasive species will be removed from the site prior to construction as part of site clearance. This will limit the spreading of alien and invasive plant species and in turn, promote the growth indigenous plant species on the proposed site and ultimately, the surrounding area.

8.3 Adverse Biophysical Impacts

All activities that are related to the proposed activity that could have some impact on the environment were identified. These impacts can be of environmental, socio-economic or cultural nature. Impacts are often not only confined within the direct scope of the proposed activity and can accumulate as a network of indirect impacts on the surrounding area.

Different impacts are associated with the construction and operational phases of the proposed activity. The significance will be determined by both the extent and duration of the impact. The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk

Table 5: Impact rating

PARAMETERS	DESCRIPTION
Extent (E)	Refers to the physical or geographical size that is affected by the impact. It can be categorised into the following ranges: • Onsite – Within specific site boundary (weight value – 1) • Local – Within municipal boundary (weight value – 2) • Regional – Outside municipal boundary (weight value –

	3)
Duration (D)	Time span associated with impact: • Short term – 1 Year or less (weight value – 1) • Medium term – 1-5 Years (weight value –2) • Long term – Longer than 5 Years (weight value – 3)
Intensity and Reversibility (I)	The severity of an impact on the receiving environment: • Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1) • Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2) • High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3)
Impact Significance/Consequence	Adding the extent, duration and intensity together provides the significance of the impact (High, Medium or Low). **Extent + Duration + Intensity = High/Medium/Low Impact**
Probability (P)	The likelihood of an impact occurring: • Unlikely – 0% - 45% chance of the potential impact occurring (weight value – 1) • Possible – 46% - 75% chance of the potential impact occurring (weight value – 2) • Likely - >75% chance of the potential impact occurring (weight value – 3)
Environmental Risk Refer to table below	Multiplication of the significance of the impact by the probability of the impact occurring produces a final conclusion of the overall risk that an impact poses to the surrounding environment.

	High/Medium/Low Impact X Probability = High/Medium/Low Environmental Risk

Table 6: Impact significance

Significance of Impact				
		Low Impact (1-5)	Medium Impact (6-8)	High Impact (9)
Probability	Definite/Very Likely (3)	9 - 15 L - M	18 - 24 M - H	27 H
	Possible (2)	6 - 10 L - M	12 – 16 M	18 M - H
	Unlikely (1)	3 - 5 L	6 – 8 L	9 L
ENVIRONMENTAL RISK	Guidelines for Control Strategies			
(H)-High	Proactively reduce risk level, short term response			
(M-H) Medium-High	Proactively reduce risk level, short term response			
(M)-Medium	Management strategies to reduce risk level, short to medium term response			
(L-M) Low-Medium	Management strategies to reduce risk level, short to medium term response, operational control and housekeeping			
(L)-Low	Operational Control			

9 DESCRIPTION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

The anticipated environmental impacts associated with the development are discussed in this section with reference to possible mitigation measures that will reduce adverse impacts and enhance positive impacts

9.1 Construction Impacts

9.1.1 Positive Impacts

9.1.1.1 Socio-Economic Impacts

a) Job Creation

The proposed development would create job opportunities during the construction phase. The value that the jobs created by the construction industry should not be underestimated as it benefits lots of people that have no other work and further transfer skills.

b) Eradication of alien and invader plant species

All alien and invasive species will be removed from the site prior to construction as part of site clearance. This will limit the spreading of alien and invasive plant species and in turn, promote the growth indigenous plant species on the proposed site and ultimately, the surrounding area

9.1.2 Negative Impacts

9.1.2.1 Soils and Geology

a) The site clearance and levelling will cause some additional exposed areas and could trigger some additional erosion and siltation, especially during rainy periods;
b) Dust pollution;
c) Degradation of soils;
d) Unstable conditions;
e) Dangerous excavations.

Mitigation Measures:

a) Implementation of temporary storm water management measures during construction;
b) Appointing of a geotechnical engineer to assist with foundation designs and other stability and geotechnical issues;
c) Implementation of dust suppression measures during the construction phase;
d) Clear marking of dangerous excavations

9.1.2.2 Surface Water

a) More exposed areas increased erosion and siltation and water pollution;
b) Possible fuel spillages may find its way into surface water bodies

Mitigations Measures:

a) Implementation of temporary storm water management measures during construction;
b) Schedule (where possible) construction associated with earthworks for the drier winter months
c) Fuel should be stored in bunded areas. Bunds should be sized to hold 110% of the maximum capacity of the largest tank

9.1.2.3 Flora and Fauna

The proposed development could have the following impacts on the biological and ecological environments:

a) Increase in flow velocity around the development area in an already fragmented environment;
b) The proposed development can result in an increase of hardened surfaces and subsequent storm water runoff;
c) Accidental introduction of exotics and invaders.

Mitigation Measures:

a) All affected and exposed areas should be rehabilitated upon the completion of construction. In this regard, special reference is made to the use of indigenous vegetation as the first choice during landscaping;
b) All areas affected by construction, which are to remain as open space areas, should be rehabilitated upon the completion of the construction phase of the development;
c) The landscape architect should only specify the use of native and indigenous plant species in their plant design;

d) Indigenous species and preferably endemic plant species should be encouraged within the development as this will promote habitat for birds and insects; and
e) All exotic invader plant species on site should be eradicated.

9.1.2.4 Noise Nuisance

A certain amount of noise will be generated during the construction phase, which may definitely become a nuisance to the surrounding land owners, residents and businesses.

Mitigation Measures:

a) It is anticipated that a certain amount of noise will be generated during the construction phase. The contractors should take care, and manage construction/demolition works to such an extent to comply to minimum ambient noise levels as defined in local, provincial, and National policies and frameworks;
b) The contractor should liaise with local residents on how best to minimise impact.
c) The local population should be kept informed of the nature and duration of intended activities;
d) Construction yards, workshops, concrete batching plants and other noisy fixed facilities should be located well away from noise sensitive areas;
e) All construction vehicles, plant and equipment are to be kept in good repair;
f) Blasting operations (if required) are to be strictly controlled with regard to the size of explosive charges in order to minimise noise and air blast and timings of explosions;
g) Construction activities should remain and take place during reasonable hours during the day and early evening. No construction should be allowed on weekends from 14h00 on Saturday afternoons to 06h00 the following Monday morning; and
h) It must be ensured that the working conditions of construction workers comply with the requirements of the occupational Health and safety Act, 1993 (Act No 85 of 1993).

9.1.2.5 Heavy vehicle traffic and noise increase on the local roads

Construction vehicles will have a negative impact on traffic volumes, road safety and noise levels during the construction period

Mitigation Measures:

a) The heavy construction vehicles should avoid the local roads during peak traffic times and large deliveries should also be scheduled outside the peak traffic times;

b) Signs should be erected in the vicinity of the site and on all major junctions that the construction vehicles will use; and
c) The construction vehicles should obey all traffic rules and stay within the speed limits.

9.1.2.6 Visual Impacts

The movement of construction vehicle through the site may be associated with a visual impact. Apart from the movement vehicles the absence of vegetation which used to be seen on site can results in a visual impact

Mitigation Measures:

a) Construction traffic must be restricted to designated route.
b) The site will be demarcated by a green net or an alternative not to minimize visual impact

9.1.2.7 Soil Contamination

a) Spillage of fuel or oil leaks from construction vehicle may results in the contamination of the soil and groundwater.
b) Storm water runoff may cause erosion of topsoil

Mitigation Measures:

a) Fuel storage should be stored in a bundled area.

b) Fuel and material storage must be away from stockpiles.

c) Contaminated soil must be treated on site using a spillage kit.

d) All earthworks must be adequately controlled and managed

e) Any excavations must be clearly marked and demarcated.

9.1.2.8 Waste Generation

A construction site of this scale requires the establishment of construction infrastructure, such as a site office, material stockyards, and workshops. The area where the above facilities are to be erected should be located in an already disturbed part of the site. Absence of proper sanitation facilities and good housekeeping could negatively impact the local community, surface/sub-surface hydrology and soils.

Mitigation Measures:

a) Identify a central waste storage area and establish suitable containers skips for the different waste streams;
b) The wind direction and the proximity to neighbouring properties should be taken into account, when a central waste storage area is established;
c) Rubble and waste should be removed from the construction site on a weekly basis by a service provider;
d) The contractor should communicate with other trades and businesses in the area to establish waste exchange and recycling possibilities;
e) Rubble and waste should be removed to registered dumping sites as is acceptable to the local authorities; and
f) Chemical toilets, one for every then workers, should be erected close to the area where construction works are taking place.

9.1.2.9 Air Quality

It can be expected that a certain amount of dust will be generated due to earthmoving activities and demolition works. One should take note that the impact of dust pollution is short-term and lasting for the duration of construction only.

Mitigation Measures:

The application site must be damped on a regular basis with water during dry and windy conditions.

9.1.2.10 Safety and Security

The following safety and security problems can arise during the construction phase:

a) Reckless operators of construction vehicles can cause dangerous conditions on the nearby roads as well as on the construction site;
b) Deep excavations without warning signs can pose a health and safety risk to the construction personnel on site, as well as the public/surrounding residents/pedestrians;
c) Possible crime initiated due to an influx of people that are associated with construction;
d) Workers on roofs without safety harnessing.

Mitigation Measures:

a) Although regarded as a normal practice, it is important to erect proper signs indicating the operation of heavy vehicles in the vicinity of dangerous crossings and access roads;
b) Dangerous excavations where construction is not actively taking place, should be properly marked and demarcated with orange safety barrier tape;
c) Construction must be completed in the shortest possible time. No construction worker or relative may reside on the application site during the construction phase. All construction workers must leave the site at the end of the day's work. A security company must be appointed to secure the site, and to ensure a safe and controlled environment;
d) No construction worker, friend or relative may reside on site. Only security personnel may be present on site after construction hours; and
e) No construction worker should be allowed to enter any adjacent private property for any reason without written consent.

9.2 Operational Impacts

9.2.1 Positive Impacts

9.2.1.1 Social

The following social impacts are likely to take place:

a) Upliftment of the agricultural and business node;
b) Increased jobs;
c) Job opportunities in close proximity of residential areas;
d) Job opportunities in close proximity of public transport;

9.2.1.2 Physical Environment

Geology and Soils

There will be prevention of erosion and siltation

Hydrology

There will be promotion of surface drainage

Fauna and Flora

a) Implementation of a weed control programme;
b) Replacement of exotic species with indigenous species;
c) Habitat creation;
d) Removal of exotic invaders;
e) Development on already disturbed areas; and
f) Create opportunity to introduce indigenous vegetation species on the site and to attract birds and insects.

The proposed development will create the opportunity to re-vegetate the site with indigenous vegetation. The exposed areas will be covered with paved surfaces or vegetation and will prevent any further erosion and siltation. The areas covered with vegetation will also improve the micro-climatic conditions of the site and its surroundings. It will also contribute to the aesthetical qualities of the study area. It is also recommended that plant species that attract birds and insect species be introduced as part of the planting selection to be used for the development's landscaping.

9.2.2 Negative Impacts

9.2.2.1 Exothermic hot water generators and coal storage areas

Generation of emissions from the exothermic hot water generators (such as carbon dioxide, carbon monoxide, sulphur dioxide and nitrous oxides) and coal storage

Mitigation Measures

a) Use high-grade coal where possible as lower grade coal may result in higher sulphur emissions.
b) Regular maintenance of the exothermic hot water generators. Optimal combustion will allow for „cleaner" stack emissions.
c) Ensure adequate storage of coal to minimise dispersion of fine coal dust, i.e. a covered storage area.
d) The storage area should be demarcated and Safety signage including "No Smoking", "No Naked Lights" and "Danger", are to be clearly displayed at the coal storage area.
e) Fire extinguishers should be readily available at the coal storage area.

9.2.2.2 Handling and storage of coal.

Possible contamination of surface water from manure which may cause eutrophication

Mitigation Measures:

a) Store coal in bunkers.
b) Construct a bump/berm at the bunker entrance to prevent rain water from entering the bunker and becoming contaminated.
c) Construct a roof to prevent rain water from being contaminated by the coal.
d) Prevent coal spillages during loading and remove any coal spillages from the soil and return to the coal bunker.

9.2.2.3 Washing of Chicken Houses

Possible groundwater contamination from Run off of contaminated water. .
Mitigation Measures:

a) Wash and sanitise houses with biodegradable soaps and disinfectants.
b) Use biodegradable soaps and disinfectants in the footbath and showers.
c) Use biodegradable soaps and disinfectants for washing of vehicles.

9.2.2.4 Chemical Substances.

Storage and handling of chemical substances including fuel, greases, vaccines, detergents etc.

Mitigation Measures:

a) Identify all chemical substances used onsite including fuel, greases, vaccines, detergents etc.
b) Obtain the material safety data sheet of each of these chemical substances.
c) Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment.
d) Material Safety Data Sheets for all hazardous chemical substances must be readily available on site.
e) Develop and implement a dangerous goods management plan based on the material safety data sheets of all identified chemical substances and the 1995 Hazardous Chemical Substances Regulations in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

f) Keep a stock inventory register of all chemicals in the store.
g) Powders must be stored above liquids.
h) Proper storage of chemicals in a lockable, well ventilated building.
i) Ensure adequate access control for the storage area.
j) Storage areas for hazardous chemicals are to comply with standard fire safety regulations.
k) Safety signage including "No Smoking", "No Naked Lights" and "Danger", and product identification signs, are to be clearly displayed in areas housing chemicals.
l) Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water.
m) Chemicals are to be properly labelled and handled in a safety conscious manner.
n) All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE).
o) The removal of only the daily-required amount of chemicals to be used from the shed.
p) Immediately clean all spillage of fuels, lubricants and other petroleum based products.
q) The contaminated material must be disposed of in accordance with the waste management procedure.
r) No hazardous chemical must be discarded in the sewage or storm water system.
s) Train staff on the use of chemicals in accordance with the risks as described in the material data sheets.
t) Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and removed from site.

9.2.2.5 Outbreak of Disease or Infection of Chickens

Infection and possible death of chickens, other avian species and humans

Mitigation Measures

a) All chickens should originate from a closed bio-security compartment.
b) All chicks should originate from disease free sources.
c) Chicks from another farm should not be mixed with chickens in the flock.
d) Access control to and from the premises and access to the premises should only be by prior arrangement.

e) Installation of footbaths with disinfectant at all the entrances to each of the free-range chicken facilities.
f) Installation of showers for all staff working on site.
g) Use a sound vaccination program.
h) Never permit contaminated equipment from other poultry farms in the buildings.
i) Keep wild birds, rodents and predators away from the free-range chicken houses.
j) Installation of rodent bait traps and flytraps.
k) Clean and sanitise free-range chicken houses after each cycle with biodegradable soaps and disinfectants.
l) Monitoring and auditing of processes by a contracted veterinarian or State Vet.
m) Obtain a reliable diagnosis before starting treatment for a certain disease.
n) Seek advice of a trained poultry diagnostician when it is apparent that a disease is present in the flock.
o) When submitting a sample to a diagnostic laboratory, submit a sample of the problem flock. The sample should include two or more sick birds and freshly dead birds, if any. Take care to preserve dead specimens by cooling and preventing decomposition. It is not recommended to freeze dead birds as this may cause cell rupture and make diagnosis more difficult.
p) Proper handling, storage and disposal of litter and mortalities, in demarcated areas, away from foot traffic or vehicles entering and leaving the premises

9.3 Significance Assessment

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION MEASURES					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
CONSTRUCTION PHASE												
Soils and Geology	2	2	3	3	21	Medium -High	2	1	1	1	4	Low
Surface water	1	1	1	2	6	Low -Medium	1	1	1	1	3	Low
Flora and Fauna	1	1	1	2	6	Low -Medium	1	1	1	1	3	Low
Noise	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Visual	1	2	1	3	12	Low -Medium	1	1	1	1	3	Low
Soil contamination	1	1	1	2	6	Low -Medium	1	1	1	1	3	Low
Waste generation	1	1	1	2	6	Low -Medium	1	1	1	1	3	Low
Air quality	1	2	3	3	18	Medium -High	2	3	1	2	12	Medium

Safety and security	1	2	3	3	18	Medium -High	2	3	1	2	12	Medium
OPERATIONAL PHASE												
Air Quality	1	2	1	3	12	Low -Medium	1	1	1	1	3	Low
Surface water	1	2	3	3	18	Medium -High	2	3	1	2	12	Medium
Groundwater	1	2	3	3	18	Medium -High	2	3	1	2	12	Medium

10 ENVIRONMENTAL IMPACT STATEMENT

10.1 Physical Environment

10.1.1 Construction Phase

a) The natural environment will be affected by construction related activities- site clearance, bulk earthworks etc. The study area is on the other hand in a developed and transformed state with no important or significant faunal or floral species present;
b) The study area is not affected by any floodlines, drainage line or sensitive wetland/riparian habitat. It must however be noted that runoff from the proposed development site has the potential to affect the surrounding open space areas if adequate storm water management measures are not implemented;
c) Valuable topsoil may be lost during the construction process. The loss of topsoil can be minimised through the storage of topsoil in stockpiles on site and the reuse thereof within the landscape component of the development;
d) Some vegetative coverage will be lost and areas will be exposed. Such areas will be subject to erosion and siltation. The terrestrial biodiversity assessment as derived from the Mpumalanga Conservation Plan however indicates that no natural habitats or sensitive faunal or floral species are present on site. Some areas on the site are defined as Least Concern

10.1.2 Operational Phase

a) Some vegetative coverage will be permanently lost to accommodate the hard surfaces and structures associated with the proposed development;
b) Increased storm water volumes due to an increase in impermeable surfaces.
c) Possible groundwater and surface water contamination from composting and carcass disposal

10.2 Socio-Economic Environment

10.2.1 Construction Phase

a) Nuisance to neighbours due to dust pollution that are associated with construction activities;
b) Nuisance to neighbours due to noise that is generated by construction activities;

c) Nuisance to neighbours due to the undesirable visual impact that is associated with construction activities;
d) Damage to local roads by heavy vehicles; and
e) Heath, safety and security problems that is likely to occur during construction

10.2.2 Operational Phase

a) Increased traffic volumes;
b) Possible noise pollution and visual pollution caused by the signage, interior lighting, security lighting, exterior lighting.

10.3 Finding

None of the adverse impacts that were identified are regarded as impacts that cannot be mitigated to acceptable levels and therefore it is our opinion that there are no "fatal flaws" associated with the proposed development.

11 CONCLUSION AND RECOMMENDATION

11.1 Conclusion

As mentioned throughout the report, the subject property is in a developed and transformed state with no significant or sensitive faunal or floral habitats. The significance assessment of the impacts that is associated with the development indicates that almost 81% of the anticipated adverse impacts are of a short-term nature lasting for the construction phase only. In addition, it is important that one should take cognizance of the fact that the significance of these impacts is predominantly low to medium, with high mitigation levels. The significance assessment further indicated that a great number of beneficial impacts are associated with the development. These impacts are generally of a socioeconomic nature with medium to high significance ratings.

11.2 Recommendations

Both beneficial and adverse impacts of the development were thoroughly assessed, and the needs and benefits have been assessed in such a way as to give the proposed development the go-ahead. As a result, the EAP is of the opinion that the proposed will have a significant long-term beneficial socio-economic impact on the subject property and its immediate surroundings

12 REFERENCES

Berg, J., 1998. *Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies..* Pretoria: J.L. van Schaik..

Canada, G. o., 2017. *Environment and Climate Change Canada.* [Online] Available at: https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=CBE3CD59-1&offset=4 [Accessed 28 October 2018].

Census, S., 2011. *Census South Africa.* [Online] Available at: https://census2011.adrianfrith.com/place/877059 [Accessed 21 October 2017 October 2018].

Department of Water Affiars and Forestry, 1997. *Minimum Standards and Guidelines for Groundwater Resource development for the Community Water Supply and Sanitation Programme, First edition,* Pretoria: DWAF.

Development, U. E., 2014. *Bakgatla Ba Kgafela Long Term Master Plan,* s.l.: s.n.

DWA, 2011. *Planning Level Review of Water Quality in South Africa.* Pretoria: Department of Water Affairs.

DWAF, 2009. *Integrated Water Resource Management Plan for the Upper and Middle Olifants Catchment.* Pretoria: Department of Water Affairs and Forestry.

Environmental Impact Assessment Regulations of 2014 as amended (2017).

Huffman, T., 2007. *A handbook of Iron Age Archaeology.,* Pietermaritzburg: University of Kwazulu –Natal Press.

Johnson, M. R. & Thomas, C. R. A. a. R. J., 2006. *The Geology of South Africa.* s.l.:Council of Geoscience.

Mahlangu, S., 2017. *Harmony Hill Extension 2 Twonship Establishment on Remaining Extent of Portion 96 and Remaining Extent of Portion 111 of the Farm Grootfontein 196 - JT,* Johannesburg: EIMS.

Mason, R., 1962. *Prehistory of the Transvaal: A Record of Human Activity.,* Johannesburg: Witswatersrand University Press.

Mulder, S., July 2015. *EIA and EMPr for Changes to Surface Infrastructure at Sedibelo Platinum Mine,* s.l.: SLR.

National Environmental Management Act No.107 of 1998 (1998).

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

National Water Act No. 36 of 1998 (1998).

National Water Act, 1998. *(Act 36 of 1998).* s.l.:Republic of South Africa.

NEMA: Air Quality Act, 2004 (2004).

NEMA: Protected Areas Act No. 57 of 2003 (2003).

NEMA: Waste Act No. 59 of 2008 (2008).

Pistorius, J., 2005. *Results of a Phase II Heritage Impact Assessment Study: An investigation of Late Iron Age (including initiation cairns) and mining heritage remains on the farm Onverwacht 292KT in the Mpumalanga and Limpopo Provinces of South Africa. ,* s.l.: Unpublished report for SAHRA and Modikwa Platinum .

Robb L.J., B. G. A. C. a. P. M., 2006. *The Geology of South Africa.* Pretoria: Council of Geoscience.

SANS 241-1:2011, 2011. *Drinking water - Part 1: Microbiological, physical, aesthetic and chemical determinands.* 1 ed. Pretoria: Standards South Africa.

ScienceStruck, 2018. *Vanadium uses.* [Online] Available at: https://sciencestruck.com/vanadium-uses [Accessed 22 October October 2018].

Sepp, S., n.d. *Sandatlas.* [Online] Available at: https://www.sandatlas.org/diabase/ [Accessed 28 February 2019].

Stolp, L., 2017. *Proposed Expansion, Upgrade and Maintenance Projects within Sun City Complex, North-West Province,* s.l.: s.n.

Taylor, T. T. E. K. M., 2009. *Palaeobotany. The biology and evolution of fossil plants.* Burlington MA, USA: Academic Press.

Witthüser, K. H. M. R. T. R. E. B. A. J. P. K. D. I. B. H. v. R. J. D. M. a. d. W. M., 2011. *Determing Sustainable Yields of Potential Productive Well Fields in the Basement Aquifers of Mpumalanga Province with Special Emphasis on the WMand Luvuvhu/Letaba Water.* s.l.:s.n.

World Health Organization, 2011. *Guidleines for Drinking-water Quality. Fourth Edition,* Geneva: WHO Library Cataloguing-in-Publication Data.

APPENDIX 1: LAYOUT DESIGNS

APPENDIX 2: PREVIOUS ENVIRONMENTAL AUTHORISATION

APPENDIX 3: ENVIRONMENTAL MANAGEMENT PROGRAMME