# Draft Basic Assessment

## for the proposed development of a Chicken Egg-Layer facility on Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga

***Prepared for:***
**Lungile Poultry Farming (Pty) Ltd**

CSIR Report Reference Number:

CSIR/IU/021MH/IR/2018/0003/A

**June 2018**

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Basic Assessment for the proposed development of a Chicken Egg-Layer facility on Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga.

# DRAFT BASIC ASSESSMENT REPORT

CSIR Report Number: CSIR/IU/021MH/IR/2018/0003/A

June 2018

***Prepared for:***
Lungile Poultry Farming (Pty) Ltd

***Prepared by:***
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Rirhandzu Marivate



# REPORT DETAILS

| | |
|---|---|
| **Title:** | Basic Assessment for the proposed development of a Chicken Egg-Layer facility on Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga: Draft Basic Assessment Report |
| **Purpose of this report:** | The purpose of this BA Report is to:<br>• Present the proposed project and the need for the project;<br>• Describe the affected environment at a sufficient level of detail to facilitate informed decision-making;<br>• Provide an overview of the BA Process being followed, including public consultation;<br>• Assess the predicted positive and negative impacts of the project on the environment;<br>• Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project;<br>• Provide an Environmental Management Programme (EMPr) for the proposed project.<br><br>This BA Report has been made available to all Interested and Affected Parties (I&APs) and stakeholders for a 30-day review period. All comments submitted during the review of the BA Report will be incorporated into the finalised BA Report as applicable and where necessary. This finalised BA Report will then be submitted to the Mpumalanga Department of Agriculture, Rural development and Land Administration (MDARDLEA) for decision-making. |
| **Prepared for:** | Lungile Poultry Farming (Pty) Ltd |
| **Prepared by:** | CSIR<br>P O Box 320, Stellenbosch, 7599<br>Tel: +27 21 888 2408<br>Fax: +27 21 888 2493 |
| **Authors:** | Rirhandzu Marivate<br><br>Reviewer: Minnelise Levendal |
| **CSIR Report Number:** | CSIR/IU/021MH/IR/2018/0003/A |
| **Date:** | June 2018 |
| **To be cited as:** | CSIR, 2018. Draft Basic Assessment Report for the proposed development of a chicken broiler facility on Portion 4 of Farm Waterval, Waterval, Mpumalanga.CSIR Report Number CSIR/IU/EMS/ER/2016/0002/A |

**ENVIRONMENTAL ASSESSMENT PRACTITIONER**


| | |
|---|---|
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***Project Team***

| Name | Qualification & Expertise |
|---|---|
| Minnelise Levendal | -MSc Biological Science (Botany) (Stellenbosch University)<br>-16 years of experience in Environmental Management<br>-Inclusive of 10 years' experience in conducting Environmental Assessments |
| Rirhandzu Marivate | -BSc (Honours) Ecology, Environment, and Conservation (University of the Witwatersrand)<br>-4 years of experience in Environmental Management |

The Council for Scientific and Industrial Research has been one of the leading organisations in South Africa contributing to the development and implementation of environmental assessment and management methodologies. The CSIR's Environmental Management Services (EMS) unit has over 20 years of experience in environmental management practices, involving conducting environmental assessment and management studies in over 15 countries in Africa. Key sectors of CSIR's work include renewable energy, infrastructure, natural resource management, mining, industrial development and oil and gas. CSIR's environmental assessments are conducted with national legal requirements as well as those of international agencies such as the World Bank, International Finance Corporation and World Health Organisation.

# Opportunity for review

Opportunity for Review:

The Draft Basic Assessment Report and Draft Environmental Management Programme (EMPr) have been made available to all Interested and Affected Parties (I&APs) and stakeholders for a 30-day review period extending from the 13 June 2018 to the 13 July 2018. All comments received during the review period of the Draft Basic Assessment Report will be incorporated into the Final Basic Assessment Report and EMPr which will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land & Environmental Affairs (DARDLEA) for decision-making.

All comments on the Draft Basic Assessment Report and Draft EMPr are to be submitted to the CSIR by the 13 July 2018 at the details provided below.

**Environmental Assessment Practitioner- Rirhandzu Marivate**

Council for Scientific & Industrial Research (CSIR)

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| | |
|---|---|
| **Appendix A** | Site plan(s) – (must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers) |
| **Appendix B** | Photographs |
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| **Appendix D** | Route position information – **N/A** |
| **Appendix E** | Public participation information |
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# EXECUTIVE SUMMARY

## INTRODUCTION AND BACKGROUND

The Lungile Poultry Farming is a small scale commercial farming enterprise that was established in 2016. This company is proposing to establish a start-up enterprise comprising of a commercial chicken egg-layer facility on Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga. The farm currently has no buildings on it and is vacant. The proposed development area is 19.5 hectare, to comprise of 0.6 chicken egg-layer facilities (office and changing rooms, silo, and reservoir) and 5 hectare small scale crop farming of a variety of vegetables, and associated infrastructure. The proposed operations of the project will be housing 30 000- 45 000 hens per chicken house. The eggs will then be distributed to egg wholesalers in the area, for packaging and sale.

## ENVIRONMENTAL ASSESSMENT PROCESS

The Council for Scientific and Industrial Research (CSIR) was appointed by the National Department of Environmental Affairs (DEA), to manage the Special Needs and Skills Development Programme which is aimed at providing *pro-bono* Environmental Services to small-scale businesses. The programme offers the undertaking of a Basic Assessment for projects that require this assistance in applying for Environmental Authorisation. The CSIR is managing this Basic Assessment (BA) Process on behalf of the project applicant under the Special Needs and Skills Development Programme.

The proposed development triggers listed activities in terms of the Environmental Impact Assessment (EIA) Regulations, Government Regulations (GNR) and 327 as Amended 07 April 2017 promulgated under the National Environmental Management Act (Act no 107 of 1998) (NEMA).

In terms of the NEMA EIA Regulations published in GNR 327 as Amended 07 April 2017 Government Gazette Number 40772, a BA process is required as the project triggers the following listed activities (detailed in Table 1 below).

**Table S.1: Listed activities to be triggered**

| Relevant notice: | Activity No (s) (in terms of the relevant notice) : | Description of each listed activity as per the Government Notice: |
|---|---|---|
| GN. R 327 as Amended 7 April 2017 | 5 (ii) | The development and related operation of facilities or infrastructure for the concentration of-More than 5000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days. |
| GN. R 327 as Amended 7 April 2017 | 5 (iv) | The development and related operation of facilities or infrastructure for the concentration of-More than 25000 chicks younger than 20 days per facility situated outside an urban area. |
| GN. R 327 as Amended 7 April 2017 | 27 | The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or<br>ii) Maintenance purposes undertaken in accordance with a maintenance management plan. |
| GN. R 324 as Amended 7 April 2017 | 12 f | The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with maintenance management plan. |

These listed activities require Environmental Authorisation from the competent authority, i.e. the Mpumalanga Department of Agriculture, Rural Development, Land & Environmental Affairs (DARDLEA).

## PROJECT DESCRIPTION

The proposed site is located on Portion 4 of Farm Waterval in Waterval. The project is within the 1st Ward of the Dr. JS Moroka Local Municipality in Mpumalanga province. The proposed project involves the construction of chicken egg-layer facilities on the 362 hectare plot of land.

The said project aims to house between 30 000 – 45 000 chickens over their nesting cycle, the eggs will be sold off to egg wholesalers and private customers in the local area. The hens will also be sold once they stop producing eggs. This proposed production project is in line with chicken broiler best practices along with legislation and standards, established via the Environmental Assessment process.

The site has been zoned for agricultural purposes but is currently vacant with sprouts of natural vegetation. The project manager (applicant), with his compliance to requirements of an Environmental Assessment is ensuring the project complies to providing sustainable produce with ecological considerations being part of the entire development and operational processes.

The layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping and has attempted to minimize environmental impacts as much as possible. The preferred project development footprint totals 19.5 hectares, including 5 ha for crop production. Upon completion the chicken broiler facility will include the following:

- 5 x Chicken Houses
- 1 x Office
- 1 x Water Reservoir
- 1 x Change Rooms & Showers

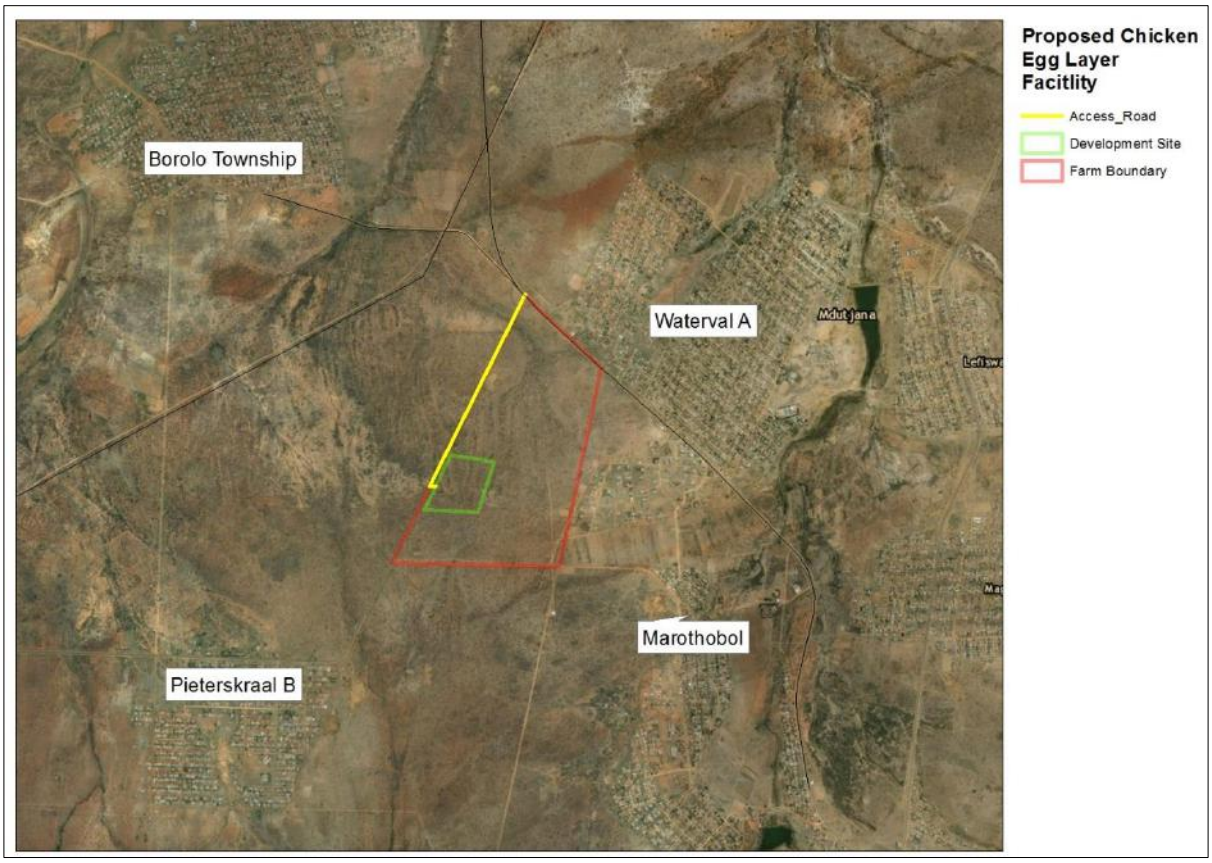


**Figure S1: Location of the proposed development for a chicken egg-layer facility of Lungile Poultry Farming on Portion 4 of Farm Waterval, Waterval, Dr. JS Moroka.**

# IMPACT ASSESSMENT

Two specialist studies were conducted as part of the BA Process, i.e. an Ecological study and a Heritage Impact Assessment. The potential impacts and associated significance ratings with and without mitigation are provided in Table S.2 below:

**Table S.2: Summary of Impacts**

| POTENTIAL ECOLOGICAL IMPACTS | Significance Rating Without Mitigation | Significance Rating With Mitigation |
|---|---|---|
| **Construction Phase** | | |
| Loss of indigenous vegetation from construction | Moderate | Moderate |
| Introduction and proliferation of alien species | Low | Low |
| Loss of mammal and herpatofauna habitat | Low | Low |
| Loss of avian habitat | Very Low | Very Low |
| Increased dust and erosion | Moderate | Very Low |
| Sensory disturbance on fauna | High | Moderate |
| Pollution from construction activities | Very Low | Very Low |
| Electrocution and collision of avian fauna | Very Low | Very Low |
| **Operational Phase** | | |
| Loss of indigenous vegetation | High | Moderate |
| Introduction and proliferation of alien species | Very Low | Very Low |
| Loss of mammal and herpatofaunal habitat | Moderate | Low |
| Loss of avian habitat | Very Low | Very Low |
| Sensory disturbance of fauna | High | Moderate |
| Pollution from operational activities | Very Low | Very Low |
| Electrocution and collision of avian fauna | Very Low | Very Low |
| Environmental contamination from chicken waste | Moderate | Low |
| Poor/ inappropriate control of animal pests | Moderate | Low |
| Disease transmission from poor waste management | Moderate | Low |
| **Decommissioning Phase** | | |
| Introduction and proliferation of alien species | High | Low |
| Increased dust and erosion | Moderate | Low |
| Sensory disturbance of fauna | Low | Low |
| **POTENTIAL HERITAGE IMPACTS** | **Significance Rating Without Mitigation** | **Significance Rating With Mitigation** |
| **Construction Phase** | | |
| Destruction of archaeological artefacts | Very Low | Very Low |
| **Operational Phase** | | |
| Impact on heritage resources | Very Low | Very Low |
| **Cumulative Impacts** | | |
| Impacts to heritage resources | Very Low | Very Low |

# EAP'S RECOMMENDATION

This BA Report has investigated and assessed the significance of the predicted, potential positive and negative, direct and indirect as well as cumulative impacts associated with the proposed development. Based on the findings of this BA process, it is the opinion of the Environmental Assessment Practitioner (EAP) that no potential negative impacts have been identified within this BA that are to be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Section 24 of the Constitution states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures and monitoring requirements. These measures will be implemented to promote conservation by avoiding the sensitive environmental features present on site. Accordingly, the development site for Lungile's Chicken Layer facility has been moved to the south of the property in order to minimise its impact on the environment, as suggested by the ecological specialist.

Based on the findings of the BA process undertaken, it is the opinion of the EAP that the project benefits outweigh the negative environmental impacts, and that the project will make a positive contribution towards skills development, women empowerment and economic growth in the Dr JS Moroka Local Municipality.

An Environmental Management Programme (EMPr) has been compiled for the proposed project and is included as Appendix H of the BAR. This Draft EMPr includes the potential impacts associated with each project phase as well as the mitigation measures to avoid or reduce the potential impacts. The Draft EMPr is a dynamic document that should be updated regularly and provides clear and implementable measures for the establishment and operation of the proposed chicken broiler facility.

**Concluding statement from EAP: Provided that the specified mitigation measures in the BAR and Draft EMPr are implemented effectively, it is proposed that the project receives Environmental Authorisation in terms of the EIA Regulations promulgated under the NEMA.**

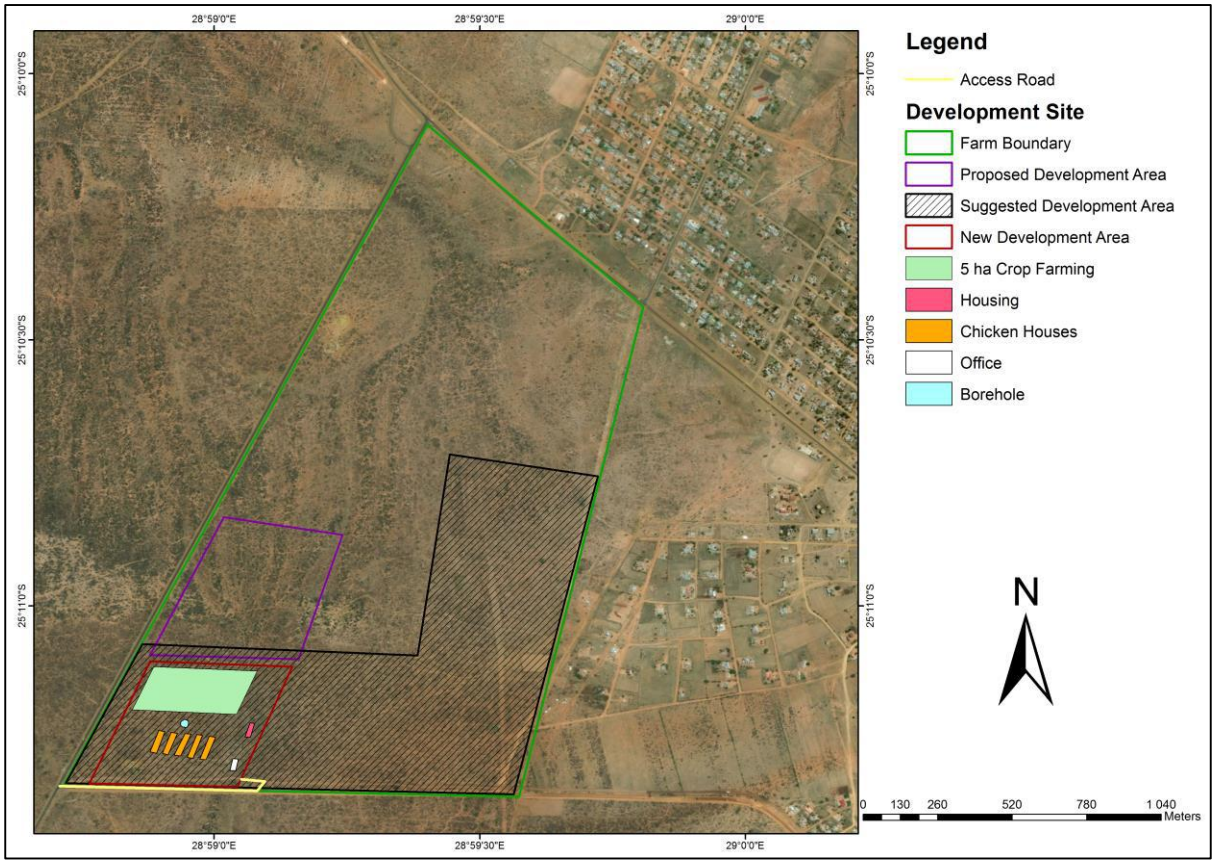


**Figure S2: Location of new preferred development site as per ecological specialist assessment.**

# GLOSSARY

| | |
|---|---|
| **BA** | Basic Assessment |
| **BID** | Background Information Document |
| **CSIR** | Council for Scientific and Industrial Research |
| **DARDLEA** | Department of Agriculture, Rural Development, Land & Environmental Affairs. |
| **DEA** | National Department of Environmental Affairs |
| **EAP** | Environmental Assessment Practitioner |
| **EIA** | Environmental Impact Assessment |
| **EMP** | Environmental Management Plan |
| **EMPr** | Environmental Management Programme |
| **I&AP** | Interested and Affected Party |
| **IDP** | Integrated Development Plan |
| **MDARD** | Mpumalanga Department of Agriculture and Rural Development |
| **NWA** | National Water Act (Act 36 of 1998) |
| **NEM: AQA** | National Environment Management: Air Quality Act (Act 39 of 2004) |
| **NEMA** | National Environmental Management Act (Act 107 of 1998) |
| **NEMWA** | National Environmental Management: Waste Act (Act 59 of 2008) |
| **NHRA** | National Heritage Resources Act (Act 25 of 1999) |
| **PPP** | Public Participation Process |
| **PTO** | Permission to Occupy |
| **SAHRA** | South African Heritage Resources Agency |
| **SAHRIS** | South African Heritage Resources Information System |
| **SDF** | Spatial Development Framework |
| **TOR** | Terms of Reference |

# Summary of where requirements of Appendix 1 of the 2014 NEMA EIA Regulations (GN R 982, as amended) are provided in this Basic Assessment Report

| APPENDIX 1 OF THE REGULATIONS | YES / NO | SECTION IN BAR |
|---|---|---|
| 2) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include- | | |
| (a) details of –<br>i. the EAP who prepared the report; and | √ | Appendix I |
| ii. the expertise of the EAP, including a curriculum vitae; | √ | Appendix I |
| (b) the location of the activity, including<br>i) the 21 digit Surveyor General code of each cadastral land parcel; | √ | Section A<br>Appendix A, B |
| (ii) where available, the physical address and farm name; | √ | Section A |
| (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; | | |
| (c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is-<br>(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or<br>(ii) on land where the property has not been defined, the coordinates within which the activity<br>(iii) is to be undertaken; | √ | Section B |
| (d) a description of the scope of the proposed activity, including<br>(i) all listed and specified activities triggered and being applied for; and<br>(ii) a description of the activities to be undertaken including associated structures and infrastructure ; | √ | Section A2 |
| (e) a description of the policy and legislative context within which the development is proposed including-<br>(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development | √ | Section C<br>Appendix E |

| APPENDIX 1 OF THE REGULATIONS | YES / NO | SECTION IN BAR |
|---|---|---|
| planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and<br>(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments | | |
| (f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location | √ | Section E9 |
| (g) a motivation for the preferred site, activity and technology alternative; | √ | Section A3 |
| (h) a full description of the process followed to reach the proposed preferred alternative within the site, including:<br>(i) details of all the alternatives considered;<br>(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;<br>(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;<br>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;<br>(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-<br>(aa) can be reversed;<br>(bb) may cause irreplaceable loss of resources; and<br>(cc) can be avoided, managed or mitigated;<br>(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;<br>(vii) positive and negative impacts that the proposed activity and alternatives will have on the | √ | Section E<br>Appendix G |

| APPENDIX 1 OF THE REGULATIONS | YES / NO | SECTION IN BAR |
|---|---|---|
| environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;<br>(viii) the possible mitigation measures that could be applied and level of residual risk;<br>(ix) the outcome of the site selection matrix;<br>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and<br>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity; | | |
| (i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-<br>(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and<br>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures; | √ | Section E<br>Appendix H |
| (j) an assessment of each identified potentially significant impact and risk, including-<br>(I) cumulative impacts;<br>(ii) the nature, significance and consequences of the impact and risk;<br>(iii) the extent and duration of the impact and risk;<br>(iv) the probability of the impact and risk occurring;<br>(v) the degree to which the impact and risk can be reversed;<br>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and<br>(vii) the degree to which the impact and risk can be avoided, managed or mitigated; | √ | Section E<br>Appendix G |
| (k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report; | √ | Appendix H |
| (l) an environmental impact statement which contains- | √ | Section E2 |

| APPENDIX 1 OF THE REGULATIONS | YES / NO | SECTION IN BAR |
|---|---|---|
| (i) a summary of the key findings of the environmental impact assessment;<br>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and<br>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; | | |
| (m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr; | **√** | Section E5 |
| (n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation; | **√** | Appendix E4 and E5 |
| (o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed; | | Appendix G |
| (p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation; | | Appendix G |
| (q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised; | **√** | N/A |
| (r) an undertaking under oath or affirmation by the EAP in relation to:<br>(i) the correctness of the information provided in the reports;<br>(ii) the inclusion of comments and inputs from stakeholders and I&APs;<br>(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and<br>(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and | **√** | Appendix E4 and E5 |
| (s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post | **N/A** | N/A |

| APPENDIX 1 OF THE REGULATIONS | YES / NO | SECTION IN BAR |
|---|---|---|
| decommissioning management of negative environmental impacts; | | |
| (t) any specific information that may be required by the competent authority; and | **N/A** | N/A |
| (u) any other matters required in terms of section 24(4)(a) and (b) of the Act. | **N/A** | N/A |

# Basic Assessment for the Lungile Poultry Farming (Pty) Ltd's proposed chicken egg-layer facility enterprise on Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga

# INTRODUCTION

## Project Background

Lungile Poultry Farm (pty) Ltd (hereafter Lungile Poultry)is proposing to establish a start-up enterprise comprising of a chicken egg layer facility. The proposed site is located on portion 4 of the farm Waterval 35 JS, in Waterval, Mpumalanga. The project falls within ward 01 of the Dr JS Moroka Local Municipality. The proposed project involves the construction of a chicken egg layer facility that is 0.6 hectare (ha) in size on a the 362 ha plot of land (Figure 3).

The farm currently has no buildings on it and is vacant. The proposed development area is 19.5 hectare, to comprise of chicken egg-layer facilities (office and changing rooms, silo, and reservoir) and 5 hectare small scale crop farming of a variety of vegetables, and associated infrastructure. The proposed operations of the project will be housing 30 000- 45 000 hens per chicken house. These will then be distributed to egg wholesalers in the area, for packaging and sale. This proposed production project is in line with chicken layer best practices along with legislation and standars, established via the Environmental Assessment process.

Lungile Poaultry has been granted Permission to Occupy (PTO) by the local authority, Dr JS Moroka Local Municipality, for their land portions. The land currently has no buildings on it and is vacant and has sprouts of natural vegetation. The project manager (applicant), with his compliance to requirements of an Environmental Assessment is ensuring the project complies to providing sustainable produce with ecological considerations being part of the entire development and operational processes.

The layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping and has attempted to minimize environmental impacts as much as possible. The preferred project development footprint totals 0.6 hectares with there being an intention to also grow crop on 5 hectares within the plot of land. Upon completion the chicken broiler will include the following (Figure 4):

- 5 x Chicken Houses
- 1 x Office
- 1 x Water Reservoir
- 1 x Change Rooms & Shower
- 5 hectare vegetable cultivation

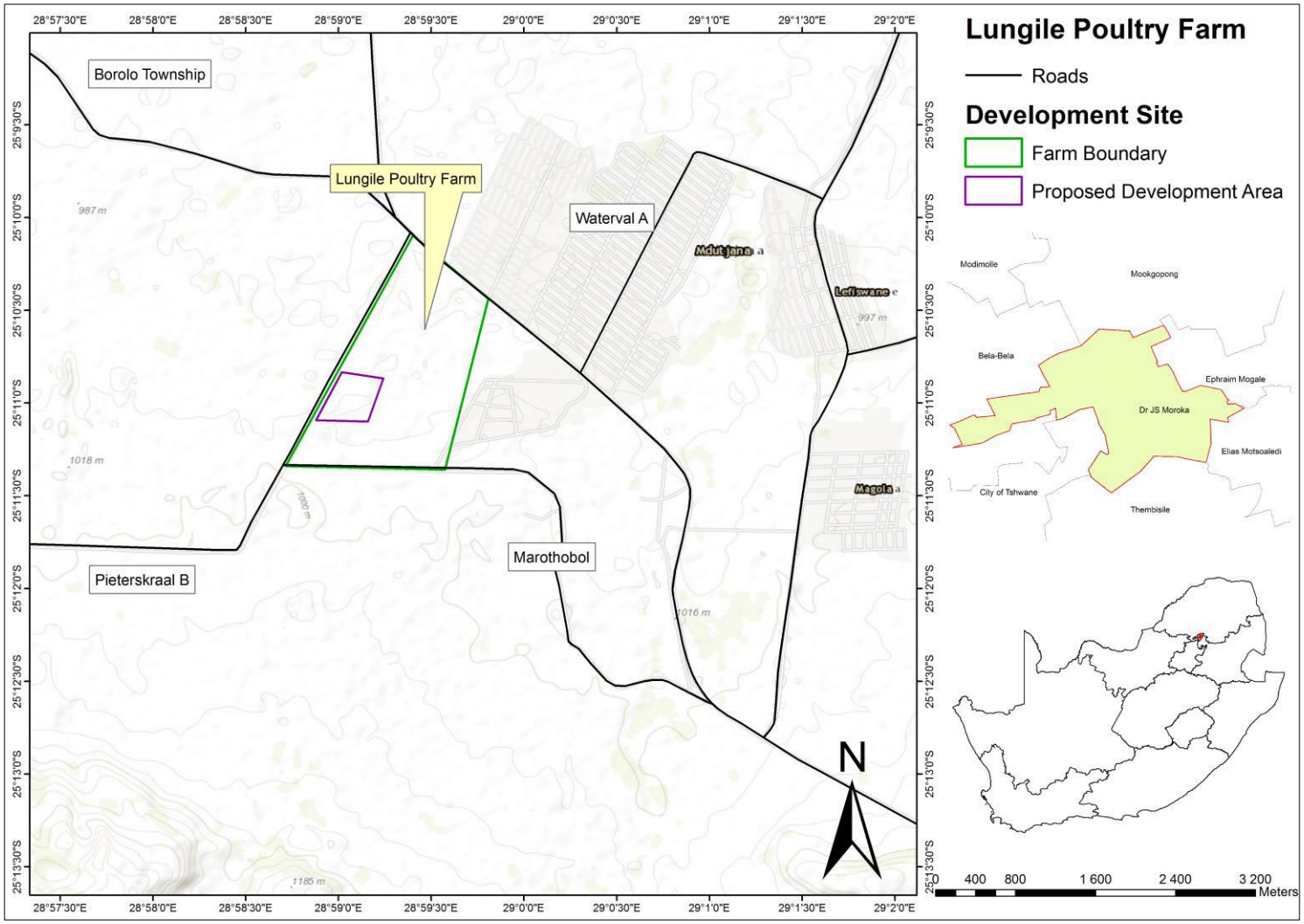


**Figure 3: Location of the proposed development for a chicken broiler facility of Lungile Poultry Farm (Pty) Ltd on portion 4 of the farm Waterval 34 JS, Waterval, Mpumalanga Province.**

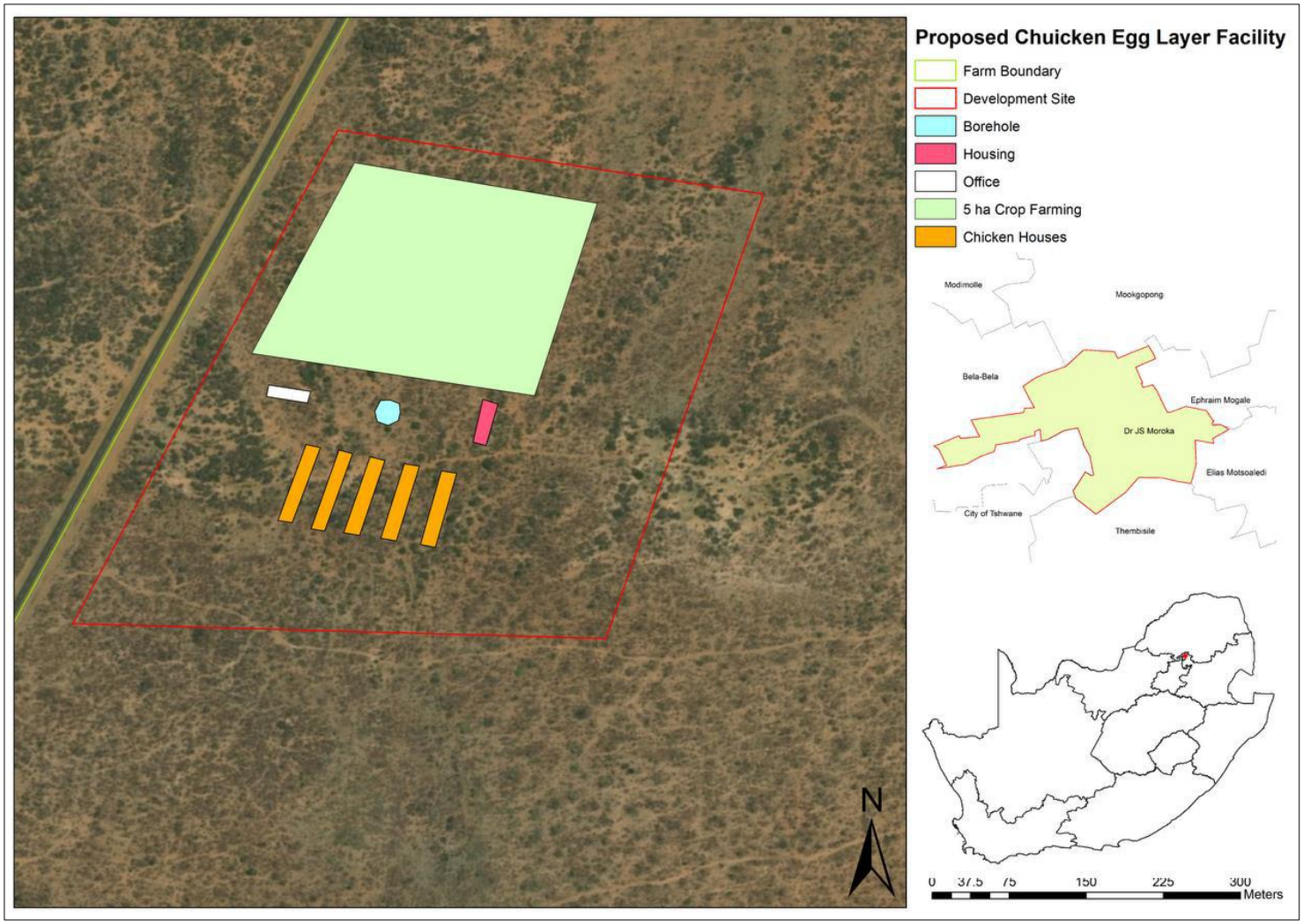


**Figure 4:** **Layout of the proposed development for a chicken broiler facility of Lungile Poultry Farm (Pty) Ltd on portion 4 of the farm Waterval 34 JS, Waterval, Mpumalanga Province.**

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# SECTION A: ACTIVITY INFORMATION

## 1. PROPOSAL OR DEVELOPMENT DESCRIPTION

**Project title (must be the same name as per application form):**

**Basic Assessment for the proposed development of a Chicken Egg-Layer facility on Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga**

Select the appropriate box

| The application is for an upgrade of an existing development | | The application is for a new development | X | Other, specify | |
|---|---|---|---|---|---|

Does the activity also require any authorisation other than NEMA EIA authorisation?

| YES | NO |
|---|---|

If yes, describe the legislation and the Competent Authority administering such legislation

National Water Act, 1998 (Act 36 of 1998), and the Competent Authority is the Department of Water and Sanitation.

National Heritage Resources Act (Act 25 of 1999), and the Competent Authority is the South African Heritage Resources Agency (SAHRA).

| If yes, have you applied for the authorisation(s)? | YES | |
|---|---|---|
| If yes, have you received approval(s)? (attach in appropriate appendix) | YES | NO |

## 2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

| Title of legislation, policy or guideline: | Administering authority: | Promulgation Date: |
|---|---|---|
| National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended). | National & Provincial | 27 November 1998 |
| National Water Act, 1998 (Act No. 36 of 1998) as amended | National | 26 August 1998 |
| National Heritage Resources Act, 1999 (Act No. 25 of 1999) | National & Provincial | 28 April 1999 |
| National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) | National & Provincial | 7 June 2004 |
| National Environmental Management Waste Act, 2009 (Act No. 59 of 2008) | National & Provincial | 10 March 2009 |
| Environmental Impact Assessment Regulations, 2014 | National & Provincial | 4 December 2014 |

| Title of legislation, policy or guideline: | Administering authority: | Promulgation Date: |
|---|---|---|
| National Development Plan: A Vision for 2030 | National | 19 February 2013 |
| Department of Environmental Affairs Guidelines on Public Participation | National & Provincial | 10 October 2012 |
| Spatial Planning Land Use Management Act, 2013 (Act No. 16 of 2013) | National | 6 August 2013 |
| DR JS Moroka Integrated Development Plan: 2017-2022 | Local | 28 April 2017 |
| Nkalanga District Rural Development Plan: 2017 | Provincial & Local | August 2016 |

| Description of compliance with the relevant legislation, policy or guideline: | |
|---|---|
| **Legislation, policy of guideline** | **Description of compliance** |
| National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended). | The Environmental Authorisation for the proposed development is lawfully applied for in terms of the EIA Regulations, 2014, promulgated under NEMA. The conditions on the Environmental Authorisation, if approved, will be adhered to. |
| National Water Act, 1998 (Act No. 36 of 1998) as amended | Pertinent legislation published under this act will be adhered to as well as a Water Use License Application. |
| National Heritage Resources Act, 1999 (Act No. 25 of 1999) | Submitted the proposed project to the South African Heritage Resources Agency (SAHRA) online platform South African Heritage Resources Information System (SAHRIS) |
| National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) | The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) as amended (NEMBA) including all the pertinent legislation published in terms of this act was considered in undertaking this Basic Assessment process. This included the determination and assessment of the fauna and flora prevailing in the proposed project and the handling thereof in terms of NEMBA. |
| National Environmental Management Waste Act, 2009 (Act No. 59 of 2008) | The Waste Management License will be undertaken in respect of the National Environmental Management: Waste Act (Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083) as amended NEM:WA. Pieces of legislation published under this act will be adhered to. |
| Environmental Impact Assessment Regulations, 2014 | All the triggered activities as per National Environmental Management Act (Act No. 107 of 1998) have been listed below. |

| **Description of compliance with the relevant legislation, policy or guideline:** | |
|---|---|
| **Legislation, policy of guideline** | **Description of compliance** |
| National Development Plan: A Vision for 2030 | The South African Government through the Presidency has published a National Development Plan. The Plan aims to eliminate poverty and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety. It proposes the following strategies to address the above goals:<br><br>1. Creating jobs and improving livelihoods;<br>2. Expanding infrastructure;<br>3. Transition to a low-carbon economy;<br>4. Transforming urban and rural spaces;<br>5. Improving education and training;<br>6. Providing quality health care;<br>7. Fighting corruption and enhancing accountability;<br>8. Transforming society and uniting the nation. |
| Dr JS Moroka Integrated Development Plan 2017-2022<br><br>Dr JS Moroka Spatial Development Framework 2017 | The Spatial Development Framework (SDF) is the legislated component of the municipality's IDP that prescribes development strategies and policy guidelines to restructure and reengineer the urban and rural form. The SDF is the municipality's long-term vision of what it wishes to achieve spatially, and within the IDP programmes and projects. The SDF should not be interpreted as a blueprint or master plan aimed at controlling physical development, but rather the framework giving structure to an area while allowing it to grow and adapt to changing circumstances.<br><br>The proposed project falls on the eastern extent of the local municipality and is earmarked for agriculture within the Spatial Development Framework. As a resource, the region holds large undeveloped areas, which could in future accommodate growth. Description of compliance with the relevant legislation, policy or guideline: According to the IDP, the proposed project falls within an area which is demarcated as "rural", and the intention of development in this area is to create vibrant, equitable and sustainable rural development which provides food and work opportunities. |

In terms of the NEMA EIA Regulations published in GNR 327 as Amended 07 April 2017 Government Gazette Number 40772, 2 a Basic Assessment (BA) process is required as the project applies to the following listed activities (detailed in Table 1 below).

**Table 1: Listed Activities relating to the proposed project**

| Relevant notice: | Activity No (s) (in terms of the relevant notice) : | Description of each listed activity as per the Government Notice: |
|---|---|---|
| GN. R 327 as Amended 7 April 2017 | 5 (ii) | The development and related operation of facilities or infrastructure for the concentration of-More than 5000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days. |
| GN. R 327 as Amended 7 April 2017 | 5 (iv) | The development and related operation of facilities or infrastructure for the concentration of-More than 25000 chicks younger than 20 days per facility situated outside an urban area. |
| GN. R 327 as Amended 7 April 2017 | 27 | The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or<br>ii) Maintenance purposes undertaken in accordance with a maintenance management plan. |
| GN. R 324 as Amended 7 April 2017 | 12 f | The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with maintenance management plan. |

## 3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not** include the no go option into the alternative table below.

**Note:** After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

The proposed site was chosen based on the sites sensitivities which are presented in the ecological (fauna and flora) and Heritage specialist studies undertaken as part of this process (Appendix G). There are no additional locational alternatives for this proposed project as this is the only available site to the applicant, who is a special needs applicant.

Provide a description of the alternatives considered.

| No. | Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other") | Description |
|---|---|---|
| **1** | Proposal | **<u>Site Location and Layout:</u>**<br>The proposed project is a commercial chicken egg-layer facility on Portion 4 of Farm Waterval, Waterval 34 JS, Mpumalanga. The farm currently has no buildings on it and is vacant. The proposed development footprint falls within a 19.5 hectare selected development area, to comprise of a 0.6 ha chicken egg-layer facility (office and changing rooms, silo, and reservoir) and 5 hectare small scale crop farming of a variety of vegetables. The proposed operations of the project will be housing 30 000- 45 000 hens per chicken house. These will then be distributed to egg wholesalers in the area, for packaging and sale.<br>This proposed production project is in line with chicken broiler best practices along with legislation and standards, established via the Environmental Assessment process.<br><br>The site has been earmarked for agricultural purposes but is currently vacant with sprouts of natural vegetation. The project manager, who is also the applicant, with his compliance to requirements of an Environmental Assessment is ensuring the project complies to providing sustainable produce with ecological considerations being part of the entire development and operational processes.<br><br>The layout plan of the proposed has been developed based on the outcome of the specialist studies and sensitivity mapping. The current preferred project development footprint totals 0.6 hectares with there being an intention at some point to grow crops of 5 ha within the 19.5 ha development area. Upon completion the chicken layer facility will include the following:<br><br>Construction of:<br>- 5 x chicken houses at 75m x 15 m x 2.4m each<br>- 4-tier egg laying cages<br>- 5 x cage rows of 103m a row<br>- 8000 birds per cage row<br>- Office block<br>- Change Room & Showers<br><br>Additional internal Infrastructure:<br>- 1 x Egg collection System<br>- 1 x Manure Scrapper<br>- 1 x Manure Conveyor<br>- 1 x Feeding System (Pan feeder system)<br>- 1 x Watering system (Nipple lines connected to a bore hole or reservoir)<br>- 1 x Borehole ( Capacity yet to be determined)<br>- 1 x 19 metric tonne Feeding Silo |

| No. | Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other") | Description |
|---|---|---|
| | | - 1 x Heating & Ventilation System (Electricity Generator or Boiler)<br>- 1 x Curtain System of 120m x 2.5 m<br>- 1 x 20m² waste storage area.<br><br>The chicken layer farming activities generate waste comprised of bird excrement, spilled feed, bird feathers, mortalities and used chicken bedding (wood shavings, sawdust and peanut hulls). The applicant plans to distribute the chicken waste as fertilizer to nearby farmers, as well as sell a portion of the waste. Further, there is the option to dry the compost and use it as feed to local cattle farmers. This will require the applicant to attain a Fertilizer permit if the compost is sold. Broiler chicken waste will be collected every cycle (6 weeks) when chicken houses are cleaned,. Should there be no demand for the waste, the waste will be disposed of at a licenced facility. A waste management license will not be required as the amount of waste produced is below the recommended threshold stipulated in the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA).<br><br>There will be a need to apply for both a water use license and electrical connections for commercial purposes should the need arise. The project proposes to drill a borehole for domestic and agricultural use. The development site will be located adjacent to the existing R65 and will therefore be easily accessible without investing in a lot of road infrastructure. |
| **2** | Property Alternative | There have been no alternative properties or locations identified for the proposed project due to the applicant's lack of funding. The applicant is a special needs applicant and is currently assisted by the Special Needs and Skills Development Programme on a pro bono basis to undertake the BA process. Therefore this is the only piece of land the applicant has available to undertake the proposed activities and it would not be economically feasible for the business to find and or purchase new property. Therefore, no alternate properties have been investigated in the Basic Assessment. |
| **3** | Activity Alternative | The applicant has limited access to other plots of land and was fortunate to be granted Permission to Occupy (PTO) from the municipality on condition that the development comprises agriculture. Furthermore, the project will be granted funding support from LandBank and Small Enterprise Development Agency (SEDA) if it develops a chicken layer facility as agreed. The project will also be monitored by the Department of Agriculture, Rural and Land Administration. |
| | Design or Layout Alternative | The proposed design and layout will be placed on the property in a means which minimise the impact it can have on the environment. The layout of the chicken broiler houses is focused on the biosecurity measure, which allows for more effective management of chicken broiler production as it lessens the risk of the broiler chickens |

| No. | Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other") | Description |
|---|---|---|
| | | catching diseases if the activity were to be an open environment or being stolen. These also allow for the most efficient compliance to chicken welfare legislation, maximising chicken production outputs. |
| | Technology to be used | The technology to be used is in line with chicken broiler standards, it further leads to chicken welfare as well as complying with best practices in broiler chicken production. No other technologies have been investigated due to the current technologies will be in line with best practices associated with broiler chicken production. |

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

**Site layout and Location: Alternatives**

The Council for Scientific and Industrial Research (CSIR) has been appointed by the Department of Environmental Affairs (DEA) to implement the Special Needs and Skills Development Programme (SNSD. This is a pro bono programme providing Environmental Impact Assessments (EIAs) to businesses considered as Small, Medium and Micro Enterprises (SMMEs) who do not have the financial means to comply with the EIA regulations. Also included in this category are Community Trusts, Individuals or Government Programmes. To this effect, the CSIR received a successful application from **Lungile Poultry Farm (Pty) Ltd** and is assisting them acquire their Environmental Authorization Certificate from DEA *pro bono*, inclusive of all costs for the Basic Assessment, Specialist Studies, Site Visits and Human Resources.

**Lungile Poultry Farm** is a 100% black owned entity being funded by the Land Bank which offers support to previously disadvantaged individuals who do not have the start-up capital to launch their own enterprise. **Lungile Poultry Farm** has been granted Permision to Occupy (PTO) by the Dr JS Moroka Local Municipality. Due to this, identification of land and its size, there is no scope for identifying an alternative location or property as this is the only property they could acquire. The proposed layout is within the biosecurity measures which have further taken direction from the Ecological Impact Assessment (Appendix G) in an attempt to avoid impacts in areas with high conservation priority.

**Activity Alternative**

In their process of due diligence and market feasibility **Lungile Poultry Farm** preferred to undertake a business that could function at a small to medium scale focusing on producing high quality produce but with the ability and intension to grow in the future. Chicken layer which has ranked first in the industry that is growing and large potential opportunities increasing by 6% in production per annum both in the rural markets South African market.

**Technology and Design: Alternatives**

The pre-development research which has been conducted on this project has been extensive, including feasibility studies and market research as well as production research. Applying the top principles in growing chickens will be adopted by **Lungile Poultry Farm**. The proposed design and technology include the structure of the chicken houses will be made of slates and concrete floors, it will be cleaned out only at the end of every six week cycle where they combination of saw dust, used as bedding, and manure will be used by local farmers as fertilizer. The environment within the chicken house will be completely controlled powered by a generator or boilers, the ventilation will be natural with the drawing or closing of side curtain of the chicken houses to control airflow.

The proposed development will therefore not utilise intensive technologies, which would results in high energy demand. There will be an attempt to make use of very little energy and also making use of resource saving techniques, no other major technological structures have been proposed. Therefore, the proposed **Lungile Poultry Farm** project alternatives are the only viable alternatives to take forward to the Impact Assessment phase.

## 4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

| | **Size of the activity:** |
|---|---|
| Proposed activity (T**otal environmental (landscaping, parking, etc.) and the building footprint)** | 19.5 ha |
| **Alternatives:** | |
| Alternative 1 (if any) | |
| Alternative 2 (if any) | |
| | Ha/ $m^2$ |

or, for linear activities:

| | **Length of the activity:** |
|---|---|
| Proposed activity | N/A |
| **Alternatives:** | |
| Alternative 1 (if any) | N/A |
| Alternative 2 (if any) | N/A |
| | m/km |

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

| | **Size of the site/servitude:** |
|---|---|
| Proposed activity | N/A |
| Alternatives: | |
| Alternative 1 (if any) | |
| Alternative 2 (if any) | |
| | Ha/$m^2$ |

## 5. SITE ACCESS

**Proposal**

| | |
|---|---|
| Does ready access to the site exist, or is access directly from an existing road? | YES |
| If NO, what is the distance over which a new access road will be built | N/A |

Describe the type of access road planned:

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

**Alternative 1**

| | |
|---|---|
| Does ready access to the site exist, or is access directly from an existing road? | YES |
| If NO, what is the distance over which a new access road will be built | N/A |

Describe the type of access road planned:

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

**Alternative 2**

| | |
|---|---|
| Does ready access to the site exist, or is access directly from an existing road? | YES |

If NO, what is the distance over which a new access road will be built | N/A

Describe the type of access road planned:

[redacted]

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

## 6. LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
  - A4 size for activities with development footprint of 10sqm to 5 hectares;
  - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
  - A2 size for activities with development footprint of >20 hectares to 50 hectares);
  - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
  - A0 = 1: 500
  - A1 = 1: 1000
  - A2 = 1: 2000
  - A3 = 1: 4000
  - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
  - Rivers and wetlands;
  - the 1:100 and 1:50 year flood line;
  - ridges;
  - cultural and historical features;
  - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

***Note from CSIR:*** **A Locality map depicting the current and proposed piggery facility on the farm has been included as Appendix A. Photographs indicating sensitive features on site can also be found in this Appendix and in the Ecological Specialist Report (EcoAgent CC, 2018) attached as Appendix G.**

**FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)**

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

## 7. SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

***Note from CSIR:*** **Site photographs in the eight major compass directions have been included as Appendix B. Photographs indicating sensitive features on site can also be found in the Ecological Specialist Report (EcoAgent CC, 2018) attached as Appendix G.**

## 8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

***Note from CSIR:*** **An illustration of the structures for the proposed activities on site can be found in the "Project Site Sensitivity Map" in Appendix A. (This new preferred site layout is due to the sensitivities identified on the site, the layout initially proposed by the applicant can be found in a rough sketch in Appendix C).**

# SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

## 1. PROPERTY DESCRIPTION

| | |
|---|---|
| **Property description:** (Including Physical Address and Farm name, portion etc.) | Portion 4 of the farm Waterval 34 JS, Waterval, Mpumalanga. |

## 2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

| Alternative: | Latitude (S): | Longitude (E): |
|---|---|---|
| | **25.18564657595425** | **28.98615639656782** |

In the case of linear activities:

| Alternative: | Latitude (S): | Longitude (E): |
|---|---|---|
| • Starting point of the activity | | |
| • Middle point of the activity | | |
| • End point of the activity | | |

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix

Addendum of route alternatives attached **N/A**

The 21 digit Surveyor General code of each cadastral land parcel

| PROPOSAL | T | 0 | J | S | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alt. 1 | | | | | | | | | | | | | | | | | | | | | |
| Alt. 2 | | | | | | | | | | | | | | | | | | | | | |
| etc. | | | | | | | | | | | | | | | | | | | | | |

## 3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

| | | |
|---|---|---|
| | 1:50 – 1:20 | |

## 4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

| | | | |
|---|---|---|---|
| | Plain | Undulating plain/low hills | |

## 5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

| | |
|---|---|
| Shallow water table (less than 1.5m deep) | NO |
| Dolomite, sinkhole or doline areas | NO |
| Seasonally wet soils (often close to water bodies) | NO |
| Unstable rocky slopes or steep slopes with loose soil | NO |
| Dispersive soils (soils that dissolve in water) | NO |
| Soils with high clay content (clay fraction more than 40%) | NO |
| Any other unstable soil or geological feature | NO |
| An area sensitive to erosion | NO |

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s) NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

**Latitude (S):** **Longitude (E):**

c) are any caves located within a 300m radius of the site(s) NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

**Latitude (S):** **Longitude (E):**

d) are any sinkholes located within a 300m radius of the site(s) NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

**Latitude (S):** **Longitude (E):**

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

## 6. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

***NOTE FROM CSIR:*** **All Conservation Important species on Site have been included in the Ecological Specialist Report (Limosella Consulting, 2018) attached as Appendix G.**

Indicate the types of groundcover present on the site and include the estimated percentage found on site

| | |
|---|---|
| Natural veld - good condition<br>% = 80 | |

[redacted]

Are there any rare or endangered flora or fauna species (including red list species) present on the site

YES [redacted]

If YES, specify and explain:

Flora: The site does not contain any Red List plant species, but there are two nationally and two provincially protected plant species. These are namely, *Sclerocarya birrea, Vachellia erioloba,* and *Spirostochys Africana, Aloe grecitheadii* respectively.

Fauna:
No Red Data or sensitive fauna species are deemed to be present on the site. However, there are five bird species that are among those listed as species of conservation concern and a number of these are also of national and international concern that may occur on site (Taylor *et al.* 2015). These are the Cape Vulture, Lesser Kestrel Secretarybird, White-bellied Korhaan and Blue Krane. Several of these are expected to only visit the site occasionally (Cape Vulture, Lesser Kestrel and Secretarybird), since there exists no obvious roost or breeding habitats for these species on site. All are species that have either large home ranges or wander widely in search of food (Limosella Consulting, 2018).

The woodland does not really offer suitable breeding habitat for White-bellied Korhaan or Blue Cranes.

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.

[redacted] NO

If YES, specify and explain:

[redacted]

Are there any special or sensitive habitats or other natural features present on the site?

[redacted] NO

If YES, specify and explain:

[redacted]

YES [redacted]

Was a specialist consulted to assist with completing this section

If yes complete specialist details

| | |
|---|---|
| Name of the specialist: | EcoAgent<br><br>*Contributors and Authors:*<br>1) G.J Bredenkamp. 2) I.L. Rautenbach and 3) A. Bootsma. |
| Qualification(s) of the specialist: | 1) B.Sc. University of Pretoria, Botany and Zoology as majors; B.Sc. Hons. (cum laude) University of Pretoria, Botany; T.H.E.D. (cum laude) Pretoria Teachers Training College; M.Sc. University of Pretoria, Plant Ecology; D.Sc. (Ph.D.) University of Pretoria, Plant Ecology.<br>2) B.Sc. University of Pretoria; T.H.E.D Pretoria Teachers Training College, M.Sc. University of Pretoria; Ph.D. University of Natal.<br>3) MSc Ecology, University of South Africa; B. Sc (Hons) Botany, University of Pretoria; B. Sc (Botany & Zoology), University of South Africa. |

| | | | |
|---|---|---|---|
| Postal address: | PO Box 24355<br>Monument Park | | |
| Postal code: | 0181 | | |
| Telephone: | (012 460 2525 | Cell: | 082 576 7046 |
| E-mail: | antoinette@limosella.co.za | Fax: | 012 460 2525 |
| Are any further specialist studies recommended by the specialist? | | YES | NO |
| If YES, specify: | | | |
| If YES, is such a report(s) attached? | | YES | NO |
| If YES list the specialist reports attached below | | | |

***Note from CSIR:*** **Please see the Specialist Declaration as per Appendix 6 of the NEMA EIA Regulations 2014) on Page iv of the Ecological Specialist Report, attached as Appendix G.**

## 8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

| | | |
|---|---|---|
| 1. Vacant land | | |
| | 7. Agriculture | 8. Low density residential |

**NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks**

**NORTH**

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 8 | 8 |
| 1 | 1 | 1 | 1 | 8 |
| 1 | 1 | | 1 | 8 |
| 1 | 1 | 1 | 1 | 8 |
| 1 | 1 | 1 | 1 | 7,8 |

**WEST** **EAST**

**SOUTH**

**Note:** More than one (1) Land-use may be indicated in a block.

**Please note:** The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively.

Have specialist reports been attached YES NO
If yes indicate the type of reports below

A biodiversity and wetland assessment of the proposed Lungile Poultry Farm situated on the Farm Waterval 34 JS, Mpumalanga.
EcoAgent CC, Commissioned by Limosella Consulting, 2018.
Appendix G

## 9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

## 9.1 Project Demographic Baseline

To fully understand the value of a proposed project, there must be at the least some extensive consideration of the anticipated social as well as environmental impacts which might occur. The said impacts are very often broad, not concentrated or limited to the site of the proposed project. Both social and environmental impacts of the project may filter its way out into the neighboring communities and towns. Therefore, a proper project demographic baseline should incorporate at least the municipal, nearby towns and neighbors of the proposed project. This baseline study will include a brief overview of the socio-economic conditions of the DR JS Moroka Local Municipality, Mpumalanga.Dr JS Moroka Local Municipality is located in the Nkalanga District Municipality in the province of Mpumalanga, as one of six municipalities in the Nkalanga Disrict. The local municipality shares boundaries with Gauteng and Limpopo. The municipality has 61 villages, 31 wards with the total population of 249 705 (StatsSA 2011), 62 162 households (figure 4), 99.4% of whom are black African (Table 3).

Dr JS Moroka Local Municipality has about 4 unique economic features that include the Mkhombo & Mdala Nature Reserves, Ndebele Arts, beadwork & crafts, tourism and agriculture that are major potential economic drivers in the area.

The Dr JS Moroka LM ad a slight increase in the total population from 243 310 in 2001 to 249 7095 in 2011 (StatsSA 2011), which was a 2.5% increase. The population of the LM accounts for 19.1% of the total population of Nkalanga District Municipality (StatsSA 2011).

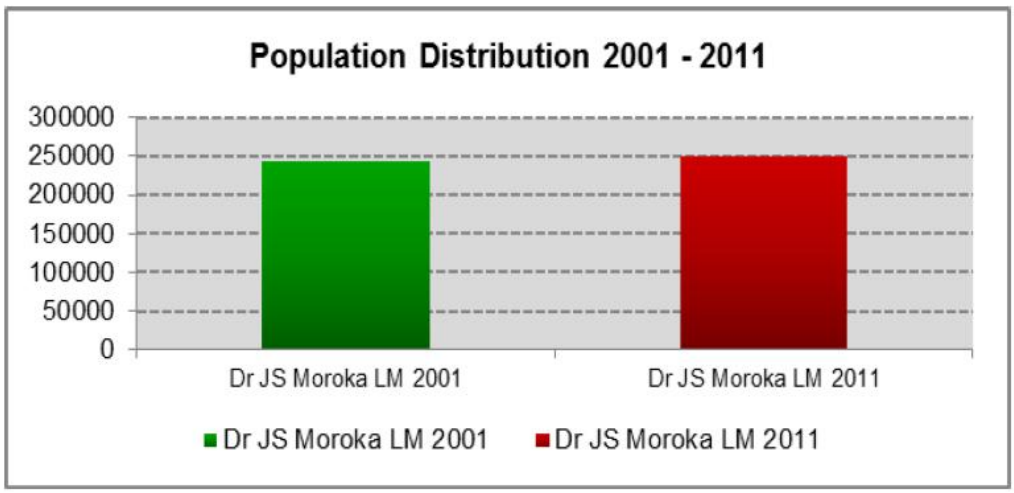


**Figure 4: Population Distributionof DR JS Moroka, Mpumalanga (StasSA 2011)**

**Table 2: Racial demographic composition Dr JS Moroka, Mpumalanga (StasSA 2011)**

| Racial make up | |
|---|---|
| Group | Percentage |
| Black African | 99.4% |
| Coloured | 0.2% |
| Indian/ Asian | 0.1% |
| White | 0.1% |
| Other | 0.2% |

**Figure 5**

**Table 3: Gender Demographic Composition Dr JS Moroka (StasSA)**

| Gender Classification | |
|---|---|
| **Group** | **Percentage** |
| Male | 50,2% |
| Female | 49,8 % |

In general, the level of education in the region is low which makes access to employment and economic growth a challenge. According to StatsSA Dr JS Moroka experiences an increase in the highest level of education from 2001 to 2011 in Secondary (30.7% to 41.4%) and Higher (2.8% to 4.1%), but Primary Education declined from 2.8% to 4.1%.

## 9.2 Baseline economic information

The total number of households earning no income has decreased from 80.4% in 2001 to 47.3% in 2011. The overall monthly income levels are still very low and well below the minimum living level (MLL) estimated at R4000 to R4500 per month (National Treasury 2014). 97.4% of households within Dr JS Moroka earned a monthly income well below the MLL. According to the IDP, this indicated a high dependency level of households on government grants and services. The highest number of people living on monthly income of R1-R400 is 64515 (see figure 5 below).

The employment levels increased with 14.1% from 39.3% in 2001to 53.4% in 2011 (StatsSA 2011). The increase in employment is positive, although unemployment is still very high (46.6%).

| Income | Person |
|---|---|
| R 1 - R 400 | 64 515 |
| R 401 - R 800 | 6837 |
| R 801 - R 1 600 | 35 931 |
| R 1 601 - R 3 200 | 8547 |
| R 3 201 - R 6 400 | 5523 |
| R 6 401 - R 12 800 | 3966 |
| R 12 801 - R 25 600 | 1890 |
| R 25 601 - R 51 200 | 258 |
| R 51 201 - R 102 400 | 42 |
| R 102 401 - R 204 800 | 42 |
| R 204 801 or more | 45 |
| Unspecified | 7311 |

**Figure 5: Monthly Individual Income in Dr JS Moroka (StatsSA 2011)**

# 10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
(b) the construction of a bridge or similar structure exceeding 50m in length;
(c) any development or other activity which will change the character of a site
    (i) exceeding 5 000 m2 in extent; or
    (ii) involving three or more existing erven or subdivisions thereof; or
    (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(d) the re zoning of a site exceeding 10 000 m2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

| | | |
|---|---|---|
| Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site? | YES | NO |

If YES, explain:

N/A

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

No archaeological remains were seen in the study area but a residential structure that may be older than 60 years of age was present. The house is in very poor condition and is of low heritage significance. Direct impacts to this structure would be of low significance.

Because no significant heritage impacts are expected, it is recommended that the proposed broiler chicken facility should be authorised. The larger house on the site should be retained and reused if possible, although this should not be a condition of authorisation. The following condition should be incorporated into the Environmental Authorisation:

- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

| | | |
|---|---|---|
| Will any building or structure older than 60 years be affected in any way? | | NO |
| Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)? | YES | NO |

If yes, please attached the comments from SAHRA in the appropriate Appendix

***Note from CSIR:*** **A heritage screening was submitted to South African Heritage Resources Agency (SAHRA) via the SAHRIS portal (Case ID 12190) the project was required to perform a**

**Heritage Impact Assessment (HIA) to explore the archaeological and paleontological, for which they are the competent authority. A letter from SAHRA in response to the BID is included in Appendix F, in which a consideration of heritage resources was requested by PHRAG. A heritage specialist, CTS Heritage, was appointed to comment on the sensitivity of heritage resources on site. The report from CTS Heritage has been included in Appendix G.**

# SECTION C: PUBLIC PARTICIPATION (SECTION 41)

## 1. THE ENVIRONMENTAL ASSESSMENT PRACTITIONER MUST CONDUCT PUBLIC PARTICIPATION PROCESS IN ACCORDANCE WITH THE REQUIREMENT OF THE EIA REGULATIONS, 2014.

## 2. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

| | | |
|---|---|---|
| Was the draft report submitted to the local authority for comment? | YES | [redacted] |
| If yes, has any comments been received from the local authority? | [redacted] | NO |

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

This Draft report is hereby released for a 30-day commenting period. The report has been mailed to the Local Municipality for comments. The comments will be incorporated into the final BA Report which will be submitted to DARDLEA for decision-making.

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

The Draft BAR is only released now and will be submitted to the local authority for comment.

## 3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

| | | |
|---|---|---|
| Has any comment been received from stakeholders? | [redacted] | NO |

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

[redacted]

If "NO" briefly explain why no comments have been received

The Draft Basic Assessment Report is released in conjunction with the first round of Public Participation. Stakeholders and Interested & Affected Parties will be notified of the release of the report as well as the Basic Assessment process, and will be given the opportunity to comment on the Draft BAR. Comments received from the Draft BAR will be addressed and incorporated into the final BAR for Lungile.

## 4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

## 5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below.

Appendix 1 – Proof of site notice

Appendix 2 – Written notices issued as required in terms of the regulations

Appendix 3 – Proof of newspaper advertisements

Appendix 4 –Communications to and from interested and affected parties

Appendix 5 – Minutes of any public and/or stakeholder meetings

Appendix 6 - Comments and Responses Report

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report

Appendix 8 –Comments from I&APs on amendments to the BA Report

Appendix 9 – Copy of the register of I&APs

# SECTION D: RESOURCE USE AND PROCESS DETAILS

## 1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

**Solid waste management**

| Will the activity produce solid construction waste during the construction/initiation phase? | YES | NO |
|---|---|---|
| If yes, what estimated quantity will be produced per month? | Estimated 25m$^3$ | |

How will the construction solid waste be disposed of (describe)?

Anticipated construction solid waste to be produced includes building rubble, packaging material, overburden material and general litter from construction staff. It is recommended that construction waste/rubble will be collected and stored temporarily in designated containers for the different waste types, and thereafter disposed of at the nearest appropriate licensed waste disposal site.

Where will the construction solid waste be disposed of (describe)?

Waste will be disposed of at an appropriate licensed landfill site, possibly at the nearest landfill site to dispose of building rubble.

| Will the activity produce solid waste during its operational phase? | YES | NO |
|---|---|---|
| If yes, what estimated quantity will be produced per month? | Chicken Waste 75m$^3$<br><br>Other Waste- 2m$^3$ | |

How will the solid waste be disposed of (describe)?

Solid waste generated during the operational phase, normal waste, constituting household rubbish and consumables, will be stored in suitable bins and transported to the nearest licenced disposal site. Medical waste such as needles will be disposed of through existing medical waste streams in the area. Chicken waste will be produced collectively when cleaning the facilities during each cycle which can be 3 to 6 months. This waste will be removed from the broiler facility and used as fertilizer in future when a crop garden is formed on the plot, but for now will be distributed as fertilizer to local farmers, at a later stage of the project it may be distributed to cattle farmers as feed.

| Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity? | | NO |
|---|---|---|

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

All waste generated, except for chicken manure, cults and mortalities, will always be disposed of at a nearby registered disposal site.

**Note:** If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

| | | |
|---|---|---|
| Can any part of the solid waste be classified as hazardous in terms of the relevant legislation? | YES | NO |

If yes, inform the competent authority and request a change to an application for scoping and EIA.

| | | |
|---|---|---|
| Is the activity that is being applied for a solid waste handling or treatment facility? | YES | NO |

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

The majority of waste generated during the operational phase will be from chicken manure, cults and mortalities, as well as chicken bedding. Thus, it will be dried and processes to be used as fertilizer on the crop farming to be introduced on the farm at a later stage. In the meantime, the manure, cults and mortality waste will be dried in the attempt to be distributed as feed and fertilizer to local agricultural farms.

**Liquid effluent (other than domestic sewage)**

| | | |
|---|---|---|
| Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? | YES | NO |
| If yes, what estimated quantity will be produced per month? | $m^3$ | |
| If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)? | YES | NO |

| | | |
|---|---|---|
| Will the activity produce any effluent that will be treated and/or disposed of on site? | Yes | NO |
| If yes, what estimated quantity will be produced per month? | $75m^3$ | |

If yes describe the nature of the effluent and how it will be disposed.

In the process of cleaning the chicken layer houses with a low toxicity biodegradable liquid will be used, this will result is a slurry mix of the liquid with parts of chicken manure and mortalities. This liquid will have little impact on the environment. The manure, cults and mortality waste will be dried in the attempt to be distributed as feed and fertilizer to local agricultural farms.

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

| | | |
|---|---|---|
| Will the activity produce effluent that will be treated and/or disposed of at another facility? | YES | NO |

If yes, provide the particulars of the facility:

| | | | |
|---|---|---|---|
| *Facility name:* | N/A | | |
| *Contact person:* | | | |
| *Postal address:* | | | |
| *Postal code:* | | | |
| *Telephone:* | | *Cell:* | |
| *E-mail:* | | *Fax:* | |

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

**Liquid effluent (domestic sewage)**

| | | |
|---|---|---|
| Will the activity produce domestic effluent that will be disposed of in a municipal sewage system? | | NO |

| | | |
|---|---|---|
| If yes, what estimated quantity will be produced per month? | $m^3$ | |
| If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)? | YES | NO |

| | | |
|---|---|---|
| Will the activity produce any effluent that will be treated and/or disposed of on site? | YES | NO |

If yes describe how it will be treated and disposed off.

N/A

**Emissions into the atmosphere**

| | | |
|---|---|---|
| Will the activity release emissions into the atmosphere? | YES | NO |
| If yes, is it controlled by any legislation of any sphere of government? | YES | NO |

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If no, describe the emissions in terms of type and concentration:

The emissions released from the proposed chicken layer facility will be in the form of construction emissions, dust from trucks on gravel roads. This dust will however be minimal due to the length of the project as well as little traffic being generated. Further, due to the clearing/levelling of land for construction there will also be temporary dust caused.

Operational emissions will be in the form of odour from the chicken waste, these are a result of the anaerobic metabolic process occurring. Further, odour from a chicken layer facility is not regarded as forming part of air quality emissions, it does though, mean that the proposal must consider the smell as a nuisance which might possibly impact on the quality of life.

## 2. WATER USE

Indicate the source(s) of water that will be used for the activity

| | | | |
|---|---|---|---|
| municipal | | groundwater | |

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate
the volume that will be extracted per month: Estimated 750 kilolitres

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix

| Does the activity require a water use permit from the Department of Water Affairs? | YES | NO |
|---|---|---|

If yes, list the permits required

The feasibility of the borehole is in the process of being examined for the proposed project.
For this the project will require a Water Use license under the National Water Act (Act 36 of 1998 – NWA) where activities have been triggered:

Section 21

Taking water from a water source (The use of a borehole)
Storage of water (Reservoir storage of the borehole water)
(g) Disposing of waste in a manner which may be detrimental in the impact of water resource (Use of septic tanks)

| | | |
|---|---|---|
| If yes, have you applied for the water use permit(s)? | YES | NO |
| If yes, have you received approval(s)? (attached in appropriate appendix) | YES | NO |

## 3. POWER SUPPLY

Please indicate the source of power supply eg. Municipality / Eskom / Renewable energy source

Eskom/ Dr JS Moroka Local Municipality

If power supply is not available, where will power be sourced from?

N/A

## 4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Should the projects application for funding be approved, there would be a consideration of the extensive use of solar power for electrifying the broiler facility. This electricity would be used for lighting and the powering of water pumps.
This would aid self-efficiency in allowing the farm to carry on with operations even during load shedding from Eskom

Describe how alternative energy sources have been taken into account or been built into the design of the activity, *if any*:

# SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4)(b)(i).

## 1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

The Comments and Responses Report (CRR) following the release of the Draft Basic Assessment Report will form part of this Final BAR and can be found in Appendix E.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)
(A full response must be provided in the Comments and Response Report that must be attached to this report):

N/A

## 2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts

### APPROACH TO THE BASIC ASSESSMENT

**1) METHODOLOGY OF IMPACT ASSESSMENT**

According to the DEA IEM Series guideline on "Impact Significance" (2002), there are a number of quantitative and qualitative methods that can be used to identify the significance of impacts resulting from a development. The process of determining impact significance should ideally involve a process of determining the acceptability of a predicted impact to society. Making this process explicit and open to public comment and input would be an improvement of the EIA/BA process. The CSIR's approach to determining significance is generally as follows:

- Use of expert opinion by the specialists ("professional judgement"), based on their experience, a site visit and analysis, and use of existing guidelines and strategic planning documents and conservation mapping (e.g. SANBI biodiversity databases);
- Review of specialist assessment by all stakeholders including authorities such as nature conservation officials, as part of the report review process (i.e. if a nature conservation official disagreed with the significance rating, then we could negotiate the rating); and
- Our approach is more a qualitative approach - we do not have a formal matrix calculation of significance as is sometimes done.

**2) SPECIALIST CRITERIA FOR IMPACT ASSESSMENT**

The following methodology has been provided by the CSIR to the specialist who conducted the Ecological assessment, NSS, for incorporation into their specialist assessment:

**Assessment of Potential Impacts**

The assessment of impact significance is based on the following conventions:

**Nature of Impact** - this reviews the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"

**Spatial Extent** - this should indicate whether the impact will be:

- Site specific;
- Local (<2 km from site);
- Regional (within 30 km of site); or
- National.

**Duration** - The timeframe during which (lifetime of) the impact will be experienced:

- Temporary (less than 1 year);
- Short term (1 to 6 years);
- Medium term (6 to 15 years);
- Long term (the impact will cease after the operational life of the activity); or
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

**Intensity** - it should be established whether the impact is destructive or innocuous and should be described as either:

- High (severe alteration of natural systems, patterns or processes such that they temporarily or permanently cease);
- Medium (notable alteration of natural systems, patterns or processes; where the environment continues to function but in a modified manner); or
- Low (negligible or no alteration of natural systems, patterns or processes); can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making.

**Probability** - this considers the likelihood of the impact occurring and should be described as:

- Improbable (little or no chance of occurring);
- Probable (<50% chance of occurring);
- Highly probable (50 – 90% chance of occurring); or
- Definite (>90% chance of occurring).

**Reversibility** - this considers the degree to which the adverse environmental impacts are reversible or irreversible. For example, an impact will be described as low should the impact have little chance of being rectified to correct environmental impacts. On the other hand, an impact such as the nuisance factor caused by noise impacts from wind turbines can be considered to be highly reversible at the end of the project lifespan. The assessment of the reversibility of potential impacts is based on the following terms:

- High - impacts on the environment at the end of the operational life cycle are highly reversible;
- Moderate - impacts on the environment at the end of the operational life cycle are reasonably reversible;
- Low - impacts on the environment at the end of the operational life cycle are slightly reversible; or
- Non-reversible - impacts on the environment at the end of the operational life cycle are not reversible and are consequently permanent.

**Irreplaceability** - this reviews the extent to which an environmental resource is replaceable or irreplaceable. For example, if the proposed project will be undertaken on land that is already transformed and degraded, this will yield a low irreplaceability score; however, should a proposed development destroy unique wetland systems for example, these may be considered irreplaceable and thus be described as high. The assessment of the degree to which the impact causes irreplaceable loss of resources is based on the following terms:

- High irreplaceability of resources (this is the least favourable assessment for the environment);
- Moderate irreplaceability of resources;
- Low irreplaceability of resources; or
- Resources are replaceable (this is the most favourable assessment for the environment).

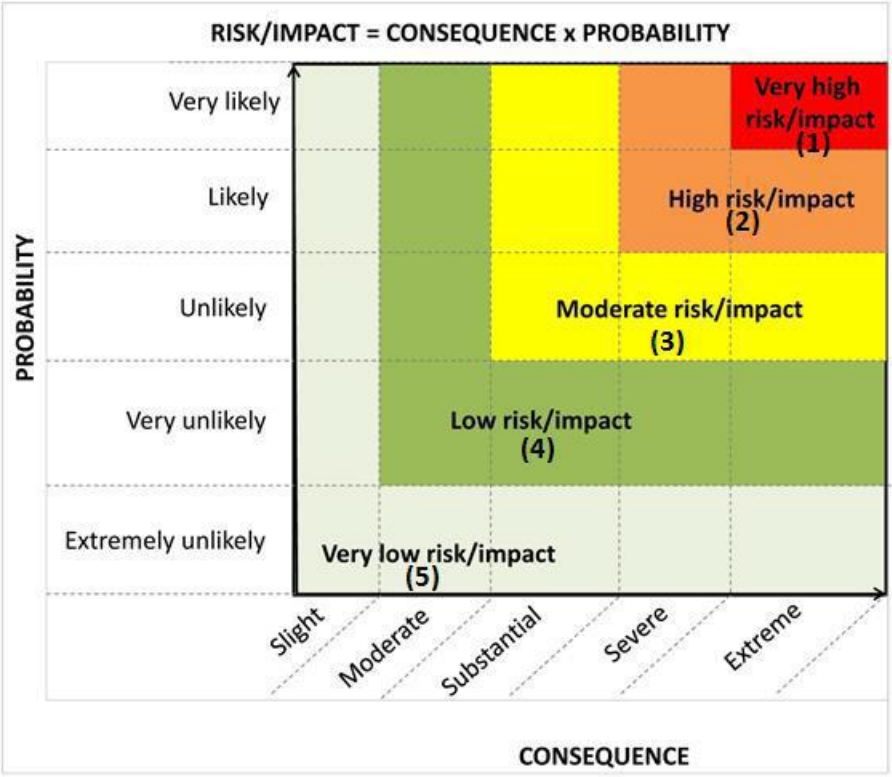


**Figure 6: Guide to assessing risk/impact significance as a result of consequence and probability.**

The status of the impacts and degree of confidence with respect to the assessment of the significance is stated as follows:

**Status of the impact:** A description as to whether the impact will be:

- Positive (environment overall benefits from impact);
- Negative (environment overall adversely affected); or
- Neutral (environment overall not affected).

**Degree of confidence in predictions**: The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as:

- High;
- Medium; or
- Low.

Based on the above considerations, the specialist provides an overall evaluation of the significance of the potential impact, which should be described as follows:

- **Low to very low:** the impact may result in minor alterations of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated;
- **Medium:** the impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated; or
- **High:** Where it could have a "no-go" implication for the project unless mitigation or re-design is practically achievable.

Furthermore, the following must be considered:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the construction, operation and decommissioning phases of the

project, where relevant.

- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region, if relevant.

**Management Actions:**

- Where negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated.
- Where positive impacts are identified, augmentation measures will be identified to potentially enhance these.
- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

**Monitoring**:

Specialists should recommend monitoring requirements to assess the effectiveness of mitigation actions, indicating what actions are required, by whom, and the timing and frequency thereof.

**Cumulative Impact:**

Consideration is given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts are evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

**Mitigation:**

The objective of mitigation is to firstly avoid and minimise impacts where possible and where these cannot be completely avoided, to compensate for the negative impacts of the development on the receiving environment and to maximise re-vegetation and rehabilitation of disturbed areas. For each impact identified, appropriate mitigation measures to reduce or otherwise avoid the potentially negative impacts are suggested. All impacts are assessed without mitigation and with the mitigation measures as suggested.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

***Note from the CSIR:*** **Feasible alternatives (i.e. location, activity and property alternatives) do not exist for the proposed project as this is the only land parcel that the owners were able to acquire, and it would not be economically feasible for the business to find and or purchase new property. Environmental impacts would be significantly higher if a new facility on different land were to be established compared to expanding an existing farming activities. The No-Go alternative will be considered.**

| PROPOSAL | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Potential Ecological Impacts During Construction Phase** | | | | | | | | | | | | |
| **Potential Impact:** | **Extent:** | **Duration:** | **Consequence:** | **Probability:** | **Reversibility:** | **Irreplaceability:** | **Significance Rating Positive/ Negative:** | **Degree of confidence:** | **Can Impact be avoided?** | **Can impact be managed or mitigated?** | **Proposed Mitigation** | **Significance Rating after Mitigation** |
| Loss of indigenous vegetation due to the clearing for construction of the chicken layer facility and for the crop production | Site Specific | 2-5 Years | Medium | Highly Probable | Low | Moderate | Moderate<br><br>Negative | High | No | Yes | ▪ The clearing of vegetation must be kept to a minimum and remain within the stands earmarked for development – leave some open space area with natural vegetation intact;<br>▪ Protected trees that may occur within the development site must be avoided – if this is not possible in limited cases, a permit to remove the particular individual tree is needed from the provincial forestry department;<br>▪ Construction must be completed as quickly as possible;<br>▪ Disturbed open areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous tree and grass species;<br>▪ During the construction phase workers must be limited to areas under construction and access to the planned open areas must be strictly controlled;<br>▪ Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.<br>▪ Plant indigenous trees – no alien species. | Moderate |
| Introduction and proliferation of alien species from clearing of areas from construction activities. | Site | Medium Term | Medium | Definite | Moderate | Moderate | Low<br><br>Negative | High | No | Yes | ▪ An alien invasive management programme must be incorporated into the Environmental Management Programme;<br>▪ Ongoing alien plant control must be undertaken;<br>▪ Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.<br>▪ Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.<br>▪ Avoid planting of exotic plant species, use indigenous species. | Low |
| Loss of mammal and herpatofauna habitat from construction activities | Site | Short Term | Low | Definite | Low | High | Low<br>Negative | High | No | Yes | ▪ The clearing of vegetation must be kept to a minimum and remain within the footprint of the development;<br>▪ The construction must be completed as quickly as possible - fauna species may be killed<br>▪ Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species;<br>▪ During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled;<br>▪ Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. | Low |
| Loss of avian habitat from construction activities | Site | Short Term | Very Low | Definite | High | Low | Very Low<br>Negative | High | No | Yes | ▪ The spatial extent of construction activities must be minimized, and as far as possible must be restricted to the areas on which buildings, roads etc will actually be located. Particular care must be taken to minimize activities in the areas of natural vegetation that will remain on the site.. | Very Low |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | ▪ The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br>▪ Disturbance by residents of birds breeding and foraging in the area should be minimized.<br>▪ Provide adequate briefing for site personnel and residents.<br>▪ Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). | |
| Increased dust and erosion from clearing of vegetation, earth-moving activities, and increased vehicle traffic. | Local | Medium Term | High | Highly Probable | Moderate | Moderate | Moderate<br><br>Negative | High | No | Yes | ▪ Limit vehicles, people and materials to the construction site.<br>▪ Commence (and preferably complete) construction during winter, when the risk of erosion should be least.<br>▪ Revegetate denude areas with locally indigenous flora a.s.a.p.<br>▪ Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.<br>▪ Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting. | Very Low |
| Sensory disturbance of fauna Associated with construction activities and with increased human presence in the area. | Local | Short Term | High | Definite | Low | High | High<br><br>Negative | High | No | Yes | ▪ Movement of construction vehicles and workers beyond the boundary of the site must be minimized. In addition, workers must be instructed to minimize disturbance of birds at all times, and steps must be taken to ensure that no illegal hunting occurs.<br>▪ The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br>▪ Disturbance by residents of birds breeding and foraging in the area should be minimized.<br>▪ Provide adequate briefing for site personnel and residents.<br>▪ Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO) and residents should always be aware of the importance of birds in their built environment. | Moderate |
| Pollution associated with construction activities and residents (e.g., fuel spills, use of cleaning chemicals, management of waste products) | Site | Short Term | Low | Improbable | High | Low | Very Low Negative | High | No | Yes | ▪ Great care must be taken that no pollutants or other waste pollute the area or enter local water systems during the construction or operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences.<br>▪ Construction workers must be suitably trained to deal with any such spills.<br>▪ Facilities to handle pollution and waste must be provided to residents. | Very Low |
| Electrocution and collision hazards of avian fauna | Site | Short Term | Low | Very Improbable | High | Low | Very Low Negative | High | No | Yes | ▪ Normal safety measures for electrical installations as used by Eskom | Very Low |
| **Potential Heritage Impacts During Construction Phase** | | | | | | | | | | | | |
| **Potential Impact:** | **Extent:** | **Duration:** | **Consequence:** | **Probability:** | **Reversibility:** | **Irreplaceability:** | **Significance Rating Positive/ Negative:** | **Degree of confidence:** | **Can Impact be avoided?** | **Can impact be managed or mitigated?** | **Proposed Mitigation** | **Significance Rating after Mitigation** |
| Destruction of archaeological artefacts | Site | Permanent | Low | Improbable | Non-Reversable | High | Very Low<br><br>Negative | High | No | No | None | Very Low |

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| **Indirect Impacts** | | | | | | | | | | | | |
| The creation of employment and skills development in the area, resulting in social upligtment in the area | Municipal District | Short Term | Moderate-High | Highly Probable | High | High | High<br><br>Positive | Medium | No | Yes | Ensure the employment of local people and develop skills of people within the local area. Pass on the knowledge to the local community. | High |
| **No-Go Alternative** | | | | | | | | | | | | |
| **Direct Impacts:**<br><br>• **All identified impacts will not occur (no clearance of natural vegetation).**<br>• **All structures on the site will remain.** | | | | | | | | | | | | |
| **Indirect Impacts**<br><br>• **No new construction employment will be created.**<br>• **No new jobs in the construction jobs will occur.** | | | | | | | | | | | | |
| **Operational Phase** | | | | | | | | | | | | |
| **Potential Impacts:** | **Extent:** | **Duration:** | **Consequence:** | **Probability:** | **Reversibility:** | **Irreplaceability:** | **Significance Rating Positive/ Negative:** | **Degree of confidence:** | **Can Impact be avoided?** | **Can impact be managed or mitigated?** | **Proposed Mitigation** | **Significance Rating after Mitigation** |
| Loss of indigenous vegetation due to the clearing for the chicken layer facility and for the crop production | Site Specific | Permanent | High | Highly Probable | Low | Moderate | High<br><br>Negative | High | No | Yes | ▪ The clearing of vegetation must be kept to a minimum and remain within the stands earmarked for development – leave some open space area with natural vegetation intact;<br>▪ Protected trees that may occur within the development site must be avoided – if this is not possible in limited cases, a permit to remove the particular individual tree is needed from the provincial forestry department;<br>▪ Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.<br>▪ Plant indigenous trees – no alien species. | Moderate |
| Introduction and proliferation of alien species from clearing of areas from construction activities. | Site | Permanent | Medium | Improbable | Moderate | Moderate | Very Low<br><br>Negative | High | No | Yes | ▪ An alien invasive management programme must be incorporated into the Environmental Management Programme;<br>▪ Ongoing alien plant control must be undertaken;<br>▪ Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.<br>▪ Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.<br>▪ Avoid planting of exotic plant species, use indigenous species. | Very Low |
| Loss of mammal and herpatofauna habitat from operational | Site | Permanent | Low | Definite | Low | High | Moderate Negative | High | No | Yes | ▪ The clearing of vegetation must be kept to a minimum and remain within the footprint of the development;<br>▪ The construction must be completed as quickly as possible - fauna species may be killed | Low |

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| activities | | | | | | | | | | | ▪ Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species;<br>▪ Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. | |
| Loss of avian habitat | Site | Short Term | Very Low | Improbable | High | Low | Very Low Negative | High | No | Yes | ▪ The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br>▪ Disturbance by residents of birds breeding and foraging in the area should be minimized.<br>▪ Provide adequate briefing for site personnel and residents. | Very Low |
| Sensory disturbance of fauna Associated with operational activities and with increased human presence in the area | Local | Short Term | High | Definite | Low | High | High<br><br>Negative | High | No | Yes | ▪ The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br>▪ Disturbance by residents of birds breeding and foraging in the area should be minimized.<br>▪ Provide adequate briefing for site personnel and residents.<br>▪ Any bird nests that are found during the operational period must be reported to the Environmental Control Officer (ECO) and residents should always be aware of the importance of birds in their built environment. | Moderate |
| Pollution associated with operational activities and residents (e.g., fuel spills, use of cleaning chemicals, management of waste products) | Site | Medium Term | Low | Improbable | High | Low | Very Low Negative | High | No | Yes | ▪ Great care must be taken that no pollutants or other waste pollute the area or enter local water systems during the construction or operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences.<br>▪ Construction workers must be suitably trained to deal with any such spills.<br>▪ Facilities to handle pollution and waste must be provided to residents. | Very Low |
| Electrocution and collision hazards of avian fauna | Site | Medium Term | Low | Improbable | High | Low | Very Low Negative | High | No | Yes | ▪ Normal safety measures for electrical installations as used by Eskom | Very Low |
| Environmental contamination from chicken excrement, bedding, feed, carcasses and other operational waste | Local | Long Term | High | Highly Probable | Low | Moderate | Moderate<br><br>Negative | High | No | Yes | ▪ Ensure that the facility is designed in accordance with international best practice norms, and with advice from an appropriate specialist, to ensure that there is no environmental contamination from effluent, fodder, carcasses and other waste, and to ensure that there is also effective storm water management.<br>▪ Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medications.<br>▪ Adhere to best practice chicken husbandry and waste disposal norms.<br>▪ All hazardous waste should be disposed of at an appropriate licensed facility for this.<br>▪ Waste recycling should be incorporated into the facility's operations as far as possible.<br>▪ Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices.<br>▪ Establish appropriate emergency procedures for accidental contamination of the surroundings.<br>▪ Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental | Low |

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| | | | | | | | | | | | specialists.<br>▪ Educate workers about the facility's waste emergency procedures with training and notices. | |
| Poor / Inappropriate control of animal pests from poor waste management and hygiene, and insufficient, inappropriate and/or ineffectual pest control | Local | Long Term | Moderate | Highly Probable | Moderate | Moderate | Moderate<br><br>Negative | High | No | Yes | ▪ Ensure that floors are sloped and slatted to facilitate drainage.<br>▪ Ensure that there is effective storm water drainage around the facility.<br>▪ Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water.<br>▪ Effectively seal and maintain all pipes and reservoirs containing slurry, to prevent animals from accessing the effluent.<br>▪ Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible.<br>▪ Check that fan louvers (if installed) work properly, and close fans completely when off.<br>▪ Prevent and manage unwanted animal access to fodder.<br>▪ Clean floors regularly.<br>▪ Clean up excess fodder regularly from under troughs and feed bins.<br>▪ Keep areas surrounding the facility free of spilled manure and litter.<br>▪ Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.<br>▪ Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects.<br>▪ Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.<br>▪ Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination.<br>▪ Ensure that measures to control pests are tightly restricted to areas where these are problematic.<br>▪ Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist.<br>▪ Rodenticides are not advised. | Low |
| Disease transmission from poor waste management and hygiene, and insufficient, inappropriate and/or ineffectual pest control | Local | Long Term | High | Probable | Moderate | Moderate | Moderate<br><br>Negative | High | No | Yes | ▪ Ensure that floors are sloped and slatted to facilitate drainage.<br>▪ Ensure that there is effective storm water drainage around the facility.<br>▪ Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water.<br>▪ Effectively seal and maintain all pipes and reservoirs containing slurry, to prevent animals from accessing the effluent.<br>▪ Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible.<br>▪ Check that fan louvers (if installed) work properly, and close fans completely when off.<br>▪ Prevent and manage unwanted animal access to fodder.<br>▪ Clean floors regularly.<br>▪ Clean up excess fodder regularly from under troughs and feed bins.<br>▪ Keep areas surrounding the facility free of spilled manure and litter.<br>▪ Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.<br>▪ Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects.<br>▪ Electrocution devices are available to kill flies, while other | Low |

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| | | | | | | | | | | | mechanical devices include traps, sticky tapes or baited traps.<br>▪ Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination.<br>▪ Ensure that measures to control pests are tightly restricted to areas where these are problematic.<br>▪ Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist.<br>▪ Rodenticides are not advised. | |
| **Potential Heritage Impacts From Operational Phase** | | | | | | | | | | | | |
| **Potential Impacts:** | **Extent:** | **Duration:** | **Consequence:** | **Probability:** | **Reversibility:** | **Irreplaceability:** | **Significance Rating Positive/ Negative:** | **Degree of confidence:** | **Can Impact be avoided?** | **Can impact be managed or mitigated?** | **Proposed Mitigation** | **Significance Rating after Mitigation** |
| Impacts to heritage resources | Site | Permanent | Low | Definite | Non-Reversible | High | Very Low<br><br>Negative | High | No | No | None | Very Low |
| **Indirect Impacts** | | | | | | | | | | | | |
| Proposed development will contribute to local economy through employment and skills development | Local | Long Term | Moderate-High | Probable | High | High | High<br><br>Positive | Moderate | Yes | Yes | Increase the possibility of local economy improvement through employment and skills development. | High |
| The proposed project may contribute to the local poultry market by supplying increase products to local distributors | Municipal District | Long Term | Moderate-High | Probable | High | High | High<br><br>Positive | Moderate | Yes | Yes | Make provisions that local businesses are the target market of the projects output products. | High |

| **No-Go Alternatives** | |
|---|---|
| **Direct Impacts** | **Significance Rating** |
| **Potential Impact on Vegetation and faunal habitats:** | **None** |
| **Impact on soil erosion and dust:** | **None** |
| **Impact on water quality and downstream aquatic ecology:** | **Moderate (current inhabitants of the house will continue to use water)** |
| **Potential for groundwater impact:** | **None** |

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| **Air Quality impact:** | **None** |
| **Waste generation:** | **Low( The inhabitants will still produce a small amount of waste)** |
| **Indirect Impacts**<br><br>**- There won't be any contribution to the poultry industry output.**<br>**- There will be improving of food security in the district municipality**<br>**- There won't be any employment increase in employment opportunities in the area** | |

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

A Biodiversity and wetland assessment of the proposed Lungile Poultry Farm situated on the Farm Waterval 34 JS, Mpumalanga (Appendix G) (by Eco Agent CC commissioned by Limosella Consulting)

Heritage Impact Assessment In terms of Section 38(8) of the NHRA for a Proposed egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga (Appendix G) (by CTS Heritage)

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

Although the site was under agriculture in the past, it is important to note that the absence of species on site does not conclude that the species is not present at the site. Reasons for not finding certain species during the summer site visit may be due to:
-The short duration of fieldwork as well as the timing of the fieldwork (just after the rains). The 2017/2018 season has experienced below average rainfall and is considered to be in a drought period. This has influenced flowering and species abundance at other sites that Eco Agent has revisited.
-Some plant species, which are small, have short flowering times, rare or otherwise difficult to detect may not have been detected even though they were potentially present on site.
-Vegetation mapping was based on the brief in-field survey as well as aerial imagery. Positioning of the vegetation units may not be exact due to potential georeferencing errors displayed in Google Earth, GPS accuracy in field as well as the age of the aerial image.

## 3. IMPACTS THAT MAY RESULT FROM THE DECOMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

***Note from the CSIR:*** **Decommissioning and/or closure phase is not expected to occur for the proposed Chicken Broiler. Should there be plans to close down the production facility; a closure plan will be submitted to the competent authority for approval and it will comply to the relevant legislation at the time of closure.**

| Potential Impacts From Decommissioning | | | | | | | | | | | | |
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| **Potential Impacts:** | **Extent:** | **Duration:** | **Consequence:** | **Probability:** | **Reversibility:** | **Irreplaceability:** | **Significance Rating Positive/ Negative:** | **Degree of confidence:** | **Can Impact be avoided?** | **Can impact be managed or mitigated?** | **Proposed Mitigation** | **Significance Rating after Mitigation** |
| Introduction and proliferation of alien species from influx of vehicles, people and materials, site disturbance, and lack of alien species control | Local | Permanent | High | Definite | Moderate | Moderate | High<br><br>Negative | High | No | Yes | ▪ Remove Category species using mechanical methods, and minimize soil disturbance as far as possible.<br>▪ Alien wood could be donated to the surrounding community. | Low |
| Increased dust and erosion from destruction of infrastructure, earth-moving activities, and increased vehicle traffic | Local | Medium Term | High | Highly Probable | Moderate | Moderate | Moderate Negative | High | No | Yes | ▪ Limit vehicles, people and materials to the decommissioning site.<br>▪ Commence (and preferably complete) decommissioning during winter, when the risk of erosion should be least.<br>▪ Revegetate denude areas with locally indigenous flora a.s.a.p.<br>▪ Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.<br>▪ Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting. | Low |
| Sensory disturbance of fauna from noise, dust and light associated with decommissioning activities | Local | Long Term | Moderate | Probable | Moderate | Low | Low<br><br>Negative | High | No | Yes | ▪ Commence (and preferably complete) decommissioning during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.<br>▪ Minimize noise to limit its impact on sensitive fauna.<br>▪ Limit demolition activities to day time hours.<br>▪ Minimize or eliminate security and decommissioning lighting, to reduce the disturbance of nocturnal fauna. | Low |

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

A Biodiversity and wetland assessment of the proposed Lungile Poultry Farm situated on the Farm Waterval 34 JS, Mpumalanga (Appendix G) (by Eco Agent CC commissioned by Limosella Consulting)

Heritage Impact Assessment In terms of Section 38(8) of the NHRA for a Proposed egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga (Appendix G) (by CTS Heritage)

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

N/A

## 4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

A potential cumulative impact can come from the construction phase in terms of the reduction bushveld environment in the area to a small extent. The residual risk is expected to be little, provided that the mitigation measures are implemented correctly. Another potential cumulative impact involves the invasion of alien plants species that pose and ecological threat as they alter the habitat structure. There is no residual risk anticipated, provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.

A potential cumulative impact can come from both the construction and operational phase and resulting from the trucks needed in both stages. During the construction phase the trucks bringing in the construction materials. During operational phase the transportation of the eggs to the markets. However, in both of these instances it would be temporary. The said impacts would be in the form of noise and dust levels being increased. Further, there could the potential of increased traffic due to accessing the sight by the trucks.

A second potential cumulative impact which is also evident in both the construction and operational phases is that of water use. The continued use of water for the farming activities may lead to a negative impact on the water table of the area. A water saving scheme will be established which is the storing of rain water in tanks for domestic uses.

The proposed project has the potential to impact the socio economic status of the local area through job creation, skills development and increased chicken egg production for the local market, as this is a positive impact, it will be encouraged.

## 5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

**Proposal**

The proposed chicken layer facility is located on land which is still in its natural state and has not been

previously transformed. The most significant environmental impacts of the proposed project are:

*Site preparation and clearance*
The clearance of land in preparation for the construction of the chicken layer facilities and supporting infrastructure is unavoidable. This may result in the exposing of soil leading to potential erosion and dust from the wind. The occurrence of erosion may result in loss of fertile land and sedimentation in watercourses (loss of wetland). These impacts will be a temporary on one hand and permanent in the other, they will be contained to some extent, with the aid of construction measures which minimise these from occurring, this will limit probability.

*Vegetation and habitat loss*
Vegetation loss during construction will be unavoidable due to the clearance of land for the facilities. As stated in the Ecological Specialist study, with the appropriate mitigation measures suggested in the report, the significance of impacts on site can be reduced. However, the specialist did raise the concern that the development area be positioned further south of the property in order to avoid the medium sensitive vegetation community (i.e. *Spirostachys africana* rocky outcrop community) The layout of the Chicken Facility will need to be designed as to minimise the impact on the greater system. Movement of the infrastructure to the south of the farm may potentially avoid the sensitive vegetation community, where the less sensitive *Combretum apiculatum* plains bushveld vegetation occurs. Furthermore, this vegetation community is situated adjacent to existing residential areas, and thus ideally located for the proposed chicken layer facility (figure 7).

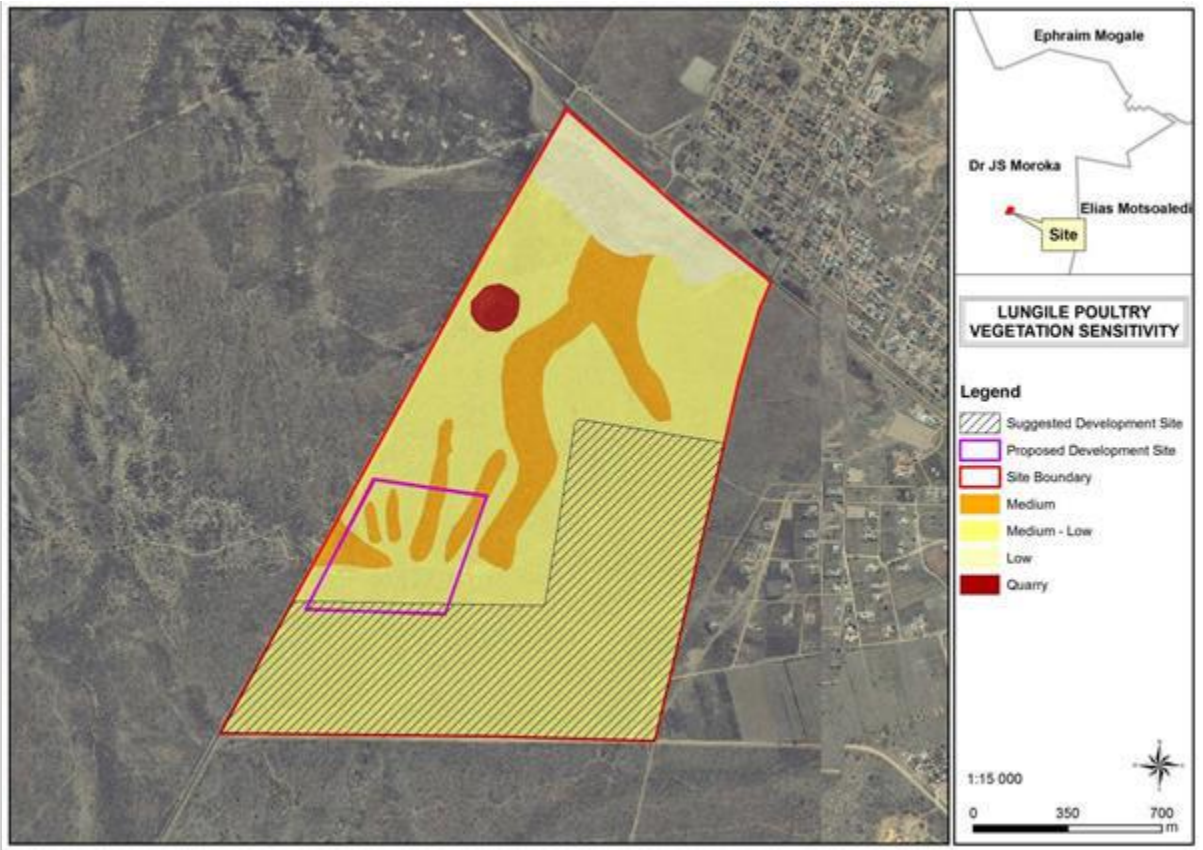



**Figure 7: Ecological Sensitivity of area and suggested development site for the chicken layer facility**

*Waste*

There will be waste generated in both stages of the project, construction and operational, and this will be ongoing during the operational phase. The proposed methods of dealing with the waste generated through the operational stage will minimise any impact occurring therefore resulting in a low probability. The recycling of the waste will be practiced to minimise impacts.

*Socio-economic*

The proposed project is expected to contribute to the growth of the local economy during both the construction and operational phases. These may be in the form of local labour to produce the eggs to be sold in the local market as well as commercial market. Overall this can be said to be the creation of employment opportunities and skills development in the area. The impact will be of temporal nature during the construction phase and permanent for the operational phase. The probability of this impact occurring is high and as such a potential high positive impact.

The proposed chicken layer facility it is concluded, based the environmental impacts assessment shown, to have relatively low impact on the environment. If the proposed mitigation and management measures are implemented as recommended the significance of these impacts found on the site will be low environmentally. Other potential impacts will be on vegetation and habitat, water quality, soil, dust, and odour as a result of earthworks associated with the activity, influx of vehicles, waste generated by the chicken broiler houses and chicken farming as a whole. Based on the selected development site( figure 8), it is the EAP's opinion that based on the ecological specialist study and on the available information to date, the CSIR has no objections to the project going forward. An Environmental Management Programme supporting this BA outlines adequate methods and mitigation measures that need to be implemented in order for the identified impacts to not pose any environmental flaws associated with the proposed development of the chicken broiler production facility and associated infrastructure.

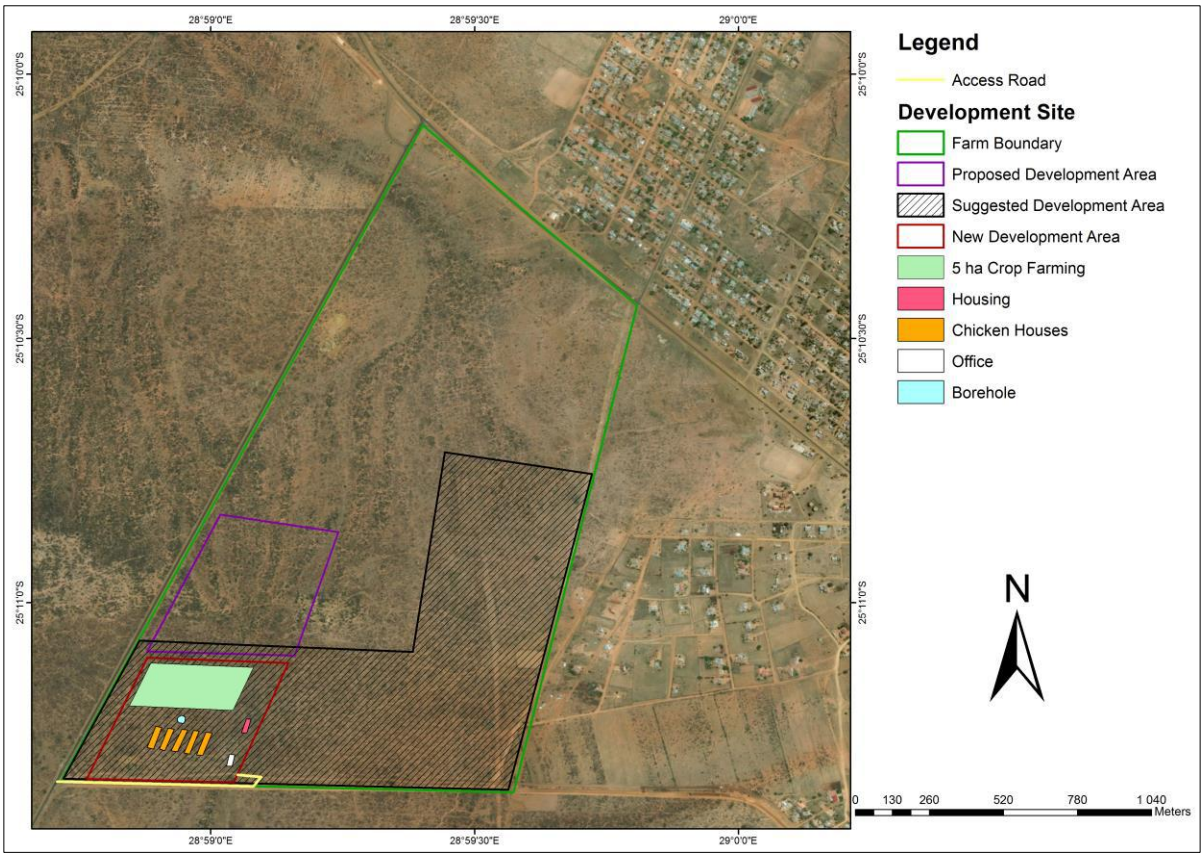


**Figure 8: New proposed development site for Lungile's Chicken Layer Facility**

**Alternative 1**

N/A

**Alternative 2**

N/A

**No-go (compulsory)**

Should the No-Go alternative take preference, it would result in there being no change to the land or surrounding area. There will be no ability to develop increased profit and increase egg production to supply the poultry industry. This opportunity to improve the local socio-economic situation and to use best practice chicken egg farming methods, including improved chickens welfare, will be lost. There won't be increased and complicated waste to be managed on site where, odour and pest control problems associated with chicken broilers will not be present. The environment will not be affected and will remain as it is currently. The environmental impacts associated with the proposed development are considered to be, with mitigations, of an acceptable level and can be effectively managed with the implementation of effective mitigation methods as discussed in the EMPr.

## 6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

**For proposal:**

- Impact on soil (erosion and dust)
- Loss of vegetation and faunal habitat
- Introduction and increase in alien vegetation
- Potential for pollution of water sources
- Waste generation
- Impact of pests and disease transmission
- Employment opportunities created

**For alternative:**

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

This proposed project is the development of a chicken egg layer facility and associated infrastructure. These developments will be according to best guidelines when it comes to broiler farming within the environmental legislation and ensuring minimal environmental impacts.

It is not feasible for the relocating of the proposed chicken layer site as firstly, this is the only available land to the applicant; secondly by default the chosen sight potentially has the smallest impact on the environment, with the required mitigations. The site further ensure minimal biosecurity threats to the chicken layer facility where there is controlled access by people as well as other animals, by this preventing pests and transmission of infections posing a threat to the poultry.

# 7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

The Spatial Development Framework (SDF) is the legislated component of the municipality's Integrated Development Plan (IDP) that prescribes development strategies and policy guidelines to restructure and reengineer the urban and rural form. The SDF is the municipality's long-term vision of what it wishes to achieve spatially, and within the IDP programmes and projects. The SDF should not be interpreted as a blueprint or master plan aimed at controlling physical development, but rather the framework giving structure to an area while allowing it to grow and adapt to changing circumstances. The proposed project has considered and is guided by the Regions SDF and IDP priorities of the area. It aims to empower the local economy, which is individuals and local business in terms of job creation and skills development. The proposed project falls within the east (Waterval B) of the Dr JS Moroka Local Municipality, which is earmarked for extensive agriculture (Figure9 below).

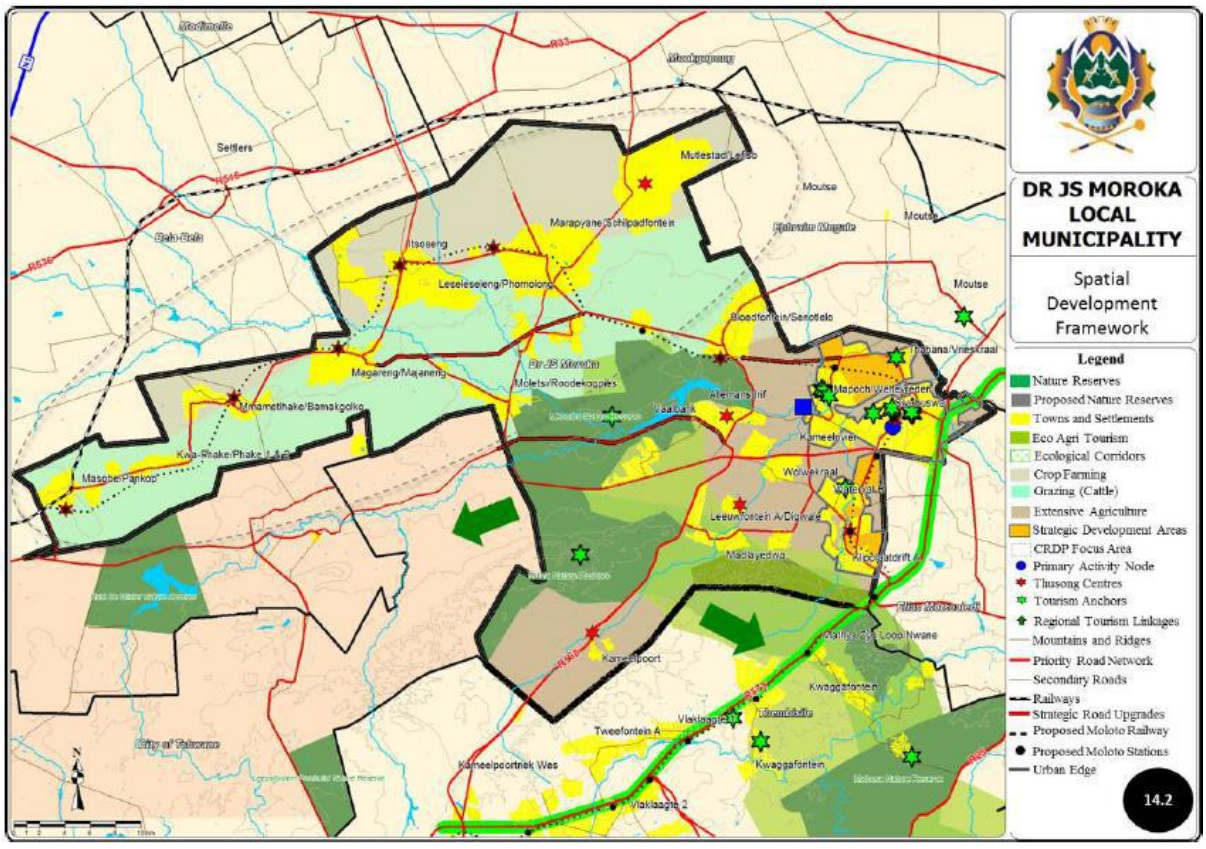



**Figure 9: The location of Waterval B within The Dr JS Moroka Spatial Development Framework 2017-2022**

The proposed project falls within the eastern region of Dr JS Moroka Local Municipality which has been designated to be part of the Comprehensive Rural Development Programme (CRDP) focus area, and is earmarked for agriculture. The CRDP's intention is to create vibrant equitable and sustainable rural communities through various interventions and development of certain economic activities.. This can be achieved through food provision as well as providing work opportunities.

In terms of the spatial development, some of the weaknesses identified for the region include:

- The region has a very large population with low levels of education, high unemployment and very low income and poor living standards.
- There is a very limited private sector investment within the region and backlogs exist in the provision of services.
- There are very few job opportunities for unskilled labourers.

## 8. RECOMMENDATION OF THE PRACTITIONER

| Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA). | YES | NO |
|---|---|---|

If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

Through this BAR process, there has been the detailed analysis of all potential impacts of the proposed project. According to the specialist studies conducted on site the overall impact of the project results in a low environmental impact. This was however aided by certain management and mitigation measures as suggested in both the report and EMPr. Based on these findings, it is suggested that this proposal be approved, with the implementation of these mitigations:

- The EMPr of this proposed development must form part of the contractual agreement and be adhered to by both the contractors and the applicant.
- The recommendations of the specialist, must be implemented.
- The applicant to ascertain that there is representation of the applicant on site, at all times of the project phases, ensuring compliance with the conditions of the EMPr and Environmental Authorisation thereof.
- A Water Use Licence/ Borehole license must be obtained for the water usage associated with the chicken broiler operations.

It is the opinion of the EAPs that the proposed development will comply with current relevant legislation, and that with the implementation of the mitigation measures suggested in this Report.

## 9. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED *(consider when the activity is expected to be concluded)*

| |
|---|
| The Environmental Authorisation is required for a minimum of 20 years. |

## 10. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers "Yes" to Point 7 above then an EMP is to be attached to this report as an Appendix

| | |
|---|---|
| EMPr attached | Yes |

# SECTION F: APPENDICES

The following appendices are attached to this BA Report:

| | |
|---|---|
| **Appendix A** | Site plan(s) – (must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers) |
| **Appendix B** | Photographs |
| **Appendix C** | Facility illustration(s) |
| **Appendix D** | Route position information – **N/A** |
| **Appendix E** | Public participation information |
| **Appendix F** | Water use license(s) authorisation – **Not applicable at this stage**<br>SAHRA information<br>Service letters from municipalities<br>Water supply information |
| **Appendix G** | Specialist Reports |
| **Appendix H** | Environmental Management Programme |
| **Appendix I** | CVs of the BA Project team |

# APPENDICES

| | |
|---|---|
| **Appendix A** | Maps |
| **Appendix B** | Site Photographs |
| **Appendix C** | Facility Illustration (s) |
| **Appendix D** | Route position information –N/A |
| **Appendix E** | Public Participation Information |
| **Appendix F** | Water use license (s) authorization- N/A<br><br>SAHRA information<br><br>Service letters from municipality<br><br>Water supply information |
| **Appendix G** | Specialist reports |
| **Appendix H** | Environmental Management Programme (EMPr) |
| **Appendix I** | Details of the BA Project team |

BASIC ASSESSMENT REPORT

# APPENDIX A: MAPS

## CONTENTS

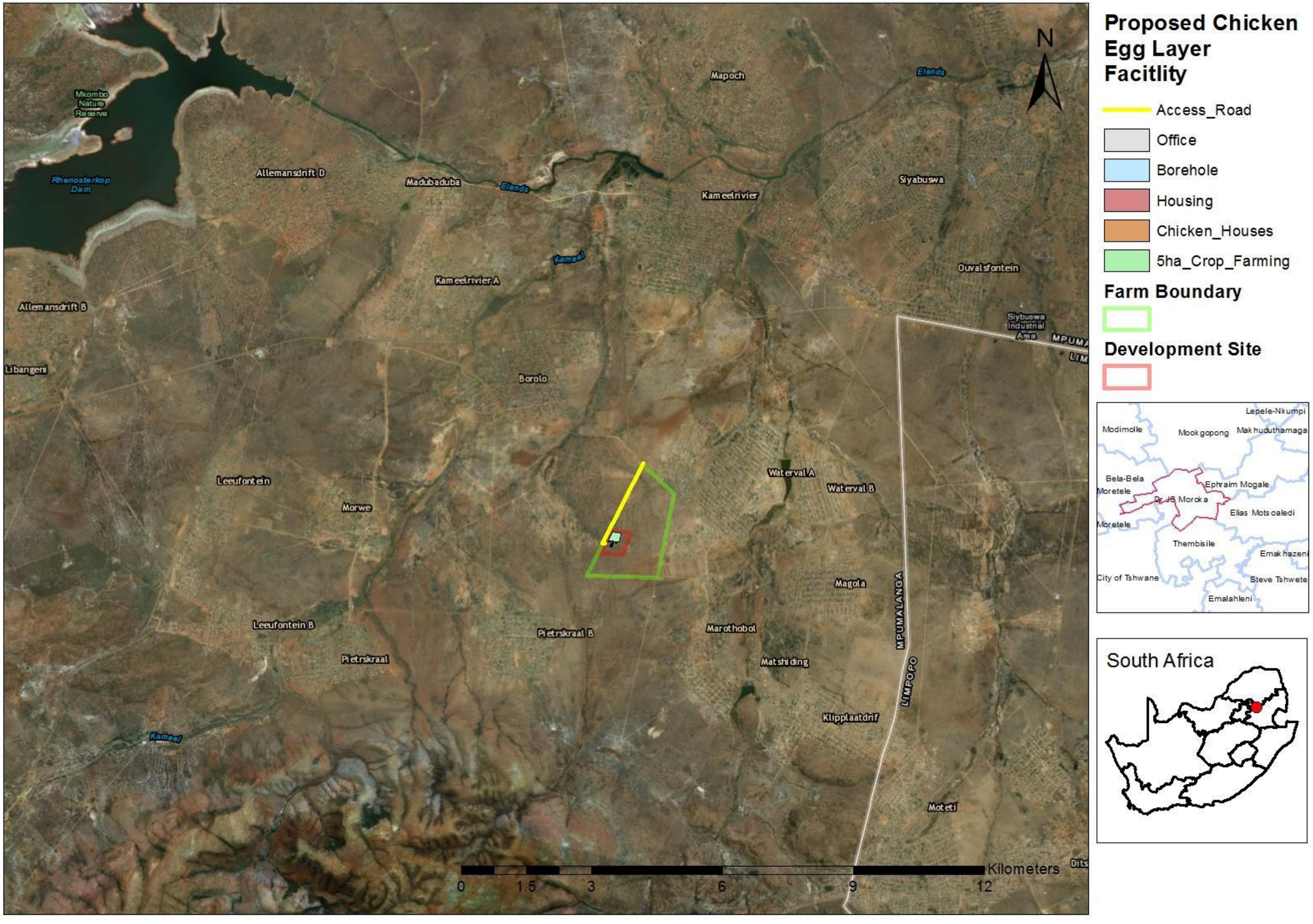



**Figure 2 Location of proposed project site of Lungile Poultry Farm on portion 4 of farm Waterval 34 JS, Waterval, Mpumalanga.**

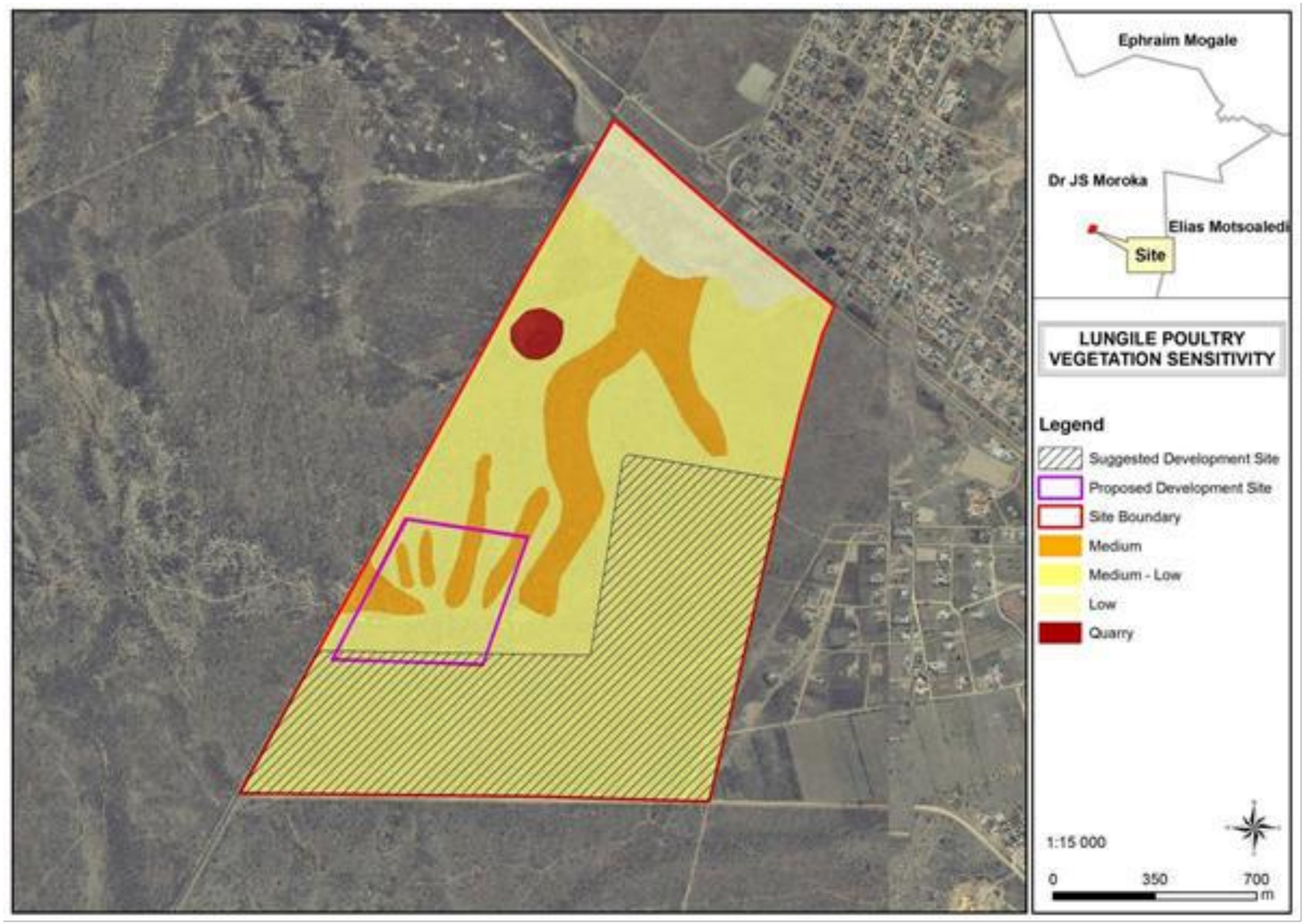



**Figure 2 Environmental Sensitivities on Lungile Poultry Farm Site, Waterval, Mpumalanga.**

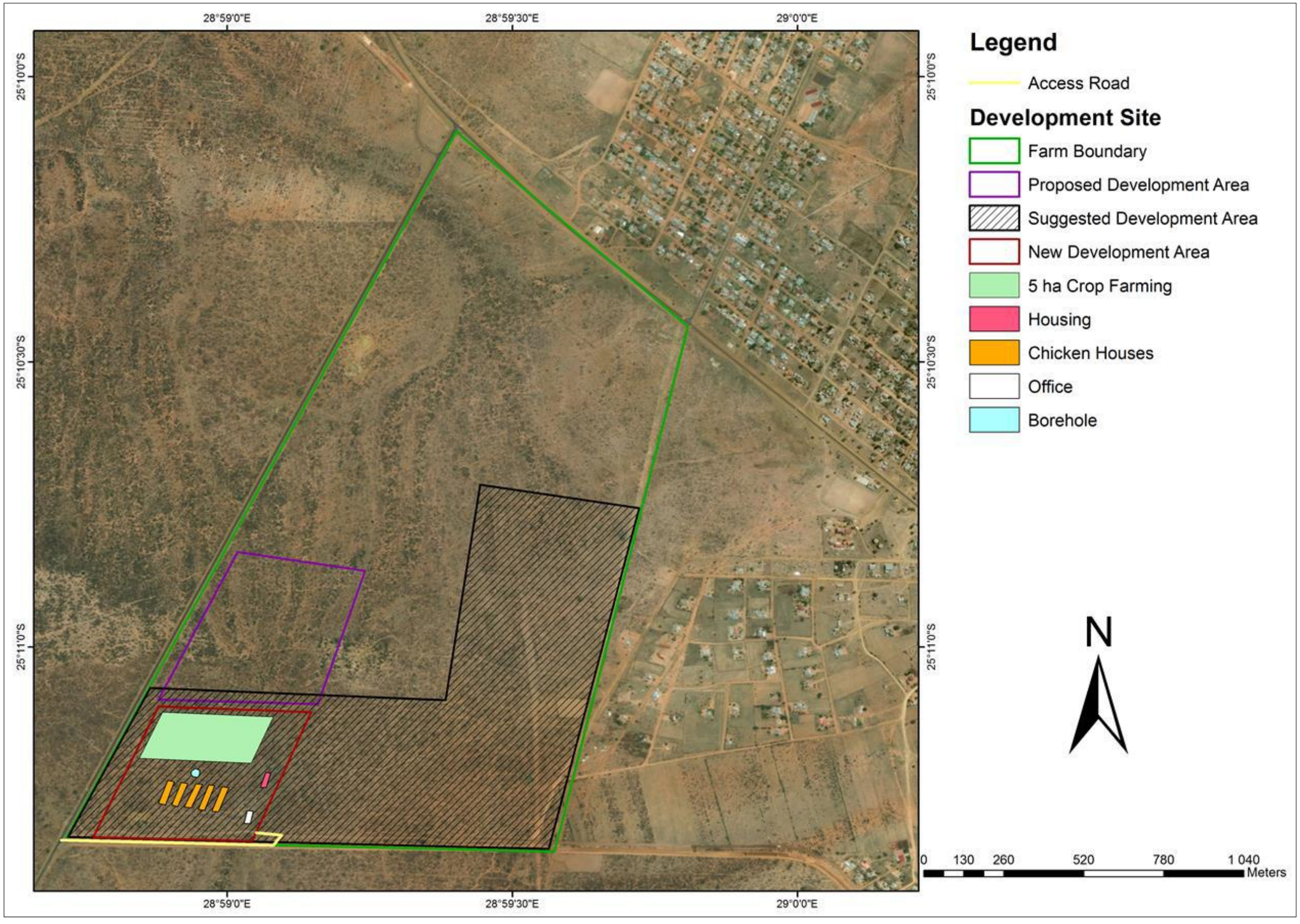



**Figure 3 Revised development layout for Lungile Poultry Farm, Waterval, Mpumalanga**

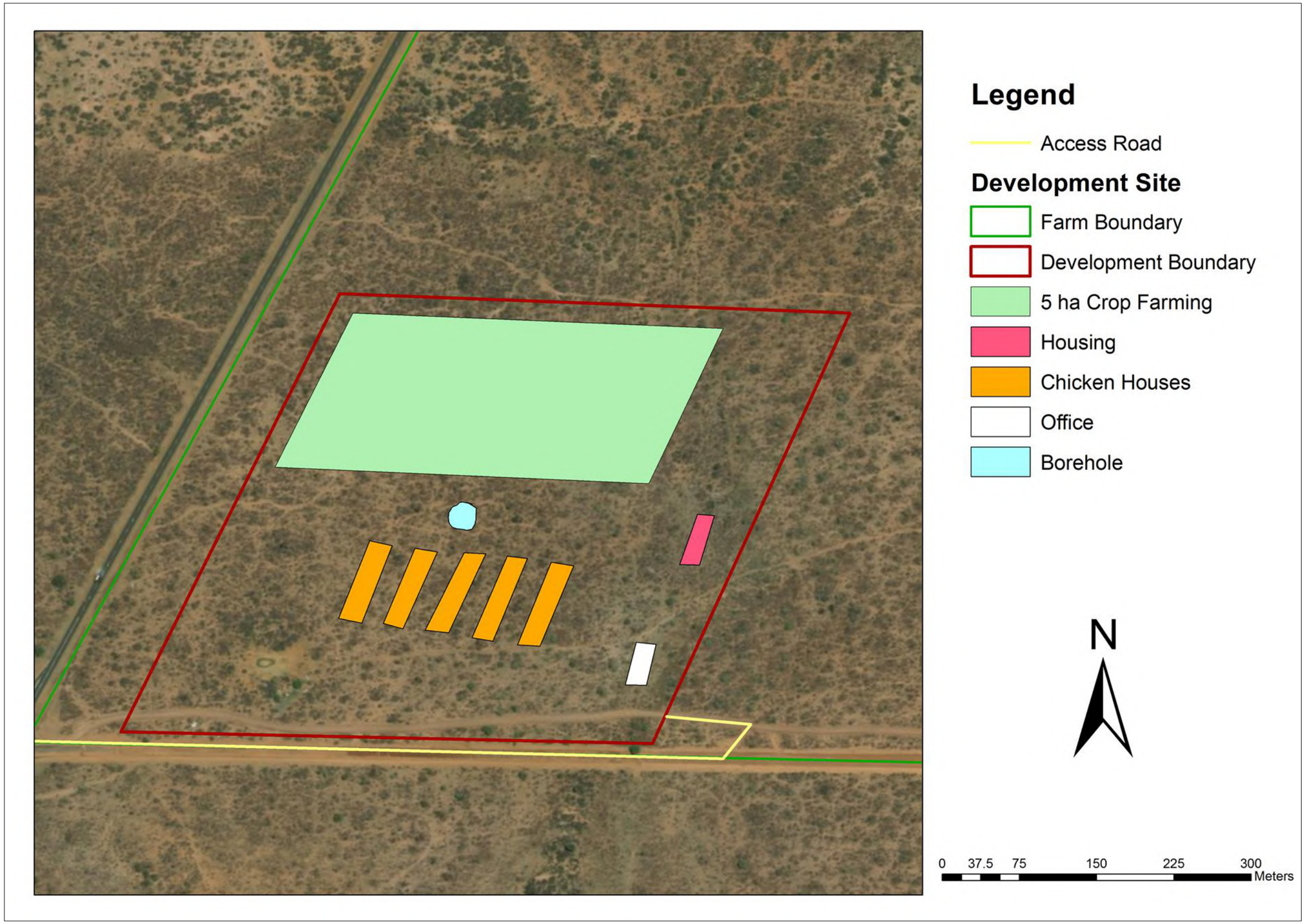


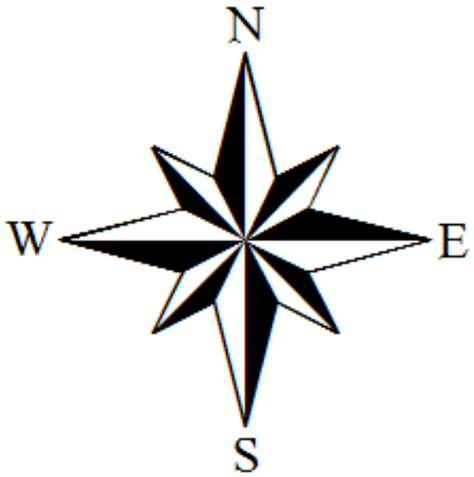

**Figure 4 Proposed Layout of Lungile Poultry Farm Chicken Layer Facility.**

BASIC ASSESSMENT REPORT

# APPENDIX B: SITE PICTURES

## CONTENTS

**Site photographs taken in the eight major compass directions for the proposed Chicken Egg-Layer development of Lungile Poultry Farming (Pty) Ltd**


N
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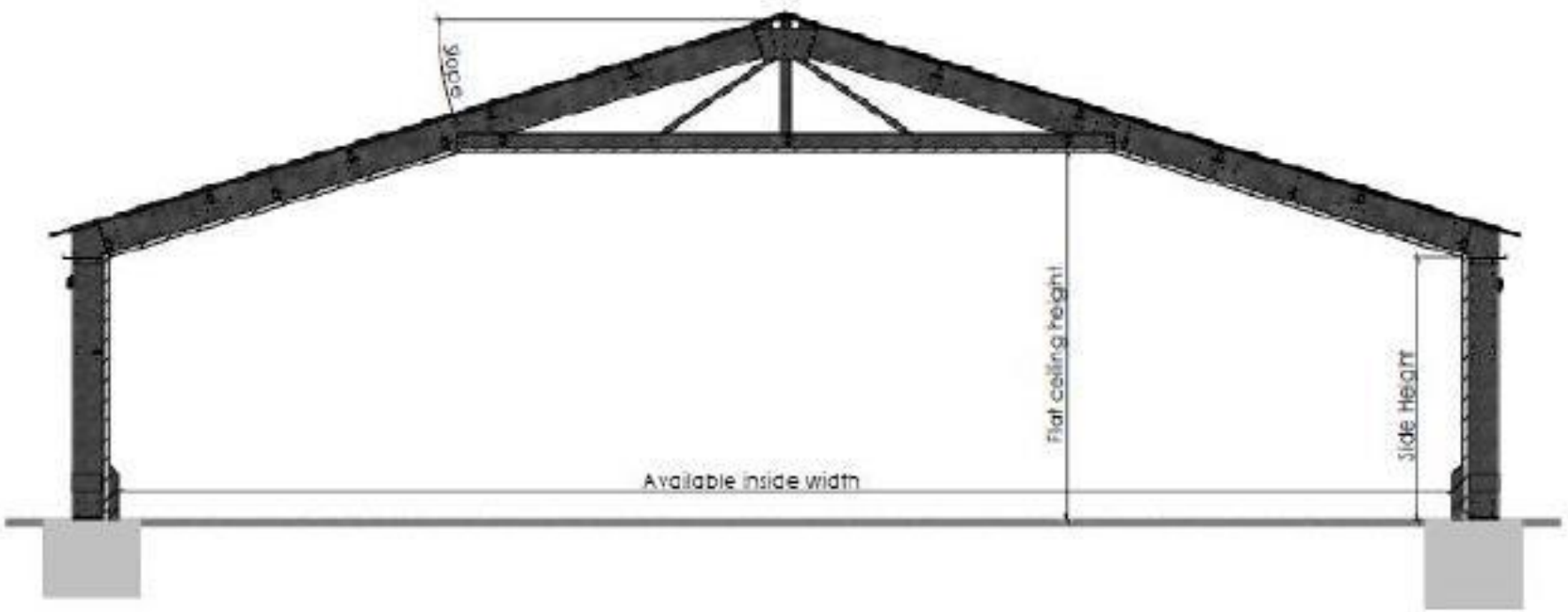
BASIC ASSESSMENT REPORT

# APPENDIX C:
# FACILITY ILLUSTRATION(S)

## CONTENTS

**Drawings and Pictures of the site facilities**


Slope
Flat ceiling height
Side Height
Available inside width

# APPENDICES

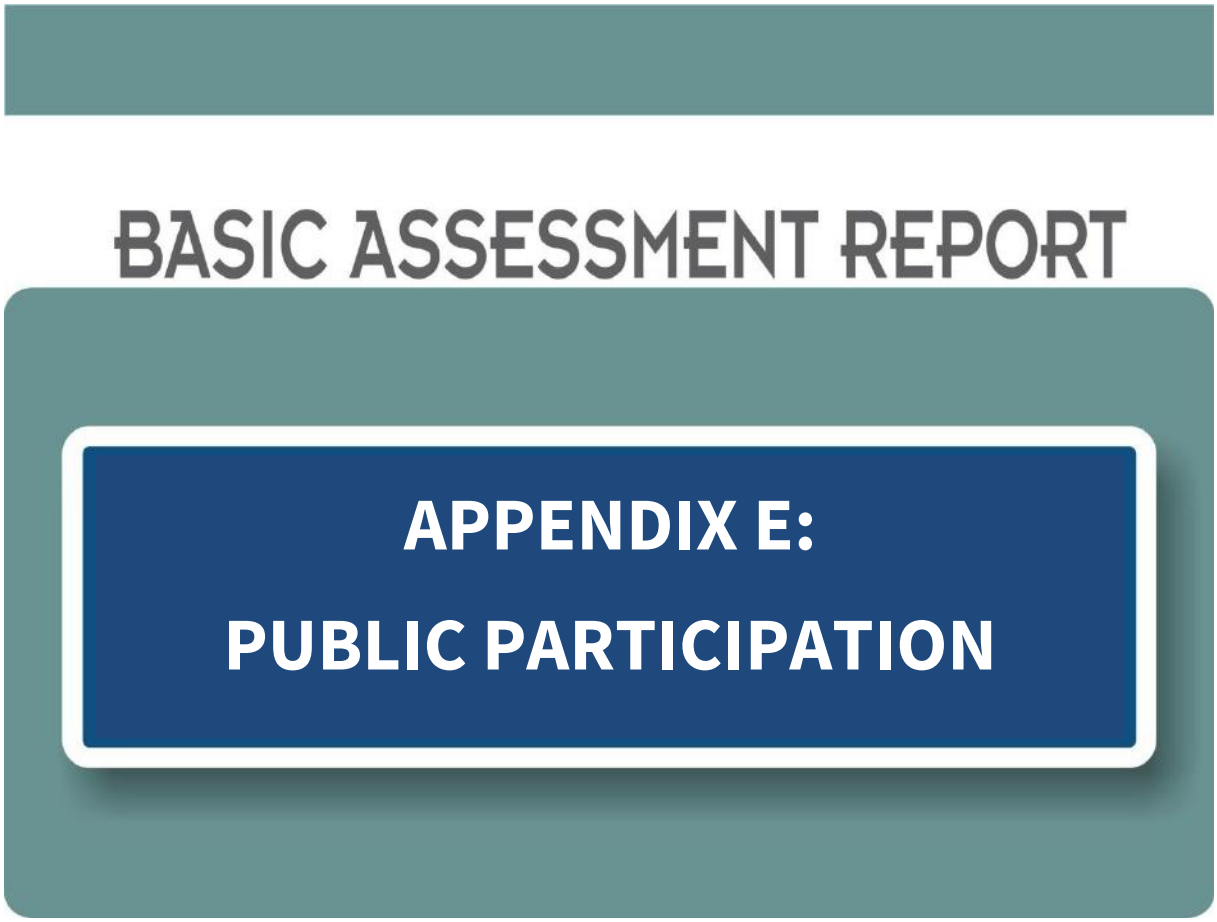
# BASIC ASSESSMENT REPORT

# APPENDIX D:

# ROUTE POSITION INFORMATION

## CONTENTS

**Route Positions Information- N/A**




## CONTENTS

**Appendix E: Proof of Site Notices**

Note: Public participation will start with the release of the Draft Basic Assessment report

## Appendix E1: Proof of site notices

# Lungile Poultry Farmin (Pty) Ltd's proposed development of a Chicken Egg-Layer Facility Enterprise on Portion 4 of the Farm Waterval 34 JS, Waterval.

## ISAZISO NGOQHUBO LOKUHLOLA SISEKELO

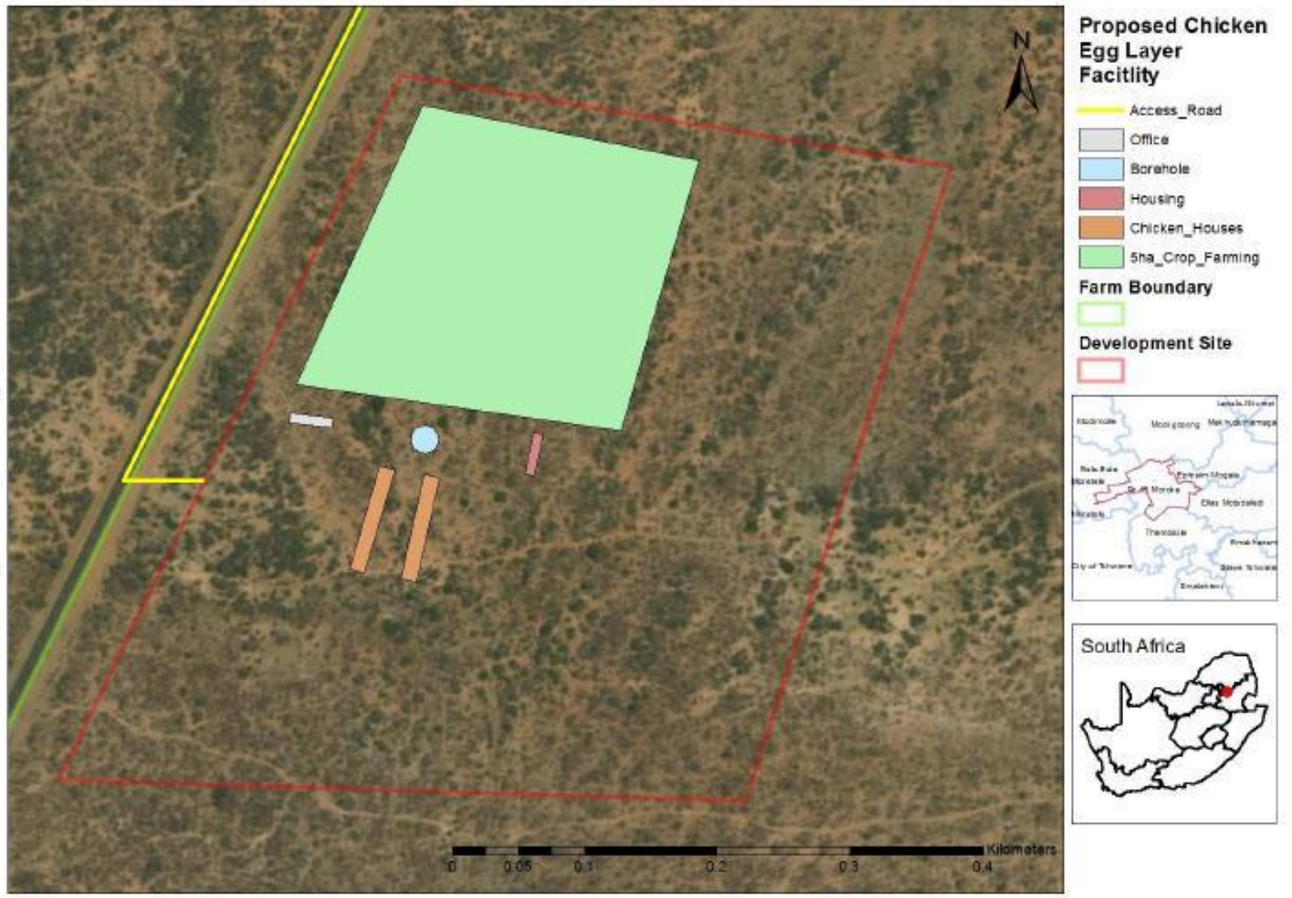
ISaziso sikhishwa ngokweMithethonqubo yokuHlola Umthelela kwezeMvelo (Environmental Impact Assessment (EIA),kwisigatshana somthethonqubo 41 (2) (a), enyatheliswe kwi Gazette Ka Hulumeni nombolo 38282 ka 4 December 2014, kumthetho i-National Environmental Management Act 1998 (Act No. 107 of 1998), ukuba i**Lungile Poultry Farming (Pty) Ltd** ihlongoza ukwakha ibhizinisi lokukhulisa izinkukhu ezizala amaqanda endaweni engamahektha awu 19.5 kwingxenye 4 yePulazi Waterval, esendaweni yase Waterval, Dr. JS Moroka, eMpumalanga.

i-Council for Scientic and Industrial Research (i-CSIR), njenge Environmental Assessment Practitioner ezimele, izophatha imisebenzi ehambisana ne-Basic Assessment Process mayelana nalephrojekthi ephakamisiwe. Iphrojekthi izobhaliswe ne-Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA). Isidingo se-Basic Assessment silethwa ilemisebenzi elandelayo ebaliwe kwimithethonqubo ye-Saziso sika Hulumeni 983, ka 8 December 2014.

| ISaziso sika Hulumeni | Inombolo yomsebenzi Obaliwe |
|---|---|
| GNR 327, 8 December 2014 (amended) | 5 (ii) |
| GNR 327, 8 December 2014 (amended) | 27 |

Ukuthola ulwazi ngalephrojekthi nokuhamba kwe-Basic Assessment, noma ufuna ukwaziwa njengo muntu othikamezekayo i-lephrojekthi, sicela uxhumane nathi kulemininingwane elandelayo:

**Mr. Samukele Ngema**
**PO Box 320, Stellenbosch, 7599**
**Tel: 021 888 2432**
**Fax: 021 888 2473**
**Email: sngema@csir.co.za**




**Isithombe 1: Indawo lapho i-Lungile Poultry Farming ihlongoza ukwakha ibhizinisi lokukhulisa izinkukhu kwingxenye 4 yePulazi Waterval, esendaweni yase Waterval, Dr. JS Moroka, eMpumalanga.**

# Lungile Poultry Farmin (Pty) Ltd's proposed development of a Chicken Egg-Layer Facility Enterprise on Portion 4 of the Farm Waterval 34 JS, Waterval.

## NOTICE OF A BASIC ASSESSMENT (BA) PROCESS

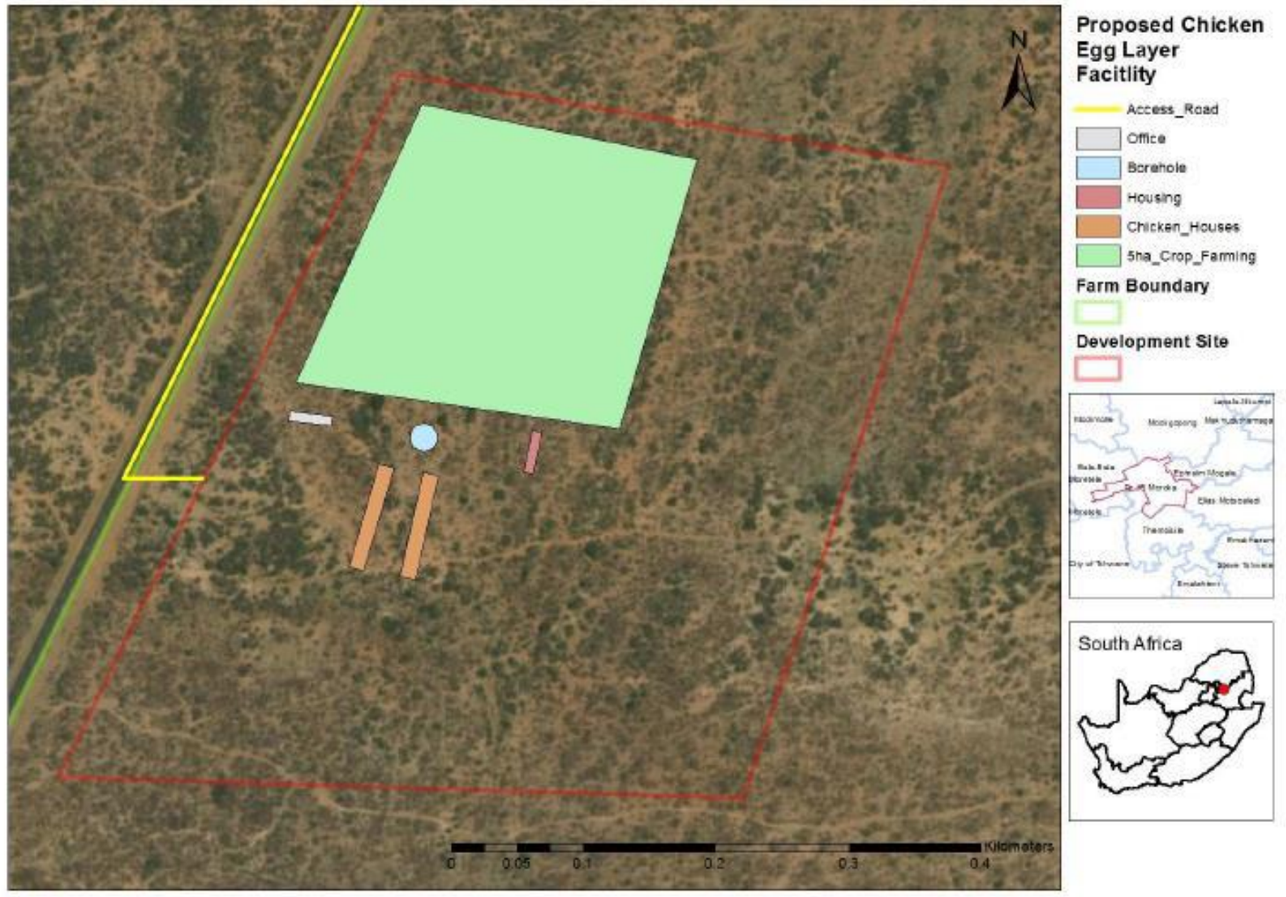
Notice is hereby given, in terms of the Environmental Impact Assessment (EIA) Regulations, under sub-regulation 41(1) and sub-regulation 41(4), published in Government Gazette No 38282 of 8 December 2014 as amended, of the National Environmental Management Act, 1998 (Act No 107 of 1998), that **Lungile Poultry Farming (Pty) Ltd**, proposes a small-scale chicken egg-layer facility and crop farming on 20 hectares on Portion 4 of the Farm Waterval, located in the Waterval area of Dr. JS Moroka Municipality, Mpumalanga Province.

The Council for Scientific and Industrial Research (CSIR), as the independent Environmental Assessment Practitioner, will manage the required Basic Assessment process for the proposed project. The project will be registered with the Mpumalanga Department of Agriculture, Rural Development and Land Environmental Affairs. The need for a Basic Assessment is triggered by the following activities listed in Government Notice Regulations (GNR) 983 of 8 December 2014 as amended:

| Government Notice | Listed Activity Number |
|---|---|
| GNR 327, 8 December 2014 (amended) | 5 (ii) |
| GNR 327, 8 December 2014 (amended) | 27 |

To obtain further information with regards to the project and Basic Assessment process, or to register as Interested and Affected Party (I&AP), please contact:

**Mr. Samukele Ngema**
**PO Box 320, Stellenbosch, 7599**
**Tel: 021 888 2408**
**Fax: 021 888 2473**
**Email: SNgema@csir.co.za**




**Locality Map depicting the location of the Proposed Project for Lungile Poultry Farming of a Chicken Egg-layer on Portion 4 of Farm Waterval, Dr. JS Moroka, Mpumalanga.**

# BASIC ASSESSMENT REPORT

# APPENDIX F:

**Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information**

## CONTENTS

## F1: Letter from South African Heritage Resources Authority

**Proposed Chicken Egg-Layer Facility for Lungile Poultry Farm (Pty)**

**Our Ref: 12190**

an agency of the Department of Arts and Culture

T: +27 21 462 4502 | F: +27 21 462 4509 | E: info@sahra.org.za
South African Heritage Resources Agency | 111 Harrington Street | Cape Town
P.O. Box 4637 | Cape Town | 8001
www.sahra.org.za

Enquiries: Nokukhanya Khumalo
Tel: 021 462 4502
Email: nkhumalo@sahra.org.za
CaseID: 12190

Date: Monday April 16, 2018
Page No: 1

### Response to NID (Notification of Intent to Develop)

**In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999)**

Attention: CSIR

**Lungile Poultry farm (Pty) Ltd is proposing to establish a start-up enterprise comprising of a chicken layer facility in Waterval,Mpumalanga.The start-up enterprise plans to build within a 20ha footprint, a chicken layer facility and crops on portion 4 of the farm Waterval 34 JS which has a total extent of 362 hectares (ha).**

Lungile Poultry Farm (Pty) Ltd is proposing to establish a chicken egg-layer production enterprise, located on Portion 4 of farm Waterval 34 JS in Mpumalanga Province.

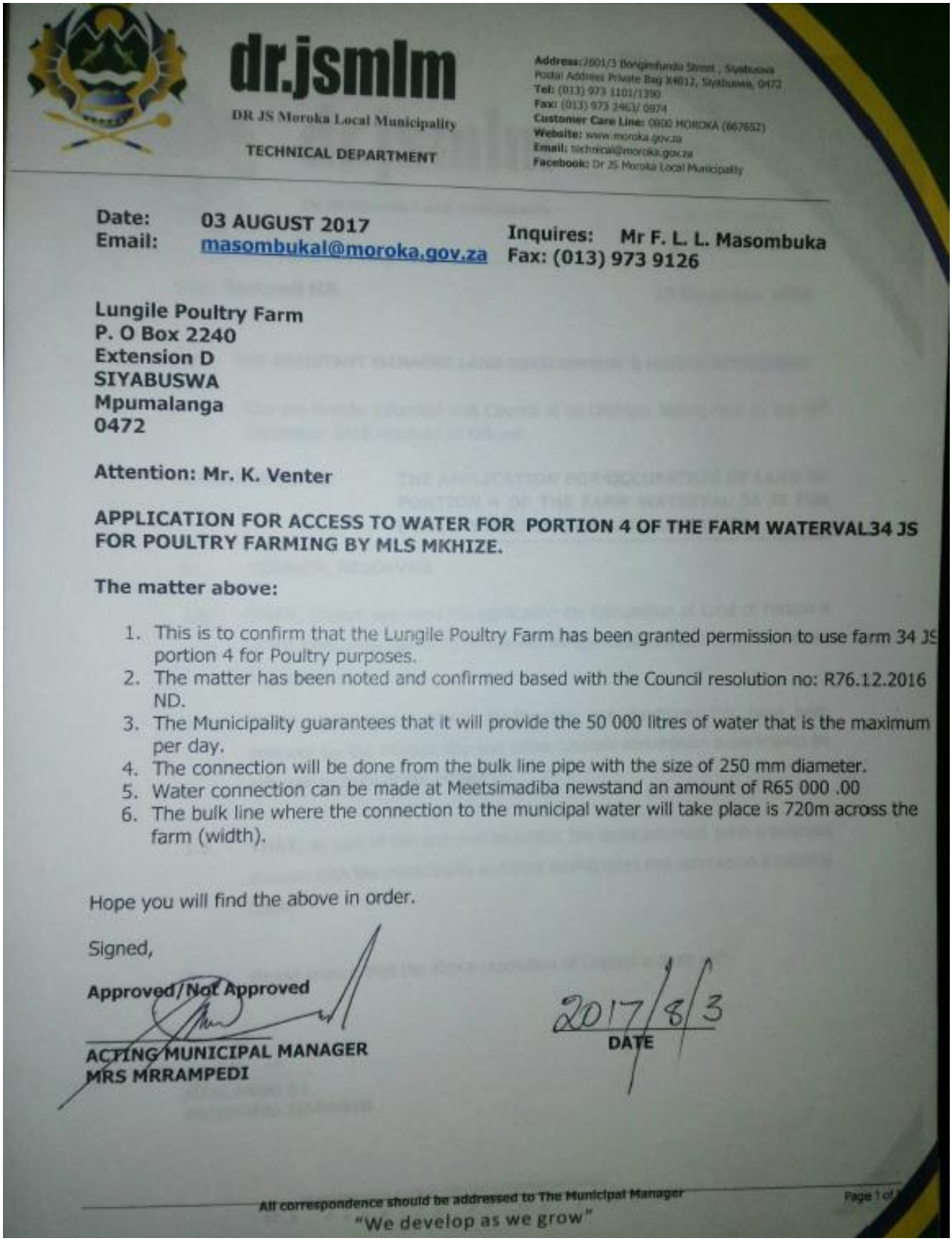
CSIR is undertaking a Basic Assessment process on behalf of Lungile Poultry Farm, in respect of listed activities in the Environmental Impact Assessment (EIA) Regulations 2014, that require an application for Environmental Authorisation, in terms of the National Environmental Management Act, 1998 (NEMA). The Nofication of Intent to Develop letter has been submitted to SAHRA in terms of section 38(8) of the National Heritage Resources Act, 25 of 1999.

In terms of the National Heritage Resources Act, no 25 of 1999 (NHRA), heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are generally protected. They may not be disturbed without a permit from the relevant heritage resources authority. In contexts of development applications, the developer must ensure that no heritage resources will be impacted by the proposed development, by lodging an application to SAHRA and submitting detailed development specifications as a notification of intent to develop. If the application is made in terms of s. 38 (8) of the NHRA then it is incumbent on the developer to ensure that a Heritage Impact Assessment (HIA) is undertaken, as s. 38(2)a does not apply. Such a study should follow the SAHRA 2007 impact assessment guidelines and section 38(3).

Any earth moving activities pose a threat to palaeontological and heritage resources. Therefore, SAHRA requires a Heritage Impact Assessment and a Palaeontological Desktop Study because the area is underlain by moderate palaeontological sensitive rocks.

Should you have any further queries, please contact the designated official using the case number quoted

**F2: Proof of Approval of Access to Water Supply from Dr JS Moroka Local Municipality**



**dr.jsmlm**
DR JS Moroka Local Municipality
TECHNICAL DEPARTMENT

Address: 2601/3 Bongimfunda Street, Siyabuswa
Postal Address: Private Bag X4012, Siyabuswa, 0472
Tel: (013) 973 1101/1390
Fax: (013) 973 2463/ 0874
Customer Care Line: 0800 MOROKA (667652)
Website: www.moroka.gov.za
Email: technical@moroka.gov.za
Facebook: Dr JS Moroka Local Municipality

**Date:** 03 AUGUST 2017
**Email:** masombukal@moroka.gov.za
**Inquires:** Mr F. L. L. Masombuka
**Fax:** (013) 973 9126

**Lungile Poultry Farm**
**P. O Box 2240**
**Extension D**
**SIYABUSWA**
**Mpumalanga**
**0472**

**Attention: Mr. K. Venter**

**APPLICATION FOR ACCESS TO WATER FOR PORTION 4 OF THE FARM WATERVAL34 JS FOR POULTRY FARMING BY MLS MKHIZE.**

**The matter above:**

1. This is to confirm that the Lungile Poultry Farm has been granted permission to use farm 34 JS portion 4 for Poultry purposes.
2. The matter has been noted and confirmed based with the Council resolution no: R76.12.2016 ND.
3. The Municipality guarantees that it will provide the 50 000 litres of water that is the maximum per day.
4. The connection will be done from the bulk line pipe with the size of 250 mm diameter.
5. Water connection can be made at Meetsimadiba newstand an amount of R65 000 .00
6. The bulk line where the connection to the municipal water will take place is 720m across the farm (width).

Hope you will find the above in order.

Signed,

**Approved / Not Approved**

**ACTING MUNICIPAL MANAGER**
**MRS MRRAMPEDI**

2017/8/3
**DATE**

All correspondence should be addressed to The Municipal Manager
"We develop as we grow"

BASIC ASSESSMENT REPORT

# APPENDIX G: SPECIALIST REPORTS

## CONTENTS

**G1: A Biodiversity and wetland assessment of the proposed Lungile Poultry Farm situated on the Farm Waterval 34 JS, Mpumalanga (Appendix G) (by Eco Agent CC commissioned by Limosella Consulting)**

**G2: Heritage Impact Assessment In terms of Section 38(8) of the NHRA for a Proposed egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga (Appendix G) (by CTS Heritage)**

ECOAGENT
ECOLOGY & BIODIVERSITY CONSULTANTS

# A biodiversity and wetland assessment of the proposed Lungile Poultry Farm situated the Farm Waterval 34 JS, Mpumalanga

**March 2018**

# A biodiversity assessment of the proposed Lungile Poultry Farm situated the Farm Waterval 34 JS, Mpumalanga

by
**G.J. Bredenkamp** D.Sc. Pr.Sci.Nat.
**I.L. Rautenbach** Ph.D. Pr.Sci.Nat.
**A. Bootsma** M.Sc. Pr.Sci.Nat.

Commissioned by
**Limosella Consulting**

Reg No: 2014/023293/07
Email: antoinette@limosella.co.za
Cell: +27 83 4545 454
www.limosella.co.za

**For the CSIR**

Implementation Unit – EMS
P.O. Box 320
Stellenbosch, 7599
Tel: (021) 888 2661

**EcoAgent CC**
PO Box 24355
Monument Park
0181
Tel 012 4602525
Fax 012 460 2525
Cell 082 5767046

The intellectual property contained in this report is transferred to the client(s), (party or company that commissioned the work) on full payment of the contract fee. Upon transfer of the intellectual property, it is recognised that written consent from the client will be required for any contributor to this report to release of any part of this report to third parties.



Remuneration for services provided by us is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

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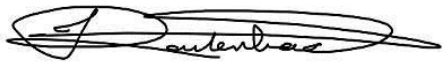
# DECLARATION OF INDEPENDENCE

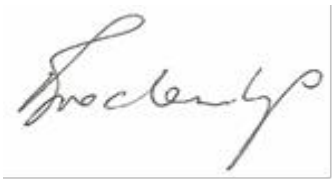
We,
George Johannes Bredenkamp (SACNASP # 400086/83),
Ignatius Lourens Rautenbach (SACNASP # 400300/05), and
Antoinette Bootsma (SACNASP # 4000222-09).

declare that we:

- hold higher degrees in the biological sciences, which allowed registration by S.A. Council for National Scientific Professions (SACNASP) as Professional Ecologist or Zoologists that sanction us to function independently as specialist scientific consultants;
- declare that as per prerequisites of the Natural Scientific Professions Act No. 27 of 2003 this project was our own work from inception and reflects exclusively our observations and unbiased scientific interpretations, and executed to the best of our abilities;
- abide by the Code of Ethics of the SACNASP;
- are committed to biodiversity conservation but concomitantly recognize the need for economic development. Whereas we appreciate opportunities to learn through constructive criticism and debate, we reserve the right to form and hold our own opinions within the constraints of our training, experience and results and therefore will not submit willingly to the interests of other parties or change our statements to appease or unduly benefit them;
- are subcontracted as specialist consultants for the project "A biodiversity assessment of the proposed Lungile Poultry Farm situated the Farm Waterval 34 JS, Mpumalanga" as described in this report;
- have no financial interest in the proposed development other than remuneration for the work performed;
- do not have, and will not have in the future any vested or conflicting interests in the proposed development;
- undertake to disclose to the consultant and its client(s) as well as to the competent authority any material information that may have the potential to influence any decisions by the competent authority, as required in terms of the Environmental Impact Assessment Regulations 2006;
- reserve the right to only transfer our intellectual property contained in this report to the client(s), (party or company that commissioned the work) on full payment of the contract fee. Upon transfer of the intellectual property, we recognise that written consent from the client will be required for any of us to release of any part of this report to third parties.
- In addition, remuneration for services provided by us is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.



I.L. Rautenbach



G.J. Bredenkamp

A. Bootsma

| | |
|---|---|
| **Fauna field work and report input** | **Dr I.L. Rautenbach**<br>SACNASP # 400300/05 |
| **Vegetation field work and report input** | **George Bredenkamp**<br>SACNASP Reg. No. 400086/83<br>Honorary Life Member of the South African Association of Botanists SAAB<br>Honorary Life Member of the Botanical Society of South Africa BotSoc |
| **Report writing and review** | **Antoinette Bootsma**<br>SACNASP Reg. No. 4000222-09<br>Member of the South African Wetland Society |

## DISCLAIMER:

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. Discussions and proposed mitigations are to some extent made on reasonable and informed assumptions built on *bone fide* information sources, as well as deductive reasoning. Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage. The vegetation and fauna team can thus not accept responsibility for conclusions and mitigation measures made in good faith based on own databases or on the information provided at the time of the directive. Although the authors exercised due care and diligence in rendering services and preparing documents, they accept no liability, and the client, by receiving this document, indemnifies the authors against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the authors and by the use of this document. This report should therefore be viewed and acted upon with these limitations in mind.

**COMPLIANCE WITH THE APPENDIX 6 OF THE 2017 EIA REGULATIONS**

| **Requirements of Appendix 6 – GN R326 EIA Regulations 7 April 2017** | **Addressed in the Specialist Report** |
|---|---|
| 1. (1) A specialist report prepared in terms of these Regulations must contain-<br><br>a) details of-<br>i. the specialist who prepared the report; and<br>ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; | Yes |
| b) a declaration that the specialist is independent in a form as may be specified by the competent authority; | Yes |
| c) an indication of the scope of, and the purpose for which, the report was prepared; | Yes |
| (cA) an indication of the quality and age of base data used for the specialist report; | Yes |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Yes |
| d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment; | Yes |
| e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used; | Yes |
| f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives; | Yes |
| g) an identification of any areas to be avoided, including buffers; | Yes |
| h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | Yes |
| i) a description of any assumptions made and any uncertainties or gaps in knowledge | Yes |
| j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities; | Yes |
| k) any mitigation measures for inclusion in the EMPr; | Yes |
| l) any conditions for inclusion in the environmental authorisation; | Yes |
| m) any monitoring requirements for inclusion in the EMPr or environmental authorisation; | Yes |
| n) a reasoned opinion-<br>i. whether the proposed activity, activities or portions thereof should be authorised;<br>(iA) regarding the acceptability of the proposed activity or activities and<br>ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; | Yes |
| o) a description of any consultation process that was undertaken during the course of preparing the specialist report; | NA |

| | |
|---|---|
| p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | NA |
| q) any other information requested by the competent authority. | Yes |
| 2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply. | Yes |

# ABSTRACT


**Vegetation and Flora**

Four plant communities (mapping units, ecosystems) were identified, ecologically assessed and described. The vegetation is mostly natural, primary bushveld but has been intensive grazed by livestock and has locally been utilised for sand/gravel burrow pits/quarries.

In general the vegetation of the site has Medium ecological sensitivity and Medium conservation value.

There are no red data listed plant species but two nationally and one provincially protected tree species and an Aloe species on the site. The development of the poultry farm can be supported, though it is suggested that the current indicated site be moved to the southern or south-eastern part of the larger site, in order to avoid the sodic lower-lying areas and rocky areas. Protected trees (Marula, Camel Thorn and Tamboti) should be avoided if possible.

**Mammals**

Two of the major habitat types are present on the site, i.e. terrestrial and arboreal. The conservation status of these three habitats is regarded as “transformed” Species richness has been dramatically reduced by urban encroachment, isolation and habitat neglect or destruction. No more than 15 species remained, and it is predicted that over time these will also perish as result of some or other catastrophic or inbreeding.

No rare or endangered mammal species now reside on the study site.

It is suggested that the planned development be supported.

**Birds**

The main impact of this extensive township development for birds is likely to affect those species that reside and breed on the natural grasslands. The vegetation of the specific development site is however so small that the site is not seen as an important site for birds. Therefore, the proposed development may be supported.

**Herpetofauna**

It is concluded that some herpetofauna species, all widely distributed generalists, do occur or may occur on the study site. There is however no reason to conserve the site habitats for the sake of any herpetofauna species.

From a herpetofauna perspective there is no objection against the development.

**Wetlands**
No wetlands or watercourses were found on site

# 1. BACKGROUND INFORMATION

It is planned to develop the Lungile poultry farm on part of the Farm Waterval 34 JS situated in the Dr JS Morake local municipality, Mpumalanga. The precise locality of the proposed development site may be selected anywhere within the larger western part of the Farm, as indicated in Figure 1.1. The site is located in grazed primary bushveld, within the Central Sandy Bushveld Vegetation Type Musina & Rutherford 2006), but already developed towns occur on the northern and eastern boundaries of the larger site.


Figure 1.1: The locality of the planned Lungile Poultry Farm development in relation to roads and surrounding land-use. The image also indicates the (smaller) proposed development site within the larger area within which the poulty farm may be located.

The planned development requires an Environmental Impact Assessment. Biodiversity and wetland assessments are parts of the Environmental Impact Assessment process. Eco-Agent CC was appointed by Limosella Consulting (Pty) Ltd to assess the vegetation and flora and undertake a fauna study as well as a wetland assessment, should a wetland be present on the site. This investigation is in accordance with the EIA Regulations No. R982-985, Department of Environmental Affairs and Tourism, 4 December 2014 emanating from Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as well as the National Water Act 1998 (Act 36 of 1998) and additions, and other relevant legislation.

The assignment is interpreted as follows: Compile a study of the vegetation, flora and vertebrate fauna of the site, with emphasis on Red Data plant and vertebrate species that occur or may occur on the site. Confirm the presence/absence of wetlands on the site. Should wetlands be present, include a wetland assessment. In order to compile this, the following had to be done:

### 1.1. Initial preparations:

- Obtain all relevant maps and information on the natural environment of the concerned area.
- This includes information on Red Data plant and vertebrate species that may occur in the area.

### 1.2. Vegetation and habitat survey:

- List the plant species (trees, shrubs, grasses and herbaceous species) present for plant community and ecosystem delimitation.
- Identify potential red data plant species, alien plant species, and medicinal plants.
- Examine the diversity and structure of the plants (trees, shrubs, grasses and herbaceous species) present, to delimit those plant communities and ecosystems relevant to vertebrate fauna distributions and abundance.

### 1.3. Plant community delimitation and description

- Process data (vegetation and habitat classification) to determine vegetation types (= plant communities) on an ecological basis.
- Describe the habitat and vegetation.
- Determine the sensitivity of the site for biodiversity and presence of rare or protected plant species.
- Prepare a vegetation map of the area.
- Prepare a sensitivity map of the plant communities present, if relevant.

### 1.4. Faunal assessment

- Compile lists of mammals, birds and herpetofauna that can be expected in the area
- Obtain lists of the Red Data vertebrates that can be expected in the area.
- Assess the quantitative and qualitative condition of suitable habitat for the Red Listed vertebrates that may occur in the area.
- Assess the possibility of Red Listed fauna being present on the study site.
- Compile a list of occurrences.

### 1.5. Wetland assessment

- Confirm the presence / absence of wetlands on the site
- Should a wetland be present - do a wetland delineation and classification

### 1.6. General

- Identify and describe particular ecologically sensitive areas.
- Identify transformed areas in need of special treatment or management, e.g. bush encroachment, erosion, water pollution, degraded areas, reclamation areas.
- Make recommendations on aspects that should be monitored during development.

### 1.7. Impact Assessment

- Compile prescribed impact assessment tables and associated descriptions of impacts on vegetation, flora, fauna and wetlands and suggest possible mitigation measures.

This report includes a site visit by the EcoAgent team on 7 March 2018 and a re-visit on 16 March 2018 to assess the vegetation, flora, wetlands and vertebrate fauna and possible impacts of the development on the biodiversity, and if needed, to suggest possible mitigation options.

This report focuses on vegetation and sensitive habitats as well as the reigning status of vertebrates and threatened plants those occur or are likely to occur on the proposed development site, and whose conservation status should be considered in the decision-making process. Special attention was paid to the qualitative and quantitative habitat conditions for Red Data plant and vertebrate species deemed present on the site. An objective of the investigation was to gauge which species still persist on the site and to compile a list of mammal, bird and herpetofauna species that may occur in the ecosystems found within the study area. The field survey indicated that there are no wetlands on the site, therefore this report does not include a wetland assessment.

# 2. RATIONALE AND SCOPE

It is widely recognised that to conserve natural resources it is of the utmost importance to maintain ecological processes and life support systems for plants, animals and humans. To ensure that sustainable development takes place, it is therefore important that possible impacts on the environment are considered before relevant authorities approve any development. This led to legislation protecting the natural environment. In 1992, the Convention of Biological Diversity, a landmark convention, was signed by more than 90 % of all members of the United Nations. In South Africa, the Environmental Conservation Act (Act 73 of 1989), the National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998) and the National Environmental Management Biodiversity Act, 2004 (Act 10 0f 2004) ensure the protection of ecological processes, natural systems and natural beauty, as well as the preservation of biotic diversity within the natural environment. They also ensure the protection of the environment against disturbance, deterioration, defacement or destruction as a result of man-made structures, installations, processes, products or activities. In support of these Acts, a draft list of Threatened Ecosystems was published (Government Gazette 2009), as part of the National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004), and these Threatened Ecosystems are described by SANBI & DEAT (2009) and a list of Threatened or Protected Species (TOPS) regulations is also available (NEMBA Notice 388 of 2013).International and national Red Data lists have also been produced for various plant and animal taxa.

All components of the ecosystems (physical environment, vegetation, animals) at a site are interrelated and interdependent. A holistic approach is therefore imperative to include effectively the development, utilisation and, where necessary, conservation of the given natural resources into an integrated development plan, which will address all the needs of the modern human population (Bredenkamp & Brown 2001).

It is therefore necessary to make a thorough inventory of the plant communities, flora and vertebrate fauna on the site, in order to evaluate the biodiversity and possible presence of species of conservation concern, red listed species and protected species. This inventory should then serve as a scientific and ecological basis for the planning exercises and the subsequent development.

**Definitions and Legal Framework**

In a South African legal context, the term watercourse is often used rather than the terms wetland or river. The National Water Act (NWA) (1998) includes wetlands and rivers into the definition of the term watercourse.

Watercourse means:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which water flows, and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Riparian habitat is the accepted indicator used to delineate the extent of a river's footprint (DWAF, 2005). The National Water Act, 1998 (Act No. 36 of 1998), defines a riparian habitat as follows: "Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse, which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.".

In contrast, the National Water Act, 1998 (Act 36 of 1998) defines a wetland as "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."(see also Ollis *et al*. 2013)

Generally, 32 m is regarded as standard for a buffer zone (Ezemvelo IEM, 2011; Biodiversity Act, 2004 (Act 10 of 2004), and Regulation 598, Government Gazette 37885, August 2014).

Authoritative legislation that lists impacts and activities on biodiversity and wetlands and riparian areas that requires authorisation includes (Armstrong, 2009):

- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- The older Environment Conservation Act, 1989 (Act 73 of 1989);
- Conservation of Agriculture Resources Act, 1983 (Act 43 of 1983);
- National Water Act, 1998 (Act 36 of 1998);
- National Forests Act, 1998 (Act 84 of 1998);
- National Environmental Management: Protected Areas Act 2003 (Act 57 Of 2003) (as Amendment Act 31 of 2004 and Amendment Act 15 of 2009)
- Government Notice Regulation 1182 and 1183 of 5 September 1997, as amended (ECA);
- Government Notice Regulation 385, 386 and 387 of 21 April 2006 (NEMA);
- Government Notice Regulation 392, 393, 394 and 396 of 4 May 2007 (NEMA);
- Government Notice Regulation 398 of 24 March 2004 (NEMA); and
- Government Notice Regulation 544, 545 and 546 of 18 June 2010 (NEMA)
- Government Notice Regulation 982, 983, 984 and 985 of 4 December 2014 (NEMA).

**In summary:**

- Vegetation, Flora and ecosystems are protected by National Environmental Management Act, 1998 (Act No. 107 of 1998) and the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- Wetlands and other watercourses are protected water resources in the National Water Act (NWA), Act 36 of 1998.
- Development or transformation of a watercourse is regarded as a water use, which can only be allowed through an approved Water Use License, irrespective of the condition of the affected watercourse.

- The NWA defines water use in a watercourse specifically related to wetlands and riparian areas as broad impacts that include the following:
    - impeding or diverting the flow of water in a watercourse (Section 21 c); and
    - altering the bed, banks, course or characteristics of a watercourse (Section 21 i);
- A recent DWA stipulation published in Government Gazette No 32805 on 18 December 2009 also require that a Water Use License should be applied for when any wetlands are present within a 500 m radius of water use activities as defined by section 21 (c) and section 21 (i) of the NWA. A Risk Matrix should by compiled for any development within 500 m of a wetland
- Risk assessment for developments that are located within 500 m of the edge of a wetland, in accordance with DWA Notice 509 of 2016 - general authorisation in terms of section 39 of the National Water Act, 1998 (act no. 36 of 1998) for water uses as defined in section 21(c) or section 21(i)]
- Wetlands are also protected in other environmental legislation, such as the National Environmental Management Act (NEMA), Act 107 of 1998. The act lists several activities that require authorisation before they can be implemented.
- NEMA lists various activities that require authorisation, when the activity is located within 32 m or less from the edge of a wetland or other watercourse.

The Scope and objectives of this study is therefore:

- To identify and map the vegetation units as ecosystems that occur on the site,
- To assess the ecological sensitivity of these ecosystems and comment on ecologically sensitive areas, in term of their biodiversity and where needed ecosystem function
- To assess qualitatively and quantitatively the significance of the fauna habitat components and current general conservation status of the site,
- To comment on connectivity with natural vegetation and habitats on adjacent sites,
- To assess presence/absence of wetlands on the site,
- To recommend suitable buffer zones, if relevant,
- To provide a list of plant and vertebrate fauna species that do or might occur on site and that may be affected by the development, and to identify species of conservation concern,
- To highlight potential impacts of the proposed development on vegetation, fauna and flora and wetlands of the study site, and
- To provide management recommendations that might mitigate negative and enhance positive impacts, should the proposed development be approved.

# 3. STUDY SITE

## 3.1 Location and the receiving environment

It is planned to develop the Lungile poultry farm on part of the Farm Waterval 34 JS, situated in the Dr JS Moroka local municipality, Mpumalanga. (Figure 3.1).

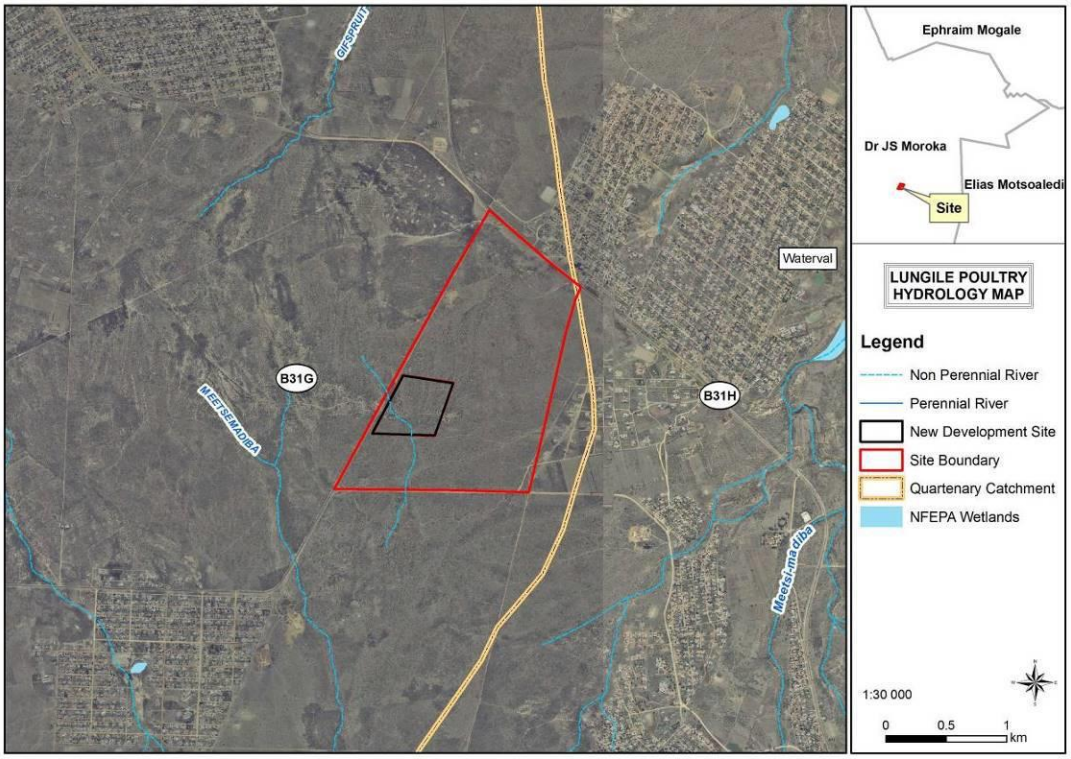



Figure 3.1: The locality of the study site


Figure 3.2 Google Earth Image of the site indicating the area of the proposed smaller development site within the larger site, and also the residential developments to the north and east of the site.

### 3.2 Geology and Soil

The area is underlain by granite of the Lebowa Granite Suite with shallow to deep sandy soils. Some longitudinal rocky outcrops occur on the site.

### 3.3 Regional Climate

Summer rainfall and with a mean annual precipitation about 600 mm. Mean monthly maximum temperatures exceed 35$^{o}$C while the mean monthly minimum is as low as -3$^{0}$C. Frost is however infrequent in winter.

### 3.4 Topography and Drainage

The site is located on a flat sandy plain, about 990 m above sea level. The NFEPA map shows a small drainage line in the south-western corner of the site (Figure 3.3), though the presence of this was not confirmed during the field survey.

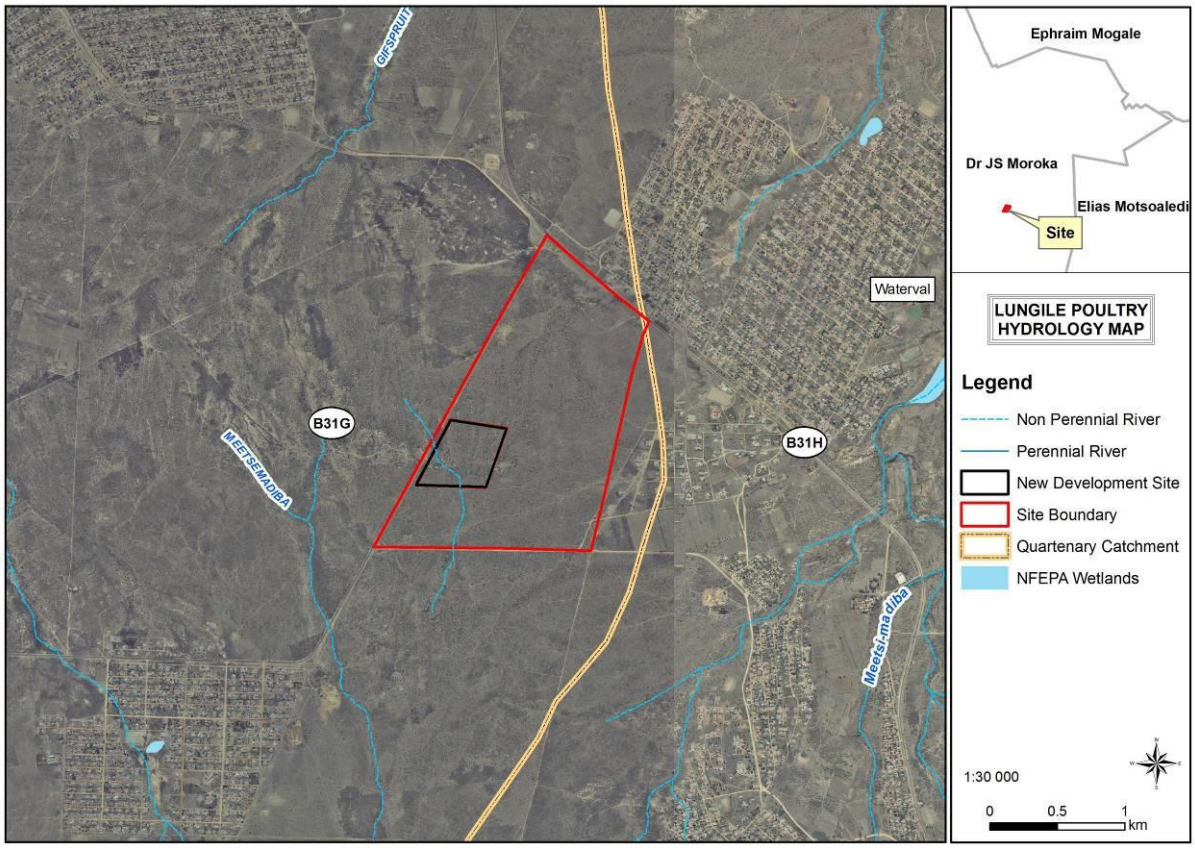



Figure 3.3: The general hydrology of the site and surrounding areas

### 3.5 Land-use

The land –use in the general area is residential to the north and east, and agricultural on the site and also to the west and south of the site (Figure 1.1).

### 3.6 Vegetation Types

The site is situated within the Central Sandy Bushveld (SVcb 12) vegetation type (Mucina & Rutherford 2006)(Figure 3.4).

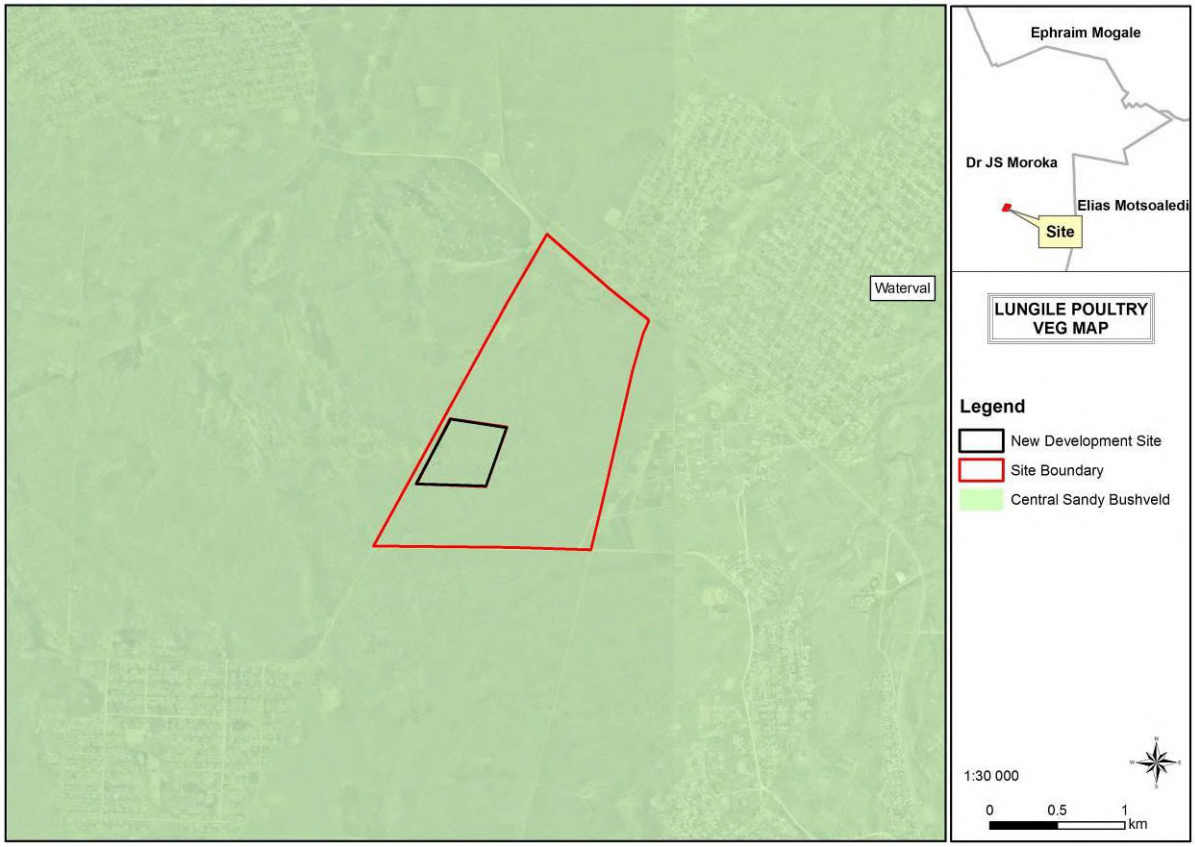



Figure 3.4: The entire site falls within Central Sandy Bushveld.

The site is covered with primary though utilized by grazing, broad-leaved bushveld vegetation, dominated by *Combretum apiculatum* and locally on deep sand by *Terminalia sericea* and *Terminalia brachystemma,* while *Spirostachys africana* is prominent on a small local depression with sodic soil and also on the rocky outcrops. The grass layer was heavily grazed and very short at the time of the site visit.

Mucina & Rutherford (2006) regarded this vegetation type as Vulnerable, as 24% of the area has been transformed for rural towns villages and associated rural agriculture. However, this vegetation type is not included as a threatened ecosystem by SANBI & DEAT (2009).

# 4. METHODS: VEGETATION AND FLORA

### 4.1. Initial preparations:

For background information, the relevant maps, aerial photographs and other information on the natural environment of the concerned area were obtained.

### 4.2. Site visit: vegetation and flora

The field survey took place on 7 March 2018 with an additional brief site visit on 16 March 2018. Different habitat types were identified on aerial images of the site. At several sampling sites within each plant community / habitat type, a description of the dominant and characteristic species found was made. These descriptions were based on total floristic composition, following established vegetation survey techniques (Mueller-Dombois & Ellenberg 1974; Westhoff & Van der Maarel 1978). Data recorded resulted in a list of the plant species present, including trees, shrubs, grasses and forbs. A species list was therefore derived for the site. These vegetation survey methods have been used as the basis of a national vegetation survey of South Africa (Mucina *et al*. 2000) and are considered to be an efficient method of describing vegetation and capturing species information. Additional notes were made of any other features that might have an ecological influence.

The identified systems are not only described in terms of their plant species composition, but also evaluated in terms of the potential habitat for Red Data plant species.

Threatened ecosystems are identified using Mucina & Rutherford (2006) and SANBI & DEAT 2009).

Critically Endangered, Endangered, Vulnerable and Protected Species (NEMBA species, TOPS species) are evaluated against the list published in Department of Environmental Affairs and Tourism Notice No. 2007 (National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)).

Protected trees are identified in accordance with the list of nationally protected trees published in Government Notice No. 29062 3 (2006) (National Forests Act, 1998 (Act No. 84 0f 1998), as Amended (Department of Water Affairs Notice No 897, 2006).

Lists of Red Data plant species for the area were obtained from the SANBI data bases, with updated threatened status, (Raimondo *et al* 2009) for the map grid 2527DB. These lists were then evaluated in terms of habitat available on the site.

Alien invasive species, according to the Conservation of Agricultural Resources Act (Act No.43 of 1983) as listed in Henderson (2001) and other weeds Bromilov (2010) are indicated.

Medicinal plants are indicated according to Van Wyk, Van Oudthoorn & Gericke (1997).

### 4.3. Conservation Value

The MBSP map (Figure 4.1) indicates no Critical Biodiversity Areas, no Ecological Support Areas and no Buffer Areas for the site. The site is located in “Other Natural Areas” (Figure 4.1).

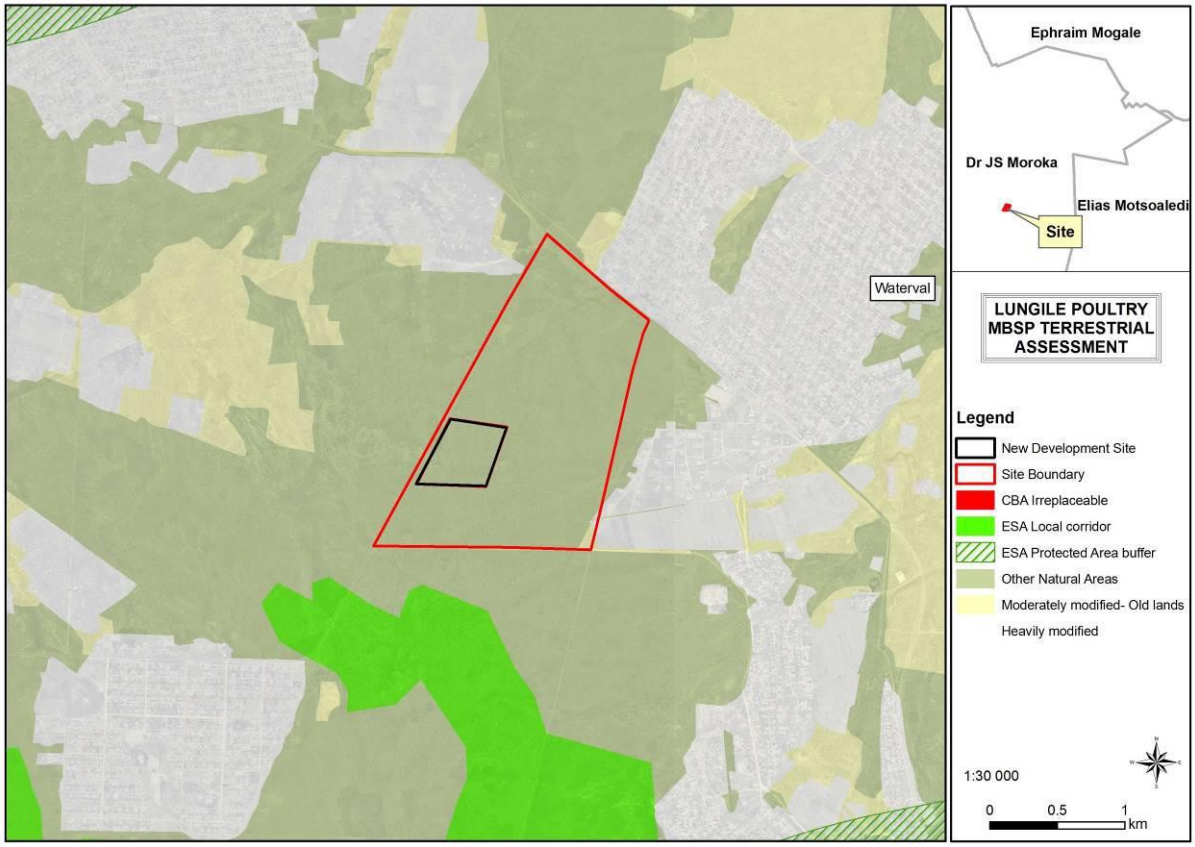



Figure 4.1: The conservation value of the site and surrounding area.

The following **conservation value** categories were used for assessing the study site:
**High**: Ecologically sensitive and valuable land with high species richness and/or sensitive ecosystems or red data species that should be conserved and no developed allowed.
**Medium-high**: Land where sections are disturbed but which is in general ecologically sensitive to development/disturbances.
**Medium**: Land on which low impact development with limited impact on the vegetation / ecosystem could be considered for development. It is recommended that certain portions of the natural vegetation be maintained as open space.
**Medium-low**: Land of which small sections could be considered to conserve but where the area in general has little conservation value.
**Low**: Land that has little conservation value and that could be considered for developed with little to no impact on the vegetation.

### 4.4 Ecological Sensitivity

It has been clearly demonstrated that vegetation not only forms the basis of the trophic pyramid in an ecosystem, but also plays a crucial role in providing the physical habitat within

which organisms complete their life cycles (Kent & Coker 1992). Therefore, the vegetation of an area will largely determine the ecological sensitivity thereof.

The vegetation sensitivity assessment aims to identify whether the vegetation within the study area is of conservation concern and thus sensitive to development:

In order to determine the sensitivity of the vegetation (ecosystem) on the site, weighting scores are calculated per plant community. The following six criteria are used, and each allocated a value of 0-3.

- Conservation status of a regional vegetation unit;
- Listed ecosystem (e.g. wetlands, hills and ridges etc)
- Legislative protection (e.g. threatened ecosystems, SANBI & DEAT 2009)
- Plant species of conservation concern (e.g. red listed, nationally or provincially protected plant species, habitat or potential habitat to plants species of conservation concern, protected plants or protected trees);
- Situated within ecologically functionally important features (e.g. wetlands or riparian areas; important habitat for rare fauna species)
- Conservation importance (e.g. untransformed and un-fragmented natural vegetation, high plant species richness, important habitat for rare fauna species).

Sensitivity is calculated as the sum the values of the criteria. The vegetation with the lowest score represents the vegetation that has the least / limited sensitivity). A maximum score of 18 can be obtained, a score of 15-18 indicated high sensitivity. The sensitivity scores are as follows (Table 4.1):

Table 4.1: Sensitivity Weighting scores for vegetation.

| **Scoring** | 15-18 | 12-14 | 9-11 | 6-8 | 0-5 |
|---|---|---|---|---|---|
| **Sensitivity** | High | Medium-High | Medium | Medium-Low | Low |

Development on vegetation that has High sensitivity will normally not be supported, except that specific circumstances may still lead to support of the proposed development.

Portions of vegetation with Medium-High or Medium sensitivity should be conserved**.**

Development may be supported on vegetation considered to have Medium-Low or Low sensitivity.

### 4.4 Plant Species Status

Plant species recorded in each plant community with an indication of the status of the species by using the following symbols:
A = Alien woody species; D = Dominant; d = subdominant; G = Garden or Garden Escape; M = Medicinal plant species; P = Protected trees species; p = provincially protected species; RD = Red data listed plant; W = weed.

### 4.5 Species Richness

Species Richness is interpreted as follows: Number of indigenous species recorded in the sample plots representing the plant community. Alien woody species and weeds are not included (Table 4.2).

Table 4.2: Categories of plant species richness.

| **No of species** | **Category** |
|---|---|
| 1-24 | Low |
| 25-39 | Medium |
| 40-59 | High |
| 60+ | Very High |

### 4.5 Limitations

The disturbed nature of the herbaceous layer.

# 5. METHODS: VERTEBRATES

## 5.1. Field Surveying Mammals and Herpetofauna

The site was visited on 7 March 2018. During this the observed and derived presence of vertebrates associated with the recognized habitat types of the study site, were recorded. This was done with due regard to the well recorded global distributions of Southern African mammals and herpetofauna coupled to the qualitative and quantitative nature of recognized habitats.

The 500-meter-wide transect along the proposed sewer line was scanned for important vertebrate habitats. During the site visit mammals and herpetofauna were identified by visual sightings by driving and walking in transects across the site. No trapping or mist netting was conducted, as the terms of reference did not require such intensive work. In addition, mammals were also identified by means of spoor, droppings, burrows or roosting sites.

Three criteria were used to gauge the probability of occurrences of mammals and herpetofauna species on the study site. These include known distribution ranges, habitat preferences and the qualitative and quantitative presences of suitable habitats.

## 5.2. Desktop Survey Mammals and Herpetofauna

As many mammals, reptiles and amphibians are either secretive, nocturnal, hibernators, migrators and/or seasonal, distributional ranges and the presence of suitable habitats were used to deduce the presence or absence of these species based on authoritative tomes, scientific literature, field guides, atlases and data bases. This can be done with a high level of confidence irrespective of season.

The probability of occurrences of vertebrate species was based on their respective geographical distributional ranges and the suitability of on-site habitats.

**High probability** would be applicable to a species with a distributional range overlying the study site as well as the presence of prime habitat occurring on the study site. Another consideration for inclusion in this category is the inclination of a species to be common, i.e. normally occurring at high population densities.

**Medium probability** pertains to a mammal species with its distributional range peripherally overlapping the study site, or required habitat on the site being sub-optimal. The size of the site as it relates to its likelihood to sustain a viable breeding population, as well as its geographical isolation is also taken into consideration. Species categorized as medium normally do not occur at high population numbers, but cannot be deemed as rare.

**A low probability** of occurrence will mean that the species' distributional range is peripheral to the study site and habitat is sub-optimal. Furthermore, some mammals categorized as low are generally deemed to be rare.

### 5.3 Specific Requirements: Mammals

During the visit the site was surveyed and assessed for the potential occurrence of Red Data and/or wetland-associated species such as Juliana's golden mole (*Neamblosomus juliana*), Highveld golden mole (*Amblysomus septentrionalis*), Rough-haired golden mole (*Chrysospalax villosus*), African marsh rat (*Dasymys incomtus*), Angoni vlei rat (*Otomys angoniensis*), Vlei rat (*Otomys irroratus*), White-tailed rat (*Mystromys albicaudatus*), a member of shrews such as the Forest shrew (*Myosorex varius*), Southern African hedgehog *(Atelerix frontalis), a number of bats such as the* Short-eared trident bat (*Cloeotis percivali*), African clawless otter (*Aonyx capensis*), Spotted-necked otter (*Lutra maculicollis*), Marsh mongoose (*Atilax paludinosus*), Brown hyena (*Parahyaena brunnea*).

### 5.4 Specific Requirements: Herpetofauna

A list of species which may occur on the site was compiled, based on the impressions gathered during the site visit, as well as publications such as FitzSimons' Snakes of Southern Africa (Broadley, 1990), Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998), A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007), Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates, Branch, Bauer, Burger, Marais, Alexander & De Villiers, 2014), Amphibians of Central and Southern Africa (Channing 2001), Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (Minter, Burger, Harrison, Braack, Bishop & Kloepfer, 2004, 2004) and A Complete Guide to the Frogs of Southern Africa (Du Preez & Carruth ers, 2009). The latest taxonomic nomenclature was used. The potential occurrences of Giant Bullfrog (*Pyxicephalus adspersus*) and Southern African Python (*Python natalensis*) are important.
.

### 5.5 Assessment Criteria mammals and herpetofauna

The conservation status of habitats within the study site can be assigned to one of five levels of sensitivity, i.e.

**High**: Ecologically sensitive and valuable land, with high species richness, sensitive ecosystems or Red Data species, that should be conserved and no development allowed.

**Medium-high**:Land where sections are disturbed but that is still ecologically sensitive to development/disturbance.

**Medium**: Land on which low-impact development with limited impact on the ecosystem could be considered, but where it is still recommended that certain portions of the natural habitat be maintained as open spaces.

**Medium-low**: Land on which small sections could be considered for conservation but where the area in general has little conservation value.

**Low**: Land that has little conservation value and that could be considered for developed with little to no impact on the habitats or avifauna.

### 5.6 Field and Desktop Surveying Birds

Birds occurring at the site of the proposed development were assessed in several steps, as detailed below. Red-listed species were identified using the recent (2015) Red Data Book for South Africa, Lesotho and Swaziland {Taylor, 2015 #91}.

Prior to the site visit, a desktop study was undertaken in which bird species that potentially occur at the site and in the surrounding areas were identified using data from the first and second South African Bird Atlas Projects (SABAP 1 and 2). A list of species potentially occurring at the site was developed This species list is thus based on an area much larger than the actual development site. This approach is adopted to ensure that all species potentially occurring at the site, whether resident, nomadic, or migratory, are identified.

A site visit took place on 7 March 2018, with a total of approximately 6 hours spent on site. The weather during the visit was warm, partly cloudy and with little wind. During the site visit, birds occurring at the site were identified by walking transects. During walking transects all birds encountered (seen or heard) were identified, nests observed were identified, and the avian habitats present were assessed.

**Limitations**

The disturbed nature of the herbaceous layer.

# 6. RESULTS: VEGETATION

### 6.1 Vegetation (map units) Classification

The general vegetation on the site is dominated by 2-4 m tall *Combretum apiculatum* trees and shrubs. At locally more disturbed patches the invasive *Dichrostachys cinerea* is prominent. At a few scattered north-south stretching, low and narrow, rocky outcrops occur on both the smaller and larger sites. Here *Spirostachys africana* is dominant. A small drainage area that may experience brief washes during high rainfall events is present on the western boundary of the site. *Vachellia tortilis* and *Spirostachys africana* are prominent in this area.

Four mapping units were identified (Figure 6.1, Table 6.1). The ecological sensitivity is of the mapping units are shown in Figure 7.2.

**Table 6.1: List of mapping units with ecological sensitivity:**

| | **Vegetation mapping unit** | **Sensitivity analysis result** |
|---|---|---|
| 1 | *Combretum apiculatum* plains bushveld | Medium-Low |
| 2 | *Spirostachys africana* rocky outcrops vegetation | Medium |
| 3 | *Terminalia sericea-Terminalia brachystemma* shrubveld on deep soil | Low |
| 4 | *Spirostahys africana-Vachellia tortilis* bushveld on sodic lower-lying area | Medium |

Q = quarry/burrow pit

Hatched area: Suggested area for the development

A vegetation map indicating the distribution of the mapping units is presented in Figure 6.1, while the ecoogical sensitivity is given in Figure 6.2.

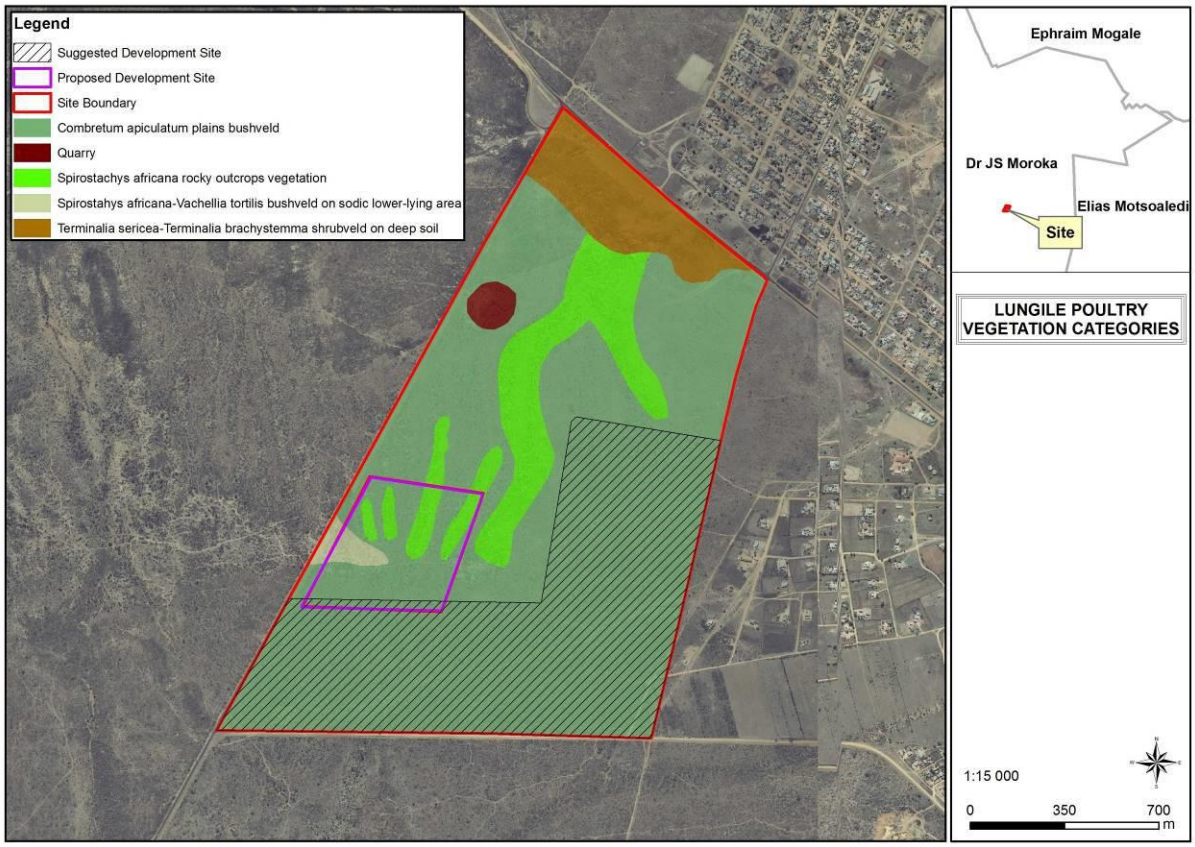



Figure 6.1: A vegetation map of the site.

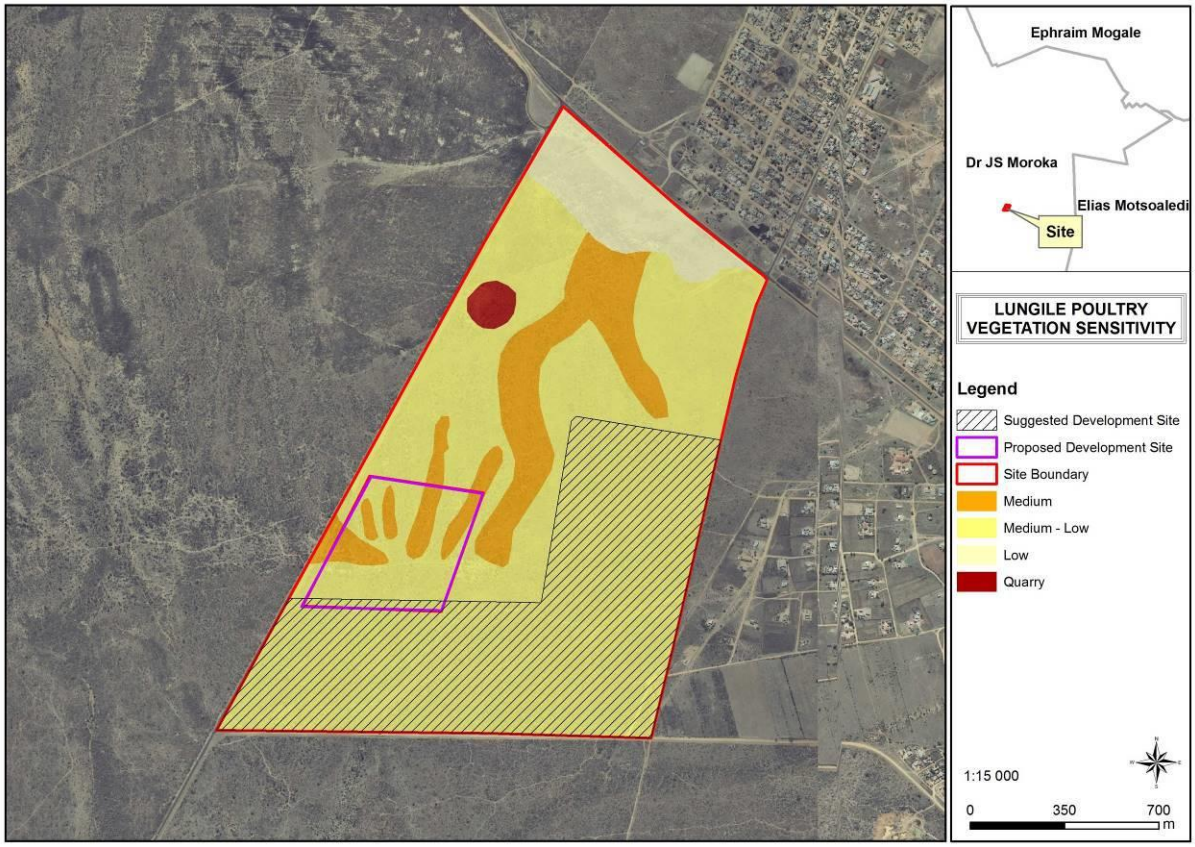



Figure 6.2: Ecological sensitivity of the site:

## 6.2 Description of the vegetation of the mapping units

### 6.2.1. *Combretum apiculatum* plains bushveld

This is a fairly dense bushveld occurs widely over the entire site (Figure 6.1), with trees and shrubs, 2-4 m tall, covering 40-50%. *Combretum apiculatum* is mostly the dominant woody species (Figure 6.3). At local more disturbed areas *Dichrostachys cinerea* is dominant (Figure 6.4). The grass layer is shortly grazed and covers only 15-20% (Figures 6.3 & 6.4).

Figure 6.3: The *Combretum apiculatum* plains bushveld with *Combretum apiculatum* dominant and with scanty grass layer.

Figure 6.4: *Dichrostachys cinerea* prominent at more disturbed areas with very low grass cover.

The following plant species were recorded in this plant community:

**Trees and shrubs, dwarf shrubs**

| | | | |
|---|---|---|---|
| *Boscia foetida* | | *Peltophorum africanum* | |
| *Cereus jamacaru* | A | *Sclerocarya birrea* | PM |
| *Combretum apiculatum* | D | *Searsia leptodictya* | |
| *Combretum hereroensis* | | *Senegalia burkei* | |
| *Combretum zeyheri* | | *Strychnos pungens* | M |
| *Commiphora africana* | | *Terminalia brachystemma* | d |
| *Dichrostachys cinerea* | d | *Terminalia sericea* | d |
| *Euclea undulata* | | *Vachellia erioloba* | P |
| *Flueggea virosa* | | *Vachellia gerrardii* | |
| *Gardenia volkensii* | | *Vachellia tortilis* | |
| *Grewia bicolor* | | | |
| *Mundulea sericea* | M | | |

**Grasses and sedges**

| | | | |
|---|---|---|---|
| *Aristida congesta* | | *Eragrostis rigidior* | d |
| *Cymbopogon pospischilii* | | *Eragrostis superba* | |
| *Eragrostis heteromera* | | *Digitaria eriantha* | d |
| *Eragrostis lehmanniana* | | *Heteropogon contortus* | |

| | | | |
|---|---|---|---|
| *Melinis repens* | | *Setaria sphacelata* | |
| *Pogonarthria squarrosa* | | *Tricholaena monachne* | |

**Forbs**

| | | | |
|---|---|---|---|
| *Abutilon austro-africanum* | | *Ledebouria revoluta* | |
| *Aloe greatheadii* | p | *Ocimum americanum* | |
| *Blepharis integrifolius* | | *Pterodiscus speciosus* | |
| *Commelina africana* | | *Ruellia cf patula* | |
| *Corchorus asplenifolius* | M | *Senecio inaequilatera* | |
| *Crassula lanceolata* | | *Senna italica* | W |
| *Dipcadi* sp | | *Solanum incanum* | |
| *Felicia muricata* | | *Solanum panduriforme* | W |
| *Geigeria burkei* | | *Tagetes minuta* | W |
| *Hilliardiella oligocephala* | M | | |

**Table 6.2 Number of species recorded:**

| | **Indigenous** | **Aliens / Weeds** | **Total** | **Red Data** | **Protected** | **Medicinal** |
|---|---|---|---|---|---|---|
| **Trees and shrubs** | 21 | 1 | 22 | 0 | 2 | 3 |
| **Grasses** | 12 | 0 | 12 | 0 | 0 | 0 |
| **Forbs** | 16 | 3 | 19 | 0 | 1 | 2 |
| **Total** | 49 | 4 | 53 | 0 | 3 | 5 |

The species richness is high and no red data listed species was found. Two protected tree species and a single provincially forb species (*Aloe greatheadii*) were recorded on the site.

| **Table 6.3 *Combretum apiculatum* plains bushveld summary** | | | |
|---|---|---|---|
| **Status** | Primary though heavily grazed bushveld | | |
| **Soil** | Shallow to deep sandy soil | **Rockiness** | 0-5% |
| **Conservation value:** | Medium (widespread) | **Ecological sensitivity** | Medium-Low |
| **Species richness:** | High | **Need for rehabilitation** | Low |
| **Dominant spp.** | *Combretum apiculatum, Terminalia sericea, Terminalia brachystemma, Dichrostachys cinerea* | | |

**Discussion**

Although this vegetation type is primary bushveld and has high plant species richness, including two nationally protected tree species, it is very widely distributed and not rare or at all threatened. The specific site is furthermore located adjacent to existing residential areas.

The site is ideally located for the proposed chicken farm development. It is suggested that the proposed development be supported in any area on the site that is occupied by this plant community.

### 6.2.2. *Spirostachys africana* rocky outcrop vegetation.

Some parallel north-south stretching, low and narrow, rocky outcrops occur on both the large site as well as the proposed smaller site (Figure 6.1). The bushveld on these rocky areas is taller and denser than the surrounding *Combretum apiculatum* plains bushveld (Figure 6.5). On these rocky areas the trees are 4-7 m tall and cover up to 40% while shrubs, 2-3 m tall, cover 15-30%. *Spirostachys africana, Combretum apiculatum* and *Pappea capensis* are prominent but several other woody species are present. The grass layer is poorly developed and covers only about 10% (Figures 6.5).

Figure 6.5: The dense bushveld on the somewhat raised rocky outcrops with *Combretum apiculatum* and *Spirostachys africana* and with scanty grass layer.

The following plant species were recorded in this plant community:

**Trees and shrubs, dwarf shrubs**

| | | | |
|---|---|---|---|
| *Aloe castanea* | | *Grewia bicolor* | |
| *Boscia foetida* | | *Gymnosporia buxifolia* | |
| *Carissa bispinosa* | | *Maerua parvifolia* | |
| *Cereus jamacaru* | A | *Pappea capensis* | d |
| *Combretum apiculatum* | d | *Sarcostemma viminale* | |
| *Combretum hereroensis* | | *Searsia leptodictya* | |
| *Combretum zeyheri* | | *Spirostachys africana* | dp |
| *Dichrostachys cinerea* | | *Vachellia gerrardii* | |
| *Euclea undulata* | M | *Vachellia robusta* | |
| *Euphorbia ingens* | | *Vachellia tortilis* | |
| *Flueggea virosa* | | *Ziziphus mucronata* | M |

**Grasses and sedges**

| | | | |
|---|---|---|---|
| *Aristida congesta* | | *Eragrostis superba* | |
| *Eragrostis heteromera* | | *Melinis repens* | |
| *Eragrostis lehmanniana* | | *Pogonarthria squarrosa* | |
| *Eragrostis rigidior* | d | *Tricholaena monachne* | |

**Forbs**

| | | | |
|---|---|---|---|
| *Abutilon austro-africanum* | | *Felicia muricata* | |
| *Aloe greatheadii* | p | *Ruellia cf patula* | |
| *Commelina africana* | | *Solanum incanum* | |
| *Crassula lanceolata* | | *Solanum panduriforme* | W |
| *Cyanotis speciosa* | | *Tagetes minuta* | W |

**Table 6.4. Number of species recorded:**

| | Indigenous | Aliens / Weeds | Total | Red Data | Protected | Medicinal |
|---|---|---|---|---|---|---|
| **Trees and shrubs** | 21 | 1 | 22 | 0 | 1 | 2 |
| **Grasses** | 8 | 0 | 8 | 0 | 0 | 0 |
| **Forbs** | 8 | 2 | 10 | 0 | 1 | 0 |
| **Total** | 37 | 3 | 40 | 0 | 2 | 2 |

The species richness is medium, mainly due to a lack of herbaceous species that are absent under the dense woody layer. No red data listed species was found and one provincially protected tree and one provincially protected forb were recorded in this plant community.

| **Table 6.5 *Spirostachys africana* rocky outcrop vegetation summary** | | | |
|---|---|---|---|
| **Status** | Primary bushveld on rocky areas | | |
| **Soil** | Shallow rocky soil | **Rockiness** | 40-70% |
| **Conservation value:** | Medium-High (widespread) | **Ecological sensitivity** | Medium |
| **Species richness:** | Medium | **Need for rehabilitation** | Low |
| **Dominant spp.** | *Combretum apiculatum, Spirostachys africana, Pappea capensis* | | |

## Discussion

This plant community is restricted to rocky outcrops and is therefore unique and rare. This primary bushveld and has medium plant species richness, but with many tree species. It is not threatened due to the very dense woody layer and difficulty to access or to develop within this dense vegetation. The *Spirostachys africana* rocky outcrop vegetation has a Medium ecological sensitivity. This is, however, a special, more restricted, rocky habitat with very dense vegetation and specific plant species composition, with *Spirostachys africana* often the dominant tree species. In Mpumalanga *Spirostachys africana* (Tamboti) is a provincially protected tree (Mpumalanga Nature Conservation Act No 10 of 1998 – Protected plants Sect 69(1)(a) Schedule 11).

It is suggested that the proposed development avoid construction in these rocky areas.

### 6.2.1. *Terminalia sericea-Terminalia brachystemma* shrubveld on deep sand

This is a dense shrubveld plant community that is restricted to deep sand on the north-western part of the large site (Figure 6.1). Locally, along the northern boundary some burrow pits are present. The vegetation is characterised by shrubs, 2-3 m tall and covering up to 50%, with *Terminalia sericea* and *Terminalia brachystemma* the dominant woody species. At local more disturbed areas *Dichrostachys cinerea* is prominent. The grass layer is shortly grazed and covers only 15-20% (Figures 6.3 & 6.4).

Figure 6.5: The *Terminalia sericea-Terminalia brachystemma* shrubveld in the north-western part of the large site.

The following plant species were recorded in this plant community:

**Trees and shrubs, dwarf shrubs**

| | | | |
|---|---|---|---|
| *Agave americana* | A | *Grewia bicolor* | |
| *Cereus jamacaru* | A | *Peltophorum africanum* | |
| *Combretum apiculatum* | | *Sclerocarya birrea* | PM |
| *Combretum hereroensis* | | *Searsia leptodictya* | |
| *Combretum zeyheri* | | *Terminalia brachystemma* | d |
| *Dichrostachys cinerea* | d | *Terminalia sericea* | d |
| *Euclea undulata* | | *Vachellia gerrardii* | |
| *Flueggea virosa* | | *Vachellia tortilis* | |
| *Gardenia volkensii* | | | |

**Grasses and sedges**

| | | | |
|---|---|---|---|
| *Aristida congesta* | | *Digitaria eriantha* | d |
| *Eragrostis heteromera* | | *Melinis repens* | |
| *Eragrostis lehmanniana* | | *Pogonarthria squarrosa* | |
| *Eragrostis superba* | | *Tricholaena monachne* | |

**Forbs**

| | | | |
|---|---|---|---|
| *Abutilon austro-africanum* | | *Geigeria burkei* | |
| *Aloe greatheadii* | p | *Ocimum americanum* | |
| *Blepharis integrifolius* | | *Senecio inaequilatera* | |
| *Corchorus asplenifolius* | M | *Senna italica* | W |
| *Evolvulus alsinoides* | | *Solanum panduriforme* | W |
| *Felicia muricata* | | | |

**Table 6.6 Number of species recorded:**

| | Indigenous | Aliens / Weeds | Total | Red Data | Protected | Medicinal |
|---|---|---|---|---|---|---|
| **Trees and shrubs** | 15 | 2 | 17 | 0 | 1 | 1 |
| **Grasses** | 8 | 0 | 8 | 0 | 0 | 0 |
| **Forbs** | 9 | 2 | 11 | 0 | 1 | 1 |
| **Total** | 32 | 4 | 36 | 0 | 2 | 2 |

The species richness is medium and no red data listed species was found. A single protected tree species and a single provincially protected forb species were recorded in this plant community.

| **Table 6.7 *Terminalia sericea-Terminalia brachystemma* shrubveld on deep sand summary** | | | |
|---|---|---|---|
| **Status** | Disturbed primary bushveld | | |
| **Soil** | Deep sandy soil | **Rockiness** | 0% |
| **Conservation value:** | Medium to Low | **Ecological sensitivity** | Medium-Low |
| **Species richness:** | Medium | **Need for rehabilitation** | Low |
| **Dominant spp.** | *Terminalia sericea, Terminalia brachystemma, Dichrostachys cinerea* | | |

**Discussion**

This vegetation type is disturbed primary bushveld and has medium plant species richness, including one nationally protected tree species (Marula) and one provincially protected forb species. This vegetation type is not rare or at all threatened. The specific vegetation is

furthermore located adjacent to existing residential areas. The developer does not want to locate the proposed chicken farm in this area.

### 6.2.4. *Spirostachys africana-Vachellia tortilis* bushveld on sodic lower-lying area.

This plant community is restricted to the western boundary of the proposed smaller site, close to the tarred road (Figure 6.1). The deep sandy soil is somewhat sodic with some surface erosion (Figure 6.9) this area is considered to be ecological more sensitive due to a relatively higher erosion potential. Surface water flows westwards towards the tarred road only during heavy rainfall events. There is a culvert under the road (Figure 6.8). The bushveld on these areas forms local bush clumps but with bare or almost bare soil between the bush clumps (Figure 6.9). The prominent woody species are *Spirostachys africana, Vachellia tortilis, Vachellia robusta* and *Euclea undulata.* On these drainage areas the trees and shrubs are 1-6 m tall and cover 40-60%. The grass layer is poorly developed and covers only about 1-5% (Figures 6.9), with *Panicum coloratum* under the bush and *Eragrostis lehmanniana* and *Digitaria eriantha* on the open patches.

Figure 6.8: The culvert under the road.

Figure 6.9: Typical *Spirostachys africana-Vachellia tortilis* bushveld on lower-lying sodic soil area with bush clumps and almost bare soil with local signs of erosion.

The following plant species were recorded in this plant community:

**Trees and shrubs, dwarf shrubs**

| | | | |
|---|---|---|---|
| *Boscia foetida* | | *Flueggea virosa* | |
| *Carissa bispinosa* | | *Grewia bicolor* | |
| *Cereus jamacaru* | A | *Gymnosporia buxifolia* | |
| *Combretum hereroensis* | | *Spirostachys africana* | dp |
| *Commiphora africana* | | *Vachellia robusta* | d |
| *Dichrostachys cinerea* | | *Vachellia tortilis* | d |
| *Euclea undulata* | M | *Ziziphus mucronata* | M |

**Grasses and sedges**

| | |
|---|---|
| *Aristida congesta* | *Melinis repens* |
| *Digitaria eriantha* | *Panicum coloratum* |
| *Eragrostis lehmanniana* | *Urochloa mossambicense* |

**Forbs**

| | | | |
|---|---|---|---|
| *Abutilon austro-africanum* | | *Solanum incanum* | |
| *Aloe greatheadii* | p | *Solanum panduriforme* | W |
| *Felicia muricata* | | *Tagetes minuta* | W |
| *Ruellia cf patula* | | | |

**Table 6.8: Number of species recorded:**

| | Indigenous | Aliens / Weeds | Total | Red Data | Protected | Medicinal |
|---|---|---|---|---|---|---|
| **Trees and shrubs** | 13 | 1 | 14 | 0 | 1 | 1 |
| **Grasses** | 6 | 0 | 6 | 0 | 0 | 0 |
| **Forbs** | 5 | 2 | 7 | 0 | 1 | 0 |
| **Total** | 24 | 3 | 27 | 0 | 2 | 1 |

The species richness is only a low medium, mainly due to a lack of herbaceous species. No red data listed species was found and no protected tree species were recorded in this plant community.

| **Table 6.9. *Spirostachys africana – Vachellia tortilis* bushveld on lower-lying sodic soil summary** | | | |
|---|---|---|---|
| **Status** | Bushveld on sodic soil with signs of erosion | | |
| **Soil** | Sandy, sodic soil | **Rockiness** | 0% |
| **Conservation value:** | Medium-High | **Ecological sensitivity** | Medium |
| **Species richness:** | Medium | **Need for rehabilitation** | Low |
| **Dominant spp.** | *Spirostachys africana, Vachellia robusta, Vachellia tortilis* | | |

**Discussion**

Due to the fact that this area is relatively prone to erosion the area is considered to be somewhat ecologically sensitive, and therefore it is suggested that development should not be supported in this area.

### 6.3 Plants of Conservation Concern

Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened, Extinct in the wild, Data deficient, Near-threatened, Critically rare, Rare and Declining. These plants are nationally protected by the National Environmental Management: Biodiversity Act (Raimondo *et al*, 2009).

Threatened species are those that are facing high risk of extinction, indicated by the categories Critically Endangered (CE), Endangered (EN) and Vulnerable (VU). Species of Conservation Concern include the Threatened Species, but additionally have the categories Near Threatened (NT), Data Deficient (DD), (DDT = lack of taxonomic data), Critically Rare (CR), Rare (R) and Declining (D). This is in accordance with the new Red List for South African Plants (Raimondo *et al*. 2009).

The only red listed plant species from Grid 2528BB is *Lydenburgia cassinoides* that is listed as Near Threatened. This species does not occur on the site and there is no suitable habitat for this species on the site.

### 6.4. Provincially Protected Plants

Two provincially protected plants were found on the site. Many individuals of *Aloe greatheadii* are present, and the provincially protected tree *Spirostachys africana* is present.

### 6.5. Nationally Protected Plants

Many individual of the nationally protected tree *Sclerocarya birrea* (Marula) and a few individuals of *Vachellia erioloba* (Camel thorn) occur on the larger site, particularly in the southern parts. No TOPS /NEMBA plant species occur on the site.

The National Forest Act, 1998 (Act No. 84 of 1998) enforces the protection of several indigenous trees. The removal, thinning or relocation of protected trees will require a permit from the Department of Agriculture, Forestry and Fisheries (DAFF) (Notice of the List of Protected Tree Species under the National Forests Act, 1998, Notice 835, Government Gazette, 23 September 2010).

### 6.6. Alien Invasive Plant Species

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. Therefore, it is important that these plants controlled and eradicated by means of an eradication and monitoring program. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The amended Regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) identifies three categories of problem plants:

Category 1 (Declared weeds): plants may not occur on any land other than a biological control reserve and must be controlled or eradicated. Therefore, no person shall establish plant, maintain, propagate or sell/import any category 1 plant species;
Category 2 (Declared invaders): plants are plants with commercial application and may only be cultivated in demarcated areas (such as biological control reserves) otherwise they must be controlled; and
Category 3 (Declared invaders): plants are ornamentally used and may no longer be planted, except those species already in existence at the time of the commencement of the regulations (30 March 2001), unless they occur within 30 m of a 1:50 year flood line and must be prevented from spreading.

In addition, a second draft of the Alien and Invasive Species Regulations, as well as a new draft list of categories of invasive species in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) was published in the Government Gazette No. 32090, in April 2009. Any species designated under section 70 cannot be propagated, grown, bought or sold by the industry without a permit. Whereas CARA previously classified problem plants into two groups - declared weeds and plant invaders - the amended regulations make provision for four groups: declared weeds (Category 1 plants), plant invaders (Category 2 and Category 3 plants) and indicators of bush encroachment. The first three groups consist of undesirable alien plants and are covered by Regulation 15. Bush encroachers, which are indigenous plants that require sound management practices to prevent them from becoming problematic, are covered separately by Regulation 16.

Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
Category 1b: Invasive species requiring compulsory control as part of an invasive species control program. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management program. No permits will be issued.
Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

In terms of the amendments to the regulations under the Conservation of Agriculture Resources Act, 1983 (Act No. 43 of 1983) and Regulation 598, Government Gazette 37885, August 2014)(Alien and Invasive Species Regulations), landowners are legally responsible for the control of alien species on their properties.

The declared invasive plant species that occur on the site that should be removed and controlled (Conservation of Agricultural Resources Act (Act 43 of 1983) are:

*Agave americana* Category 1b

*Cereus jamacaru* Category 1a

### 6.7. Vegetation Importance and Sensitivity

The result of the sensitivity analysis is given in Table 6.2.

| **Scoring** | 15-18 | 12-14 | 9-11 | 6-8 | 0-5 |
|---|---|---|---|---|---|
| **Sensitivity** | High | Medium-High | Medium | Medium-Low | Low |

Table 6.2: Scoring of vegetation that occurs within the study area.

| Vegetation | Conservation Status of regional Vegetation unit | Listed Ecosystem | Legislated Protection | Species of conservation concern | Ecological Function | Conservation Importance | Total Score out of max of 18 |
|---|---|---|---|---|---|---|---|
| 1. *Combretum apiculatum* plains bushveld | **1** | **0** | **1** | **2** | **2** | **1** | **7 Medium-Low** |
| 2. *Spirostachys africana* rocky outcrop vegetation | **1** | **0** | **2** | **2** | **2** | **3** | **10 Medium** |
| 3. *Terminalia sericea-Terminalia brachystemma* shrubveld on deep soil | **1** | **0** | **0** | **1** | **1** | **1** | **4 Low** |
| 4. *Vachellia tortilis* bushveld on sodic lower-lying area | **1** | **0** | **1** | **2** | **3** | **2** | **9 Medium-** |

The result of the sensitivity assessment (Table 6.2) indicates that although the *Combretum apiculatum* are primary, though utilized bushveld, these plant communities are considered to have Medium-Low (not higher) sensitivity. This is due to their widespread distribution over a very large area and they are consequently not threatened or rare. However important to note that two nationally protected tree species (Marula and Camel Thorn) do occur within the larger study site, and care must be taken to avoid cutting specimens down. Depending on the precise position of the smaller site, where the poultry farm will be developed, it is likely that no protected trees will be in the way of the development.

The *Spirostachys africana* rocky outcrop vegetation has a Medium ecological sensitivity. This is a special, more restricted, rocky habitat with very dense vegetation and specific plant species composition, with *Spirostachys africana* often the dominant tree species. In Mpumalanga *Spirostachys africana* (Tamboti) is a provincially protected tree (Mpumalanga Nature Conservation Act No 10 of 1998 – Protected plants Sect 69(1)(a) Schedule 11).

The *Terminalia sericea-Terminalia brachystemma* shrubveld on deep sand is more disturbed, close to developed area, and without species of conservation concern, and also has a widespread distribution. The ecological sensitivity is considered to be Low, mainly due to its disturbed condition.

*Vachellia tortilis* bushveld on sodic lower-lying area has Medium ecological sensitivity, due to the presence of the provincially protected *Spirostachys africana* and the sodic soil is prone to erosion.

### 6.8: Conclusion: Vegetation and Flora

Four plant communities (mapping units, ecosystems) were identified, ecologically assessed and described. The vegetation is mostly natural, primary bushveld but has been intensive grazed by livestock and has locally been utilised for sand/gravel burrow pits/quarries.

In general the vegetation of the site has Medium to Medium-Low ecological sensitivity and Medium conservation value.

There are no red data listed plant species but two nationally and one provincially protected tree species and an *Aloe* species on the site. The development of the poultry farm can be supported, though it is suggested that the current indicated site be moved to the southern or south-eastern part of the larger site, in order to avoid the sodic lower-lying areas and rocky areas. Protected trees (Marula, Camel Thorn and Tamboti) should be avoided if possible.

# 7. RESULTS: MAMMALS

## 7.1 Mammal Habitat Assessment

Rautenbach (1978 & 1982) found that mammal assemblages can at best be correlated with botanically defined biomes such as those by Low and Rebelo (1996 & 1998), and latterly by Mucina and Rutherford (2006) as well Knobel and Bredenkamp (2006). Hence, although the former's work has been superseded by the work of the latter two, the definitions of biomes are similar and both remain valid for mammals and are therefore recognized as a reasonable determinant of mammal distribution.

The local occurrences of vertebrates are, on the other hand, closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of vertebrate species by evaluating the habitat types within the context of global distribution ranges. Sight records and information from residents or knowledgeable locals audit such deductions.

Two of the major habitat types are represented namely terrestrial and arboreal. Although rocky elements are present, these are insufficient to be regarded as *bone fide* rupicolous habitat for discerning rock-dwelling vertebrates. The woodland habitat type is represented by bush willow, silver cluster and in particular a dense stand of sickle bush. The nature of the ca. 2 meters high sickle bush is indicative of ecological abuse as result of regular fires and heavy grazing. As a result of the increase in the density of sickle bush and its shade-effect, terrestrial habitat became degraded and is presently near-barren.

The site clearly does not excite as an ecological conservation asset!

## 7.2. Observed and Expected Mammal Species Richness

To maintain the diversity of species, connectivity is an imperative to allow for immigration and emigration. The site is now isolated by townships (Figures 7.1 – 7.5), particularly to the east, north-west and south-west. As such connectivity is progressively being jeopardized.

Historically, the site in its pristine state harbored a full complement of terrestrial and arboreal small and medium-sized mammals adapted to the Central Sandy Bushveld biome. As a consequence of progressing urbanization, we have no doubt that discerning small vertebrates and all medium and large mammals have been displaced.

The site is now hemmed in by urbanization and is as such now essentially an ecological island. Surviving species and populations are threatened by inbreeding and ultimately by localized extinction since gene flows are no longer possible, apart from catastrophic events such as fire and over-utilization.

All large mammals (viz. elephants, buffaloes, black wildebeests, plain's zebras, lions, brown and spotted hyenas, aardwolves,) have a century or more ago been hunted out for sport or to maximise farming practices. More recently progressive intensive land-use practices (particular urbanization) systematically displaced medium-sized mammals such as baboons,

vervet monkeys, pangolin, black-backed jackals, aardwolf etc. Some species are assumed to be on the edge of disappearing from the site such as the scrub hare and the two genet species. Species that managed to persist are all robust species with wide ecological tolerances or/and with high reproductive rates, some of whom are inclined to become problem animals in an urban setting.

The conservation status of the site is abominable. As such, discerning species such as white-tailed rats have been displaced by the destructive practices that impacted on habitat quality. Considering the fact that arboreal mammals are not well-adapted to exist in low woody plants (such as sickle buss), these are mostly absent.

Table 7.1: Mammal diversity. The species observed or deduced to occupy the site. (Systematics and taxonomy as proposed by Bronner et.al [2003], Skinner & Chimimba [2005], Apps [2012] and Stuart & Stuart [2015]).

| | SCIENTIFIC NAME | ENGLISH NAME |
|---|---|---|
| | Order Lagomorpha | |
| | Family Leporidae | |
| √ | *Lepus saxatilis* | Scrub hare |
| | Order Rodentia | |
| | Family Bathyergidae | |
| √ | *Cryptomys hottentotus* | African mole rat |
| | Family Tryonomyidae | |
| ? | *Thryonomys swinderianus* | Greater cane rat |
| | Family Muridae | |
| * | *Rhabdomys pumilio* | Four-striped grass mouse |
| * | *Mus minutoides* | Pygmy mouse |
| √ | *Mastomys natalensis* | Natal multimammate mouse |
| * | *Aethomys ineptus* | Tete veld rat |
| * | *Otomys irroratus* | Vlei rat |
| ? | *Gerbilliscus brantsii* | Highveld gerbil |
| | Order Eulipotypha | |
| | Family Soricidae | |
| DD? | *Myosorex varius* | Forest shrew |
| DD? | *Crocidura hirta* | Lesser red musk shrew |
| | Order Chiroptera | |
| | Family Molossidae | |
| * | *Tadarida aegyptiaca* | Egyptian free-tailed bat |
| | Family Vespertilionidae | |
| * | *Neoromicia capensis* | Cape serotine bat |
| * | *Scotophilus dinganii* | African yellow house bat |
| * | *Scotophilus viridis* | Greenish yellow house bat |
| | Order Carnivora | |
| | Family Viverridae | |
| ? | *Genetta genetta* | Small-spotted genet |
| * | *Genetta tigrina* | SA large-spotted genet |
| | Family Herpestidae | |
| * | *Cynictis penicillata* | Yellow mongoose |
| * | *Galerella sanguinea* | Slender mongoose |

√ Definitely there or have a *high* probability to occur;
***** *Medium* probability to occur based on ecological and distributional parameters;
**?** *Low* probability to occur based on ecological and distributional parameters.

### 7.3 Threatened and Red Listed Mammal Species

Red Data species rankings as defined in Friedmann and Daly's S.A. Red Data Book / IUCN (World Conservation Union) (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower Risk near threatened, DD = Data Deficient. All other species are deemed of Least Concern.

The two Red Data species (Table 8.1) are shrews ranked as "Data Deficient" (Friedmann and Daly, 2004), which is a precautionary category to compensate for a dearth of field data in making a factual assessment of their true conservation status. "DD"-rated shrews operate at the apex of their food pyramid via an invertebrate trophic sublevel, which means that their population numbers are significantly lower than that of their prey species in order to maintain sustainable prey population levels. Because of their diet, they are furthermore not readily trapped with conventional bait or traps, which may mean that their numbers are under-estimated. Specimen collection of shrews using drift fences and pitfalls invariably yield better acquisition results than live-trapping, which reiterate the sentiment that shrews numbers are more often than not under-estimated and that many species' conservation status are misconstrued.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

None of the species listed in Table 8.1 is particularly rare.

**Threatened mammal species recognised:**

**-By the IUCN Red Data List**

The compilation of Red Data mammals (Friedman and Daly (editors) 2004) is in fact a contribution to the IUCN initiative. Opinions expressed therein are elucidated above.

**-By the Biodiversity Act No 10 of 2004**

None.

**By the Regulations of the Provincial Authority**

This is closely follow in the findings of a panel of mammologists (Friedman and Day [Eds.] 2004).

**-Endemism:**

None of the species purported to be residents of the study site and surrounding areas are endemic to Mpumalanga..

### 7.4 Conclusion

Mammal species richness has been dramatically reduced by urban encroachment, land-use, isolation and habitat neglect or destruction. No more than 15 species remained, and it is predicted that over time these will also perish as result of some or other catastrophic or inbreeding.

No rare or endangered mammal species now reside on the study site.

It is suggested that the planned development be supported.

# 8. RESULTS: BIRDS

## 8.1 General

A list of bird species expected to occur on site was derived initially from the quarter-degree grid records presented in an atlas of southern African birds (Harrison et al. 1997). Based on an assessment of the habitats present at the site, and on the best regional fieldguide for the area (Marais & Peacock 2008), the list was then reduced to those species that were judged as 'possible' or 'likely' to occur within those habitats as residents or regular visitors. Due to the considerable aerial mobility of birds, a number of additional species might be expected as infrequent nomads or vagrants, but these were not included on the list. It was judged that the habitats available would offer no significant material support or conservation assistance to these species, and that if they did occur it would be temporarily and in insignificant numbers. 'Possible' refers to species that might use their mobility to make intermittent use of the habitats available when they are in a particular condition (during or after rain, flood, drought, burn, grazing, seeding, flowering) or season (regional, intra-African or inter-continental migrants). 'Likely' refers to species that are expected to make regular use of the site for feeding, roosting and/or breeding. Species actually recorded on site during the field survey are expected to fall into the latter category unless annotated otherwise.

No objective assessment was made of the carrying capacity of the habitat for any species, since this varies through time and birds are capable of arriving or departing as conditions change. Special attention was paid to species considered as threatened internationally or nationally (Taylor et al. 2015), and to those considered as species of conservation priority within Gauteng (GDARD 2014a, 2014b). The category assigned to these species was raised to include infrequent visitors as 'likely', based on the precautionary principle. Further details of the extent and limits of various habitat types detected during the field survey and on adjacent properties were also obtained by study of satellite images from Google Earth.

The habitats occupied by flighted birds differ from those of most terrestrial vertebrates in being explicitly three-dimensional, especially for aerial-feeding species and in the airspace above landscapes with low relief and short vegetation, such as occurred at the site. In the two primarily terrestrial dimensions, most birds are also more dependent on vegetation structure, and substrate texture and colour, than they are on vegetation composition, with the exception of a minority of species with particular food requirements of foliage, flowers, fruit or seeds. However, although the vegetation biomes and units most recently described for South Africa are defined primarily on vegetation composition, they do offer good analyses of the abiotic factors that also underlie these divisions, such as topography, geology, soil types and climate, and on general structural features of vegetation types and landscapes (Mucina & Rutherford, 2006). The habitats at the site occur primarily within the Tsakane Clay Grassland (Mucina & Rutherford, 2006).

The aerial mobility of birds also demands paying attention to the principal habitats surrounding the study site and their conservation status, not just those along the immediate borders but also more distant habitats that might provide sources for species visiting the site and sinks for those breeding on site. In this regard, the rocky ridges within Andesite

Mountain Bushveld extend far to the southeast (Balfour, Greylingstad), and west (~15 km to Suikerbosrand Nature Reserve), while the Blesbokspruit may form an important ecological corridor of open water. The Marievale Bird Sanctuary, SA021, is an Important Bird Area (IBA) and RAMSAR site, and downstream is the Karan floodplain above the Blesbokspruit-Suikerbosrandrivier confluence, a proposed IBA and RAMSAR site (Kemp 2006 a & c).

Birds are also a relatively visible and audible group of homeothermic vertebrates, active throughout the year, and with habitat preferences that can be evaluated from experience, by reference to the comprehensive literature available and by the subset of species that can be detected by a field survey during a particular season and time of day. Such information and experience also informs and enables searches for particular species of conservation concern.

### 8.2 Bird Habitat Assessment

The principal habitat types detected on the site that are most relevant to bird ecology and community structure are:

- Woodland. These occur on sandy substrates with shallow to deep soils. The grasses are all shortly grazed.
- Degraded, transformed residential areas to the north and east of the site.
- Limited agricultural lands in the vicinity of the site.

Habitats adjacent to the study are basically similar to those found on the site.

### 8.3 Expected and Observed Bird Species Richness

A total of 105 species are expected or were recorded on the site (Table 8.1). Of these only 32 species were recorded on the site during the visit.

### 8.4 Threatened and Red Listed Bird Species

There are five species that are among those listed as of special conservation concern and some of these are also of national and even international concern (Taylor *et al.* 2015). Several of these are expected to only visit the site occasionally (Cape Vulture, Lesser Kestrel and Secretarybird), since there exists no obvious roost or breeding habitats for these species on site. All are species that have either large home ranges or wander widely in search of food.

The woodland does not really offer suitable breeding habitat for White-bellied Korhaan or Blue Cranes.

Table 8.1: Bird species diversity expected and observed at the study site. Names and systematic order after Hockey *et al*. (2005), habitat preferences as above, estimated

probability of occurrence, and national Red Data (Taylor *et al.* 2015) and GDARD conservation priority (GDARD 2014a, 2014b).

| Scientific names | Common names | Probability of occurrence+ | Priority species, † |
|---|---|---|---|
| *Francolinus levaillantii* | Orange River Francolin | ** | |
| *Francolinus levaillantoides* | Red-winged Francolin | * | |
| *Pternistes swainsonii* | Swainson's Spurfowl | ** | |
| *Coturnix coturnix* | Common Quail | S | |
| *Numida meleagris* | Helmeted Guineafowl | ** | |
| *Alopochen aegyptiacus* | Egyptian Goose | ** | |
| *Anas undulate* | Yellow-billed Duck | ** | |
| *Turnix sylvatica* | Kurrichane Buttonquail | * | |
| *Merops apiaster* | European Bee-eater | * | |
| *Chrysococcyx caprius* | Diederik Cuckoo | ** | |
| *Tachymarptis melba* | Alpine Swift | * | |
| *Apus apus* | European Swift | * | |
| *Apus barbatus* | African Black Swift | * | |
| *Apus affinis* | Little Swift | ** | |
| *Apus caffer* | White-rumped Swift | S | |
| *Apus horus* | Horus Swift | * | |
| *Columba livia* | Rock Dove | ** | |
| *Columba guinea* | Speckled Pigeon | ** | |
| *Streptopelia senegalensis* | Laughing Dove | S | |
| *Streptopelia capicola* | Cape Turtle-Dove | S | |
| *Streptopelia semitorquata* | Red-eyed Dove | ** | |
| *Oena capensis* | Namaqua Dove | * | |
| *Neotis denhami* | Denham's Bustard | * | |
| *Eupodotis afraoides* | Northern Black Korhaan | ** | |
| *Eupodotis senegalensis* | White-bellied Korhaan | ** | † |
| *Anthropoides paradiseus* | Blue Crane | * | † |
| *Burhinus capensis* | Spotted Thick-knee | ** | |
| *Charadrius pecuarius* | Kittlitz's Plover | * | |
| *Vanellus armatus* | Blacksmith Lapwing | S | |
| *Vanellus coronatus* | Crowned Lapwing | S | |
| *Cursorius temminckii* | Temminck's Courser | ** | |
| *Glareola nordmanni* | Black-winged Pratincole | * | |
| *Elanus caeruleus* | Black-shouldered Kite | ** | |
| *Milvus migrans* | Black Kite | * | |
| *Gyps coprotheres* | Cape Vulture | * | † |
| *Circus macrourus* | Pallid Harrier | ** | |

| | | | |
|---|---|---|---|
| *Circus pygargus* | Montagu's Harrier | ** | |
| *Buteo vulpinus* | Steppe Buzzard | ** | |
| *Buteo rufofuscus* | Jackal Buzzard | * | |
| *Sagittarius serpentarius* | Secretarybird | ** | † |
| *Falco naumanni* | Lesser Kestrel | ** | † |
| *Falco rupicoloides* | Greater Kestrel | ** | |
| *Falco amurensis* | Amur Falcon | ** | |
| *Falco biarmicus* | Lanner Falcon | * | |
| *Falco peregrinus* | Peregrine Falcon | * | |
| *Ardea melanocephala* | Black-headed Heron | ** | |
| *Bubulcus ibis* | Cattle Egret | S | |
| *Bostrychia hagedash* | Hadeda Ibis | H | |
| *Ciconia ciconia* | White Stork | ** | |
| *Telophorus zeylonus* | Bokmakierie | H | |
| *Corvus albus* | Pied Crow | ** | |
| *Lanius collurio* | Red-backed Shrike | * | |
| *Lanius minor* | Lesser Grey Shrike | * | |
| *Lanius collaris* | Common Fiscal | S | |
| *Riparia paludicola* | Brown-throated Martin | S | |
| *Riparia cincta* | Banded Martin | S | |
| *Hirundo rustica* | Barn Swallow | ** | |
| *Cecropis cucullata* | Greater Striped Swallow | S | |
| *Petrochelidon spilodera* | South African Cliff Swallow | ** | |
| *Hirundo fuligula* | Rock Martin | * | |
| *Delichon urbicum* | Common House Martin | * | |
| *Acrocephalus palustris* | Marsh Warbler | ** | |
| *Cisticola tinniens* | Levaillant's Cisticola | S | |
| *Cisticola juncidis* | Zitting Cisticola | ** | |
| *Cisticola aridulus* | Desert Cisticola | ** | |
| *Cisticola textrix* | Cloud Cisticola | ** | |
| *Cisticola ayresii* | Wing-snapping Cisticola | ** | |
| *Prinia flavicans* | Black-chested Prinia | S | |
| *Mirafra cheniana* | Melodious Lark | S | |
| *Mirafra africana* | Rufous-naped Lark | S | |
| *Mirafra fasciolata* | Eastern Clapper Lark | ** | |
| *Chersomanes albofasciata* | Spike-heeled Lark | S | |
| *Certhilauda semitorquata* | Eastern Long-billed Lark | ** | |
| *Calandrella cinerea* | Red-capped Lark | S | |
| *Spizocorys conirostris* | Pink-billed Lark | * | |
| *Saxicola torquata* | African Stonechat | S | |

| | | | |
|---|---|---|---|
| *Oenanthe pileata* | Capped Wheatear | ** | |
| *Myrmecocichla formicivora* | Southern Anteating Chat | S | |
| *Lamprotornis bicolor* | Pied Starling | ** | |
| *Creatophora cinerea* | Wattled Starling | ** | |
| *Acridotheres tristis* | Common Myna | ** | |
| *Ploceus velatus* | Southern Masked Weaver | S | |
| *Quelea quelea* | Red-billed Quelea | S | |
| *Euplectes orix* | Southern Red Bishop | S | |
| *Euplectes albonotatus* | White-winged Widowbird | ** | |
| *Euplectes progne* | Long-tailed Widowbird | S | |
| *Anomalospiza imberbis* | Cuckoo Finch | * | |
| *Ortygospiza fuscicrissa* | African Quail-finch | ** | |
| *Amadina erythrocephala* | Red-headed Finch | S | |
| *Estrilda astrild* | Common Waxbill | S | |
| *Vidua macroura* | Pin-tailed Whydah | ** | |
| *Passer domesticus* | House Sparrow | ** | |
| *Passer melanurus* | Cape Sparrow | S | |
| *Motacilla capensis* | Cape Wagtail | S | |
| *Motacilla flava* | Yellow Wagtail | * | |
| *Macronyx capensis* | Cape Longclaw | S | |
| *Anthus cinnamomeus* | African Pipit | S | |
| *Anthus leucophrys* | Plain-backed Pipit | ** | |
| *Anthus vaalensis* | Buffy Pipit | ** | |
| *Anthus similis* | Long-billed Pipit | ** | |
| *Crithagra mozambica* | Yellow-fronted Canary | * | |
| *Crithagra atrogularis* | Black-throated Canary | ** | |
| *Crithagra flaviventris* | Yellow Canary | * | |
| *Crithagra gularis* | Streaky-headed Seedeater | H | |

+ Probability of occurrence (see text): * - possible; ** - likely; S – sighted; H – heard

**8.5 Conclusion**

The main impact of this poultry farm development for birds is likely to affect those species that reside and breed on the natural woodland on a very limited part of the site. This type of habitat is however widely available in the region and the site is not seen as an important site for birds. Therefore, the proposed development may be supported.

# 9. RESULTS: HERPETOFAUNA

## 9.1 Herpetofauna Habitat Assessment

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of reptile and amphibian species by evaluating the habitat types within the context of global distribution ranges. From a herpetological habitat perspective, it was established that two major habitats are naturally present on the study site, namely terrestrial and arboreal vegetation cover.

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Connectivity (to facilitate migration) to the site is fair and the limited extent of the development will not have a big effect on the connectivity.

## 9.2 Observed and Expected Herpetofaunal Species Richness

Of the 29 reptile species which may occur on the study site (Table 9.1), two were confirmed during the site visit (Table 9.2) and of the 10 amphibian species which may possibly occur on the study site (Table 9.1), none was confirmed during the site visit (Table 9.2).

The species assemblage is typical of what can be expected of this type of habitat. Most of the species of the resident diversity (Table 9.1) are fairly common and widespread (viz. the common house snake, mole snake, speckled rock skink, Cape gecko, guttural toad, Boettger's caco, common platanna and the common river frog).

Most of these herpetofauna species are robust generalists. It should be noted that potential occurrence is interpreted as being possible over a period of time, as a result of expansions and contractions of population densities and ranges which stimulate migration

**Table 9.1: Reptile and Amphibian diversity. The species observed or deduced to occupy the site. Systematic arrangement and nomenclature according to Carruthers & Carruthers (1979), Branch (1998), Alexander & Marais (2007), Minter, *et.al* (2004), Koen (2007), Du Preez & Carruthers (2009) and Bates, *et.al* 2014.**

| | SCIENTIFIC NAME | ENGLISH NAME |
|---|---|---|
| | **CLASS: REPTILIA** | **REPTILES** |
| | **Order: TESTUDINES** | **TORTOISES & TERRAPINS** |
| | **Family: Pelomedusidae** | **Side-necked Terrapins** |
| √ | *Pelomedusa subrufa* | Marsh Terrapin |
| | | |

| | SCIENTIFIC NAME | ENGLISH NAME |
|---|---|---|
| | **Order: SQUAMATA** | **SCALE-BEARING REPTILES** |
| | **Suborder:LACERTILIA** | **LIZARDS** |
| | **Family: Gekkonidae** | **Geckos** |
| √ | *Pachydactylus capensis* | Cape Gecko |
| | **Family:Lacertidae** | **Old World Lizards or Lacertids** |
| √ | *Nucras lalandii* | Delalande's Sandveld Lizard |
| | **Family: Gerrhosauridae** | **Plated Lizards** |
| * | *Gerhosaurus flavigularis* | Yellow-throated Plated Lizard |
| | **Family: Cordylidae** | **Cordylids** |
| √ | *Cordylus vittifer* | Common Girdled Lizard |
| | **Family: Scincidae** | **Skinks** |
| √ | *Afroablepharus wahlbergii* | Wahlberg's Snake-Eyed Skink |
| √ | *Trachylepis capensis* | Cape Skink |
| √ | *Trachylepis punctatissima* | Speckled Rock Skink |
| √ | *Trachylepis varia* | Variable Skink |
| | **Family: Varanidae** | **Monitors** |
| √ | *Varanus niloticus* | Nile Monitor |
| | **Family: Agamidae** | **Agamas** |
| √ | *Agama aculeata distanti* | Eastern Ground Agama |
| | | |
| | **Suborder: SERPENTES** | **SNAKES** |
| | **Family: Typhlopidae** | **Blind Snakes** |
| √ | *Afrotyphlops bibronii* | Bibron's Blind Snake |
| | **Family: Leptotyphlopidae** | **Thread Snakes** |
| √ | *Leptotyphlops scutifrons* | Peter's Thread Snake |
| | **Family: Viperidae** | **Adders** |
| √ | *Bitis arietans arietans* | Puff Adder |
| √ | *Causus rhombeatus* | Rhombic Night Adder |
| | **Family: Lamprophiidae** | |
| √ | *Aparallactus capensis* | Black-headed Centipede Eater |
| *NT?* | *Homoroselaps dorsalis* | Striped Harlequin Snake |
| √ | *Boaedon capensis* | Common House Snake |
| * | *Lamprophis aurora* | Aurora House Snake |
| √ | *Lycodonomorphus rufulus* | Brown Water Snake |
| √ | *Lycophidion capense* | Cape Wolf Snake |
| √ | *Psammophis crucifer* | Cross-Marked Grass Snake |
| √ | *Psammophylax rhombeatus* | Spotted Grass Snake |
| * | *Duberria lutrix* | Common Slug Eater |
| * | *Prosymna sundevallii* | Sundevall's Shovel-snout |
| √ | *Pseudaspis cana* | Mole Snake |
| | **Family: Elapidae** | **Cobras, Mambas and Others** |
| √ | *Hemachatus haemachatus* | Rinkhals |
| | **Family: Colubridae** | |
| √ | *Crotaphopeltis hotamboeia* | Red-Lipped Snake |
| √ | *Dasypeltis scabra* | Rhombic Egg Eater |
| | | |
| | **CLASS: AMPHIBIA** | **AMPHIBIANS** |
| | **Order: ANURA** | **FROGS** |
| | **Family: Pipidae** | **Clawed Frogs** |
| √ | *Xenopus laevis* | Common Platanna |
| | **Family: Bufonidae** | **Toads** |
| √ | *Amietaophrynus gutturalis* | Guttural Toad |

| | SCIENTIFIC NAME | ENGLISH NAME |
|---|---|---|
| * | *Amietaophrynus rangeri* | Raucous Toad |
| √ | *Schismaderma carens* | Red Toad |
| | **Family: Hyperoliidae** | **Reed Frogs** |
| √ | *Kassina senegalesis* | Bubbling Kassina |
| | **Family: Pyxicephalidae** | |
| √ | *Amietia angolensis* | Common River Frog |
| √ | *Cocosternum boettgeri* | Boettger's Caco |
| NT? | *Pyxicephalus adspersus* | Giant Bullfrog |
| √ | *Tomopterna cryptotis* | Tremolo Sand Frog |
| √ | *Tomopterna natalensis* | Natal Sand Frog |

√ Definitely there or have a *high* probability of occurring;
* *Medium* probability of occurring based on ecological and distributional parameters;
? *Low* probability of occurring based on ecological and distributional parameters.

Red Data species rankings as defined in Branch, The Conservation Status of South Africa's threatened Reptiles': 89 – 103..In:- G.H.Verdoorn & J. le Roux (editors), 'The State of Southern Africa's Species (2002) and Minter, *et.al*, Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, NT = Near Threatened, DD = Data Deficient. All other species are deemed of Least Concern.

**Table 9.2: Reptile and Amphibian species positively confirmed on the study site, observed indicators and habitat**

| SCIENTIFIC NAME | ENGLISH NAME | OBSERVATION INDICATOR | HABITAT |
|---|---|---|---|
| *Trachylepis punctatissima* | Speckled Rock Skink | Sight record of a few adults | Rocky area |
| *Agama aculeata* | Ground Agama | Sight record of an adult | Terrestrial habitat |

## 9.3 Red Listed Herpetofauna

***-By the Scientific Community***

The striped harlequin snake has not been recorded on this quarter degree square (TVL Museum Records or Ditsong Museum of Natural History), but very few moribund termitaria, where this species is most likely to be found, are present on the study site. It is very difficult to confirm whether this cryptic snake is present on any study site, but there is a very small chance this species could occur on this particular study site. The species has been collected in the Suikerbosrand Nature Reserve (Koen, 2007).

The coppery grass lizard has not been recorded on this quarter degree square (TVL Museum Records or Ditsong Museum of Natural History). This species does probably not occur on the study site.

There is no suitable habitat for bullfrogs on the site. It is important to note that in the latest literature (Measey (ed.) 2011 and Carruthers & Du Preez 2011); the giant bullfrog's status has changed officially from Near Threatened (Minter *et al*, 2004) to Least Concern in South Africa.

## 9.4 Discussion and Conclusion

It is concluded that some herpetofauna species, all widely distributed generalists, do occur or may occur on the study site. There is however no reason to conserve the site habitats for the sake of any herpetofauna species and the proposed development can be supported.

# 10. IMPACT ASSESSMENT

## 10.1. Methods

The methods and format of the impact tables used in this chapter are in accordance to the requirements of the 2014 Regulations.

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **probability (P)** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **duration (D)**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- The **extent (E)**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **magnitude (M)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- the **significance (S)**, which shall be determined through a synthesis of the characteristics described above (Table 10.1).

  The significance rating is calculated by the following formula:

  **S (significance) = (D + E + M) x (P)**
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated.*

The numerical value of the calculation is assigned to a significance category.

Table 10.1: Significance ranking of impacts

| | | | | | |
|---|---|---|---|---|---|
| **SIGNIFICANCE** | **Very High** | **High** | **Moderate** | **Low** | **Minor** |
| | **80-100** | **60-79** | **40-59** | **20-39** | **1-19** |

Impacts should be identified for the construction and operational phases of the proposed development. Proposed mitigation measures should be practical and feasible such that they can be realistically implemented by the applicant.

### 10.2 Impacts of the proposed development on the vegetation and flora of the site

The impact of the proposed chicken farm development on the vegetation of the *Combretum apiculatum* Plains Bushveld, where it is suggested the development should be located, was assessed.

The result of the sensitivity assessment (Table 6.2) indicates that although the *Combretum apiculatum* are primary, though utilized bushveld, these plant communities are considered to have Medium-Low (not higher) sensitivity. This is due to their widespread distribution over a very large area and they are consequently not threatened or rare. However important to note that two nationally protected tree species (Marula and Camel Thorn) do occur within the larger study site, and care must be taken to avoid cutting specimens down. Depending on the precise position of the smaller site, where the poultry farm will be developed, it is likely that no protected trees will be in the way of the development.

Table 10.3: Impact on *Combretum apiculatum* Plains Bushveld: Loss of indigenous vegetation due to clearing for construction of the residential town.

| ***Nature:*** The relatively small footprint for the proposed chicken farm development will be totally cleared of vegetation. This will result in the loss of some indigenous tree and herbaceous species, disturbance of plant populations and limited fragmentation of the plant community. The removal of vegetation will also expose soil increasing the risk of erosion. | | | | |
|---|---|---|---|---|
| | **Without mitigation** | | **With mitigation** | |
| **CONSTRUCTION PHASE** | | | | |
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | 2-5 years | 2 | 2-5 years | 2 |
| ***Extent*** | Limited to Site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Major | 7 | Moderate | 5 |
| ***Significance*** | **Moderate** | **50** | **Moderate** | **40** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | Permanent | 5 | Permanent | 5 |
| ***Extent*** | Limited to Site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Major | 7 | Moderate | 5 |
| ***Significance*** | **High** | **65** | **Moderate** | **55** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| | | | | |
| ***Reversibility*** | Low | | Medium | |
| ***Irreplaceable loss of resources?*** | Moderate | | Moderate | |
| ***Can impacts be mitigated?*** | Yes | | | |

***Mitigation:***

- The clearing of vegetation must be kept to a minimum and remain within the stands earmarked for development – leave some open space area with natural vegetation intact;
- Protected trees that may occur within the development site must be avoided – if this is not possible in limited cases, a permit to remove the particular individual tree is needed from the provincial forestry department;
- Construction must be completed as quickly as possible;
- Disturbed open areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous tree and grass species;
- During the construction phase workers must be limited to areas under construction and access to the planned open areas must be strictly controlled;
- Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
- Plant indigenous trees – no alien species.

***Cumulative impacts:*** Expected to reduce the bushveld environment in the area to a small extent.

***Residual Risks:*** Little anticipated provided that the mitigation measures are implemented correctly.

### 10.3 Impact due to increase in alien plant species

All cleared areas within the development sites may be prone to increase of alien trees an weed species.

Table 10.5: Increase of alien invasive plant species.

***Nature:*** Alien invasive plant species and weeds may encroach into disturbed areas.

| | **Without mitigation** | | **With mitigation** | |
|---|---|---|---|---|
| **CONSTRUCTION PHASE** | | | | |
| ***Probability*** | Definite | 4 | Probable | 2 |
| ***Duration*** | Medium-term | 3 | Medium-term | 1 |
| ***Extent*** | Limited to site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Moderate | 5 | Low | 2 |
| ***Significance*** | **Low** | **36** | **Minor** | **8** |
| ***Status (positive or negative)*** | Negative | | Positive | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Improbable | 2 | Very Improbable | 1 |
| ***Duration*** | Permanent | 5 | Permanent | 5 |
| ***Extent*** | Limited to site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Low | 2 | Low | 1 |
| ***Significance*** | **Minor** | **16** | **Minor** | **7** |
| ***Status (positive or negative)*** | Negative | | Positive | |
| | | | | |
| ***Reversibility*** | Moderate | | High | |
| ***Irreplaceable loss of resources?*** | Moderate | | Moderate | |
| ***Can impacts be mitigated?*** | Yes | | | |

| |
|---|
| ***Mitigation:***<br>• An alien invasive management programme must be incorporated into the Environmental Management Programme;<br>• Ongoing alien plant control must be undertaken;<br>• Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan **must** be implemented for the clearing/eradication of alien species.<br>• Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.<br>• Avoid planting of exotic plant species, use indigenous species. |
| ***Cumulative impacts:*** Moderate, should mitigation measure not be implemented. Alien invader plant species pose an ecological threat as they alter habitat structure; lower biodiversity, change ecosystem services and processes e.g. change nutrient cycling and productivity, and modify food webs. |
| ***Residual Risks:*** None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken. |

### 10.4 Impacts on mammals and herpetofauna

The conservation rating of the plains section (prior to land clearing) of the site or mammals and herpetofauna is considered to be **Low**. As the proposed project involves development of a chicken, the faunal impacts will largely be restricted to the construction phase, and fauna will be largely eliminated when the farm is operational. The two broad categories of impacts will be habitat loss and disturbance related to construction activities. Since the construction activities will take place over a small site area, the spatial extent of the impacts will be small.

The impact of the envisaged development is tabulated below

Table 10.6: Direct impact on mammal and herpetofauna communities and loss of faunal habitat.

| ***Nature:*** The proposed project involves the development of a chicken farm. The faunal impacts will include the construction and operational phases. Since the construction activities will be take place over a relatively small site area, the spatial extent of the impacts will be relatively small.<br>. | | | | |
|---|---|---|---|---|
| | **Without mitigation** | | **With mitigation** | |
| **CONSTRUCTION PHASE** | | | | |
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | Short duration | 2 | Short duration | 1. |
| ***Extent*** | Limited to site | 1 | Limited to site | 1 |
| ***Magnitude*** | Low | 4 | Low | 2. |
| ***Significance*** | **Low** | **35** | **Low** | **25** |
| ***Status (positive or negative)*** | Negative | | | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | Permanent | 5 | Permanent | 5 |
| ***Extent*** | Site | 1 | Site | 1 |

| | | | | |
|---|---|---|---|---|
| ***Magnitude*** | Low | 2 | Low | 1 |
| ***Significance*** | **Moderate** | **40** | **Low** | **35** |
| ***Status (positive or negative)*** | **Negative** | | **Negative** | |
| | | | | |
| ***Reversibility*** | No | | No. | |
| ***Irreplaceable loss of resources?*** | Yes | | Yes | |
| ***Can impacts be mitigated?*** | Yes | | | |

***Mitigation:***

- .The clearing of vegetation must be kept to a minimum and remain within the footprint of the development;
- The construction must be completed as quickly as possible - fauna species may be killed
- Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species;
- During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled;
- Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.

***Cumulative impacts:*** No

***Residual Risks*:** No.

### 10.5 Impacts on birds

#### 10.5.1 General comments

The impacts on avifauna will occur during both the construction and operational phases. The two broad categories of impacts will be habitat loss and disturbance related to construction activities and finally the increased presence of many residents during the operational phase.

Avian habitats in the areas where buildings, roads and other infrastructure are constructed, avian habitats will be permanently lost. The movement and activities of personnel and residents on site and the associated noise, pollution and litter all having a negative effect on birds. In addition, the presence of people will increase the probability of activities such as illegal killing of birds. Pollution associated with construction activities (e.g., fuel spills, use of cleaning chemicals) could have negative impacts on avifauna, particularly if such chemicals were to make their way into drainage lines and wetlands, even off-site. Electrical infrastructure such as distribution lines, as well as electric fences, pose a potential collision risk to flying birds, and a potential electrocution risk to perching birds.

#### 10.5.2 Specific impacts

Table 07: Avian habitat loss.

| ***Nature:*** A very small area of avian habitat will be destroyed during construction of the chicken farm area. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |

| CONSTRUCTION PHASE | | | | |
|---|---|---|---|---|
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | Short duration | 1 | Short duration | 1 |
| ***Extent*** | Site specific | 1 | Site specific | 1 |
| ***Magnitude*** | Very low | 2 | Very low | 2 |
| ***Significance*** | **Low** | **20** | **Low** | **20** |
| ***Status (positive or negative)*** | Negative | | | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Improbable | 1 | Improbable | 1 |
| ***Duration*** | Short duration | 2 | Short duration | 2 |
| ***Extent*** | Site specific | 1 | Site specific | 1 |
| ***Magnitude*** | Very low | 1 | Very low | 1 |
| ***Significance*** | **Minor** | **4** | **Minor** | **4** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| | | | | |
| ***Reversibility*** | High | | High | |
| ***Irreplaceable loss of resources?*** | No | | No | |
| ***Can impacts be mitigated?*** | Yes | | | |

***Mitigation:***

- The spatial extent of construction activities must be minimized, and as far as possible must be restricted to the areas on which buildings, roads etc will actually be located. Particular care must be taken to minimize activities in the areas of natural vegetation that will remain on the site..
- The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.
- Disturbance by residents of birds breeding and foraging in the area should be minimized.
- Provide adequate briefing for site personnel and residents.
- Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO).

***Cuculative Impacts:*** Expected to be minimal. It is not envisaged that any Red Data species will be displaced by the habitat transformation that will take place as a result of the construction and operation of the proposed development. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created town forms habitat for specific bird species.

***Residual Risks:*** None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.

Table 10.8: Impact on birds due to disturbance associated with construction activities and with increased human presence in the area.

***Nature:*** The presence of vehicles and construction workers will cause disturbance to avifauna, with the movement and activities of personnel on site and the associated noise, pollution and litter all having a negative effect on birds. In addition, the presence of construction workers will increase the probability of activities such as illegal hunting of birds. The permanent presence of a much larger number of people than presently occur at the site will result in greater disturbance of birds that use the area for foraging and breeding.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| **CONSTRUCTION PHASE** | | |

| | | | | |
|---|---|---|---|---|
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | Short term 2-5 years | 2 | Short term 2-5 years | 2 |
| ***Extent*** | Limited to Local Area | 2 | Limited to Local area | 2 |
| ***Magnitude*** | High | 8 | Medium | 6 |
| ***Significance*** | **High** | **60** | **Moderate** | **50** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Definite | 5 | Definite | 5 |
| ***Duration*** | Permanent | 5 | Permanent | 5 |
| ***Extent*** | Limited to Local Area | 2 | Limited to Local Area | 2 |
| ***Magnitude*** | High | 8 | High | 6 |
| ***Significance*** | **High** | **75** | **High** | **65** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| | | | | |
| ***Reversibility*** | Low | | Low | |
| ***Irreplaceable loss of resources?*** | High | | High | |
| ***Can impacts be mitigated?*** | Yes | | | |

***Mitigation:***

- Movement of construction vehicles and workers beyond the boundary of the site must be minimized. In addition, workers must be instructed to minimize disturbance of birds at all times, and steps must be taken to ensure that no illegal hunting occurs.
- The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.
- Disturbance by residents of birds breeding and foraging in the area should be minimized.
- Provide adequate briefing for site personnel and residents.
- Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO) and residents should always be aware of the importance of birds in their built environment.

***Cumulative impacts:*** Expected to be minimal. The habitat is however already largely transformed and fragmented due to the adjacent agricultural and residential activities and the site is not a unique habitat within the landscape. It is not envisaged that any Red Data species will be displaced by the habitat transformation that will take place as a result of the construction and operation of the proposed development. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created town forms habitat for specific bird species.

***Residual Risks:*** None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.

Table 10.9: Pollution associated with construction or operational activities

***Nature:*** Pollution associated with construction activities and residents (e.g., fuel spills, use of cleaning chemicals, management of waste products) could have negative impacts on avifauna.

| | **Without mitigation** | | **With mitigation** | |
|---|---|---|---|---|
| **CONSTRUCTION PHASE** | | | | |
| ***Probability*** | Improbable | 2 | Very Improbable | 1 |
| ***Duration*** | Short term 2-5 years | 2 | Short term 2-5 years | 2 |
| ***Extent*** | Limited to Site | 1 | Limited to Site | 1 |

| | | | | |
|---|---|---|---|---|
| ***Magnitude*** | Low | 4 | Minor | 2 |
| ***Significance*** | **Minor** | **14** | **Minor** | **5** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Improbable | 2 | Very Improbable | 1 |
| ***Duration*** | Medium term | 3 | Medium term | 3 |
| ***Extent*** | Limited to Site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Low | 4 | Minor | 2 |
| ***Significance*** | **Minor** | **16** | **Minor** | **6** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| | | | | |
| ***Reversibility*** | High | | High | |
| ***Irreplaceable loss of resources?*** | Low | | Low | |
| ***Can impacts be mitigated?*** | Yes | | | |

***Mitigation:***

- Great care must be taken that no pollutants or other waste pollute the area or enter local water systems during the construction or operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences.
- Construction workers must be suitably trained to deal with any such spills.
- Facilities to handle pollution and waste must be provided to residents.

***Cumulative impacts:*** Expected to be minimal. It is not envisaged that any Red Data species will be displaced. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created town forms habitat for specific bird species.

***Residual Risks:*** None anticipated provided that the mitigation measures are implemented correctly and rehabilitation of the site is undertaken.

Table 11.10: Electrocution and collision hazards

***Nature:*** Electrical infrastructure such as distribution lines, as well as electric fences, pose a potential collision risk to flying birds, and a potential electrocution risk to perching birds. The magnitudes of these risks are much lower than the corresponding risks associated with large overhead transmission lines. Assuming that the electrical infrastructure comprising part of the proposed development is typical of farming, no specific mitigation measures are required.

| | **Without mitigation** | | **With mitigation** | |
|---|---|---|---|---|
| **CONSTRUCTION PHASE** | | | | |
| ***Probability*** | Very Improbable | 1 | Very Improbable | 1 |
| ***Duration*** | Short term 2-5 years | 2 | Short term 2-5 years | 2 |
| ***Extent*** | Limited to Site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Low | 4 | Minor | 2 |

| | | | | |
|---|---|---|---|---|
| ***Significance*** | **Minor** | **7** | **Minor** | **5** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| **OPERATIONAL PHASE** | | | | |
| ***Probability*** | Improbable | 2 | Very Improbable | 1 |
| ***Duration*** | Medium term | 3 | Medium term | 3 |
| ***Extent*** | Limited to Site | 1 | Limited to Site | 1 |
| ***Magnitude*** | Low | 4 | Minor | 2 |
| ***Significance*** | **Minor** | **16** | **Minor** | **6** |
| ***Status (positive or negative)*** | Negative | | Negative | |
| | | | | |
| ***Reversibility*** | High | | High | |
| ***Irreplaceable loss of resources?*** | Low | | Low | |
| ***Can impacts be mitigated?*** | Yes | | | |
| ***Mitigation:***<br>• Normal safety measures for electrical installations as used by Eskom | | | | |
| ***Cumulative impacts:*** Expected to be minimal. It is not envisaged that any Red Data species will be displaced. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created town forms habitat for specific bird species. | | | | |
| ***Residual Risks:*** None. | | | | |

## 11. GENERAL CONCLUSIONS

### Vegetation and Flora

Four plant communities (mapping units, ecosystems) were identified, ecologically assessed and described. The vegetation is mostly natural, primary bushveld but has been intensively grazed by livestock and has locally been utilised for sand/gravel burrow pits/quarries.

In general the vegetation of the site has Medium to Medium-Low ecological sensitivity and Medium conservation value.

There are no red data listed plant species but two nationally and one provincially protected tree species and an *Aloe* species on the site. The development of the poultry farm can be supported, though it is suggested that the current indicated site be moved to the southern or south-eastern part of the larger site, in order to avoid the sodic lower-lying areas and rocky areas. Protected trees (Marula, Camel Thorn and Tamboti) should be avoided if possible.

### Mammals

Mammal species richness has been dramatically reduced by urban encroachment, land-use, isolation and habitat neglect or destruction. No more than 15 species remained, and it is predicted that over time these will also perish as result of some or other catastrophic or inbreeding.

No rare or endangered mammal species now reside on the study site.

It is suggested that the planned development be supported.

### Birds

From an avifaunal perspective, the conservation status of this site is medium-low – the grassland may still represent significant foraging and/or breeding habitat for some species of conservation significance. The main impact of this poultry farm development for birds is likely to affect those species that reside and breed on the natural woodland on a very limited part of the site. This type of habitat is however widely available in the region and the site is not seen as an important site for birds. Therefore, although avian habitats will be destroyed, the ultimate impact of the development on birds is considered to be insignificant and the development can be supported.

### Herpetofauna

It is concluded that some herpetofauna species, all widely distributed generalists, do occur or may occur on the study site. There is however no reason to conserve the site habitats for the sake of any herpetofauna species and the proposed development can be supported.

### Wetlands

No wetland habitat or watercourses were recorded on the site. However, water runoff accumulating in low-lying sections of the site should be accommodated through effective stormwater management to ensure that no erosion occurs.

## 12. LIMITATIONS, ASSUMPTIONS AND GAPS IN KNOWLEDGE

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. Discussions and proposed mitigations are to some extent made on reasonable and informed assumptions built on *bone fide* information sources, as well as deductive reasoning. Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage. EcoAgent can therefore not accept responsibility for conclusions and mitigation measures made in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

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NEMBA, National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species. Government Notices.

NEMBA, National Environmental Management Biodiversity Act, 2004. (Act 10 of 2004). Draft List of Threatened Ecosystems. Government Gazette RSA Vol. 1477, 32689, Cape Town, 6 Nov 2009.

NFA, National Forests Act, 2006 (Act 84 of 1998 as amended). Government Gazette RSA Vol. 897, 29062 , Cape Town, 8 Sept 2006.

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GDARD, 2014b. Technical Report for the Gauteng Conservation Plan (Gauteng C-Plan V3.3. Gauteng Department of Agriculture and Rural Development.

# 14. DETAILS OF SPECIALIST CONSULTANTS

## GEORGE JOHANNES BREDENKAMP

**Born**: 10 February 1946 in Johannesburg, South Africa.
**Citizenship**: South African
**Marital status**: Married, 1 son, 2 daughters

**Present work address**
Extra-ordinary Professor
Department of Plant Science, University of Pretoria, Pretoria, 0002, South Africa
Tel:(27)(12)420-3121 Fax: (27)(12)362 5099
E-Mail: george.bredenkamp@up.ac.za

***or***

EcoAgent CC, or Ecotrust Environmental Services CC
PO Box 25533, Monument Park, 0105, South Africa
Tel and Fax: (27)(12) 460 2525
Cell 082 5767046
E-Mail: ecoagent@mweb.co.za or ecoagent@mile.co.za

**Qualifications**:

1963 Matriculation Certificate, Kemptonpark High School
1967 B.Sc. University of Pretoria, Botany and Zoology as majors,
1968 B.Sc. Hons. (cum laude) University of Pretoria, Botany.
1969 T.H.E.D. (cum laude) Pretoria Teachers Training College.
1975 M.Sc. University of Pretoria, Plant Ecology .
1982 D.Sc. (Ph.D.) University of Pretoria, Plant Ecology.

**Theses**: (M.Sc. and D.Sc.) on plant community ecology and wildlife management in nature reserves in South African grassland and savanna.

**Professional titles**:

• MSAIE&ES South African Institute of Ecologists and Environmental Scientists
- 1989-1990 Council member
• MGSSA Grassland Society of Southern Africa
- 1986 Elected as Sub-editor for the Journal
- 1986-1989 Serve on the Editorial Board of the Journal
- 1990 Organising Committee: International Conference: Meeting Rangeland challenges in Southern Africa
- 1993 Elected as professional member
• Pr.Sci.Nat. South African Council for Natural Scientific Professions **Reg No 400086/83**
- 1993-1997 **Chairman** of the Professional Advisory Committee: Botanical Sciences

- 1993-1997: **Council** Member
- 1992-1994: Publicity Committee
- 1994-1997: Professional Registration Committee

**Professional career:**

• Teacher in Biology 1970-1973 in Transvaal Schools
• Lecturer and senior lecturer in Botany 1974-1983 at University of the North
• Associate professor in Plant Ecology 1984-1988 at Potchefstroom University for CHE
• Professor in Plant Ecology 1988-2008 at University of Pretoria.
• Founder and owner of the Professional Ecological Consultancy firms Ecotrust Environmental Services CC and Eco-Agent CC, 1988-present.

**Academic career:**

• Students:
- Completed post graduate students: M.Sc. 53; Ph.D. 14.
- Presently enrolled post-graduate students: M.Sc. 4; Ph.D. 1.

• Author of:
- 175 scientific papers in refereed journals
- >150 papers at national and international congresses
- >300 scientific (unpublished) reports on environment and natural resources
- 17 popular scientific papers.
- 39 contributions in books

• Editorial Committee of
- South African Journal of Botany,

Journal Grassland Society of Southern Africa,
Bulletin of the South African Institute of Ecologists.
Journal of Applied Vegetation Science.( Sweden)
- Phytocoenologia (Germany)

• FRD evaluation category: C1 (=leader in South Africa in the field of Vegetation Science/Plant Ecology)

**Membership:**

• International Association of Vegetation Science.
• International Society for Ecology (Intecol)
• Association for the Taxonomic study of the Flora of Tropical Africa (AETFAT).
• South African Association of Botanists (SAAB)
1988-1993 Elected to the **Council** of SAAB.
1989-1990 Elected as **Chairman** of the Northern Transvaal Branch
1990 Elected to the Executive Council as **Vice-President**
1990- Sub-editor Editorial Board of the Journal
1991-1992 Elected as **President** (2-year period)
1993 **Vice-President** and Outgoing President
• Wildlife Management Society of Southern Africa

• Suid-Afrikaanse Akademie vir Wetenskap en Kuns
(=South African Academy for Science and Art).
• Wildlife Society of Southern Africa
1975 - 1988: Member
1975 - 1983: Committee member, Pietersburg Centre
1981 - 1982: **Chairman**, Pietersburg Centre
• Dendrological Society of Southern Africa
1984 - present: Member
1984 - 1988: Committee member, Western Transvaal Branch
1986 - 1988: **Chairman**, Western Transvaal Branch
1987 - 1989: Member, Central Committee (National level)
1990 - 2000: Examination Committee
• Succulent Society of South Africa
1987 - present: Member
• Botanical Society of South Africa
2000 – present: Member
2001- 2008: Chairman, Pretoria Branch
2009-present Committee member Pretoria Branch
2002 – present: Chairman, Northern Region Conservation Committee
2002- 2007: Member of Council

**Special committees**:

• Member or past member of 10 special committees re ecology, botany, rangeland science in South Africa.
• Member of the International Code for Syntaxonomical Nomenclature 1993-1996.

**Merit awards and research grants**:

1968 Post graduate merit bursary, CSIR, Pretoria.
1977-1979 Research Grant, Committee re Research Development, Dept. of Co-operation and Development, Pretoria.
1984-1989 Research Grant, Foundation for Research Development, CSIR, Pretoria.
1986-1987 Research Grant, Dept. of Agriculture and Water Supply, Potchefstroom.
1990-1997 Research Grant, Dept. of Environmental Affairs & Tourism, Pretoria.
1991-present Research Grant, National Research Foundation , Pretoria.
Research Grant, Water Research Commission.
1999-2003 Research Grant, Water Research Commission.
2006 South African Association of Botanists Silwer Medal for outstanding contributions to South African Botany

**Abroad**:

1986 Travel Grant, Potchefstroom University for Christian Higher Education, Potchefstroom
Visits to Israel, Italy, Germany, United Kingdom, Portugal.
1987 Travel Grant, Potchefstroom University for Christian Higher Education, Potchefstroom.
Visits to Germany, Switzerland, Austria, The Netherlands, United Kingdom.
1990 Travel Grant, FRD.

Visit to Japan, Taiwan, Hong-Kong.

1991 Travel Grant, FRD.

Visits to Italy, Germany. Switzerland, Austria, France, The Netherlands, United Kingdom.

1993 Travel Grant, University of Pretoria.

Visits to the USA, Costa Rica, Czech Republic, Austria.

1994 Travel Grant FRD.

Visits to Switzerland, The Netherlands, Germany, Czech Republic.

1995 Travel Grant FRD, University of Pretoria

Visits to the USA

Travel Grant, University of Pretoria

Visit to the UK.

Travel Grant University of Pretoria, Visit Czech Republic, Bulgaria

Travel Grant, University of Pretoria, Visit Czech Republic, Italy, Sweden

Travel Grant, University of Pretoria, Visit Hungary, Spain, USA

Travel Grant, University of Pretoria, Visit Poland, Italy, Greece.

Travel Grant, NRF, Visit Brazil

2006 German Grant Invited lecture in Rinteln, Germany

**Consultant**

Founder and owner of Ecotrust Environmental Services CC and Eco-Agent CC
Since 1988 **>300** reports as consultant on environmental matters, including:
Game Farm and Nature Reserve planning,
Environmental Impact Assessments,
Environmental Management Programme Reports,
Vegetation Surveys,
Wildlife Management,
Veld Condition and Grazing Capacity Assessments,
Red data analysis (plants and animals).

## IGNATIUS LOURENS RAUTENBACH

### Independent Environmental Consultant – MAMMALOGY; Ph.D., Prof. Nat. Sci. .

**Identity Number** 421201 5012 00 5
**Gender** Male
**Date of Birth** 1 December 1942; born Germiston, RSA
**Nationality** South African
**Home Languages** Bilingual (English & Afrikaans)
**Postal Address** 45 Helgaard Street, Kilner Park, Pretoria, RSA 0186. Tel no +27 12 3334112, Cell +27 082 3351288. E-mail naasrauten@mweb.co.za
**Former Position** Retired Director: Planning, Northern Flagship Institute
**Present Position** Consultant – Specialist, Environmental Impact Assessments (Applied research), Photographing microstock for four agencies
**Qualifications** **B.Sc**. (UP) 1966, **T.H.E.D** (Pta TTC) 1967, **M.Sc.** (UP) 1971, **Ph.D**. (Un. Natal) 1971
**Professional Honours** 1. Professional Natural Scientist (Zoology) – S.A Council for Natural Scientific Professions, Registration # 400300/05
2. Fellow of the Photographic Society of South Africa
3. Master photographer at club level
4. Honorary life member of the S.A. Wildlife Management Association.
**Notable Research Contribution** In-depth survey of the Mammals of the Transvaal. 1982. 211pp. Ecoplan Monograph 1.
**Notable Literary Contribution** Rautenbach, Naas & Annalene Rautenbach. 2008. *Photography for Focused Beginners.* 302pp with 250 images. Green Door Studio, Pretoria.
**Formal Courses Attended** Computer Literacy, Project Management, Contract Design, Senior Management
**Employment history**
**May 2001 - Present** Self-employed, collaborator with Eco-Agent CC Ecological Consultants as well as Galago Environmental [environmental impact assessments], technical writing, and photography
**April 1999 - August 2001** Director: Planning, Northern Flagship Institution
**Jan 1991 - April 1999** Executive Director, Transvaal Museum
**July 1967 - Dec 1990** Curator (in charge) of the Division of Mammalogy, Transvaal Museum. Promoted to Principal Scientist rank as of June 1985
**March - June 1967** Research student at the Mammal Research Institute of the Zoology Department, University of Pretoria
**July 1966, Nov l966 - Febr 1967** Member of the Smithsonian Institution's field teams collectively partaking in the 'African Mammal Project'
**1966**: Part-time research assistant to Prof. J. Meester, University of Pretoria
**1962 - 1965** Temporary assistant during University holidays in the Nematology laboratories, Agricultural Technical Services
**1991 - 2002** Founder member and non-executive director of the Board of Trustees of
**1993 - 2001** Founder member and Trustee of the privatised Museums Pension Fund
**1997 - 2001** Non-executive director of the Tswaing Section 21 Company

**Professional Achievements**

**Managed** a research institute of 125 members of staff. Solicited numerous grants totalling ≥ R1 000 000. Initiated and overseen building programmes of R30 million at the Transvaal Museum. Conceptualised and managed 12 display programmes.

**Research:** Author and co-author of 85 scientific publications re mammalogy in peer reviewed subject journals, 18 popular articles, 10 books, and >400 contractual EIA research reports. Extensive field work and laboratory experience in Africa, Europe, USA, Alaska, Brazil and Mexico. B -rated by FRD as scientist of international status 1983 – 1995.

**Students:** Additional to museum manager duties, **c**o-supervised 5 B.Sc. (Hons.), 2 M.Sc. and 2 Ph.D. students.

**Public Recognition:**

Public speaking *inter alia* Enrichment Lecturer on board the 6* *SS Silver Wind*, radio talks, TV appearances.

**Hobbies**

Technical writing, photography, field logistics, biological observations, wood working, cooking, designs.

**Personal Evaluation**

I am goal-orientated, expecting fellow workers and associates to share this trait. I am an extrovert, sensitive to amicable interpersonal relations. I have a wide interest span ranging from zoological consulting, photography, cooking, sport, news, gardening and out of necessity, DIY. To compensate for my less than perfect memory, I lead a structured and organised life to deal with the detail of a variety of interests. Often to the chagrin to people close to me, I have an inclination to “Think Out of the Box”.

**ANTOINETTE BOOTSMA nee van Wyk**

| | |
|---|---|
| ID Number | 7604250013088 |
| Name of Firm: | Limosella Consulting |
| SACNASP Status: | Professional Natural Scientist # 400222-09 Botany and Ecology |

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**EDUCATIONAL QUALIFICATIONS**

- MSc Ecology, University of South Africa (2017) Awarded with distinction. Project Title: Natural mechanisms of erosion prevention and stabilization in a Marakele peatland; implications for conservation management
- Short course in wetland soils, Terrasoil Science (2009)
- Short course in wetland delineation, legislation and rehabilitation, University of Pretoria (2007)
- B. Sc (Hons) Botany, University of Pretoria (2003-2005). Project Title: A phytosociological Assessment of the Wetland Pans of Lake Chrissie
- B. Sc (Botany & Zoology), University of South Africa (1997 - 2001)

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**PUBLICATIONS**

- A.A. Boostma, S. Elshehawi, A.P. Grootjans, P.L Grundling, S. Khosa. *In Press.* Ecohydrological analysis of the Matlabas Mountain mire, South Africa. Mires and Peat
- P.L. Grundling, A Lindstrom., M.L. Pretorius, A. Bootsma, N. Job, L. Delport, S. Elshahawi, A.P Grootjans, A. Grundling, S. Mitchell. 2015. Investigation of Peatland Characteristics and Processes as well as Understanding of their Contribution to the South African Wetland Ecological Infrastructure Water Research Comission KSA 2: K5/2346
- A.P. Grootjans, A.J.M Jansen , A, Snijdewind, P.C. de Hullu, H. Joosten, A. Bootsma and P.L. Grundling. (2014). In search of spring mires in Namibia: the Waterberg area revisited. Mires and Peat. Volume 15, Article 10, 1–11, http://www.mires-and-peat.net/, ISSN 1819-754X © 2015 International Mire Conservation Group and International Peat Society

- Haagner, A.S.H., van Wyk, A.A. & Wassenaar, T.D. 2006. *The biodiversity of herpetofauna of the Richards Bay Minerals leases.* CERU Technical Report 32. University of Pretoria.
- van Wyk, A.A., Wassenaar, T.D. 2006. *The biodiversity of epiphytic plants of the Richards Bay Minerals leases.* CERU Technical Report 33. University of Pretoria.
- Wassenaar, T.D., van Wyk, A.A., Haagner, A.S.H, & van Aarde, R.J.H. 2006. *Report on an Ecological Baseline Survey of Zulti South Lease for Richards Bay Minerals*. CERU Technical Report 29. University of Pretoria

**KEY EXPERIENCE**

The following projects provide an example of the application of wetland ecology on strategic as well as fine scale as well as its implementation into policies and guidelines. (This is not a complete list of projects completed, rather an extract to illustrate diversity);

- More than 90 external peer reviews as part of mentorship programs for companies including Gibb, Galago Environmental Consultants, Lidwala Consulting Engineers, Bokamoso Environmental Consultants, 2009 ongoing
- More than 300 fine scale wetland and ecological assessments in Gauteng, Mpumalanga, KwaZulu Natal, Limpopo and the Western Cape 2007, ongoing
- Strategic wetland specialist input into the Open Space Management Framework for Kyalami and Ruimsig, City of Johannesburg, 2016
- Fine scale wetland specialist input into the ESKOM Bravo Integration Project 3, 4, 5 and Kyalami – Midrand Strengthening.
- Wetland/Riparian delineation and functional assessment for the proposed maintenance work of the rand water pipelines and valve chambers exposed due to erosion in Casteel A, B and C in Bushbuckridge Mpumalanga Province
- Wetland/Riparian delineation and functional assessment for the Proposed Citrus Orchard Establishment, South of Burgersfort (Limpopo Province) and North of Lydenburg (Mpumalanga Province).
- Scoping level assessment to inform a proposed railway line between Swaziland and Richards Bay. April 2013.
- Environmental Control Officer. Management of onsite audit of compliance during the construction of a pedestrian bridge in Zola Park, Soweto, Phase 1 and Phase 2. Commenced in 2010, ongoing.
- Fine scale wetland delineation and functional assessments in Lesotho and Kenya. 2008 and 2009;

- Analysis of wetland/riparian conditions potentially affected by 14 powerline rebuilds in Midrand, Gauteng, as well submission of a General Rehabilitation and Monitoring Plan. May 2013.
- Wetland specialist input into the Environmental Management Plan for the upgrade of the Firgrove Substation, Western Cape. April 2013
- An audit of the wetlands in the City of Johannesburg. Specialist studies as well as project management and integration of independent datasets into a final report. Commenced in August 2007
- Input into the wetland component of the Green Star SA rating system. April 2009;
- A strategic assessment of wetlands in Gauteng to inform the GDACE Regional Environmental Management Framework. June 2008.
- As assessment of wetlands in southern Mozambique. This involved a detailed analysis of the vegetation composition and sensitivity associated with wetlands and swamp forest in order to inform the development layout of a proposed resort. May 2008.
- An assessment of three wetlands in the Highlands of Lesotho. This involved a detailed assessment of the value of the study sites in terms of functionality and rehabilitation opportunities. Integration of the specialist reports socio economic, aquatic, terrestrial and wetland ecology studies into a final synthesis. May 2007.
- Ecological studies on a strategic scale to inform an Environmental Management Framework for the Emakazeni Municipality and an Integrated Environmental Management Program for the Emalahleni Municipality. May and June 2007

# HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for a

# Proposed egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga

**Prepared by**

CTS HERITAGE

In Association with

**CSIR**

April 2018

CTS HERITAGE

**THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS**

I Jenna Lavin, as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

**Signature of the specialist**

CTS Heritage
**Name of company**

05 April 2018
**Date**



CTS Heritage
34 Harries Street, Plumstead, Cape Town, 7800
**Tel:** (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

The table below ***must be included in the specialist report and completed***:

~~COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS~~

| Requirements of Appendix 6 – GN R982 | Addressed in the Specialist Report |
|---|---|
| 1. (1) A specialist report prepared in terms of these Regulations must contain-<br>a) details of-<br>i. the specialist who prepared the report; and<br>ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; | ✓ |
| b) a declaration that the specialist is independent in a form as may be specified by the competent authority; | ✓ |
| c) an indication of the scope of, and the purpose for which, the report was prepared; | ✓ |
| d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment; | ✓ |
| e) a description of the methodology adopted in preparing the report or carrying out the specialised process; | ✓ |
| f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure; | ✓ |
| g) an identification of any areas to be avoided, including buffers; | ✓ |
| h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | ✓ |
| i) a description of any assumptions made and any uncertainties or gaps in knowledge; | ✓ |
| j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment; | ✓ |
| k) any mitigation measures for inclusion in the EMPr; | ✓ |
| l) any conditions for inclusion in the environmental authorisation; | ✓ |
| m) any monitoring requirements for inclusion in the EMPr or environmental authorisation; | ✓ |
| n) a reasoned opinion-<br>i. as to whether the proposed activity or portions thereof should be authorised; and<br>ii. if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; | ✓ |
| o) a description of any consultation process that was undertaken during the course of preparing the specialist report; | ✓ |
| p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | ✓ |
| q) any other information requested by the competent authority. | ✓ |

I JENNA LAVIN, as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

| | |
|---|---|
| ✓ | other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or |

| | |
|---|---|
| | am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted); |

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).

Signature of the specialist

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Name of company

16/05/2018

Date

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# EXECUTIVE SUMMARY

1. Site Name:

Proposed Lungile Poultry Farm

2. Location:

Farm Waterval 34 JS, Mpumalanga

3. Locality Plan:

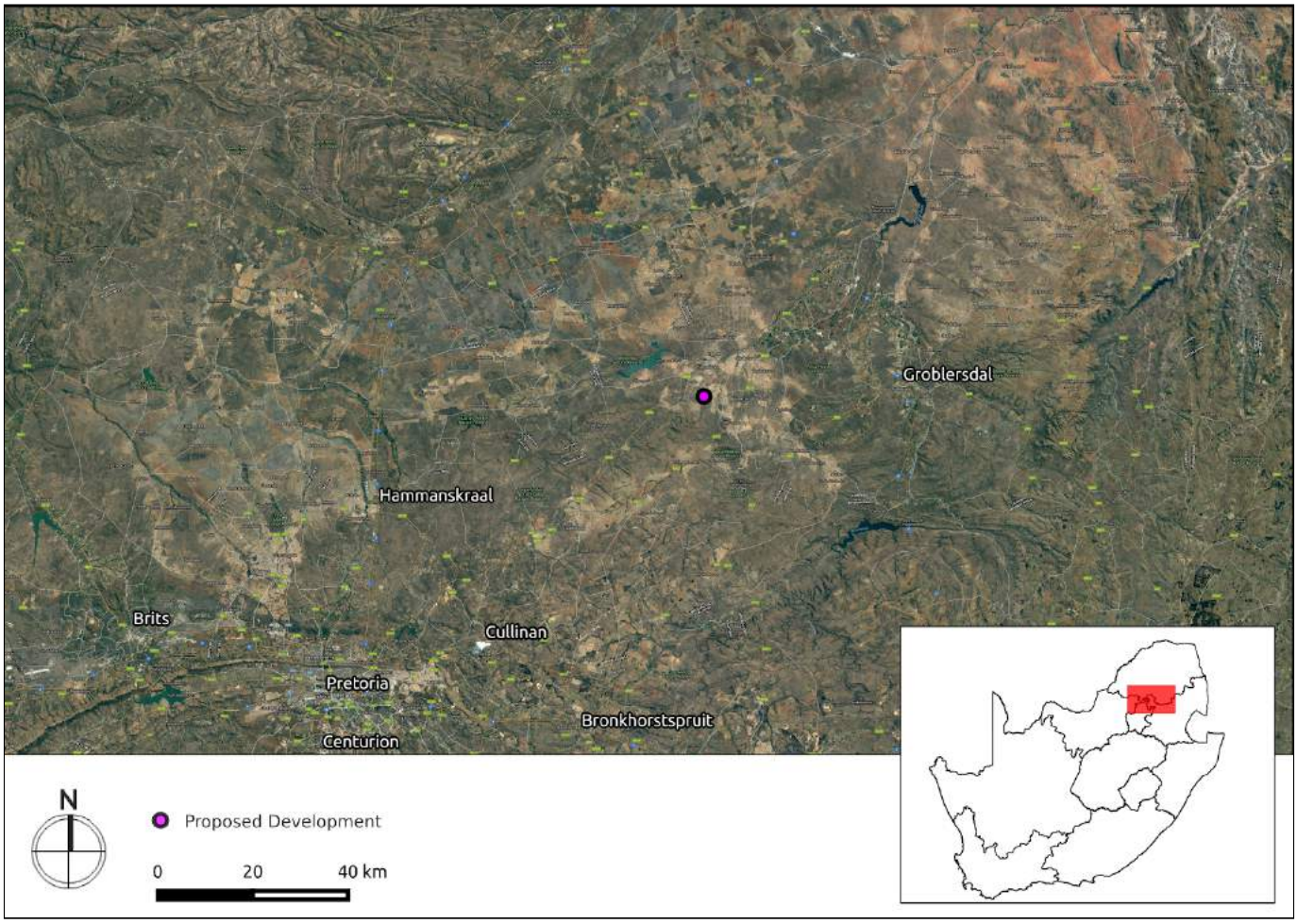


**Figure 1: Location of the proposed development site**

4. Description of Proposed Development:

The application is for a proposed egg-layer facility in Dr JS Moroka Local Municipality Mpumalanga.

5. Heritage Resources Identified:

None

6. Anticipated Impacts on Heritage Resources:

None



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7. Recommendations:

While it is unlikely that the proposed development will impact on any significant heritage resources, there is a very small chance that trace fossils (ripple marks and microbial mats) could be discovered when excavations for the roads and buildings commence. As such, it is recommended that the proposed Monitoring Program included in the Desktop Palaeontological Assessment (Appendix 2) be implemented.

**Monitoring Programme for Palaeontology – to commence once the excavations begin.**

The following procedure is only required if fossils are seen on the surface and when excavations commence.

1. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, plants, insects, bone, coal) should be put aside in a suitably protected place. This way the construction activities will not be interrupted.
2. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures. Please see attached Fossil Finds Procedure for the Western Cape as an example (Appendix 4).
3. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
4. If there are fossils of interest then the qualified palaeontologist sub-contracted for this project should visit the site to inspect the selected material and check the dumps where feasible.
5. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
6. If no good fossil material is recovered then the site inspections by the palaeontologist can cease. A report by the palaeontologist must be sent to SAHRA.
7. If no fossils are found and the excavations have finished then no further monitoring is required.

Author/s and Date:

Jenna Lavin

05 April 2018



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# CONTENTS





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# 1. INTRODUCTION

## 1.1 Background Information on Project

The application is for a proposed egg-layer facility in Dr JS Moroka Local Municipality, Mpumalanga. The proposed site is located on Portion 4 of Farm Waterval 34 JS across the road (in a southwest direction) from the main Waterval Township. The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation. The project will be developed on land that is currently vacant. The project will specialize in the production and sale of eggs. The project will essentially purchase 'ready to lay' pullets and raise them through their productive cycle. The start-up enterprise plans to build an environmentally controlled chicken layer facility with supporting infrastructure and a 5ha vegetable crop field.

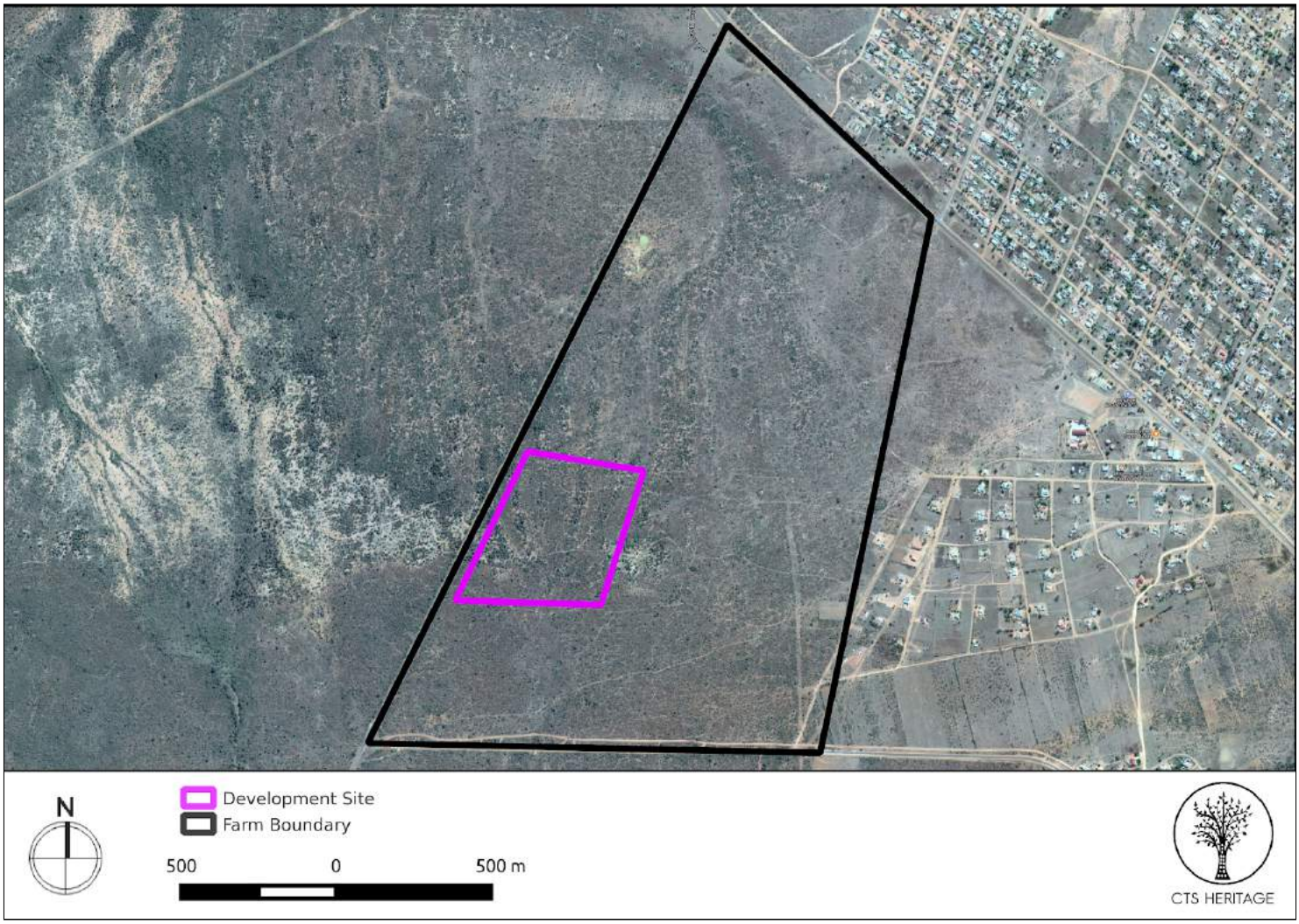


**Figure 1: Close up satellite image indicating proposed location of development**

# 2. METHODOLOGY

## 2.1 Purpose of HIA

The purpose of this HIA is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).



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## 2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on 26 March 2018 to determine what heritage resources are likely to be impacted by the proposed development (Appendix 1), and a Desktop Palaeontological Assessment was completed to assess likely impacts to palaeontology (Appendix 2)..
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

# 3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

## 3.1 Definition of the property

The proposed development falls within a portion of the Farm Waterval 34 JS, Mpumalanga (Figure 1).

## 3.2 Geology, geomorphology, climate and vegetation

The Lungile Poultry Farm will be located on ancient rocks of possibly three types. The Lebowa Granite Suite comprises a number of granite types, and the Verena type (has prominent coarse-grained mantled alkali feldspar phenocrysts) is thought to have a different origin from the rest of the granites in this suite (Cawthorn et al., 2006). Nonetheless being of igneous origin it does not contain fossils.

The Rashoop Granophyre Suite is made up of three main magmatic and metamorphic types: the Zwartbank Pseudogranophyre, the Diepkloof Granophyre and the Rooikop Porphyritic Granite (Cawthorn et al., 2006). They are geochemically distinct and are included in the upper part of the Bushveld Complex as they overlie the Rustenburg Layered Suite.

The Selons River Formation is considered redundant (Cawthorn et al., 2006) based on the work of Schweitzer et al. (1995) and the equivalent terminology is the Kwaggasnek Formation and Schrikkloof Formation. These are all volcanic units and are composed of a fine-grained groundmass with variable proportions of phenocrysts, porphyroblasts and amygdales (Cawthorn et al., 2006).

Other rocks in the region are those of the Pretoria Group which range in age from about 2400 to 2100 million years ago and comprise a variety of sandstones, shales, quartzites, breccia and conglomerates with some contemporaneous volcanic rocks. The mafic rocks of the Bushveld Complex are thought to be formed by a number of episodes of sill- like intrusions into the upper crust, i.e. the Pretoria group sedimentary and volcanic rocks (Cawthorn et al., 2006). The hot magma altered (metamorphosed) the host rocks up to a distance of 50km (Cawthorn et al., 2006) and formed, for example, quartzites from the arenaceous (sandy) sediments.



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The oldest rocks in the area are the Black Reef Formation (quartzite) and Bloempoort Group which is made up of alternating cycles of carbonaceous claystone-siltstone and sandstone cycles with some carbonates and volcanic rocks (Erikssen et al., 2006) and represents a marginal basin with deltaic and shoreline deposits.

The younger Karoo-aged rocks (Dwyka and Ecca Groups) are distant from the proposed development, more than 20km to the northwest, and will not be considered further.

### 3.3 Historical Background of the Area

According to Pistorius (2010 NID 6194), “Focused archaeological research has been conducted in the Mpumalanga and Limpopo Provinces of South Africa for more than four decades. This research consists of surveys and of excavations of Stone Age and Iron Age sites as well as the recording of rock art and historical sites.” However, very few archaeological or built environment sites of significance are known from the area surrounding the proposed development (Figures 2 and 3). The nearest HIA conducted in the vicinity of the proposed development is located approximately 5km away by Pistorius in 2003 (SAHRIS NID 5047). While he did not find any archaeological or built environment heritage resources, he noted the presence of burial grounds and graves. Only eight heritage resources are known to exist within a 30km buffer of the proposed development area - some archaeological resources of low heritage significance and burial grounds and graves.

The site proposed for development is underlain by the Ecca Group of high palaeontological sensitivity according to the SAHRIS Palaeosensitivity map. This group is known for non-marine trace fossils, vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc*) and insects.

The Lebowa Granite Suite would not preserve any fossils as it is igneous in origin. Similarly the Rashoop Granophyre Suite which comprises various intrusive granitic material would not preserve any fossils. In contrast the Selons River Formation (Kwaggasnek and Schrikkloof Formations; Rooiberg Group) is made up of finer grained sediments that have been deposited in a marginal basin context and may preserve ripple marks. It is slightly younger than the Daspoort and Magaliesberg Formations (Pretoria Group) where trace fossils have been found. It is too old for body fossils but there is a very small chance that microbial mats could be preserved, although these are very poor and hard to recognize in the Daspoort Formation. Trace fossils, in the form of microbial mats that have formed on or have helped to preserve ripple marks, have been found in the Daspoort and Magaliesberg Formations (underlying and overlying the Silverton Formation, respectively; Erikssen et al., 2012) but they do not provide localities. According to the authors the trace fossils would have formed on the shores of the sea (Erikssen et al., 2012), but no body fossils have been found as the rocks are too old. To date, no microbial mats have been reported from the Selons River Formation.



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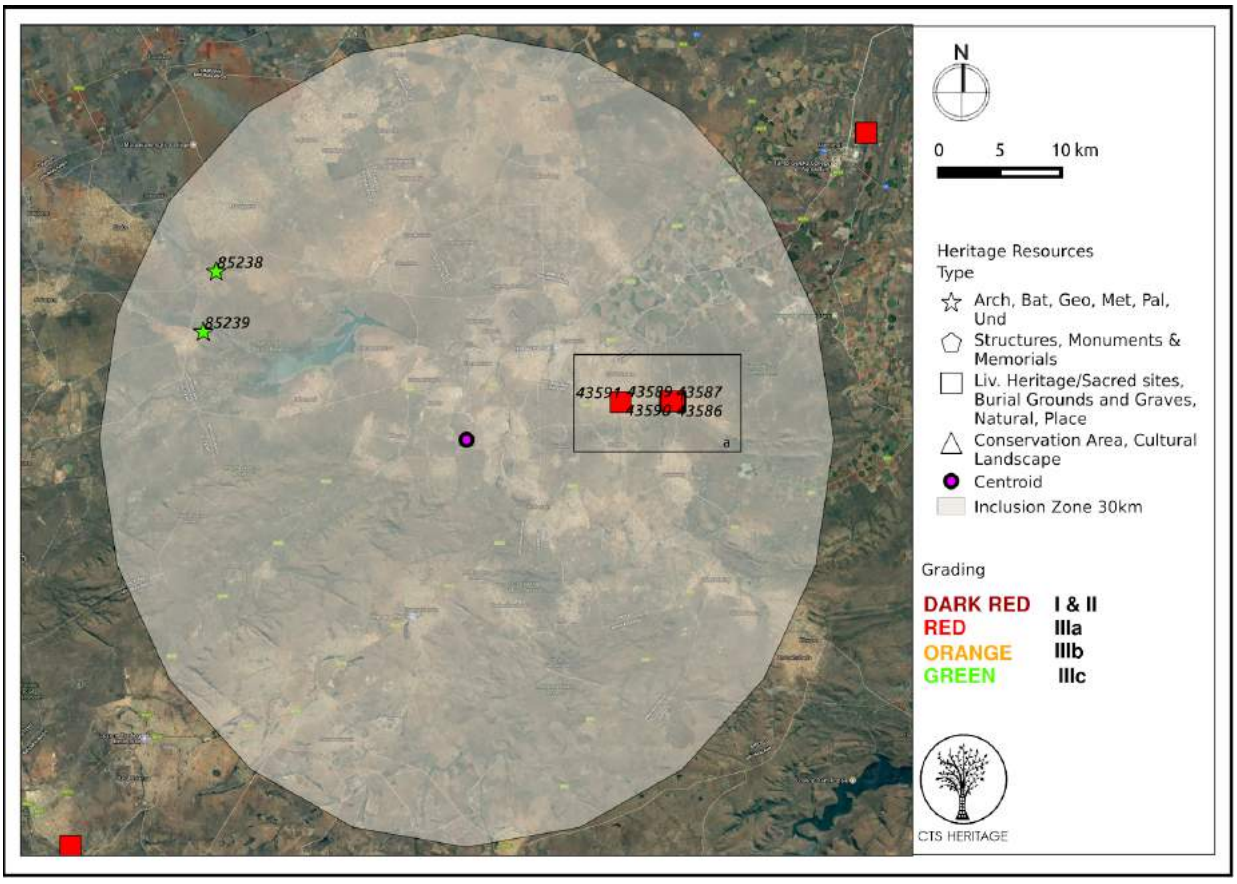


**Figure 3: Spatialisation of known heritage resources within 30km of the development area**

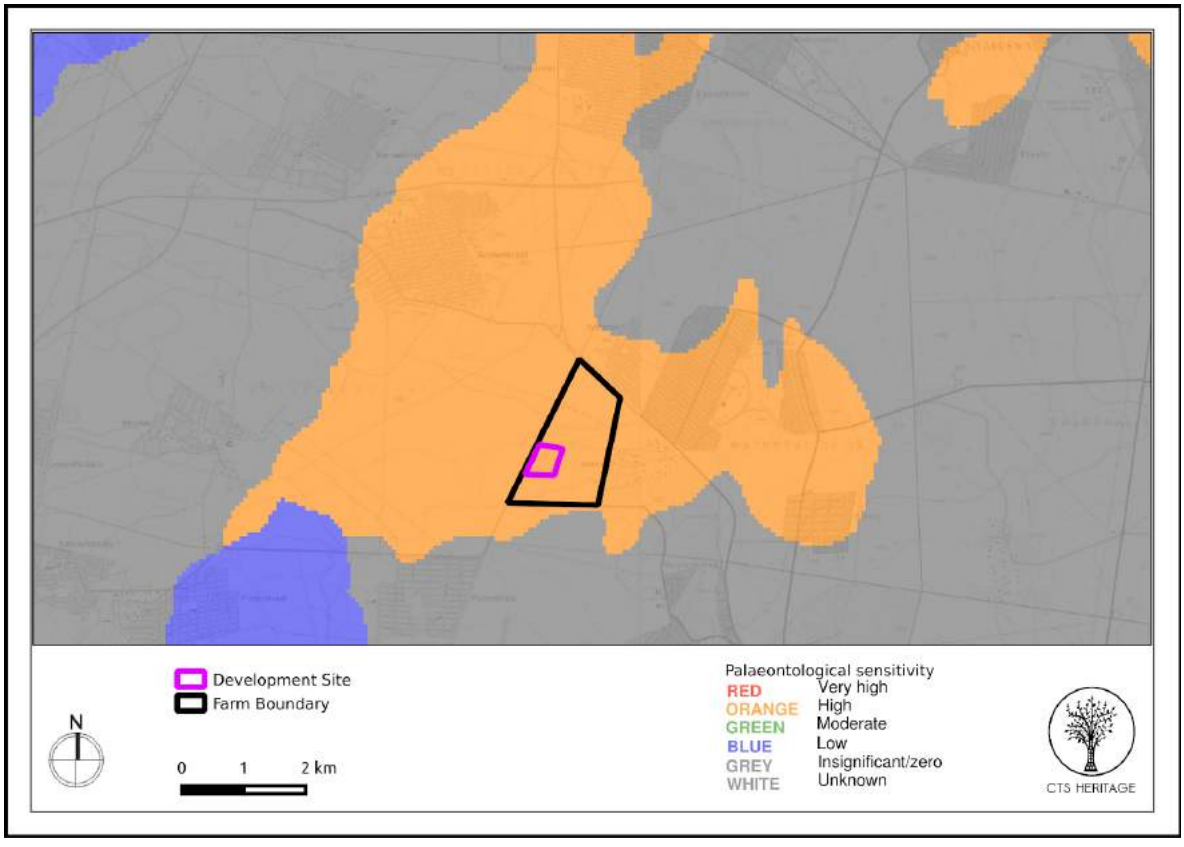


**Figure 4. Palaeosensitivity Map. Indicating high fossil sensitivity underlying the study area.**



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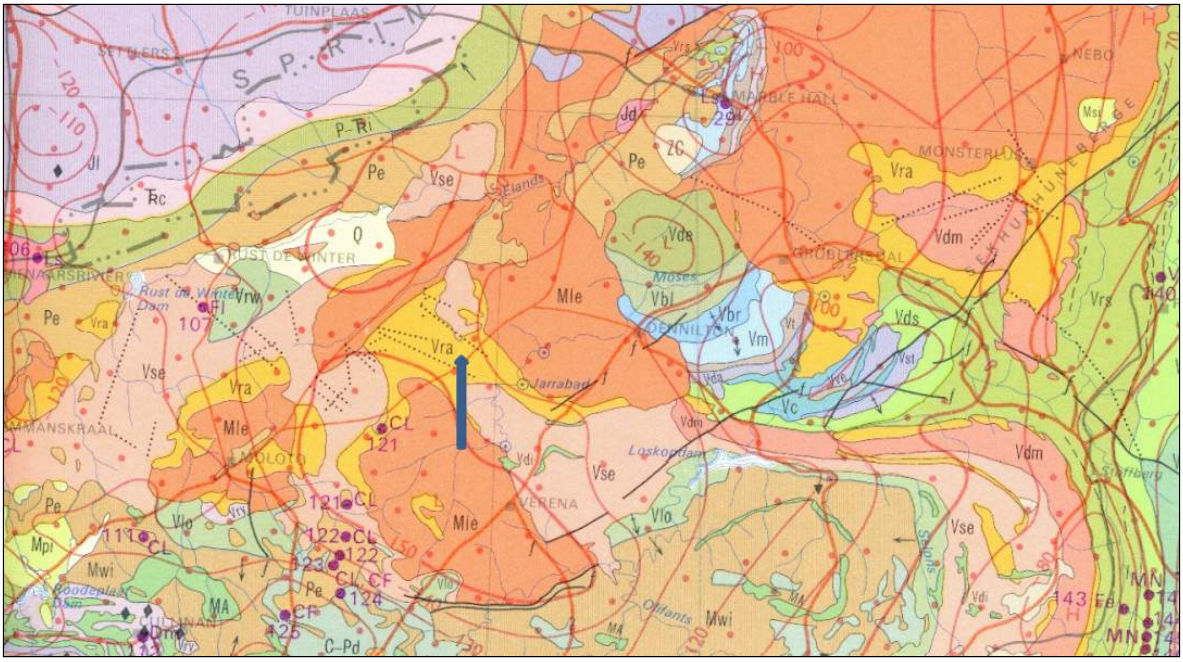


**Figure 5: Geological map of the area between Hammanskraal and Groblersdal. Abbreviations of the rock types are explained in Appendix 2. Map enlarged from the Geological Survey 1: 1 000 000 map 1984.**

## 4. IDENTIFICATION OF HERITAGE RESOURCES

### 4.1 Summary of specialist findings

No significant heritage resources were identified in either the archaeological or the palaeontological assessments conducted.

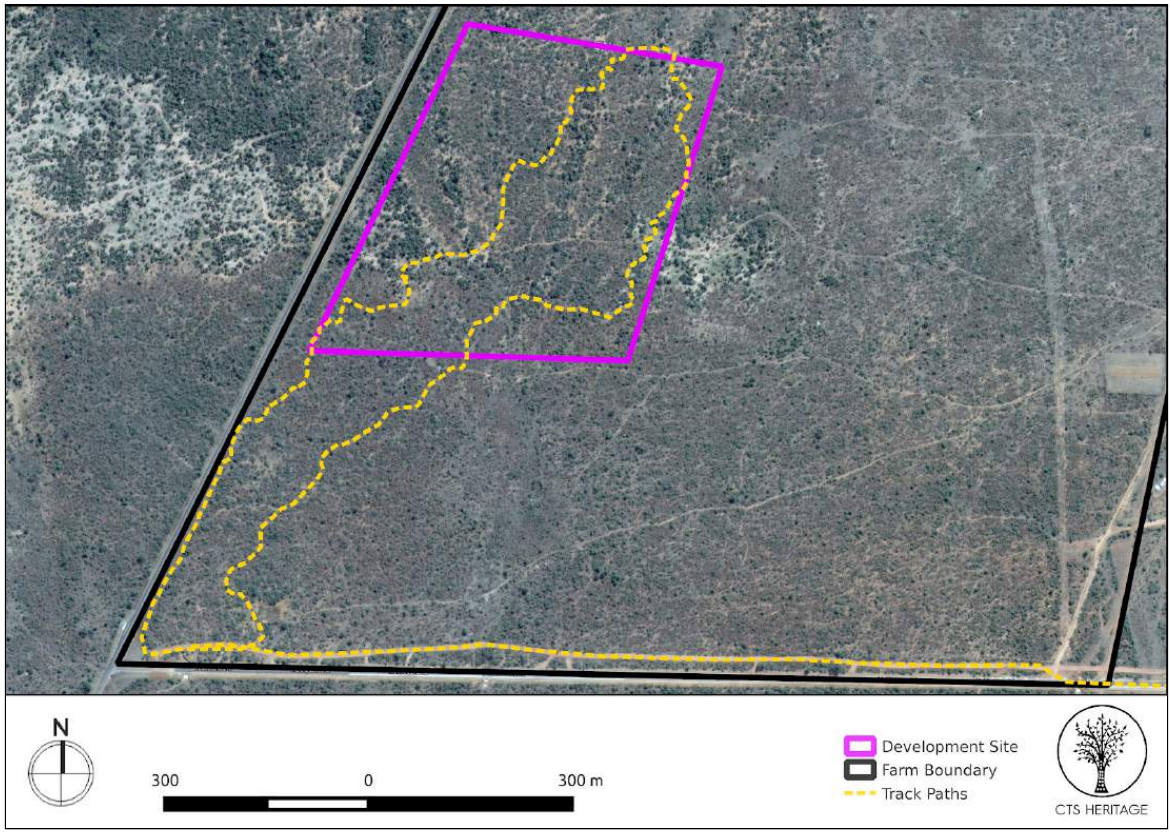


**Figure 6: Track paths of foot survey**



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## 4.2 Heritage Resources identified

***Structures and Places***

None

***Living Heritage***

None

***Archaeology***

None

***Palaeontology***

The underlying rocks are of the ancient Lebowa Granite Suite and the Rashoop Granophyre Suite which are volcanic in origin and do not preserve fossils. The third rock type is the Selons Formation of the Palaeoproterozoic Rooiberg Group which are predominantly poorly sorted sandstones.

## 4.3 Field Assessment

No heritage resources were identified during the field assessment.

## 4.4 Selected photographic record


**Figures 7 and 8: General context of development site**


**Figures 9 and 10: General context of development site**



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**Figures 10 and 11: General context of development site**

## 5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

### 5.1 Assessment of impact to Heritage Resources

No impact to heritage resources is anticipated. There is a very small chance that trace fossils (ripple marks and microbial mats) could be discovered when excavations for the roads and buildings commence and a Chance Find Protocol and Monitoring Programme has therefore been added to the report. The specialist palaeontological study concluded that the project may continue as far as the palaeontological resources are concerned.

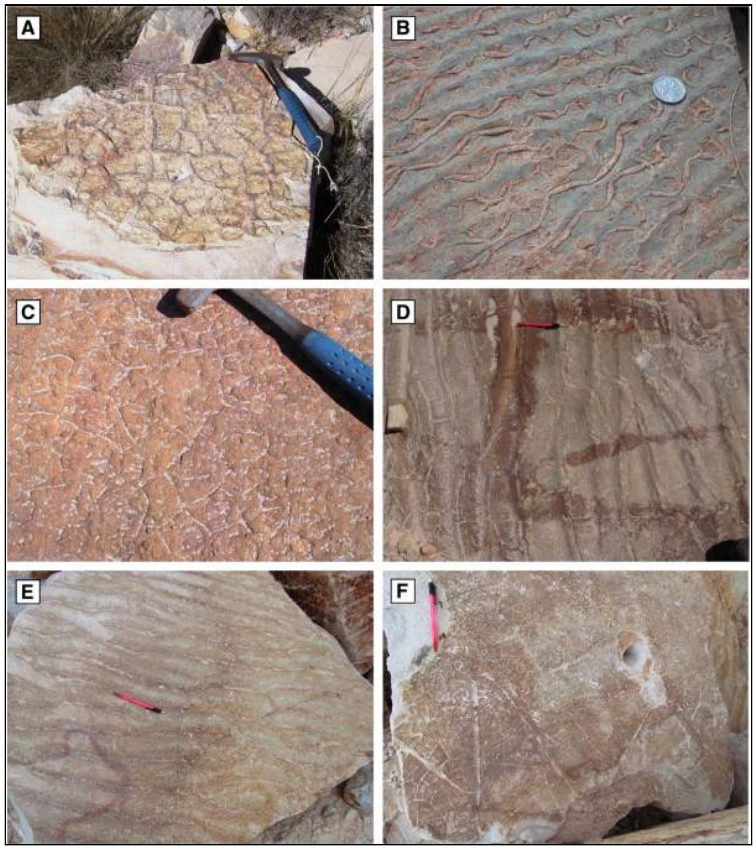


**Figure 12: Examples of trace fossils such as ripple marks and microbial mats that could be found in the Daspoort or Magaliesberg Formations, or others of the Pretoria Group. (Figure copied from Erikssen et al., 2012, their figure 6).**



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## 5.2 Social and Economic Benefit

The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation.

## 5.3 Proposed development alternatives

No project alternatives have been provided.

## 6. RESULTS OF PUBLIC CONSULTATION

The public consultation for this project will take place as part of the broader consultation required for EA.

## 7. CONCLUSION AND RECOMMENDATIONS

While it is unlikely that the proposed development will impact on any significant heritage resources, there is a very small chance that trace fossils (ripple marks and microbial mats) could be discovered when excavations for the roads and buildings commence. As such, it is recommended that the proposed Monitoring Program included in the Desktop Palaeontological Assessment (Appendix 2) be implemented.

**Monitoring Programme for Palaeontology – to commence once the excavations begin.**

The following procedure is only required if fossils are seen on the surface and when excavations commence.

1. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, plants, insects, bone, coal) should be put aside in a suitably protected place. This way the construction activities will not be interrupted.
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6. If no good fossil material is recovered then the site inspections by the palaeontologist can cease. A report by the palaeontologist must be sent to SAHRA.
7. If no fossils are found and the excavations have finished then no further monitoring is required.



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| **Nid** | **Report Type** | **Author/s** | **Date** | **Title** |
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# APPENDICES



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# APPENDIX 1:

## Archaeological Specialist Report



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# ARCHAEOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA for a

# Proposed egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga

**Prepared by**

CTS HERITAGE

In Association with

**CSIR**

April 2018

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**THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS**

I Nkosinathi Tomose, as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Nkosinathi G. Tomose
**Signature of the specialist**

CTS Heritage
**Name of company**

05 April 2018
**Date**



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## EXECUTIVE SUMMARY

The application is for a proposed egg-layer facility in Dr JS Moroka Local Municipality Mpumalanga. The proposed site is located on Portion 4 of Farm Waterval 34 JS across the road (southwest direction) from the main Waterval Township. The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation. The project will be developed on land that is currently vacant. The project will specialize in the production and sale of eggs. The project will essentially purchase 'ready to lay' pullets and raise them through their productive cycle. The start-up enterprise plans to build an environmentally controlled chicken layer facility with supporting infrastructure and a 5ha vegetable crop field.

No archaeological resources were identified during the site visit. A pile of rocks was noted, however this occurrence has no archaeological or heritage significance.

There is no objection to the proposed development for archaeological reasons. It is unlikely that any significant heritage resources will be impacted by the proposed development.

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# CONTENTS





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## 1. INTRODUCTION

### 1.1 Background Information on Project

The application is for a proposed egg-layer facility in Dr JS Moroka Local Municipality Mpumalanga. The proposed site is located on Portion 4 of Farm Waterval 34 JS across the road (southwest direction) from the main Waterval Township. The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation. The project will be developed on land that is currently vacant. The project will specialize in the production and sale of eggs. The project will essentially purchase 'ready to lay' pullets and raise them through their productive cycle. The start-up enterprise plans to build an environmentally controlled chicken layer facility with supporting infrastructure and a 5ha vegetable crop field.

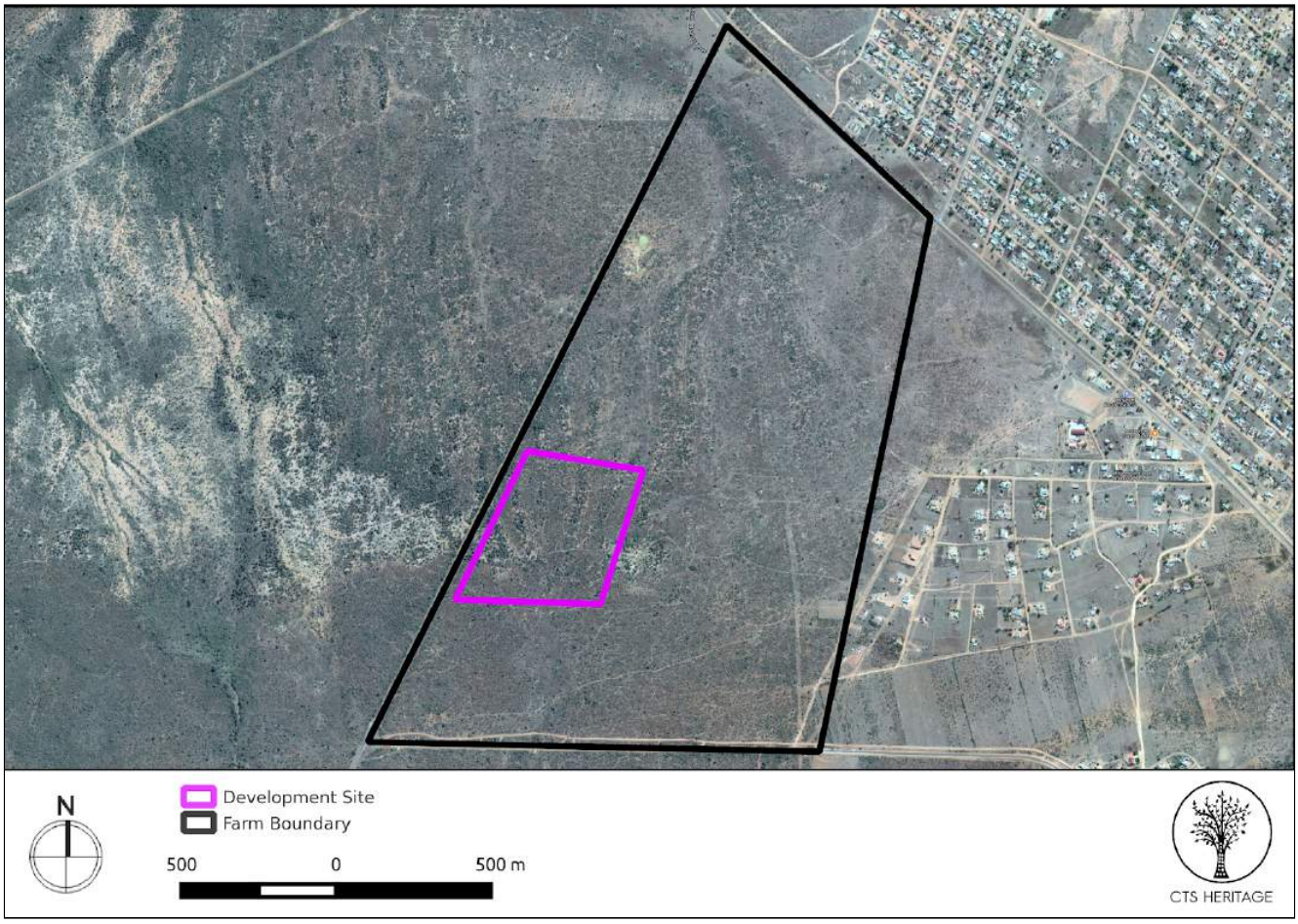


**Figure 1: Close up satellite image indicating proposed location of development**

## 2. METHODOLOGY

### 2.1 Purpose of Archaeological Study

The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to archaeological resources.



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## 2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on 26 March 2018 to determine what archaeological resources are likely to be impacted by the proposed development.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

## 3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

According to Pistorius (2010 NID 6194), "Focused archaeological research has been conducted in the Mpumalanga and Limpopo Provinces of South Africa for more than four decades. This research consists of surveys and of excavations of Stone Age and Iron Age sites as well as the recording of rock art and historical sites." However, very few archaeological or built environment sites of significance are known from the area surrounding the proposed development (Figures 2 and 3). The nearest HIA conducted in the vicinity of the proposed development is located approximately 5km, by Pistorius in 2003 (SAHRIS NID 5047). While he did not find any archaeological or built environment heritage resources, he noted the presence of burial grounds and graves. Only eight heritage resources are known to exist within a 30km buffer of the proposed development area - some archaeological resources of low heritage significance and burial grounds and graves.

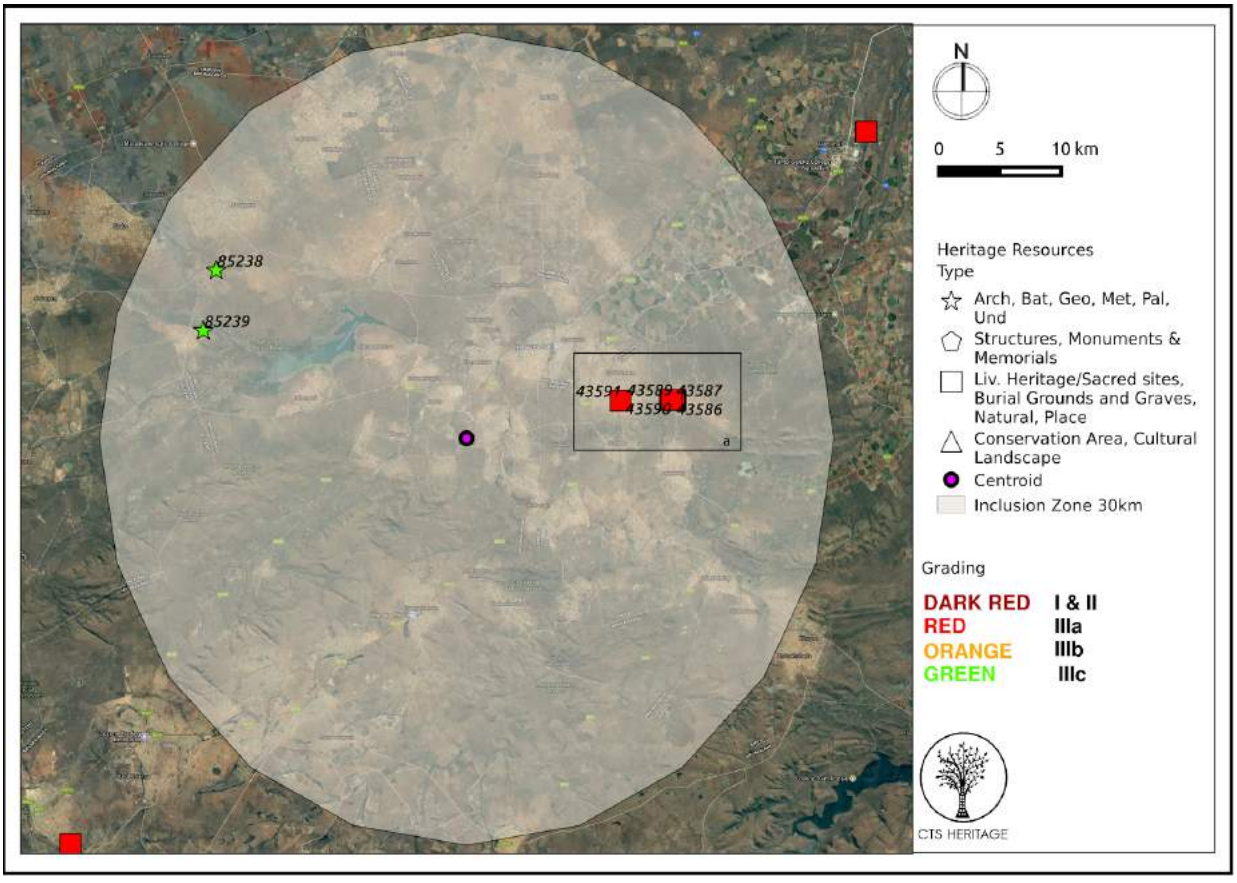


**Figure 3: Spatialisation of known heritage resources within 30km of the development area**



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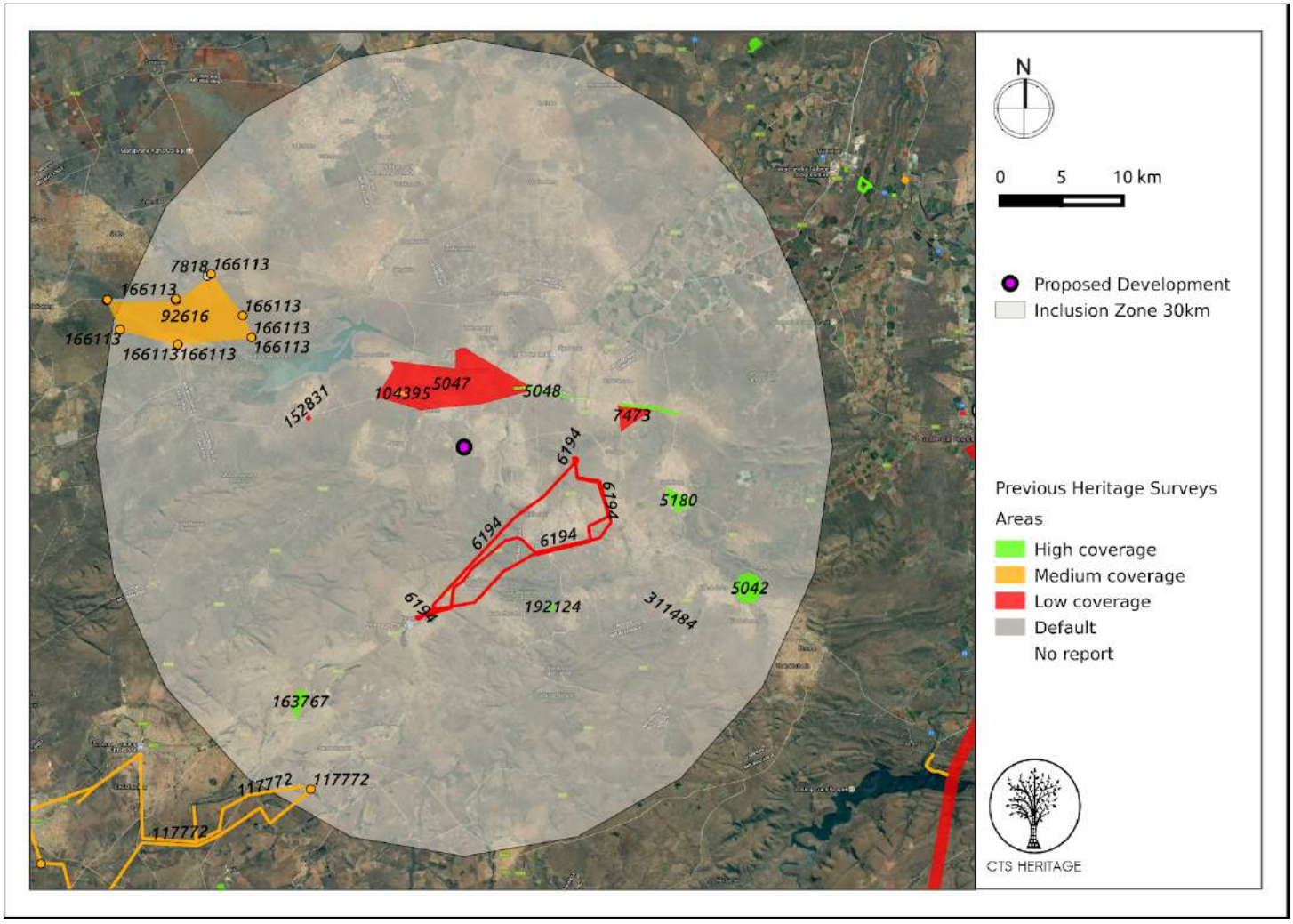


**Figure 4: Previous HIAs Map. Previous Heritage Impact Assessments surrounding the proposed development area within 30km, with SAHRIS NIDS indicated.**

## 4. IDENTIFICATION OF HERITAGE RESOURCES

### 4.1 Field Assessment

The site visit was undertaken on 26 March 2018. No restrictions were encountered. Visibility was moderate due to dense vegetation, however the researcher believes that a thorough assessment of the likely archaeological resources to be found on the property was achieved.

### 4.2 Archaeological Resources identified

No archaeological resources were identified during the site visit. A pile of rocks was noted, however this occurrence has no archaeological or heritage significance.



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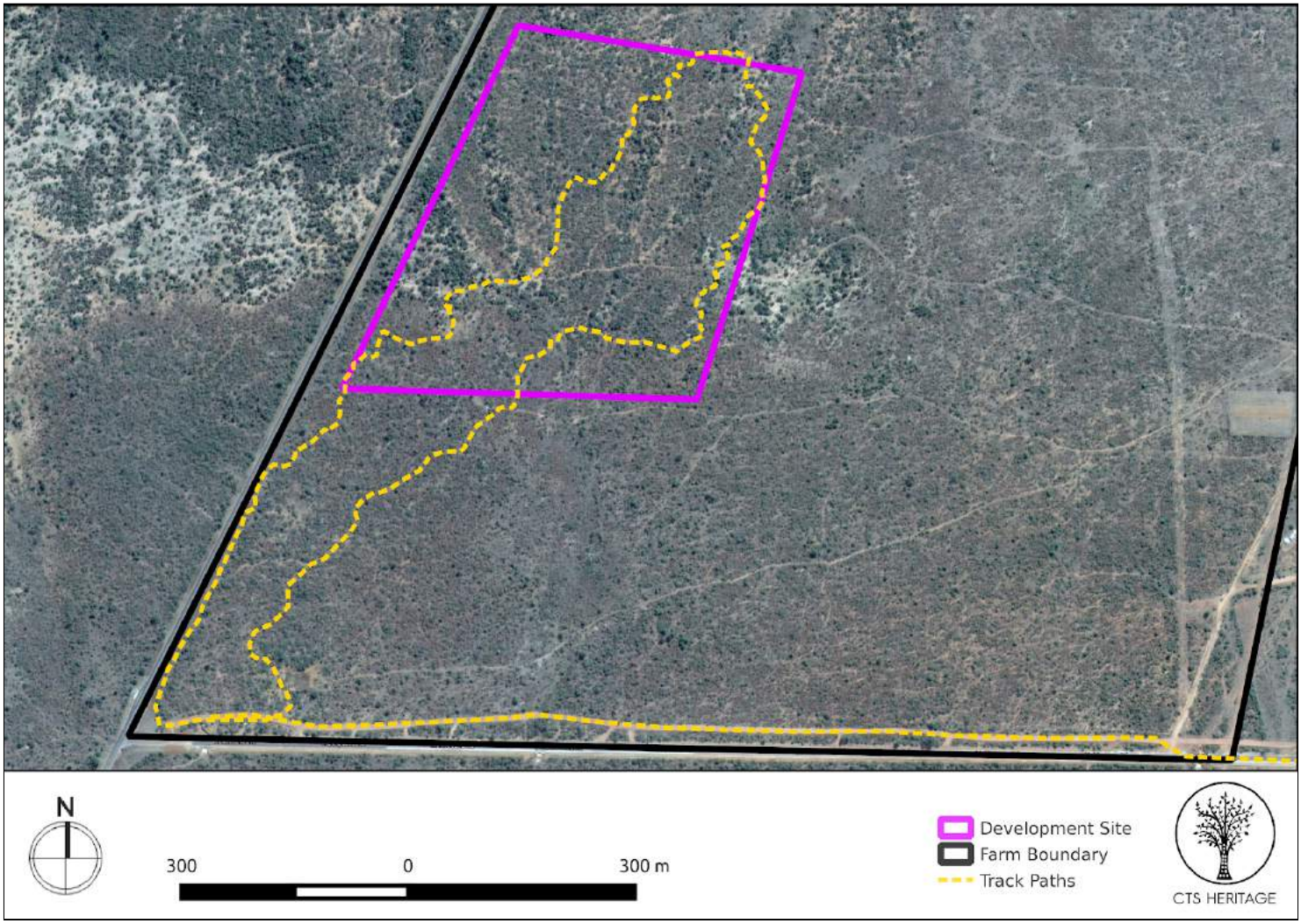


**Figure 5: Track paths of foot survey**

## 4.3 Selected photographic record

**Figures 6 and 7: General context of development site**



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**Figures 8 and 9: General context of development site**


**Figures 6 and 7: General context of development site**

## 5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

### 5.1 Assessment of impact to Archaeological Resources

None. It is unlikely that any significant archaeological resources will be impacted by the proposed development.

## 6. CONCLUSION AND RECOMMENDATIONS

There is no objection to the proposed development for archaeological reasons. It is unlikely that any significant heritage resources will be impacted by the proposed development.



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## 7. REFERENCES

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| 7818 | AIA Phase 1 | Richard Munyai | 01/08/2011 | Phase 1 Archaeological Scoping Study: An archaeological investigation for the proposed upgrading of 11.8km (gravel to tar) of road D2740 Rust de Winter - Moloto in the Nkangala Region of the Mpumalanga District Province |
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| | | | | |
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# APPENDIX 2:

## Desktop Palaeontological Specialist Report



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# Palaeontological Impact Assessment for the proposed Lungile Poultry Farm Egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga Province

**Desktop Study**

**For**

**CTS Heritage**
**(CTS Project: CTS18_040)**

**28 March 2017**

**Prof Marion Bamford**
Palaeobotanist
P Bag 652, WITS 2050
Johannesburg, South Africa
Marion.bamford@wits.ac.za

## Expertise of Specialist

The Palaeontologist Consultant is: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf
Experience: 30 years research; 20 year PIA studies

## Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by CTS Heritage, Cape Town, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

Specialist: ..... Prof Marion Bamford.....

Signature: ..... 

## Executive Summary

The desktop Palaeontological Impact Assessment for the area southwest of Groblersdal, on Portion 4 of Farm Waterval 34 JS, Mpumalanga Province, where CSIR proposes to construct an egg-layer facility for Lungile Poultry Farm, is presented here.

The underlying rocks are of the ancient Lebowa Granite Suite and the Rashoop Granophyre Suite which are volcanic in origin and do not preserve fossils. The third rock type is the Selons Formation of the Palaeoproterozoic Rooiberg Group which are predominantly poorly sorted sandstones. There is a very small chance that trace fossils (ripple marks and microbial mats) could be discovered when excavations for the roads and buildings commence so a Chance Find Protocol and Monitoring Programme has been added to the report. It is concluded that the project may continue as far as the paleontology is concerned.

# Table of Contents

## 1. Background

An application has been made for a proposed egg-layer facility in Dr JS Moroka Local Municipality Mpumalanga. The proposed site is located on Portion 4 of Farm Waterval 34 JS across the road (southwest direction) from the main Waterval Township. The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation. The project will be developed on land that is currently vacant. The project will specialize in the production and sale of eggs. The project will essentially purchase 'ready to lay' pullets and raise them through their productive cycle. The start-up enterprise plans to build an environmentally controlled chicken layer facility with supporting infrastructure and a 5ha vegetable crop field.

The proposed infrastructure development is in the form of:
- 2 x Chicken Layer housing (12m Wide, 81m Long and 3.1m High)
- Maize and Vegetables (5ha Production)
- Office
- Housing
- Borehole

This report complies with the requirements of the NEMA and environmental impact assessment (EIA) regulations (GNR 982 of 2014). The table below provides a summary of the requirements, with cross references to the report sections where these requirements have been addressed.

Table 1: Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014)

| **A specialist report prepared in terms of the Environmental Impact Regulations of 2014 must contain:** | **Relevant section in report** |
|---|---|
| Details of the specialist who prepared the report (CV in Appendix A) | Prof Marion Bamford |
| The expertise of that person to compile a specialist report including a curriculum vitae | Palaeontologist (PhD Wits 1990) |
| A declaration that the person is independent in a form as may be specified by the competent authority | Page 2 |
| An indication of the scope of, and the purpose for which, the report was prepared | Section 1 |
| The date and season of the site investigation and the relevance of the season to the outcome of the assessment | n/a Seasons make no difference to fossils |
| A description of the methodology adopted in preparing the report or carrying out the specialised process | Section 2, |
| The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure | See table 2 |
| An identification of any areas to be avoided, including buffers | n/a |
| A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | n/a |
| A description of any assumptions made and any uncertainties or gaps in knowledge; | Section 6, |
| A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment | n/a |

| | |
|---|---|
| Any mitigation measures for inclusion in the EMPr | n/a |
| Any conditions for inclusion in the environmental authorisation | n/a |
| Any monitoring requirements for inclusion in the EMPr or environmental authorisation | Section 8, |
| A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and | n/a |
| If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan | n/a |
| A description of any consultation process that was undertaken during the course of carrying out the study | Section 3 |
| A summary and copies if any comments that were received during any consultation process | n/a |
| Any other information requested by the competent authority. | n/a |

## 2. Methods and Terms of Reference

1. In order to determine the likelihood of fossils occurring in the affected area geological maps, literature, palaeontological databases and published and unpublished records must be consulted.

2. If fossils are likely to occur then a site visit must be made by a qualified palaeontologist to locate and assess the fossils and their importance.

3. Unique or rare fossils should either be collected (with the relevant South African Heritage Resources Agency (SAHRA) permit) and removed to a suitable storage and curation facility, for example a Museum or University palaeontology department or protected on site.

4. Common fossils can be sacrificed if they are of minimal or no scientific importance but a representative collection could be made if deemed necessary.

The published geological and palaeontological literature, unpublished records of fossil sites, catalogues and reports housed in the Evolutionary Studies Institute, University of the Witwatersrand, and SAHRA databases were consulted to determine if there are any records of fossils from the sites and the likelihood of any fossils occurring there.


Figure 1: Locality of the proposed Lungile Poultry Farm near Groblersdal, between Waterval Township and Borolo, on Portion 4 of Farm Waterval 34 JS. Google Earth map supplied by CTS.

## 3. Consultation Process

No consultations were carried out during the desktop study. Apart from reviewing interested and/or affected party (IAP) comments received by the EIA consultant during the EIA process, no other consultation took place as part of the paleontological study.

## 4. Geology and Palaeontology

Project location and geological setting

The site for the proposed egg-laying facility of Lungile Poultry Farm is between Waterval Township to the east and Borolo to the northwest, which is west-southwest of Groblersdal. The land is currently vacant.

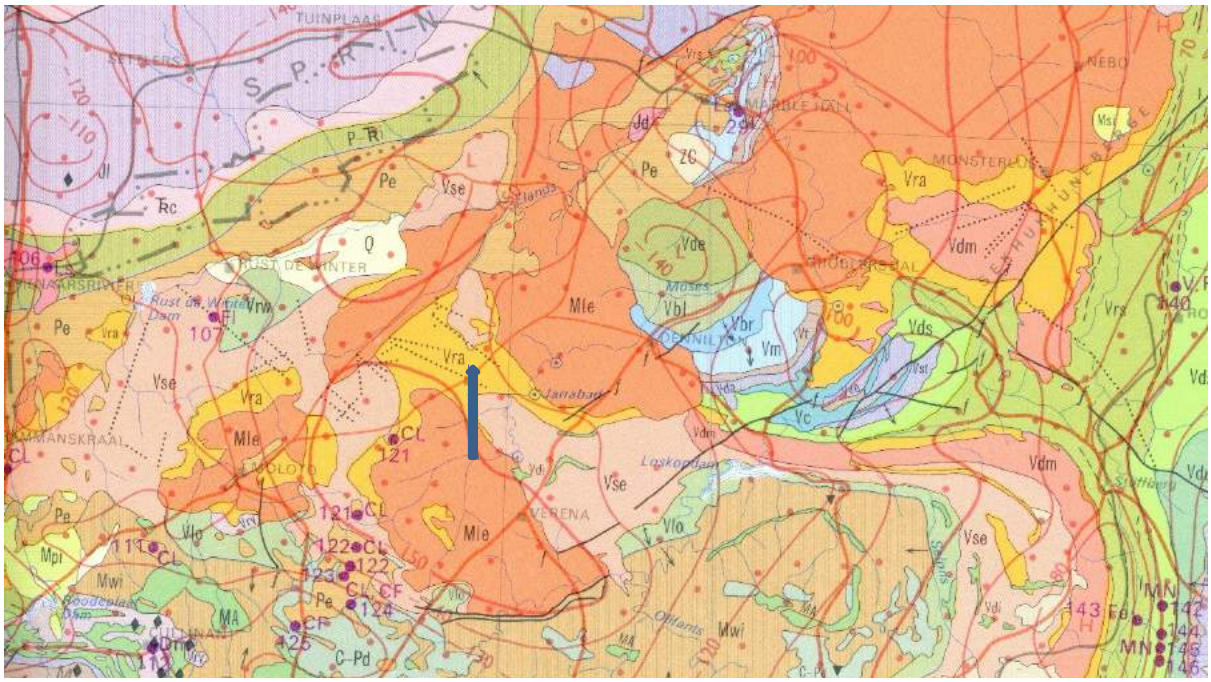


Figure 2: Geological map of the area between Hammanskraal and Groblersdal. The approximate location of the proposed project is indicated with the arrows. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 1 000 000 map 1984.

Table 2: Explanation of symbols for the geological map and approximate ages (Cawthorn, et al., 2006; Barker et al., 2006; Schweitzer et al., 1995). SG = Supergroup; Fm = Formation. The shaded symbols represent the geological units that are most relevant to the project.

| **Symbol** | **Group/Formation** | **Lithology** | **Approximate Age** |
|---|---|---|---|
| Q | Quaternary | Aeolian sands | Last 2.5 Ma |
| Pe | Ecca Group, Permian | Sandstone, shale, coal | Ca 290-260 Ma |
| C-Pd | Dwyka | Tillite, sandstone, mudstone, shale | >290 Ma |
| Mwi | Wilge River Fm, Waterberg Group | Sandstone, conglomerate | |
| Mle | Lebowa Granite Suite, Bushveld Complex | Hornblende and biotite granites | 2052 Ma |
| Vds | Dsjate subsuite, | Gabbro, norite | |
| Vdr | Dwars River subsuite, critical zone of Rusternburg Layered Suite; Bushveld Complex | Anorthosite, pyroxenite | >2050 Ma |
| Vc | Croyden subsuite, Lower zone of | Harzbergite, bronzitite | >2050 Ma |

| Symbol | Group/Formation | Lithology | Approximate Age |
|---|---|---|---|
| | Rusternburg Layered Suite; Bushveld Complex | | |
| Vra | Rashoop Granophyre Suite | Granophyre | Ca 2050 Ma |
| Vlo | Loskop Fm, uppermost Transvaal Sequence | Shale, sandstone, conglomerate, volcanic rocks | 2100 Ma |
| Vse | Selons River, Rooiberg Group | Red porphyritic rhyolite | Ca 2017 Ma |
| Vdm | Damwal Fm, Rooiberg Group | Black porphyritic and amygdaloidal rhyolite | Ca 2071 Ma |
| Vve | Vermont Fm, Pretoria Group | Mudrock, hornfels | |
| Vda | Daspoort Fm, Pretoria Group | Quartzite | |
| Vt | Timeball Hill Fm, Pretoria Group | Shale, quartzite, conglomerate, breccia, diamictite | |
| Vbr | Black Reef Fm, | Quartzite, conglomerate, shale, basalt | >2642 Ma |
| Vbl | Bloempoort Group; pre-Transvaal Supergroup | Slate, andesite, quartzite, shale | |
| Vde | Dennilton inlier | Acid lava, tuff, schist, gneiss | 2830 – 2770 Ma |

Geology

The Lungile Poultry Farm will be located on ancient rocks of possibly three (shaded in Table 2). The Lebowa Granite Suite comprises a number of granite types, and the Verena type (has prominent coarse-grained mantled alkali feldspar phenocrysts) is thought to have a different origin from the rest of the granites in this suite (Cawthorn et al., 2006). Nonetheless being of igneous origin it does not contain fossils.

The Rashoop Granophyre Suite is made up of three main magmatic and metamorphic types: the Zwartbank Pseudogranophyre, the Diepkloof Granophyre and the Rooikop Porphyritic Granite (Cawthorn et al., 2006). They are geochemically distinct and are included in the upper part of the Bushveld Complex as they overlie the Rustenburg Layered Suite.

The Selons River Formation is considered redundant (Cawthorn et al., 2006) based on the work of Schweitzer et al. (1995) and the equivalent terminology is the Kwaggasnek Formation and Schrikkloof Formation. These are all volcanic units and are composed of a fine-grained groundmass with variable proportions of phenocrysts, porphyroblasts and amygdales (Cawthorn et al., 2006).

Other rocks in the region are those of the Pretoria Group which range in age from about 2400 to 2100 million years ago and comprise a variety of sandstones, shales, quartzites, breccia and conglomerates with some contemporaneous volcanic rocks. The mafic rocks of the Bushveld Complex are thought to be a formed by a number of episodes of sill- like intrusions into the upper crust, i.e. the Pretoria group sedimentary and volcanic rocks (Cawthorn et al., 2006). The hot magma altered (metamorphosed) the host rocks up to a distance of 50km (Cawthorn et al., 2006) and formed, for example, quartzites from the arenaceous (sandy) sediments.

The oldest rocks in the area are the Black Reef Formation (quartzite) and Bloempoort Group which is made up of alternating cycles of carbonaceous claystone-siltstone and sandstone cycles with some carbonates and volcanic rocks (Erikssen et al., 2006) and represents a marginal basin with deltaic and shoreline deposits.

The younger Karoo-aged rocks (Dwyka and Ecca Groups) are distant from the proposed development, more than 20km to the northwest, and will not be considered further.

Palaeontology
(Refer to Figure 4 for SAHRIS palaeosensitivity)

The Lebowa Granite Suite would not preserve any fossils as it is igneous in origin. Similarly the Rashoop Granophyre Suite which comprises various intrusive granitic material would not preserve any fossils.

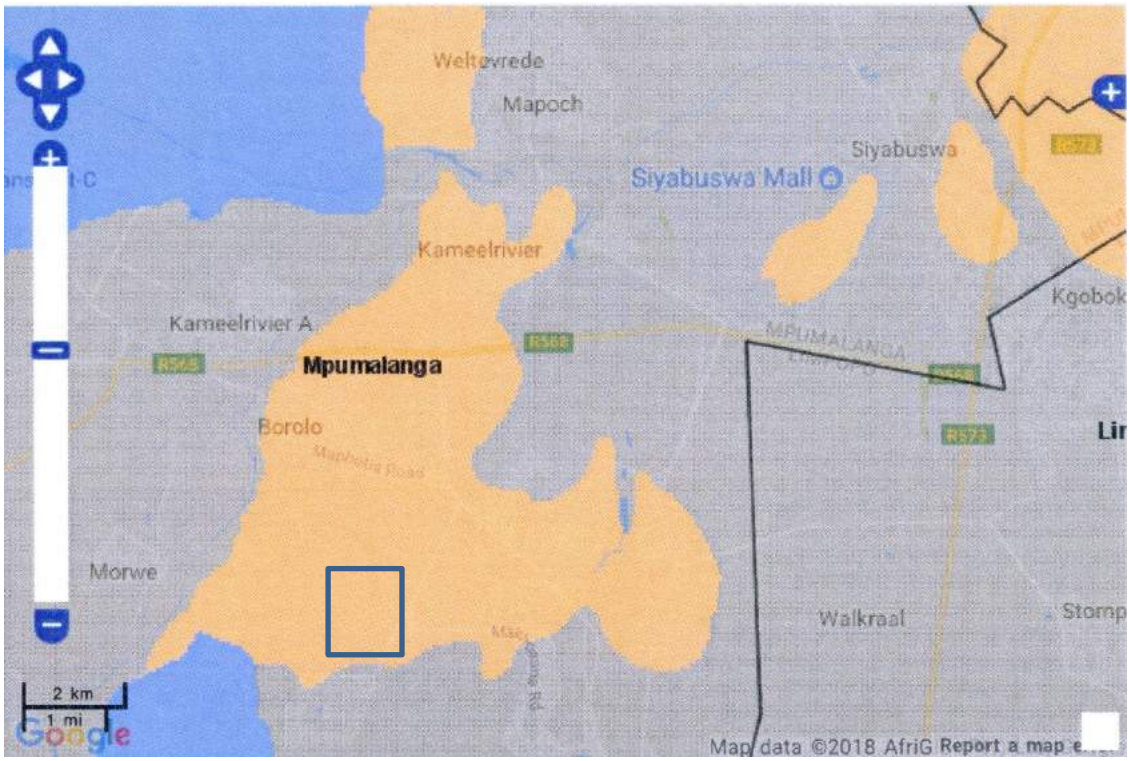


Figure 4: SAHRIS palaeosensitivity map. The site is within the blue rectangle. Colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

In contrast the Selons River Formation (Kwaggasnek and Schrikkloof Formations; Rooiberg Group) is made up of finer grained sediments that have been deposited in a marginal basin context and may preserve ripple marks. It is slightly younger than the Daspoort and Magaliesberg Formations (Pretoria Group) from where trace fossil have been found. It is too old for body fossils but there is a very small chance that microbial mats could be preserved although these are very poor and hard to recognize in the Daspoort Formation.
Trace fossils, in the form of microbial mats that have formed on or have helped to preserve ripple marks, have been found in the Daspoort and Magaliesberg Formations (underlying and overlying the Silverton Formation, respectively; Erikssen et al., 2012) but they do not provide localities. According to the authors the trace fossils would have formed on the shores of the sea (Erikssen et al., 2012), but no body fossils have been found as the rocks are too old. To date no microbial mats have been reported from the Selons River Formation.

## 5. Impact assessment

Using the criteria in the table below, the impact of the Lungile Poultry Farm egg-laying facility and associated infrastructure has been assessed.

**TABLE 3: CRITERIA FOR ASSESSING IMPACTS**

| PART A: DEFINITION AND CRITERIA | | |
|---|---|---|
| **Criteria for ranking of the SEVERITY/NATURE of environmental impacts** | **H** | Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. |
| | **M** | Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. |
| | **L** | Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. |
| | **L+** | Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. |
| | **M+** | Moderate improvement. Will be within or better than the recommended level. No observed reaction. |
| | **H+** | Substantial improvement. Will be within or better than the recommended level. Favourable publicity. |
| **Criteria for ranking the DURATION of impacts** | **L** | Quickly reversible. Less than the project life. Short term |
| | **M** | Reversible over time. Life of the project. Medium term |
| | **H** | Permanent. Beyond closure. Long term. |
| **Criteria for ranking the SPATIAL SCALE of impacts** | **L** | Localised - Within the site boundary. |
| | **M** | Fairly widespread – Beyond the site boundary. Local |
| | **H** | Widespread – Far beyond site boundary. Regional/ national |
| **PROBABILITY (of exposure to impacts)** | **H** | Definite/ Continuous |
| | **M** | Possible/ frequent |
| | **L** | Unlikely/ seldom |

The surface activities would not impact on the fossil heritage as the rocks are ancient and volcanic so there are no fossils present. The IMPACT is nil (according to the scheme in Table 3).

Excavation for the roads, housing structures and other infrastructure would penetrate only a few metres below ground surface so there would be minor deterioration of the surface of sites and an impact on any potential fossils. Therefore the SEVERITY/NATURE of the environmental impact would be L.

DURATION of the impact would be permanent: H.

Since only the possible fossils within the area would be trace fossils such as microbial mats and ripple marks where any new roads or buildings are built, the SPATIAL SCALE will be localised within the site boundary: L.

There is no chance of finding fossils in the Lebowa Grante suite or the Rashoop Granophyre Suite, but there is a very small chance of finding trace fossils on the surface as of the Silverton Formation if the project occurs on these rocks. Trace and microfossils have been reported from older and younger Formations, but not the Silverton Formation which is

present in the area. However, the PROBABILITY of affecting any fossils is unlikely or seldom: L.

## 6. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the volcanic rocks, basement rocks, dolomites, sandstones, shales, quartzites, granites basalts and gabbros are typical for the country and do not contain any fossil material. The sediments of the Selons River Formation could contain trace fossils of algal mats and ripple marks, however, they have yet to be recorded from the proposed site for prospecting.

## 7. Recommendation

It is unlikely that any fossils occur in the sites for the proposed access to boreholes and water pipes to the west and east of because mostly the rocks are much too old and volcanic in origin. There is an extremely small chance that there are unexplored exposures of the Selons River Formations at the sites. As there is a chance find, a monitoring protocol is recommended.

As far as the palaeontology is concerned the proposed development can go ahead. Any further palaeontological assessment would only be required after excavations and drilling have commenced and if fossils are found by the geologist or environmental personnel. The procedure can be added to the EMPr.

## 8. Monitoring Programme for Palaeontology – to commence once the excavations begin.

1. The following procedure is only required if fossils are seen on the surface and when excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, plants, insects, bone, coal) should be put aside in a suitably protected place. This way the construction activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 5). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.

5. If there are fossils of interest then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then the site inspections by the palaeontologist can cease. A report by the palaeontologist must be sent to SAHRA.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

## 9. References

Cawthorn, R.G., Eales, H.V., Walraven, F., Uken, R., Watkeys, M.K., 2006. The Bushveld Complex. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. pp 261-281.

Erikssen, P.G., Altermann, W., Hartzer, F.J., 2006. The Transvaal Supergroup and its pre-cursors. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. pp 237-260.

Eriksson, P.G., Bartman, R., Catuneanu, O., Mazumder, R., Lenhardt, N., 2012. A case study of microbial mats-related features in coastal epeiric sandstones from the Palaeoproterozoic Pretoria Group, Transvaal Supergroup, Kaapvaal craton, South Africa); the effect of preservation(reflecting sequence stratigraphic models) on the relationship between mat features and inferred palaeoenvironment. Sedimentary Geology 263, 67-75.

Schweitzer, J.K., Hatton, C.J., De Waal, S.A., 1995. Regional lithochemical stratigraphy of the Rooiberg Group, upper Transvaal Supergroup: a proposed new subdivision. South African Journal of Geology 98, 245-255.

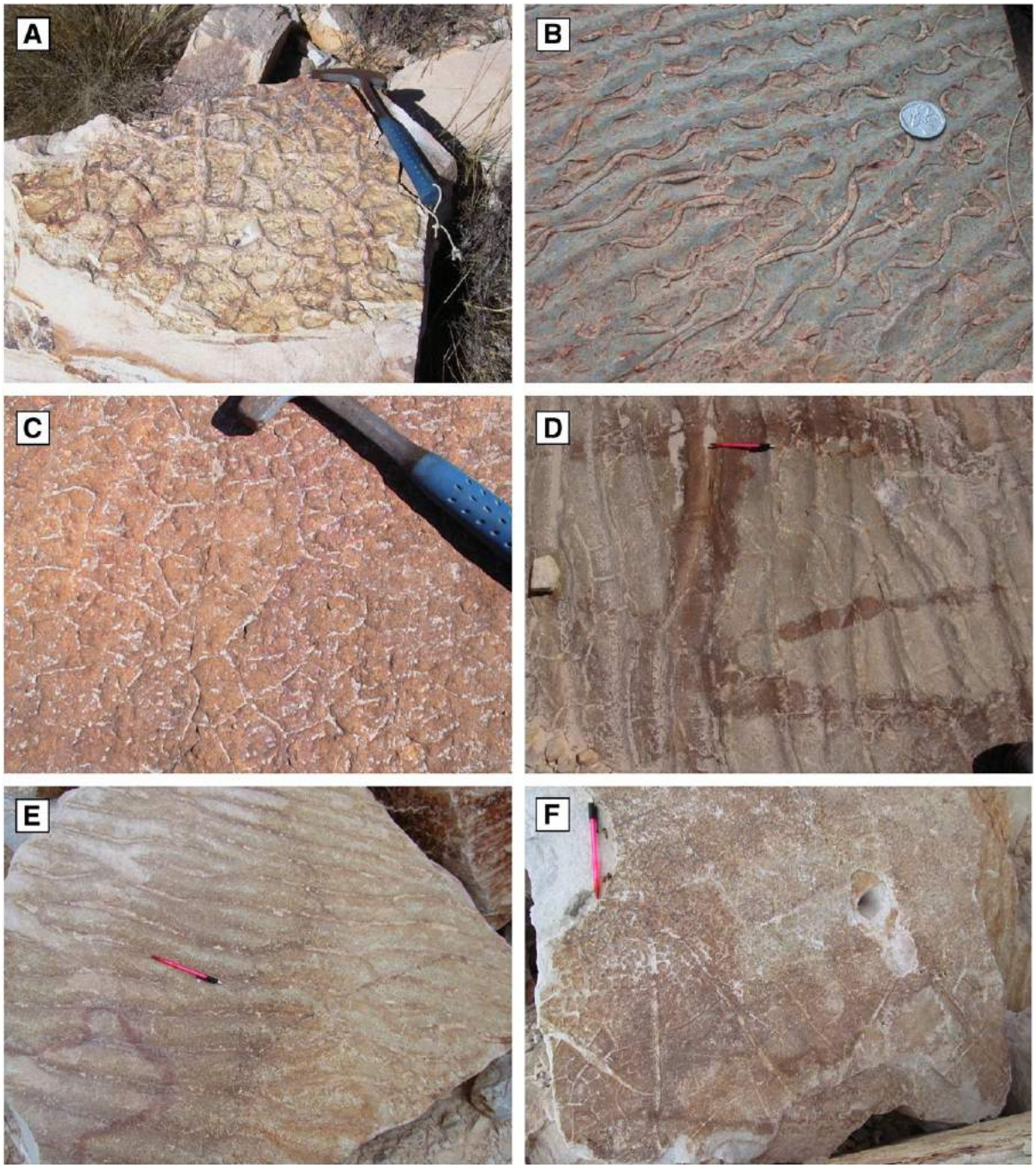


Figure 5: Examples of trace fossils such as ripple marks and microbial mats that could be found in the Daspoort or Magaliesberg Formations, or others of the Pretoria Group. (Figure copied from Erikssen et al., 2012, their figure 6).

**Appendix A** – Details of specialist

# Curriculum vitae (short) - Marion Bamford
# PhD
# January 2018

## I) Personal details


Surname : **Bamford**
First names : **Marion Kathleen**
Present employment : Professor; Director of the Evolutionary Studies Institute.
Member Management Committee of the NRF/DST Centre of
Excellence Palaeosciences, University of the Witwatersrand,
Johannesburg, South Africa-
Telephone : +27 11 717 6690
Fax : +27 11 717 6694
Cell : 082 555 6937
E-mail : marion.bamford@wits.ac.za ; marionbamford12@gmail.com


## ii) Academic qualifications

Tertiary Education: All at the University of the Witwatersrand:
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.
1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.
1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.
1986-1989: PhD in Palaeobotany. Graduated in June 1990.

## iii) Professional qualifications

*Wood Anatomy Training (overseas as nothing was available in South Africa)*:
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps
1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer
1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

## iv) Membership of professional bodies/associations

Palaeontological Society of Southern Africa
Royal Society of Southern Africa - Fellow: 2006 onwards
Academy of Sciences of South Africa - Member: Oct 2014 onwards
International Association of Wood Anatomists - First enrolled: January 1991
International Organization of Palaeobotany – 1993+
Botanical Society of South Africa

South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016
SASQUA (South African Society for Quaternary Research) – 1997+
PAGES - 2008 –onwards: South African representative
ROCEEH / WAVE – 2008+
INQUA – PALCOMM – 2011+onwards

### vii) Supervision of Higher Degrees

All at Wits University

| Degree | Graduated/completed | Current |
|---|---|---|
| Honours | 5 | 2 |
| Masters | 6 | 3 |
| PhD | 9 | 3 |
| Postdoctoral fellows | 5 | 3 |

### viii) Undergraduate teaching

Geology II – Palaeobotany GEOL2008 – average 65 students per year
Biology III – Palaeobotany APES3029 – average 25 students per year
Honours – Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology; Micropalaeontology – average 2-8 students per year.

#### ix) Editing and reviewing

Editor: Palaeontologia africana: 2003 to 2013; 2014 – Assistant editor
Guest Editor: Quaternary International: 2005 volume
Member of Board of Review: Review of Palaeobotany and Palynology: 2010 –
Cretaceous Research: 2014 -

Review of manuscripts for ISI-listed journals: 25 local and international journals

## x) Palaeontological Impact Assessments

Selected – list not complete:

- Thukela Biosphere Conservancy 1996; 2002 for DWAF
- Vioolsdrift 2007 for Xibula Exploration
- Rietfontein 2009 for Zitholele Consulting
- Bloeddrift-Baken 2010 for TransHex
- New Kleinfontein Gold Mine 2012 for Prime Resources (Pty) Ltd.
- Thabazimbi Iron Cave 2012 for Professional Grave Solutions (Pty) Ltd
- Delmas 2013 for Jones and Wagener
- Klipfontein 2013 for Jones and Wagener
- Platinum mine 2013 for Lonmin
- Syferfontein 2014 for Digby Wells
- Canyon Springs 2014 for Prime Resources
- Kimberley Eskom 2014 for Landscape Dynamics
- Yzermyne 2014 for Digby Wells
- Matimba 2015 for Royal HaskoningDV

- Commissiekraal 2015 for SLR
- Harmony PV 2015 for Savannah Environmental
- Glencore-Tweefontein 2015 for Digby Wells
- Umkomazi 2015 for JLB Consulting
- Ixia coal 2016 for Digby Wells
- Lambda Eskom for Digby Wells
- Alexander Scoping for SLR
- Perseus-Kronos-Aries Eskom 2016 for NGT
- Mala Mala 2017 for Henwood
- Modimolle 2017 for Green Vision
- Klipoortjie and Finaalspan 2017 for Delta BEC

## xi) Research Output

Publications by M K Bamford up to January 2018 peer-reviewed journals or scholarly books: over 110 articles published; 5 submitted/in press; 8 book chapters.
Scopus h index = 22; Google scholar h index = 24;
Conferences: numerous presentations at local and international conferences.

## xii) NRF Rating

NRF Rating: B-2 (2016-2020)
NRF Rating: B-3 (2010-2015)
NRF Rating: B-3 (2005-2009)
NRF Rating: C-2 (1999-2004)

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# APPENDIX 3:

## Heritage Screening Assessment



CTS Heritage
34 Harries Street, Plumstead, Cape Town, 7800
**Tel:** (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

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# HERITAGE SCREENER

| | |
|---|---|
| CTS Reference Number: | **CTS18_040** |
| SAHRIS CASE ID: | |
| Client: | **CSIR** |
| Date: | **5 March 2018** |
| Title: | **Proposed egg-layer facility on Portion 4 of Farm Waterval 34 JS, Mpumalanga** |

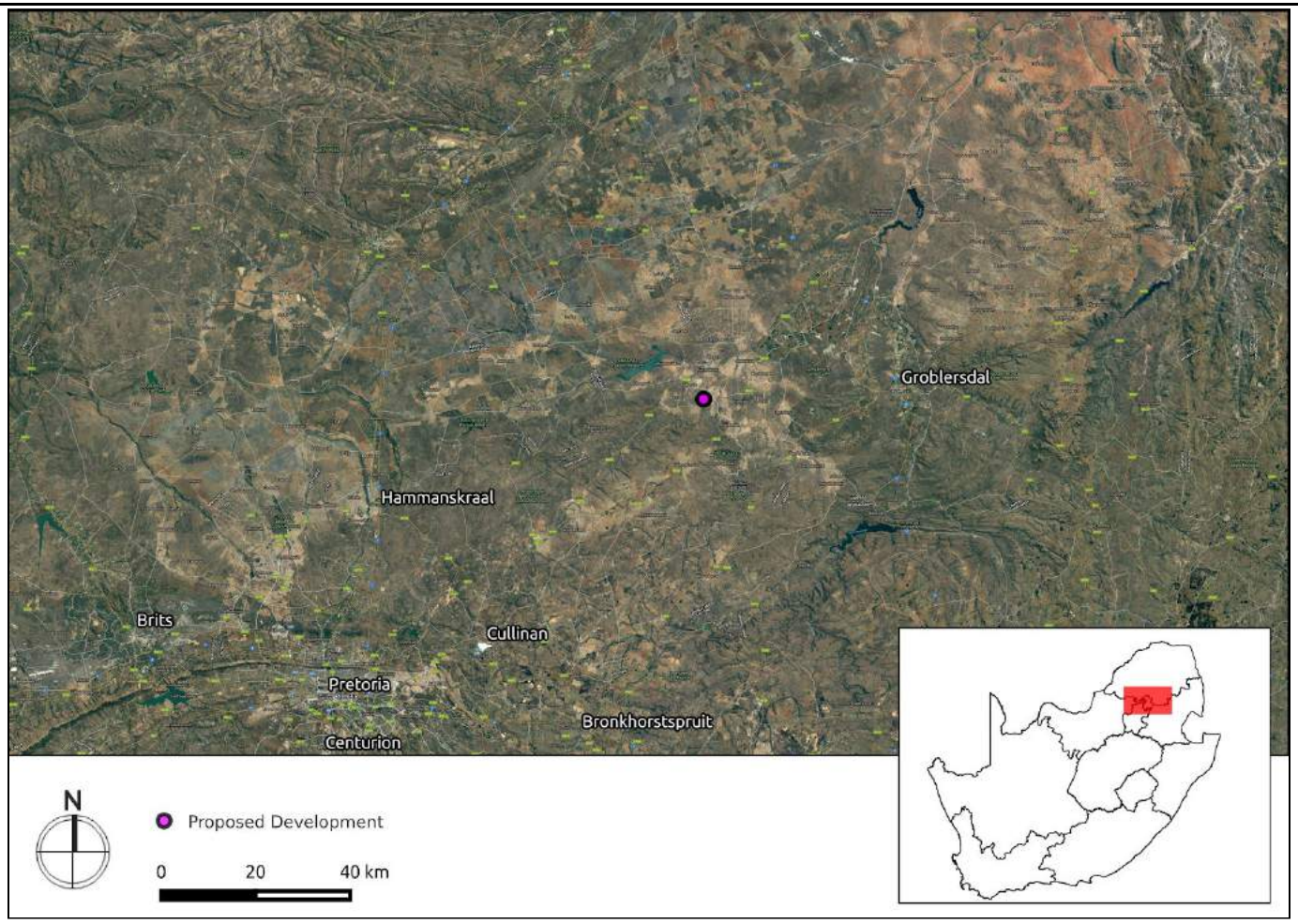


**Figure 1a**. Satellite map indicating the location of the proposed development in the Eastern Cape Province

| | |
|---|---|
| Recommendation by CTS Heritage Specialists: (Type 2) | **RECOMMENDATION:** **The heritage resources along the routes proposed for development are only partially recorded**<br>See Section 8 for full recommendations. |


CTS Heritage
34 Harries Street, Plumstead, Cape Town, 7800
**Tel:** (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

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## 1. Proposed Development Summary

The application is for a proposed egg-layer facility in Dr JS Moroka Local Municipality Mpumalanga. The proposed site is located on Portion 4 of Farm Waterval 34 JS across the road (southwest direction) from the main Waterval Township. The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation. The project will be developed on land that is currently vacant. The project will specialize in the production and sale of eggs. The project will essentially purchase 'ready to lay' pullets and raise them through their productive cycle. The start-up enterprise plans to build an environmentally controlled chicken layer facility with supporting infrastructure and a 5ha vegetable crop field.

## 2. Application References

| | |
|---|---|
| **Name of relevant heritage authority(s)** | SAHRA |
| **Name of decision making authority(s)** | Mpumalanga Provincial Department of Agriculture, Rural Development, Land & Environmental Affairs |

## 3. Property Information

| | |
|---|---|
| **Latitude / Longitude** | 3226543.07171 -2898190.10776 |
| **Erf number / Farm number** | Portion 4 of Farm Waterval 34 JS |
| **Local Municipality** | Dr JS Moroka |
| **District Municipality** | Nkangala |
| **Previous Magisterial District** | Mdutjana |
| **Province** | Mpumalanga |
| **Current Use** | Vacant |
| **Current Zoning** | Agricultural |
| **Total Extent** | 2.4km$^2$ |

## 4. Nature of the Proposed Development

| | |
|---|---|
| **Total Surface Area** | 20ha |
| **Depth of excavation (m)** | Estimated 1.5 metres |
| **Height of development (m)** | Estimated 3.9 metres |
| **Expected years of operation before decommission** | NA |

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## 5. Category of Development

| | |
|---|---|
| **Triggers: Section 38(8) of the National Heritage Resources Act** | **x** |
| **Triggers: Section 38(1) of the National Heritage Resources Act** | |
| 1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length. | |
| 2. Construction of a bridge or similar structure exceeding 50m in length. | |
| 3. Any development or activity that will change the character of a site- | |
| a) exceeding 5 000m$^2$ in extent | **x** |
| b) involving three or more existing erven or subdivisions thereof | |
| c) involving three or more erven or divisions thereof which have been consolidated within the past five years | |
| 4. Rezoning of a site exceeding 10 000m$^2$ | |
| 5. Other (state): | |

## 6. Additional Infrastructure Required for this Development

The proposed infrastructure development is in the form of:

- 2 x Chicken Layer housing (12m Wide, 81m Long and 3.1m High)
- Maize and Vegetables (5ha Production)
- Office
- Housing
- Borehole

## 7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

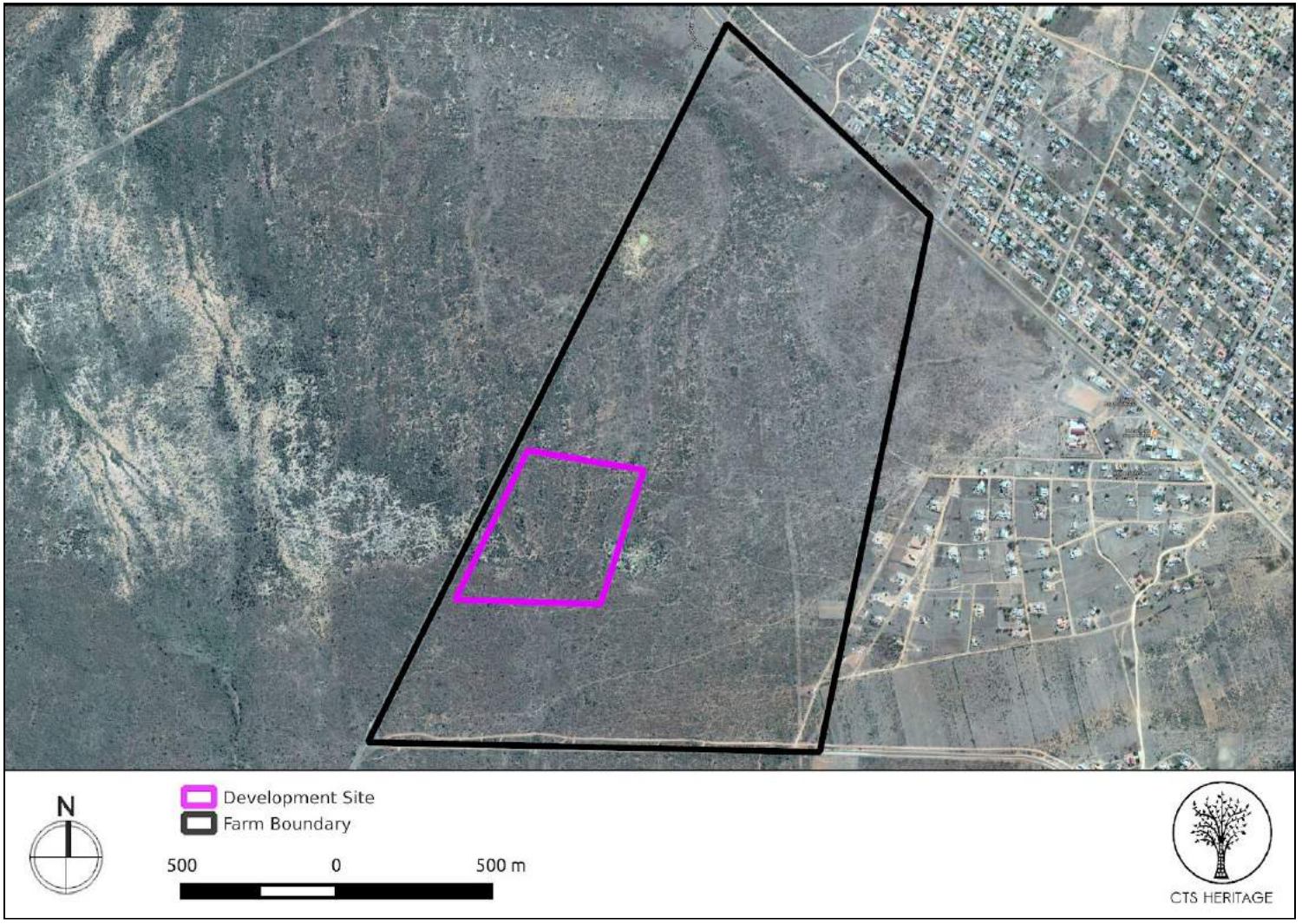


**Figure 1b. Overview Map**. Satellite image (2018) indicating the proposed development area at closer range.

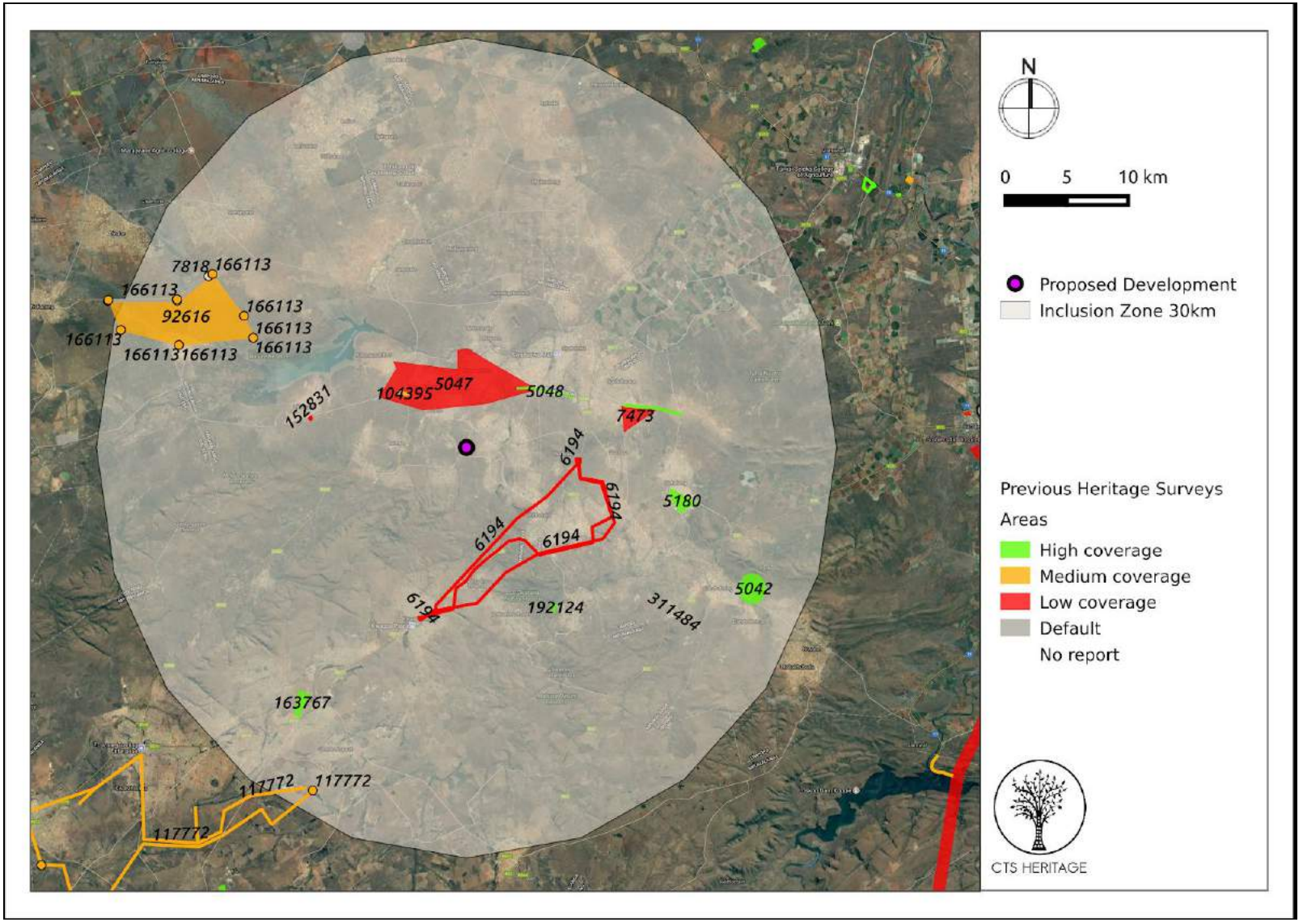


**Figure 2a. Previous HIAs Map.** Previous Heritage Impact Assessments surrounding the proposed development area within 30km, with SAHRIS NIDS indicated. Please see Appendix 2 for full reference list.

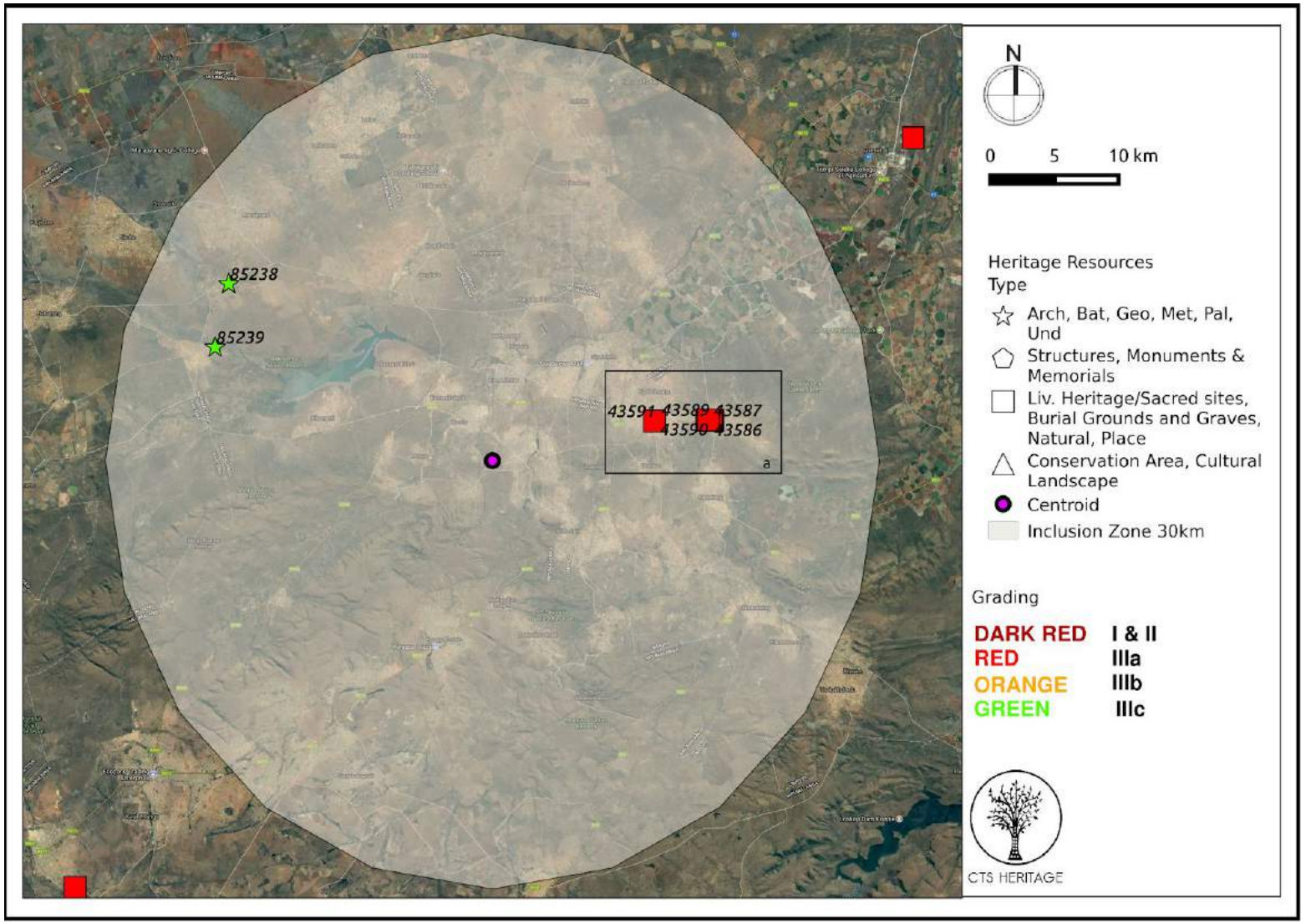


**Figure 3. Heritage Resources Map.** Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated (see Figure 3b for inset). Please See Appendix 4 for full description of heritage resource types.

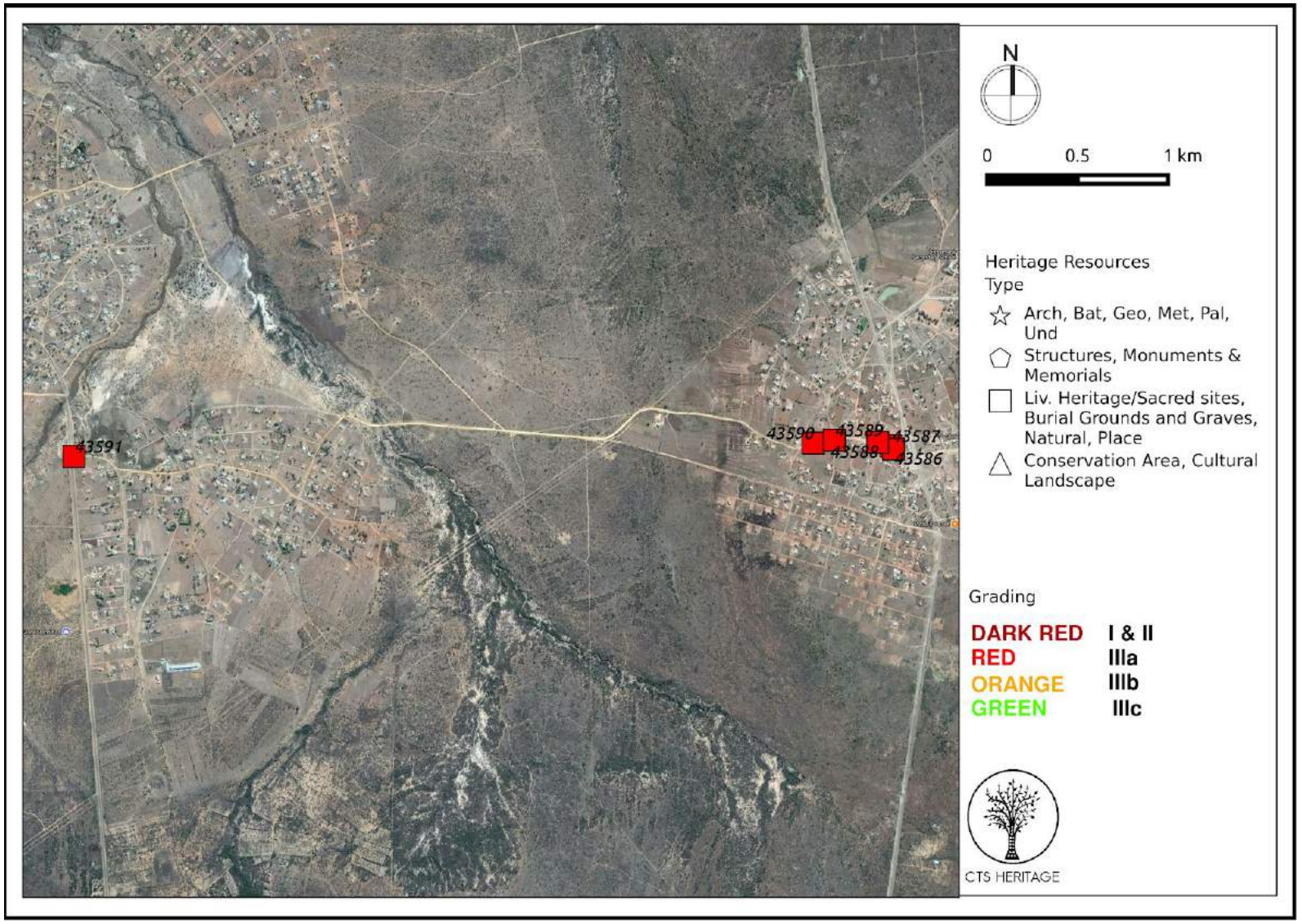


**Figure 3a. Inset Map.** Indicating spatial layout of sites in this region. Please see Appendix 1 for all Site IDs.

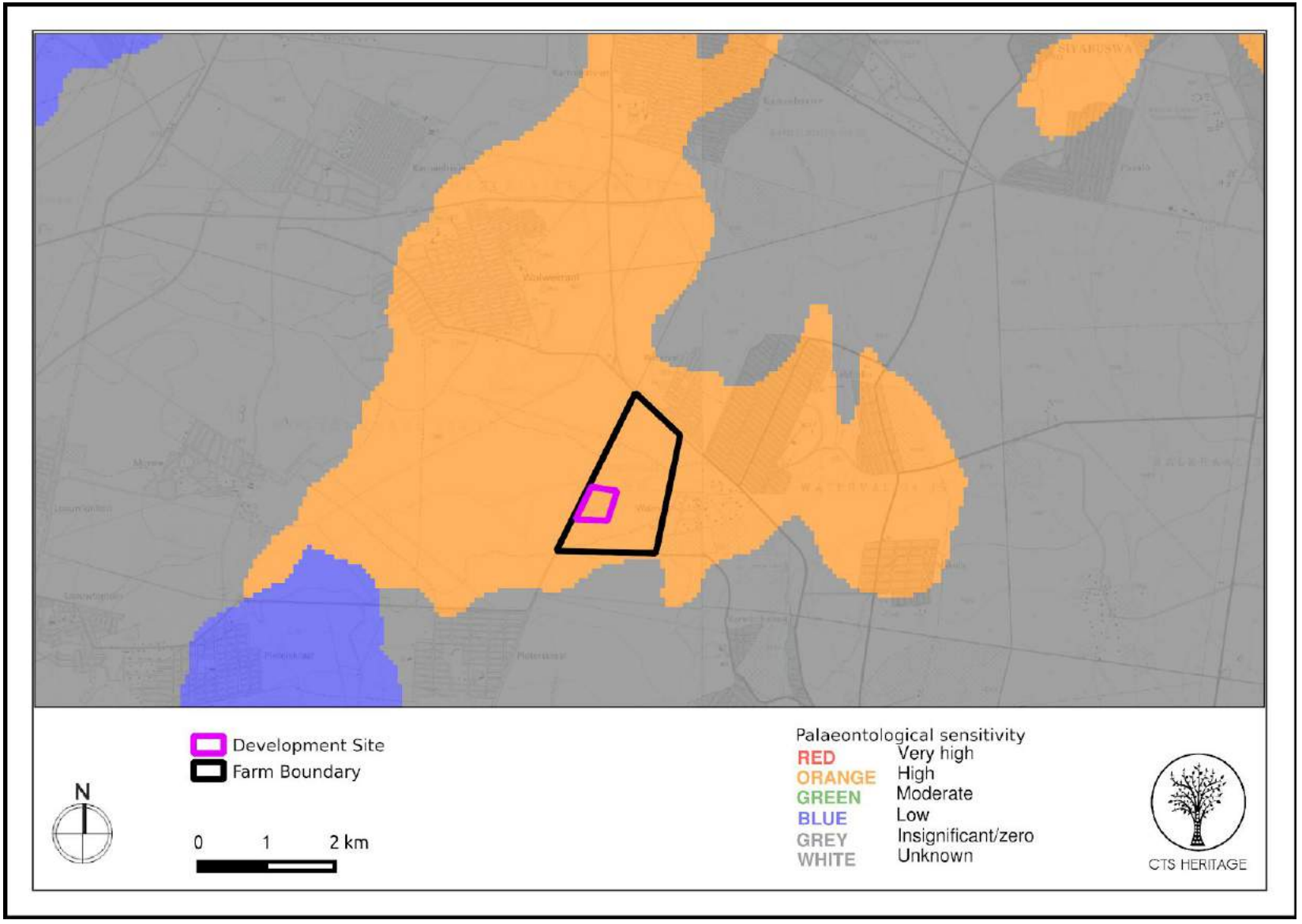


**Figure 4. Palaeosensitivity Map**. Indicating high fossil sensitivity underlying the study area. Please See Appendix 3 for full guide to the legend.

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## 8. Heritage statement and character of the area

The application is for a proposed egg-layer facility in Dr JS Moroka Local Municipality Mpumalanga. The proposed site is located on Portion 4 of Farm Waterval 34 JS across the road (southwest direction) from the main Waterval Township. The project falls under the Special Needs Programme of the CSIR and DEA in assisting small scale agricultural initiatives to obtain Environmental Authorisation. The project will be developed on land that is currently vacant. The project will specialize in the production and sale of eggs. The project will essentially purchase 'ready to lay' pullets and raise them through their productive cycle. The start-up enterprise plans to build an environmentally controlled chicken layer facility with supporting infrastructure and a 5ha vegetable crop field.

According to Pistorius (2010 NID 6194), "Focused archaeological research has been conducted in the Mpumalanga and Limpopo Provinces of South Africa for more than four decades. This research consists of surveys and of excavations of Stone Age and Iron Age sites as well as the recording of rock art and historical sites." However, very few archaeological or built environment sites of significance are known from the area surrounding the proposed development (Figures 2 and 3). The nearest HIA conducted in the vicinity of the proposed development is located approximately 5km, by Pistorius in 2003 (SAHRIS NID 5047). While he did not find any archaeological or built environment heritage resources, he noted the presence of burial grounds and graves. Only eight heritage resources are known to exist within a 30km buffer of the proposed development area - some archaeological resources of low heritage significance and burial grounds and graves. Despite the low impact nature of the proposed development, there is a chance that unmarked burials may be impacted by the proposed development and as such, it is recommended that a heritage impact assessment be conducted.

The site proposed for development is underlain by the Ecca Group of high palaeontological sensitivity according to the SAHRIS Palaeosensitivity map. This group is known for non-marine trace fossils, vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc*) and insects. Despite the low impact nature of the proposed development, there is a chance that significant fossil material may be impacted by the proposed development. To our knowledge, SAHRA is currently requiring a minimum desktop PIA in areas of high palaeontological sensitivity (orange) on the Palaeosensitivity Map. Given the low impact nature of the proposed development and the tight budgetary constraints within a Special Needs Programme application, a desktop PIA should suffice.

**RECOMMENDATION:**
**The heritage resources along the routes proposed for development are only partially recorded**
**Based on the available information, the proposed development is likely to impact on heritage resources and as such, it is recommended that a complete Heritage Impact Assessment is required that consists of a one day field assessment to assess impacts to possible burial grounds and graves. The HIA will also need a desktop PIA.**

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# APPENDIX 1

## List of heritage resources within the 30km Inclusion Zone

| Site ID | Site no | Full Site Name | Site Type | Grading |
|---|---|---|---|---|
| 85238 | CANY002 | Canyon Springs 002 | Artefacts | Grade IIIc |
| 85239 | CANY003 | Canyon Springs 003 | Artefacts | Grade IIIc |
| 43587 | NAG02 | Naganeng Road 02 | Structures, Burial Grounds & Graves | Grade IIIa |
| 43590 | NAG05 | Naganeng Road 05 | Structures, Burial Grounds & Graves | Grade IIIa |
| 43586 | NAG01 | Naganeng Road 01 | Burial Grounds & Graves | Grade IIIa |
| 43588 | NAG03 | Naganeng Road 03 | Burial Grounds & Graves | Grade IIIa |
| 43589 | NAG04 | Naganeng Road 04 | Burial Grounds & Graves | Grade IIIa |
| 43591 | NAG06 | Naganeng Road 06 | Burial Grounds & Graves | Grade IIIa |

# APPENDIX 2

## Reference List

| Heritage Impact Assessments | | | | |
|---|---|---|---|---|
| **Nid** | **Report Type** | **Author/s** | **Date** | **Title** |
| 7818 | AIA Phase 1 | Richard Munyai | 01/08/2011 | Phase 1 Archaeological Scoping Study: An archaeological investigation for the proposed upgrading of 11.8km (gravel to tar) of road D2740 Rust de Winter - Moloto in the Nkangala Region of the Mpumalanga District Province |
| 7818 | AIA Phase 1 | Richard Munyai | 01/08/2011 | Phase 1 Archaeological Scoping Study: An archaeological investigation for the proposed upgrading of 11.8km (gravel to tar) of road D2740 Rust de Winter - Moloto in the Nkangala Region of the Mpumalanga District Province |
| 117772 | AIA Phase 1 | Eric Ndivhuho Mathoho | 01/08/2012 | ARCHAEOLOGICAL IMPACTS ASSESSMENT PROCESS: PROPOSED NEW 132KV POWER LINE FROM GEMSBOK SUBSTATION TO BIG TREE SUBSTATION VIA THE KWAMHLANGA SUBSTATION, THEMBISILE HANI LOCAL MUNICIPALITY IN MPUMALNGA PROVINCE. |

CTS HERITAGE

| | | | | |
|---|---|---|---|---|
| 166113 | HIA Phase 1 | Anton van Vollenhoven | 20/08/2012 | A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED CANYON SPRINGS COAL PROJECT, SIYABUSWA DISTRICT, MPUMALANGA PROVINCE |
| 6194 | AIA Phase 1 | Julius CC Pistorius | 01/06/2010 | Phase 1 Heritage Impact Assessment (HIA) study for the proposed new 132KV power line running between Kwaggafontein and Amandla substations in the Mpumalanga and Limpopo Provinces of South Africa |
| 7818 | AIA Phase 1 | Richard Munyai | 01/08/2011 | Phase 1 Archaeological Scoping Study: An archaeological investigation for the proposed upgrading of 11.8km (gravel to tar) of road D2740 Rust de Winter - Moloto in the Nkangala Region of the Mpumalanga District Province |
| 117772 | AIA Phase 1 | Eric Ndivhuho Mathoho | 01/08/2012 | ARCHAEOLOGICAL IMPACTS ASSESSMENT PROCESS: PROPOSED NEW 132KV POWER LINE FROM GEMSBOK SUBSTATION TO BIG TREE SUBSTATION VIA THE KWAMHLANGA SUBSTATION, THEMBISILE HANI LOCAL MUNICIPALITY IN MPUMALNGA PROVINCE. |
| 145847 | AIA Phase 1 | Jean-Pierre Celliers | 14/10/2013 | Phase 1 Archaeological Impact Assessment in respect of the Proposed Funda Mlimi Poultry Abbatoir on the farm Gemsbokfontein 231 JR, Gauteng Province. |
| 152831 | AIA Phase 1 | Jaco van der Walt | 04/11/2013 | Archaeological Impact Assessment For the Proposed Libangeni and Mmamethlake Landfill Sites, Located within the Dr JS Moroka Local Municipality, Limpopo Province |
| 152833 | Exemption Letter | John E Almond | 04/11/2013 | RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES: PROPOSED LIBANGENI LANDFILL SITE, FARM LEEUWFONTEIN NO. 188JR, DR JS MOROKA LOCAL MUNICIPALITY, MPUMALANGA |
| 165359 | HIA Letter of Exemption | Christine Van Wyk Rowe | 02/06/2014 | Letter of recommendation for the exemption from a phase 1 archaeological and Heritage investigation for the proposed township establishment on portion 3 Riekerts Laager 165 JR Siyabuswa, Mpumalanga |
| 179223 | Heritage Scoping | Wouter Fourie | 01/09/2014 | Nokukhanya Solar Facility: Heritage Scoping Report |
| 311484 | Heritage Impact Assessment Specialist Reports | Wouter Fourie | 20/03/2015 | Nokukhanya Solar Facility: Heritage Impact Assessment Report |
| 5042 | HIA Letter of Exemption | Frans Roodt | 24/11/2006 | Phase 1 Heritage Resource Impact Assessment (Scoping & Evaluation) Ntwane/Elandsdoorn Groblersdal, Mpumalanga Letter of Recommendation for Exemption |
| 5047 | AIA Phase 1 | Julius CC Pistorius | 01/07/2003 | Heritage Impact Assessment Study for a Proposed New 22 kV Powerline on the Farm Kameelrivier 160 JR near Siyabuswa, Mpumalanga |
| 5048 | AIA Phase 1 | Johnny Van | 01/12/2007 | Heritage Impact Assessment Report for the Proposed Siyabuswa Water Augmentation Scheme, Moutse |

| | | | | |
|---|---|---|---|---|
| | | Schalkwyk | | Magisterial District, Mpumalanga Province |
| 5180 | AIA Phase 1 | McEdward Murimbika | 01/03/2005 | The Makgadimeng Water Supply, Marble Hall, Mpumalanga Province |
| 7472 | AIA Phase 1 | McEdward Murimbika | 01/03/2005 | Naganeng Road Upgrade, Marble Hall, Mpumalanga Province, Cultural and Archaeological Heritage Assessment, Specialist Study |
| 7473 | AIA Phase 1 | McEdward Murimbika | 01/03/2005 | Naganeng Water Supply, Marble Hall, Mpumalanga Province, Cultural and Archaeological Heritage Assessment, Specialist Study |
| 92616 | AIA Phase 1 | Anton van Vollenhoven | 01/08/2012 | A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED CANYON SPRINGS COAL PROJECT, SIYABUSWA DISTRICT, MPUMALANGA PROVINCE |
| 104395 | AIA Phase 1 | Christine Van Wyk Rowe | 01/07/2012 | SPECIALIST REPORT FOR PHASE 1 ARCHEOLOGICAL / HERITAGE IMPACT ASSESSMENT: PROPOSED RESIDENTIAL TOWNSHIP (MORIPE GARDEN): REMAINING EXTENT OF PORTION 7 OF THE FARM KAMEELRIVIER 160JR, SIYABUSWA MPUMALANGA |
| 130624 | PIA Desktop | Marion Bamford | 06/09/2013 | SAHRA's request for a Palaeontological Impact Assessment for development of an opencast mine by Canyon Springs Investments 82 (Pty) Ltd, near Bela-Bela, Mpumalanga – on behalf of Prime Resources, Parktown North, Johannesburg (Ms Zoë Gebhardt) |
| 163767 | AIA Phase 1 | Christine Van Wyk Rowe | 14/05/2014 | Phase 1 AIA / HIA for a proposed township development on portion 1, 4 & 5 of Vlaklaagte 221 JR, Vlaklaagte Mpumalanga |
| 166113 | HIA Phase 1 | Anton van Vollenhoven | 20/08/2012 | A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED CANYON SPRINGS COAL PROJECT, SIYABUSWA DISTRICT, MPUMALANGA PROVINCE |
| 166451 | AIA Phase 1 | Christine Van Wyk Rowe | 17/06/2014 | Phase 1 Archaeological and Heritage Impact assessment for a proposed township development on portion 36 of the farm Vlaklaagte, Mpumalanga |
| 181586 | AIA Phase 1 | Francois P Coetzee | 31/10/2014 | Cultural Heritage Assessment for the Proposed Expansion of the Bhundu Inn Hotel, Portion 174 of the Farm Goederede 60 JS, Thembisile Hani Local Municipality, Nkangala District, Mpumalanga |
| 192124 | PIA Desktop | Marion Bamford | 10/09/2014 | Palaeontological Impact Assessmentfor the proposed Hotel (Bhundu Inn) apgrade adjacent to the SS Skosana Nature reserve, Mpumalanga |

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# APPENDIX 3 - Keys/Guides

## Key/Guide to Acronyms

| | |
|---|---|
| **AIA** | Archaeological Impact Assessment |
| **DARD** | Department of Agriculture and Rural Development (KwaZulu-Natal) |
| **DEA** | Department of Environmental Affairs (National) |
| **DEADP** | Department of Environmental Affairs and Development Planning (Western Cape) |
| **DEDEAT** | Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape) |
| **DEDECT** | Department of Economic Development, Environment, Conservation and Tourism (North West) |
| **DEDT** | Department of Economic Development and Tourism (Mpumalanga) |
| **DEDTEA** | Department of economic Development, Tourism and Environmental Affairs (Free State) |
| **DENC** | Department of Environment and Nature Conservation (Northern Cape) |
| **DMR** | Department of Mineral Resources (National) |
| **GDARD** | Gauteng Department of Agriculture and Rural Development (Gauteng) |
| **HIA** | Heritage Impact Assessment |
| **LEDET** | Department of Economic Development, Environment and Tourism (Limpopo) |
| **MPRDA** | Mineral and Petroleum Resources Development Act, no 28 of 2002 |
| **NEMA** | National Environmental Management Act, no 107 of 1998 |
| **NHRA** | National Heritage Resources Act, no 25 of 1999 |
| **PIA** | Palaeontological Impact Assessment |
| **SAHRA** | South African Heritage Resources Agency |
| **SAHRIS** | South African Heritage Resources Information System |
| **VIA** | Visual Impact Assessment |

## Full guide to Palaeosensitivity Map legend

| | | |
|---|---|---|
| | **RED**: | VERY HIGH - field assessment and protocol for finds is required |
| | **ORANGE/YELLOW**: | HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely |
| | **GREEN**: | MODERATE - desktop study is required |
| | **BLUE/PURPLE**: | LOW - no palaeontological studies are required however a protocol for chance finds is required |
| | **GREY**: | INSIGNIFICANT/ZERO - no palaeontological studies are required |
| | **WHITE/CLEAR**: | UNKNOWN - these areas will require a minimum of a desktop study. |

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# APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

**DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION**

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

**DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY**

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

**DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON**

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in

three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report was undertaken.

**Low coverage** will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

**Medium coverage** will be used for

- reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.
- reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

**High coverage** will be used for

- reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

**RECOMMENDATION GUIDE**

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

**(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.**

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

**(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.**

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area
- undertaking mitigation measures requested in previous assessments/records of decision.

**(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.**

**Note:**
The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

The compilation of the Heritage Screener will not include any field assessment. The Heritage Screener will be submitted to the applicant within 24 hours from receipt of full payment. **If the 24-hour deadline is not met by CTS, the applicant will be refunded in full.**

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# APPENDIX 4:

## HWC Fossil Finds Procedure as an example for the EMPr



CTS Heritage
34 Harries Street, Plumstead, Cape Town, 7800
**Tel:** (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

**HWC PROCEDURE: CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL**
***June 2016***

**Introduction**
This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

**Training**
Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO

It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

**Actions to be taken**
One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

**Procedure to follow if it is likely that the material identified is a fossil:**

i. The ECO or site agent must ensure that all **work ceases** immediately in the vicinity of the area where the fossil or fossils have been found;

ii. The ECO or site agent must **inform HWC of the find immediately.** This information must include photographs of the findings and GPS co-ordinates**;**

iii. The ECO or site agent must compile a **Preliminary Report and fill in the *Fossil Discoveries: HWC Preliminary Record Form*** within 24 hours without removing the fossil from its original position. The **Preliminary Report** records basic information about the find including:

- The date
- A description of the discovery
- A description of the fossil and its context (e.g. position and depth of find)
- Where and how the find has been stored
- Photographs to accompany the preliminary report (the more the better):
  - ➔ A scale must be used
  - ➔ Photos of location from several angles
  - ➔ Photos of vertical section should be provided
  - ➔ Digital images of hole showing vertical section (side);
  - ➔ Digital images of fossil or fossils.

Upon receipt of this **Preliminary Report**, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

v. **Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags.** This protection should allow for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilisation.

vi. If the find cannot be stabilised, **the fossil may be collect with extreme care** by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.

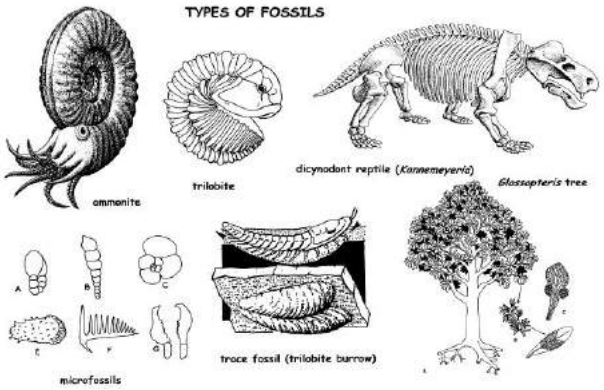
| FOSSIL DISCOVERIES: HWC PRELIMINARY RECORDING FORM | | |
|---|---|---|
| **Name of project:** | | |
| **Name of fossil location:** | | |
| **Date of discovery:** | | |
| **Description of situation in which the fossil was found:** | | |
| **Description of context in which the fossil was found:** | | |
| **Description and condition of fossil identified:** | | |
| **GPS coordinates:** | Lat: | Long: |
| **If no co-ordinates available then please describe the location:** | | |
| **Time of discovery:** | | |
| **Depth of find in hole** | | |
| **Photographs (tick as appropriate and indicate number of the photograph)** | Digital image of vertical section (side) | |
| | Fossil from different angles | |
| | Wider context of the find | |
| **Temporary storage (where it is located and how it is conserved)** | | |
| **Person identifying the fossil** | Name:<br>Contact: | |
| **Recorder** | Name:<br>Contact: | |
| **Photographer** | Name:<br>Contact: | |

iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

## Palaeontology: what is a fossil?

Fossils are the traces of ancient life (animal, plant or microbial) preserved within rocks and come in two forms:

- Body fossils preserve parts, casts or impressions of the original tissues of an organism (e.g. bones, teeth, wood, pollen grains); and
- Trace fossils such as trackways and burrows record ancient animal behaviour.




### How to report chance fossil finds: What should I do if I find a fossil during construction/mining?

If you think you have identified a fossil:

Immediately inform the ECO or Site Agent. He/she will then contact HWC and write a report and if necessary operations will stop in that specific area until the fossil is recovered

Heritage Western Cape
ceoheritage@westerncape.gov.za
021 483 5959
www.hwc.org.za



## Types of palaeontological finding - What does a fossil look like?

Fossils vary in size, from fossilised tree trunks and dinosaur bones down to very small animals or plants. Finds can be **individual fossils** (one isolated wood log or bone) or **clusters and beds** (several bones, teeth, animal or plant remains, trace fossils in close proximity or bones resembling part of a skeleton). A bed of fossils is a layer with many fossil remains.

Below there is a list of few examples of fossils which may be identified during excavations in the Western Cape.

| Image | Description | Image | Description |
|---|---|---|---|
|  | Leaves |  | Snail shells and other shells |
|  | Fossil wood |  | Bones of larger animals |
|  | The remains of fish and marine life (e.g. teeth, scales, starfish) |  | Large burrows made by moles and other animals |
|  | Stromatolites |  | Traces made by burrowing insects (ants, wasps, dung-beetles etc.). |
|  | Animal footprints | | |

Images provided by Dr John Almond

Text by HWC's Archaeology, Palaeontology & Meteorites Committee June 2016

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# APPENDIX 5:

## CVs of Specialists



CTS Heritage
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**Tel:** (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

**CURRICULUM VITAE**

**Jenna Lavin**

Tel: 083 619 0854 (c)
E-mail address: jenna.lavin@gmail.com
ID number: 8512050014089

Address: 7 Carey Street, Woodstock, cape Town

## EDUCATION:

**Tertiary**

| | |
|---|---|
| 2014 | M.Phil in Conservation of the Built Environment (University of Cape Town)<br>- Not completed as of 2017 |
| 2011 | Continued Professional Development Course in Urban Conservation Management (University of Cape Town) Part I and Part II |
| 2010 | M.Sc. with Distinction in Archaeology (University of Cape Town)<br>Title: *Palaeoecology of the KBS member of the Koobi Fora Formation: Implications for Pleistocene Hominin Behaviour*. |
| 2007 | B.Sc. Honours in Archaeology (University of Cape Town)<br>Title: *The Lost Tribes of the Peninsula: An Investigation into the historical distribution of Chacma baboons (Papio ursinus) at the Cape Peninsula, South Africa.*<br>Koobi Fora Field School, Rutgers University (U.S.A.)/ National Museums of Kenya |
| 2006 | B.Sc. Archaeology (University of Cape Town)<br>B.Sc. Environmental and Geographic Science (University of Cape Town) |

**Secondary**

| | |
|---|---|
| 1999-2003 | Rustenburg High School for Girls<br>Firsts in English, Afrikaans, Mathematics HG, Biology HG, History HG, Entrepreneurship. |

## EMPLOYMENT HISTORY:

**PROFESSIONAL DEVELOPMENT**
**Environmental and Heritage Management:**

Director: Heritage for CTS heritage and member of OpenHeritage NPC.
*July 2016 to present*

I am a member of the senior management of the company. I am responsible for project management and quality control on all of our heritage-related projects. I provide specialist heritage expertise when required and assist with the drafting of management plans, impact assessments and other specialist reports. I liaise with clients, authorities and other specialists to ensure the highest quality product from CTS Heritage. I manage the budgets and financial compliance for all our projects and for the business in general. In addition, I manage a specialist team of two archaeologists. Through OpenHeritage, I have been intimately involved with the development, and successful implementation of, of a digital heritage objects management system for the National Museum in Kenya as well as Tristan da Cuhna.

Assistant Director for Policy, Research and Planning at Heritage Western Cape (HWC).
*August 2014 to June 2016*

As a member of the management structure of HWC, I was responsible for the drafting of new heritage related policy, the grading and declaration of Provincial Heritage Sites, the development of Conservation Management Plans, facilitating the development of inventories of heritage resources through local authorities as well as managing the development of the Western Cape's Heritage Information Management System (HIMS). I was also responsible for managing the project to nominate the Modern Human Origins proposed World Heritage Site.

I performed the role of Acting Deputy Director for HWC from April to December 2015, including financial management responsibilities, problem solving and the training of new staff.

Heritage Officer for Palaeontology and for the Mpumalanga Province at the South African Heritage Resources Agency (SAHRA).
*January 2013 to June 2014*

Responsibilities include managing palaeontological permit applications in terms of Section 35 of the NHRA and development applications in terms of Section 38 of the NHRA. Projects included the development of a National Palaeotechnic Report identifying significant palaeontological deposits throughout SA, as well as developing professional relationships between SAHRA and the Palaeontological Society of South Africa (PSSA) and the Geological Society of South Africa (GSSA). During this time, I was part of the team that developed the digitised National Palaeontological Sensitvity Map, the first of its kind in the world.

Heritage Officer for Archaeology, Palaeontology and Meteorites at Heritage Western Cape (HWC).
*September 2010 to December 2012*

HWC is a Public Entity that forms part of the Heritage Resource Management Component of the Provincial Governments' Department of Cultural Affairs and Sport (DCAS). Projects included the declaration of Pinnacle Point and the West Coast Fossil Park as Provincial Heritage Sites (PHSs), the management of the development of the Baboon Point PHS Conservation Management Plan as well as an educational outreach program as part of the DCAS MOD Centre Project.

Heritage Officer for the Archaeology, Palaeontology and Meteorites Unit of the South African Heritage Resources Agency (SAHRA) as part of a three month contract.
*January 2010 to March 2010*

Environmental Control Officer, Amathemba Environmental Management Consulting
*Part time: 2007 to 2009*

**Field Work Experience:**

2008-2009 Field Assistant, Dr. D. Braun, Elandsfontein Excavation Locality, University of Cape Town (UCT)
Field Assistant, Dr. D. Braun, Koobi Fora Research Project (Kenya), Rutgers University, New Jersey

2006 Field Assistant, Damiana Ravasi (PhD), Zoology Department, University of Cape Town.
2005 Research Assistant, Dr. Becky Ackerman, Archaeology Department, University of Cape Town
2004 Field Assistant, Prestwich Place Excavation Locality, Archaeology Contracts Office, UCT

**Teaching Positions:**

2017 Guest Lecturer, South African Heritage Legislation, George Washington University Heritage Management Field School
2016 Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2015 Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2014 Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2013 Guest Lecturer, South African Heritage Legislation, Archaeology Honours Course, University of Cape Town
2010 Teaching Assistant, Langebaanweg Field School, Arizona State University
2009 Demonstrator, Archaeology in Practice, University of Cape Town (AGE3013H)
Demonstrator, Introduction to Geography, Earth and Environmental Science, University of Cape Town (GEO1009F)
Teaching Assistant, Koobi Fora Field School (Kenya), Rutgers University, New Jersey
Lecturer, Introduction to Geography, Earth and Environmental Science: Supplementary Course, University of Cape Town (EGS1004S)
Demonstrator, Elandsfontein Honours Field School, University of Cape Town (AGE4000W)
2008 Demonstrator, Introduction to Geography, Earth and Environmental Science, University of Cape Town (ERT1000F)
Demonstrator, Elandsfontein Honours Field School, University of Cape Town (AGE4000W)
Teaching Assistant, Koobi Fora Field School (Kenya), Rutgers University, New Jersey

**Conferences and Papers**

2017 ASAPA, Pretoria, RSA: "*Using Heritage Data to Guide Responsible Development: Tools to ensure high quality recording of heritage sites"*
ICAHM, Bagomoyo, Tanzania: "*OpenHeritage: Development and implementation of national heritage management systems - Lessons from South Africa, Namibia and Kenya"*
2016 ICAHM, Salalah, Oman: "*Straight to the (Baboon) Point: A look at the Conservation of Archaeological Landscapes in South Africa using Baboon Point as a Case Study*"
2015 Leakey Foundation, Sonoma County, San Fransisco, USA: ""*Straight to the (Baboon) Point: A look at the Conservation of Archaeological Landscapes in South Africa using Baboon Point as a Case Study*"
2012 PSSA, Johannesburg, RSA: *"SAHRIS Palaeosensitivity Map - Methodology and Implementation"*

**Other**

In 2013 I was asked to join the panel of judges for the Ministerial awards for Heritage in the Western Cape. From 2013 to July 2014, I was a member of the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee and I currently sit on the Heritage Western Cape Inventories, Gradings and Interpretations Committee.

In November 2013, I was awarded a bursary from the Department of Arts and Culture to complete a Masters in Philosophy in Conservation of the Built Environment through the UCT Faculty of Engineering and the Built Environment in 2014 and 2015. I was in the process of finalising this degree in 2017, however the arrival of my son has temporarily halted my progress.

I am a paid up member of the Association for Southern African Professional Archaeologists (ASAPA), the Association of Professional Heritage Practitioners (APHP) and I have been a member of the Executive Council of APHP since 2014. In June 2017, I was selected as Chair of APHP. I am a member of the Palaeontological Society of South Africa (PSSA) and ICOMOS South Africa, for which I am Vice-President of the Board. I am also a member of the International Committee for Archaeological Heritage Management (ICAHM), a committee of UNESCO.

My private experience as a traveler in South Africa, Tanzania, Kenya, Namibia, Zambia, Malawi and Mozambique has inspired a passion for the conservation of environmental and heritage resources. I am passionate about sustainable living, with my Bachelor of Science in Environmental and Geographical Science providing a framework on which to base my values.

With a friend, I established the fundraising initiative, Chicks4Change, through which we managed to organize a number of successful events and raise R40 000 for Project Rhino to assist with anti-poaching initiatives in 2012.

I am an active participant in a not-for-profit company called OpenHeritage which is dedicated to opening access to heritage resources through digital innovation. To this end, we have been involved in a number of projects including Wikipeadia Training with Africa Centre, the development and implementation of a Collections Management System for the National Museums of Kenya and the development of a digital Inventory of the Vernacular Architecture of the Eastern Cape.

**Referees**

Mary Leslie
mleslie.za@gmail.com
082 733 2611

Janette Deacon
janette@conjunction.co.za
082 491 5067

Antonia Malan
antonia.malan@gmail.com
083 797 5672

Andrew Hall
waitabout191@gmail.com
(Currently based in Oman)

Wendy Black
wblack@iziko.org.za

**CURRICULUM VITAE**

**1. Name and Surname:** Nkosinathi Tomose

**2. Proposed Role in the Team:** Principal Heritage Consultant

**3. Biop:** Nkosinathi (affectionately known as Nathi by his peers) is an experienced consultant with 11 years' experience in the predevelopment and development sector. He specialises in environmental and sustainability matters and is an accredited archaeologist and heritage resources management resources management specialist. In his 11 years' involvement in the predevelopment and development sector, he has managed environmental and sustainability projects relating to turnkey linear development such as water augmentation, Eskom power transmission and distribution, as well as urban development and sustainability projects.

Nathi holds a Masters in Science (MSc) from the Wits University and is currently enrolled for **Master of Architecture in Sustainable Cities** (Wits) (**2018 to 2019**).

Nathi began his career in the predevelopment and development sector facilitating stakeholder relations for mine development programme in KwaNongoma, KwaZulu-Natal for **Synergistics Environmental Services** (2004). He was later appointed by Sumo Coal (a Turkish mining company in SA) and its Turkish associates as the lead **Public Participation and Community Liaison Officer** in the **Environmental Impact Assessment** for the construction of Nizamiye Turkish Masjid in Midrand (2005). Among other private companies that he has worked for are: Nzumbululo Holdings (Pty) Ltd (**Division Manager: Environment and Sustainability Department);** PGS Heritage (Lead Heritage Consultant and Community Liaison); Kanya College (**Associated Researcher**). He has worked on projects such as Environmental and Heritage Impact Assessments, Namoya SALR – Gold Mine, Maniema Province in the eastern Democratic Republic of Congo.

Within the public sector Nathi has worked for the South African Heritage Resources Agency (SAHRA) in various capacities and as a lead project manager for the Cradle of Humankind World Heritage Site (COWHS), and for the University of the Witwatersrand in the School of Geography, Archaeology & Environmental Studies.

## 4. Major Projects Involved in 2015 – 2017

**A)** Basic Assessment Report (BAR), Environmental Management Programme, Environmenta Audit for the Proposed Bela-Bela 132kV Substation, Bela-Bela, Waterberg District, Limpopo Province. Status: Approved – Environmental Authorisation (EA) Issued in April 2017 (**Annexure A**) (**Power and Energy**)

**Role:** Lead Consultant and Author:

**Client:** GKB Design and Associates (Pty) Ltd on Behalf of Bela-Bela Local Municipality

**Referee:** Mr Gaylord Mupona (gmupona@gkbgroup.co.za/ 0825276969)

**Project Proponent:** Bela-Bela Local Municipality

**B)** Integrated Heritage Resources Management report for the Proposed Elim District Hospital Redevelopment, Limpopo Province Inclusive of Baseline Social Impact Assessment and Biodiversity Study (**Built Environment**)

**Role:** Lead Consultant and Author:

**Client:** Ngonyama Okpanum and Associates (Pty) Ltd

**Referee:** Mr Hammond Dendere, Project Architect & Development Planner

**Project Proponent:** Limpopo Department of Health

**Role:** Lead Consultant and Co-Author:

**Client:** Moditi Consulting (Pty) Ltd and Ngonyama Okpanum and Associates (Pty) Ltd

**Referee:** Mr Hammond Dendere (hammond@noact.co.za / tshepom@moditi.co.za )

**Project Proponent:** National Department of Health

**C)** Integrated Heritage Resources Management Report and Social Impact Assessment Study for the Proposed Medupi Power Station Flue Gas Desulpherisation (FGD) Project, Limpopo Province, South Africa (**Power and Energy**).

**Role:** Lead Consultant and Author:

**Client:** Zithole Consulting (Pty) Ltd

**Referee:** Mrs. Sharon Meyer-Douglas (sharonm@zitholele.co.za / +27 11 207 2073)

**Project Proponent:** Eskom Holdings

**Referee:** Mrs. Sharon Meyer-Douglas, Head of Environmental service

**Project Proponent:** Eskom Holdings

**D)** Heritage and Social Impact Assessment and Social Impact Assessment Study for Study for the Proposed Ariadne-Eros 400kv/132kV Multi-Circuit Power Transmission Line, KwaZulu-Natal Province, South Africa (**Power and Energy)**.

**Role:** Lead Consultant and Author:

**Client:** Mokgope Consulting CC, Director

**Referee:** Dr Mpho Nenweli (mphonenweli@gmail.com /082 256 73099)

**Project Proponent:** Eskom Holdings and African Development Bank

**E)** Heritage and Socio-Economic Studies for the Proposed Passenger Rail Agency South Africa (PRASA) for the following Stations (**Built Environment**):

- HIA and SIA for Wonderboom PRASA Station, Pretoria Gauteng Province, South Africa
- HIA and SIA for and SIA for Lellara PRASA Station, Tembisa, Gauteng Province, South Africa
- HIA and SIA for Limindlela PRASA, Tembisa, Gauteng Province, South Africa
- HIA and SIA for Kempton Park PRASA Station, Kempton Park, Gauteng Province, South Africa
- HIA and SIA for for Germiston Junction PRASA Station, Germiston, Gauteng Province, South Africa
- HIA and SIA for Roodepoort PRASA Station, Roodepoort, Gauteng Province, South Africa
- HIA and SIA for Vereeniging PRASA Station, Vereening, Gauteng Province, South Africa
- HIA and SIA for Duffs Road PRASA Station, KwaMashu, KwaZulu-Natal Province, South Africa
- HIA and SIA for Merebank PRASA Station, Durban South, KwaZulu-Natal Province, South Africa
- HIA and SIA for Rossburgh PRASA Station, Durban South, KwaZulu-Natal Province, South Africa

**Role:** Lead Consultant and Author:

**Client:** Ecosolve Environmental Consulting (Pty) Ltd

**Referee:** Mr Tsepo Lepono, Managing Director (tsepo@ecosolve.co.za / 083 339 9103)

**Project Proponent:** Passenger Rail Agency South Africa

F. Scoping, Environmental Impact Assessment, Environmental Management Programme for Mathanjane Bulk Water Augmentation, Limpopo and Mpumalanga Province (**Water Infrastructure**)

**Role:** Lead Consultant and Author:

**Client:** GKB Design and Associates (Pty) Ltd

**Referee:** Mr Gaylord Mupona (gmupona@gkbgroup.co.za/ 0825276969)

**Project Proponent:** Rand Water on behalf of National Department of Water Affairs.

| | |
|---|---|
| **5. Demographic** | Black Youth |
| **6. Gender** | Male |
| **7. Nationality** | South African |
| **8. Date of Birth** | 05 May 1983 |

**9. Education**

| Name of Institution | Degree Obtained | Dates Attended |
|---|---|---|
| University of Witwatersrand | M.Sc. Degree | 2007 – 2008 |
| University of Witwatersrand | B.S.C Honours (Landscape and GIS) | 2006 |
| University of Witwatersrand | BA Geography & Archaeology | 2003 – 2005 |

**10. Other Qualifications (Further Education and Skills Improvement)**

| Name of Institution | Training Details | Dates Obtained |
|---|---|---|
| University of Witwatersrand | Master of Architecture in Sustainable Cities | Current - 2019 |

**11. Professional Registration/Licensure** *(do not include memberships of industry associations)*

| Registration/Licensing Body | Type of Registration | Date Obtained |
|---|---|---|
| ASAPA | Cultural Resources Management: Industrial Archaeology, Built Environment, Iron Age, Rock Art and Burial Grounds and Graves | 2006 to date |
| Amafa KwaZulu-Natal | General Heritage Consultant (Archaeology, Rock Art, Built Environment and Landscape, Burial Grounds and Graves) | 2010 to date |
| Eastern Cape PHRA | General Heritage Consultant (Archaeology, Rock Art, Built Environment and Landscape, Burial Grounds and Graves) | 2010 to date |
| SACNASP | Currently Applied for Environmental Management | 2018 |

**12. Countries of Work Experience**

| Country | Start and End Date |
|---|---|
| **South Africa** | 2008- to present ( BAR, EMPrs, Environmental Audits, Social Impact Assessment Studies, Community Participation, Relocation Action Plan and ICRMs, Public Participation and Social Consultation) |
| Democratic Republic of Congo | 2012 -2012 (HIA, Namoya SALR – Gold Mine, Maniema Province |
| Peoples Republic of China | 2010-2010 (Cultural Resources Management) |
| United States (Smithsonian Institute) | 2007-2007 (Operational Models, Funding and Marketing of Cultural Heritage Institutions in South Africa) |
| France (*Centre National de la Recherché Scientifique*) | 2004-2004 (Recording, documentation and dating of rock art) |

| **13. Languages (Scale of 1 – 5: Poor; 5 and above: Excellent)** | | | |
|---|---|---|---|
| Language | Speaking | Reading | Writing |
| IsiXhosa | 5 | 4 | 4 |
| English | 5 | 5 | 5 |
| Afrikaans | 3 | 3 | 3 |
| SeSotho | 4 | 4 | 4 |
| SeTswana | 3 | 3 | 3 |
| IsiZulu | 5 | 5 | 5 |

**14. Employment Record** *Starting with current position, list in reverse order every employment held by the candidate since graduation, giving dates of employment, name of employing organisation, positions and responsibilities held.*

| **Employer** | **Date:** |
|---|---|
| **A) NGT Holdings (Pty) Ltd:** | **September 2012 to date** |
| **Position Held**: | Founder and Director |
| **Location:** | Victory Park, Johannesburg |
| **Responsibilities:** | • Strategic Leadership<br>• Governance<br>• Financial Accounting<br>• Risk Management<br>**Professional Technical Work**<br>• Basic Assessment Reports, EMPrs, Environmental Scoping and EIRs<br>• Water Use License Applications (WULA);<br>• Waster License Application (WLA);<br>• Social and Socio-Economic Impacts Consulting<br>• Integrated Cultural Resources Management<br>• Development of Community Participation Strategies in Developmental Projects<br>• Project Management and Administration |
| **B) Freelancer** | **May to September 2012** |
| **Responsibilities:** | BAR, Consulting Project Manager, Heritage and Social Impact Specialist |
| **C) Nzumbululo Holdings (Pty) Ltd** | **April to May 2012** |
| **Position Held:** | Division Manager: Environment and Sustainability Department |
| **Location:** | Midrand, Johannesburg, South Africa |
| **Responsibilities:** | • Business development (marketing, tendering and responding to RFQs)<br>• Managing department budget and team specialist<br>• Coordination and management of Basic Assessments and EMPr for road development for Limpopo Road Agency<br>• Coordination and management of heritage projects - including grave relocation projects<br>• Coordination and management of social impact projects |

issues the management of heritage and social issues in environment and engineering projects - processes and legislation

- Management of document pathway with authorities.

| **Employer** | **Dates:** |
|---|---|
| **D) PGS Heritage (Pty) Ltd** | **October 2010 to February 2012** |
| **Position Held:** | Heritage Consultant and Community Liaison Officer |
| **Location:** | Waverley, Pretoria, South Africa |
| **Responsibilities:** | • Management of heritage and grave relocation projects<br>• Community Liaison – consulting and facilitating multi-stakeholder relations in projects that involve community and grave relocation in Mpumalanga Province i.e. clients included **Eskom Kusile Power Station (clearing ground for Kusile Power Station), Xstrata, Glencoe, Anglo, BHP Billiton and Anglo Coal**.<br>• Management of document pathway with authorities. |

| **E) Khanya College (NPO)** | **April to October 2010** |
|---|---|
| Position Held | Associate Researcher and History Programs Facilitator |
| Location | Johannesburg, South Africa |
| Responsibilities | • This job formed part of Khanya College and Workers Museum History Programme; it involved researching socio-cultural and socio-economic issues affecting previously disadvantage communities in South Africa with a particular focus on Migrant Labour (ML) issues; their forms of social organization, resistance, their socio-cultural and economic dynamics e.g. disruption of their pattern of life and livelihoods as the result of migration and political system in South Africa.<br>• Assisting Khanya College with capacity building in community empowerment workshops.<br>• Assisted Khanya College with the development and administration of a Monitoring and Evaluation Programme (MEP) for its Annual Winter School (NGO conference & workshops).<br><br>Assisting with field research/interviews in socio-cultural and economic programmes as part of Khanya College and the Workers Museum History Programme aimed at conserving and promoting histories and heritage of migrant labour in South Africa. |

| **F) South Africa Heritage Resources Agency (SAHRA)** | **March 2009 to March 2010** |
|---|---|
| Position Held | Cultural Heritage Officer (**Built Environment**) |
| Location | Johannesburg (80%) and Cape Town (20%) |
| Responsibilities | • Adjudication of heritage Impact assessment (HIAs), archaeological impact assessments (AIAs), palaeontological impact assessments (PIAs) and environmental impact assessments (EIAs) studies submitted to the SAHRA.<br>• Adjudication of heritage permits and grave relocation permits.<br>• Fostering relations between SAHRA, developers and Civic organisations on the management of cultural resources in South Africa.<br>• Advising developers to strategically incorporate heritage resources into their projects as a form of conservation measure e.g. development of integrated heritage management plans and/or conservation management plans.<br>• Managing the Cradle of Humankind World Heritage Site (COHWHS) in association with the Management Authority, the Gauteng Department of Economic Development and the Gauteng Department Agriculture and Rural Development. |

| **Employer** | **Date:** |
|---|---|
| **G) School of Geography, Archaeology & Environmental Studies** | **April 2008 to February 2009** |
| Position Held | Collections Manager |
| Location | Johannesburg, South Africa |
| Responsibilities | • Development and management of archaeology collections database/repository using Vernon Collection Management System.<br>• Development of Archaeology Department collections management policies<br>• Establishment and implementation of safety and security measures for the protection and conservation of Wits archaeology collections by liaising with different stakeholders.<br>• Preparation of collection for education and research purposes. |

| **H) Synergistics Environmental Services (Pty) ltd** | **2004 to 2006 (Part-time basis)** |
|---|---|
| Position Held | Community Liaison Officer |
| Location | Johannesburg, South Africa |
| Responsibilities | • Management of multi-stakeholder relations in application of mining rights, environmental impact assessments and public participation in kwaNongoma, South Africa. |

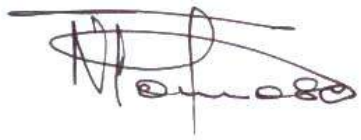
| **I) Sumo Coal (Pty) ltd** | **2006 to 2006 (Part-time basis)** |
|---|---|
| Position Held | Public Participation and Community Liaison Officer |
| Location | Johannesburg, South Africa |
| Responsibilities | • Management of multi-stakeholder relations in the environmental management process for the development of application of mining rights, environmental impact assessments and public participation in Midrand, South Africa. |

**15. Conference Papers Presented And Manuscripts Published:**

Nkosinathi, G. Tomose, 2010. Challenges and Opportunities in Managing Multi-Stakeholder Interests in World Heritage Site: *A Case of the Cradle of Humankind World Heritage, South Africa*. Conference Presentation in Beijing, Peoples Republic of China.

**15. Certification**

- I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes my qualifications and my experience. Furthermore, I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged on projects with the client.
- Finally, I hereby confirm my availability to commence work on any of your projects, from **08/January/2018**



**Signature**

# BASIC ASSESSMENT REPORT

# APPENDIX H:

## ENVIRONMENTAL MANAGEMENT PROGRAMME

## INTRODUCTION

**Purpose of the Environmental Management Programme**

This Draft Environmental Management Programme (EMPr) is prepared as part of the requirements of the Environmental Impact Assessment (EIA) Regulations (December 2014, as amended April 2017) promulgated under the National Environmental Management Act (NEMA) (Act 107 of 1998, as amended). The purpose of this Environmental Management Programme (EMPr) is to ensure "good environmental practice" by taking a holistic approach to the management and mitigation of environmental impacts during the construction and operation phase of Lungile Pooultry Farm (Pty) Ltd proposed chicken broiler facility development. This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by the chicken broilers management. The Draft EMPr is to be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) as part of the Application for Environmental Authorisation for Lungile Poultry Farm's proposed chicken broiler facility proposal on portion 4 of the farm Waterval 35 JS, in Waterval, Mpumalanga. This EMPr is considered as a document that can be updated as new information becomes available during the construction, operational and operational phases, if applicable, of the proposed development. Mitigations measure need to be implemented as addressed in this EMPr, except where they are not applicable, and additional measures should be considered when necessary. The EMPr identifies the following:

- Construction and Operation activities that will impact on the environment;
- Specifications with which the chicken broilers management shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance. This EMpr incorporates management plans for the design, construction, operation and decommissioning phases of the project, which consist of the following components:
- Impact: The potential positive or negative impact of the development that needs to be enhanced mitigated or eliminated.
- Objectives: The objectives necessary in order to meet the goal; these take into account the findings of the specialist studies.
- Mitigation/Management Actions: The actions needed to achieve the objectives, taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.
- Monitoring: The key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

**Contents of the EMPr**

This EMPr specifies the management actions necessary to ensure minimal environmental impacts, as well as procedures for monitoring these impacts associated with the proposed activity. In terms of legal compliance, this EMPr aims to satisfy appendix 4 of Government Notice Regulation 982 of 4 December 2014, presented in Table 1-1 below.

Table 1-1: Compliance with Appendix 4 of Government Notice Regulation 982 of 4 December 2014 and Section 24N of the National Environmental Management Act 107 of 1998.

| Requirements according to Appendix 4 of GNR 982 of 4 December 2014 | Section |
|---|---|
| (1) An EMPr must comply with section 24N of the Act and include-<br>a) details of -<br>(i) the EAP who prepared the EMPr; and<br>(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae; | Section 1.3<br>Appendix I |
| b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description; | Section 2 |
| c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers; | Section 2, Figure 2-1, 2-2, 2-3 |
| d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- | Section 4 |
| (i) planning and design; | Section 4 |
| (ii) pre-construction activities; | Section 4 |
| (iii) construction activities; | Section 4 |
| (iv) rehabilitation of the environment after construction and where applicable post closure; | Section 4 |

| Requirements according to Appendix 4 of GNR 982 of 4 December 2014 | Section |
|---|---|
| and | |
| (v) where relevant, operation activities; | Section 4 |
| e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d); | Section 4 |
| f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to –<br>i. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; | Section 4 |
| ii. comply with any prescribed environmental management standards or practices; | Section 4 |
| iii. comply with any applicable provisions of the Act regarding closure, where applicable; and | N/A |
| iv. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable; | N/A |
| g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f); | Section 4 |
| h) frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f); | Section 4 |
| i) an indication of the persons who will be responsible for the implementation of the impact management actions; | Section 4 |
| j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented; | Section 4 |
| k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f); | Section 4 |
| l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations; | Section 4 |
| m) an environmental awareness plan describing the manner in which-<br><br>(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and<br><br>(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and | Section 4 |
| n) any specific information that may be required by the competent authority. | N/A |

**Environmental Assessment Practitioner**

The Environmental Management Services (EMS) falls under the Specialist Services (SS) group within the Implementation Unit (IU) of the Council for Scientific and Industrial Research (CSIR). The CSIR is amongst the largest multi-disciplinary research and development organizations in Africa, which undertakes applied research and development for implementation across the continent, as well as providing consulting services to industry, government and international agencies. It has been one of the leading organisations in South Africa contributing to the development and implementation of environmental assessment and management methodologies and sustainability science.

The EMS vision is to assist in ensuring the sustainability of projects or plans in terms of environmental and social criteria, by providing a range of environmental services that extend across the project and planning life cycles. This group has over 20 years of experience in environmental management practices and research methodologies, as well as in conducting environmental assessment and management studies in over 15 countries in Africa, in particular in southern and West Africa, and elsewhere in the world. The EMS group links closely with wider CSIR expertise in areas such as resource mapping, biodiversity assessment, socio-economic assessments, strategic infrastructure development studies, environmental screening studies, natural resource management, etc. The group has also prepared guidelines such as the Integrated Management Series and Guidelines for Environmental Impact Assessment for the Western Cape provincial government

| | |
|---|---|
| Organisation | Council for Scientific and Industrial Research (CSIR) |
| Postal Adress | PO Box 320, Stellenbosch, 7599 |
| Email | sngema@csir.co.za / mlevendal@csir.co.za |
| Telephone | 021 888 2408 / 021 888 2495 |
| Fax | 021 888 2693 |
| Project Team | |
| Name | Qualification & Expertise |
| Rirhandzu Marivate | • BSc (Honours) Ecology, Environment, and Conservation |

| | |
|---|---|
| | (University of the Witwatersrand)<br>• 4 years of experience in Environmental Management |
| Minnelise Levendal | • MSC Biological Science (Botany) (Stellenbosch University)<br>• More than 17 years of experience in Environmental Management<br>• Inclusive of 10 years' experience in conducting Environmental Assessments |

This Environmental Management Programme that has been compiled in fulfilment of the requirements of the Environmental Impact Assessment Regulations (2014). This EMPr describe the activities that are proposed, and prescribe the management, mitigation and monitoring measures that must be implemented to ensure that potential negative environmental or socio-economic impacts that may be associated with the development are avoided or mitigated correctly, and to ensure that positive impacts of the proposed development are promoted where possible. This document also intended to ensure that the principles of Environmental Management specified in the National Environmental Management Act are promoted during the different phases of the proposed development of a piggery.

**PROJECT BACKGROUND**

**Project Activities**

The Lungile Poultry Farming is a small scale commercial farming enterprise that was established in 2016. This company is proposing to establish a start-up enterprise comprising of a commercial chicken egg-layer facility on Portion 4 of Farm Waterval, Waterval 34 JS, Dr JS Moroka Local Municipality, Mpumalanga. The farm currently has no buildings on it and is vacant. The proposed development footprint is 19.5 hectare, to comprise of chicken egg-layer facilities (office and changing rooms, silo, and reservoir) and 5 hectare small scale crop farming of a variety of vegetables. The proposed operations of the project will be housing 30 000- 45 000 hens per chicken house. These will then be distributed to egg wholesalers in the area, for packaging and sale.

The site has been earmarked for agricultural purposes but is currently vacant with sprouts of natural vegetation. The project manager, who is also the applicant, with his compliance to requirements of an Environmental Assessment is ensuring the project complies to providing sustainable produce with ecological considerations being part of the entire development and operational processes.

The layout plan of the proposed has been developed based on the outcome of the specialist studies and sensitivity mapping. The current preferred project development footprint totals 0.6 hectares with there being an intention at some point to grow crop of 5 ha in extent of the plot of land. Upon completion the chicken layer facility will include the following:

Construction of:
- 5 x chicken houses at 75m x 15 m x 2.4m each
- 4-tier laying cages
- 5 x cage rows of 103m a row
- 8000 birds per cage row
- Office block
- Change Room & Showers
- Cultivation of 5 ha vegetables

Additional internal Infrastructure:
- 1 x Egg collection System
- 1 x Manure Scrapper
- 1 x Manure Conveyor
- 1 x Feeding System (Pan feeder system)
- 1 x Watering system (Nipple lines connected to a bore hole or reservoir)
- 1 x Borehole ( Capacity yet to be determined)
- 1 x 19 metric tonne Feeding Silo
- 1 x Heating & Ventilation System (Electricity Generator or Boiler)
- 1 x Curtain System of 120m x 2.5 m
- 1 x 20m² waste storage area.

The chicken layer farming activities generate waste comprised of bird excrement, spilled feed, bird feathers, mortalities and used chicken bedding (wood shavings, sawdust and peanut hulls). The applicant plans to distribute the chicken waste as fertilizer to nearby farmers, as well as sell a portion of the waste. Further, there is the option to dry the compost and use it as feed to local cattle farmers. This will require the applicant to attain a Fertilizer permit if the compost is sold. Broiler chicken waste will be collected every cycle (6 weeks) when chicken houses are cleaned, if there is no demand for the waste, to be disposed at a licenced facility. A waste management license will not be required as the amount of waste produced is below the recommended threshold found in NEMWA.

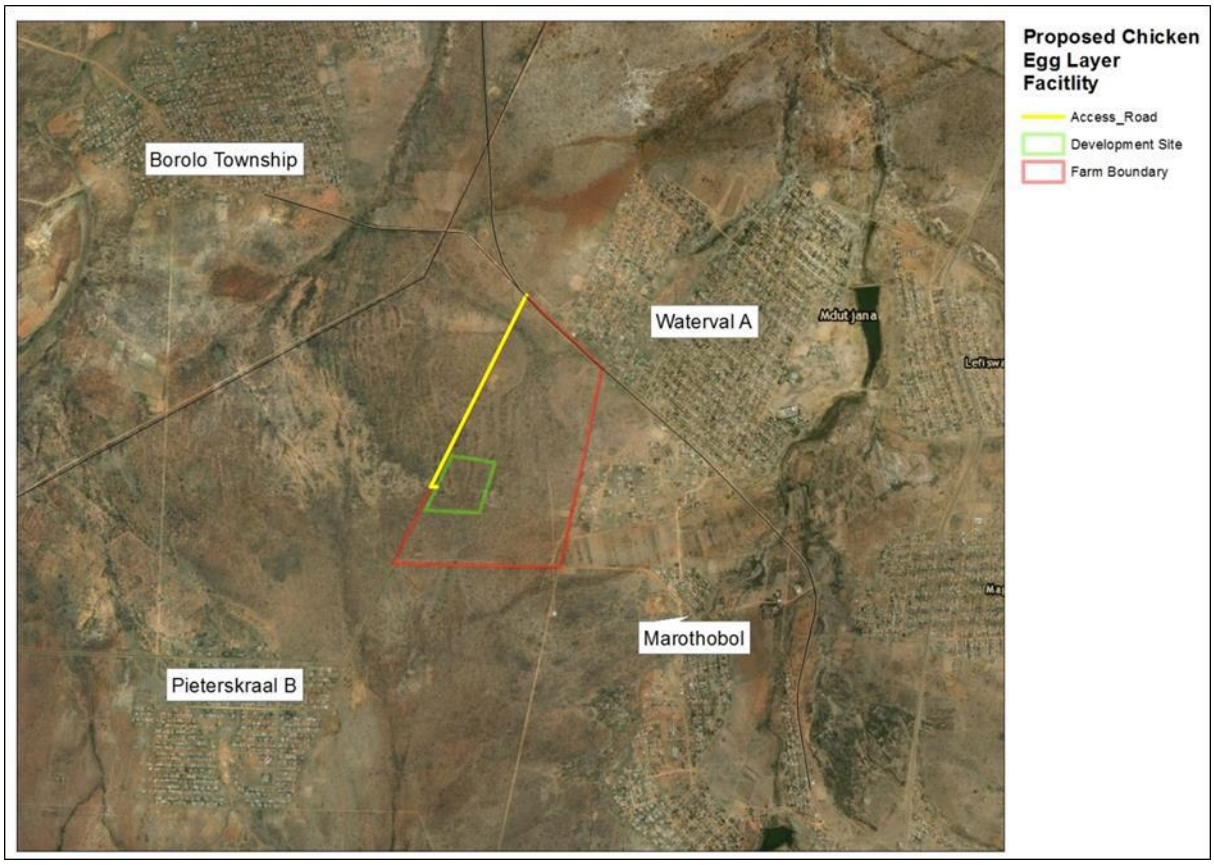



**Figure 1: Location of the proposed development for a chicken layer facility of Lungile Poultry Portion 4 of Farm Waterval 34 JS, Waterval, Mpumalanga.**

**Listed Activities**

As part of the proposed piggery expansion, listed activities defined under the National Environmental Management Act, Act No. 107 of 1998 (NEMA, 1998), as amended, in terms of the Environmental Impact Assessment (EIA) Regulations, Government Notice (GNR) 983 of 4 December 2014. Relevant listed activities triggered by the proposed activities are described as follows:

GN. R 327, as Amended 7 April 2017 Activity 5 (ii): More than 1000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days. (80000 day old chicks kept for a cycle of 6 weeks)

GN. R 327, as Amended 7 April 2017 Activity 5 (iv): More than 25000 chicks younger than 20 days per facility situated outside an urban area. (80000 day old chicks kept for a cycle of 6 weeks)

GN. R 327 as Amended 7 April 2017 Activity 27: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

GN R 324 as Amended 7 April 2017 Activity 12f: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with maintenance management plan, iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had equivalent zonig or proclamation in terms of NEMPAA.

**DESCRIPTION OF APPLICABLE LEGISLATION**

| Description of compliance with the relevant legislation, policy or guideline: | |
|---|---|
| **Legislation, policy of guideline** | **Description of compliance** |
| National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended). | The Environmental Authorisation for the proposed development is lawfully applied for in terms of the EIA Regulations, 2014, promulgated under NEMA. The conditions on the Environmental Authorisation, if approved, will be adhered to. |
| National Water Act, 1998 (Act No. 36 of 1998) as amended | Pertinent legislation published under this act will be adhered to as well as a Water Use License Application. |
| National Heritage Resources Act, 1999 (Act No. 25 of 1999) | Submitted the proposed project to the South African Heritage Resources Agency (SAHRA) online platform South African Heritage Resources Information System (SAHRIS) |
| National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) | The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) as amended (NEMBA) including all the pertinent legislation published in terms of this act was considered in undertaking this Basic Assessment process. This included the determination and assessment of the fauna and flora prevailing in the proposed project and the handling thereof in terms of NEMBA. |
| National Environmental Management Waste Act, 2009 (Act No. 59 of 2008) | The Waste Management License will be undertaken in respect of the National Environmental Management: Waste Act (Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083) as amended NEM:WA. Pieces of legislation published under this act will be adhered to. |
| Environmental Impact Assessment Regulations, 2014 | All the triggered activities as per National Environmental Management Act (Act No. 107 of 1998) have been listed below. |

**ENVIRONMENTAL MANAGEMENT STRUCTURE**

Lungile Poultry Farm's management will develop an Environmental Management Structure, in line with this EMPr, that is appropriate to the size and scale of the project to develop and implement roles and responsibilities with regards to environmental management.

**Roles and Responsibilities**

Key roles and responsibilities in order to meet the overall goal for environmental management of the proposed chicken broiler development are as follows:

**Lungile Poultry Farm Management (hereafter referred to as "Management")**

Management is responsible for the overall environmental monitoring and implementation of the EMPr, and ensuring compliance thereof with the specifications of the Environmental Authorisation (EA) issued in terms of NEMA. Management should also ensure that any other permits or licences required as part of this project are obtained and complied with. Lungile Poultry Farm may however, at their own costs, render the services of an external environmental consultant to oversee the implementation of the documented mitigation measures of this EMPr. It is also expected that management will appoint an Environmental Control Officer, Environmental Health and Safety Officer, and Construction Manager.

**Environmental Control Officer**

The Environmental Control Officer (ECO) will be the responsible person for ensuring that the provisions of the EMPr as well as the EA are complied with at all times. The ECO must fully communicate the environmental management processes associated with the project, particularly the EMPr, as well as review and ensure compliance with the conditions of the EMPr. The ECO will be responsible for issuing instructions to contractors and employees in terms of actions required with regards to environmental considerations. The ECO shall, on a regular basis, prepare and submit written reports to Management and the Competent Environmental Authority (DARDLEA) as required.

**Environmental Health & Safety (EHS) Officer**

It is important to note that the EHS Manager will be appointed to fulfil the roles of the Environmental Officer during the construction phase and that of the Environmental Manager during the operational phase. A generic term has therefore been assigned to this sector of roles and responsibilities. The responsibility of the EHS Manager includes overseeing the implementation of the EMPr during the construction and operational phases, monitoring environmental impacts, record-keeping and updating of the EMPr as and when necessary. The EHS Manager is also responsible for monitoring compliance with the conditions of the Environmental Authorisation that may be issued to Lungile Poultry Farm.

The lead contractor and sub-contractors may have their own Environmental Officers, or designate Environmental Officer functions to certain personnel.

During construction, the EHS Manager will be responsible for the following:

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Daily or weekly monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPr and Environmental Authorisation (should such authorisation be granted by DARDLEA), using a monitoring checklist that is to be prepared at the start of the construction phase.
- Preparation of the monitoring report based on the daily or weekly site visit.
- Reporting of any non-conformances within 48 hours of identification of such non-conformance to the relevant agents.
- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Construction Manager.

During operation, the EHS Manager will be responsible for:

- Overseeing the implementation of the EMPr and monitoring programmes for the operation phase.
- Reviewing the findings of the monitoring and highlight concerns to management and TNPA where necessary.
- Ensuring compliance with the Environmental Authorisation conditions.
- Ensuring that the necessary environmental monitoring takes place as specified in the EMPr.
- Updating the EMPr and ensuring that records are kept of all monitoring activities and results.

During decommissioning, the EHS Manager will be responsible for:

- Overseeing the implementation of the EMPr for the decommissioning phase; and
- Conducting an environmental inspection on completion of decommissioning and 'signing off' the site rehabilitation process.

At the time of preparing this EMPr, the EHS Manager appointment is still to be made by the applicant. The appointment of the EHS Officer is dependent upon the project proceeding to the construction phase.

**Construction Manager**

The construction manager will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction of the facility.
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project construction.
- Promoting total job safety and environmental awareness by employees, contractors and subcontractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor employs an Environmental Officer (or have a designated Environmental Officer function) to monitor and report on the daily activities on-site during the construction period.
- Ensuring that safe, environmentally acceptable working methods and practices are implemented and that sufficient plant and equipment is made available, is properly operated and maintained in order to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the EHS Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Ensuring that all appointed contractors and sub-contractors are aware of this EMPr and their responsibilities in relation to the programme.
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the EHS Manager.

At the time of preparing this Draft EMPr, a construction manager has not been appointed and appointment will depend on the project receiving authorisation and proceeding to the construction phase.

**ENVIRONMENTAL MANAGEMENT PLAN**

As part of environmental management and enhancement, an identification and description of impact management objectives must be developed, inclusive of the proposed methods and effective management and mitigation measures required during the design, construction and operational phases of the proposed chicken broiler. The table below lists potential impacts and mitigation measures recommended for the proposed Lungile Poultry Farm chicken layer development at the different phases.

| Impact Description | Environmental Objective | Management/Mitigation Measures | Monitoring Compliance & Reporting | Monitoring Frequency | Responsibility |
|---|---|---|---|---|---|
| **Construction Phase** | | | | | |
| **Loss of indigenous vegetation due to the clearing for construction of the chicken layer facility and for the crop production** | Avoid unnecessary loss of existing indigenous vegetation and faunal habitats. | -The clearing of vegetation must be kept to a minimum and remain within the stands earmarked for development – leave some open space area with natural vegetation intact;<br><br>-Protected trees that may occur within the development site must be avoided – if this is not possible in limited cases, a permit to remove the particular individual tree is needed from the provincial forestry department;<br><br>-Construction must be completed as quickly as possible;<br><br>-Disturbed open areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous tree and grass species;<br><br>-During the construction phase workers must be limited to areas under construction and access to the planned open areas must be strictly controlled; | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Pre-construction<br><br>Pre-construction<br><br>Prior to and during construction<br><br>Prior to and during construction | CSIR, Lungile Management, with advice from a Botanist / Horticulturist<br><br>Lungile Management, Construction Crew, with advice from a Botanist / Horticulturist<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew |
| | Promote re-establishment of indigenous vegetation in disturbed areas. | -Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.<br><br>-Plant indigenous trees – no alien species. | | During construction<br><br>During construction | Lungile Management, Construction Crew, with advice from a Botanist / Horticulturist<br>Lungile Management, Construction Crew, with advice from a Botanist / Horticulturist |
| **Introduction and proliferation of alien species from clearing of areas from construction activities.** | Limit / Regulate access by potential vectors of alien flora. | -Demarcate or fence in the construction site.<br><br>-Carefully limit / regulate access by vehicles and materials to the construction site.<br><br>-Prohibit the introduction of domestic animals such as dogs and cats. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Prior to and during construction<br><br>Prior to and during construction<br><br>During construction | Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Farm Management |

| | | | | | |
|---|---|---|---|---|---|
| | Maintain a tidy construction site.<br><br>By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit. | -Keep construction activities neat and tidy.<br><br>-When complete, remove all sand piles, and landscape all uneven ground while re-establishing a good topsoil layer.<br><br>-Plant only locally indigenous flora if landscaping needs to be done.<br><br>-Remove Category species using mechanical methods, and minimize soil disturbance as far as possible. Alien wood could be donated to the surrounding community. | | During construction<br><br>During construction<br><br>During construction<br><br>During construction | Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew, with advice from a Botanist / Horticulturist<br><br>Lungile Management, Construction Crew, with advice from a Botanist / Horticulturist |
| **Loss of mammal and herpatofauna habitat from construction activities** | | -The clearing of vegetation must be kept to a minimum and remain within the footprint of the development;<br><br>-The construction must be completed as quickly as possible - fauna species may be killed<br><br>-Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species;<br><br>-During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled;<br><br>-Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | During construction<br><br>During construction<br><br>During construction<br><br>During and after construction | Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew, with advice from a Botanist / Horticulturist |
| **Loss of avian habitat from construction activities** | | -The spatial extent of construction activities must be minimized, and as far as possible must be restricted to the areas on which buildings, roads etc will actually be located. Particular care must be taken to minimize activities in the areas of natural vegetation that will remain on the site.<br><br>-The boundaries of the development footprint areas | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Prior to construction<br><br>Prior to and during | Lungile Management, Construction Crew<br><br>Lungile Management, |

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| | | are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br><br>-Disturbance by residents of birds breeding and foraging in the area should be minimized. Provide adequate briefing for site personnel and residents.<br><br>-Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). | | construction<br><br>Prior to and during construction<br><br>During construction | Construction Crew<br><br>Lungile Management, Construction Crew |
| **Increased dust and erosion from clearing of vegetation, earth-moving activities, and increased vehicle traffic.** | Implement effective measures to control dust and erosion. | -Limit vehicles, people and materials to the construction site.<br><br>-Commence (and preferably complete) construction during winter, when the risk of erosion should be least.<br><br>-Revegetate denude areas with locally indigenous flora a.s.a.p.<br><br>-Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.<br><br>-Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting. | ECO to ensure compliance and reporting thereof. | During construction<br><br>During construction<br><br>During construction<br><br>During construction<br><br>During construction | Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew |
| **Sensory disturbance of fauna from increased vehicle and human activity, noise, dust and light.** | Time construction activities to minimize sensory disturbance of fauna.<br><br>Minimize noise pollution.<br><br>Minimize light pollution. | -Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.<br><br>-Minimize noise to limit its impact on calling and other sensitive fauna (e.g. frogs).<br><br>-Limit construction activities to day time hours.<br><br>-Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna. | ECO to ensure compliance and reporting thereof. | Prior to and during construction<br><br>During construction<br><br>During construction<br><br>During construction | Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew<br><br>Lungile Management, Construction Crew, ECO |

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| | | | | | Construction Crew |
| **Pollution associated with construction activities and residents (e.g., fuel spills, use of cleaning chemicals, management of** | | -Great care must be taken that no pollutants or other waste pollute the area or enter local water systems during the construction or operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences.<br><br>-Construction workers must be suitably trained to deal with any such spills.<br>Facilities to handle pollution and waste must be provided to residents. | ECO to ensure compliance and reporting thereof. | Prior to and during construction | Lungile Management, Construction Crew, ECO |
| **Electrocution and collision hazards of avian fauna** | | -Normal safety measures for electrical installations as used by Eskom | ECO to ensure compliance and reporting thereof. | Prior to and during construction | Lungile Management, Construction Crew, ECO |
| **Operational Phase** | | | | | |
| **Loss of indigenous vegetation due to the clearing for the chicken layer facility and for the crop production** | | -The clearing of vegetation must be kept to a minimum and remain within the stands earmarked for development – leave some open space area with natural vegetation intact;<br><br>-Protected trees that may occur within the development site must be avoided – if this is not possible in limited cases, a permit to remove the particular individual tree is needed from the provincial forestry department;<br><br>-Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.<br><br>-Plant indigenous trees – no alien species. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Pre-construction<br><br>Pre-construction<br><br>Throughout operations<br><br>Throughout operations | Lungile Management, ECO<br><br>Lungile Management, , ECO<br><br>Lungile Management, ECO<br><br>Lungile Management, ECO |
| **Introduction and proliferation of alien species from clearing of areas from construction activities** | | -An alien invasive management programme must be incorporated into the Environmental Management Programme;<br><br>-Ongoing alien plant control must be undertaken; Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.<br><br>-Monitor all sites disturbed by construction activities | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Prior to and during operations<br><br>Prior to and during operations | Lungile Management, ECO<br><br>Lungile Management, ECO |

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| | | for colonisation by exotics or invasive plants and control these as they emerge.<br><br>-Avoid planting of exotic plant species, use indigenous species. | | Throughout operations<br><br>Throughout operations | Lungile Management, ECO<br><br>Lungile Management, ECO |
| **Loss of mammal and herpatofauna habitat from operational activities** | | -The clearing of vegetation must be kept to a minimum and remain within the footprint of the development;<br><br>-Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Throughout operations<br><br>Throughout operations | Lungile Management<br><br>Lungile Management, , ECO |
| **Loss of avian habitat** | | -The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br><br>-Disturbance by residents of birds breeding and foraging in the area should be minimized.<br><br>-Provide adequate briefing for site personnel and residents. | LungileManagement to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Throughout operations<br><br>Throughout operations<br><br>Throughout operations | Lungile Management<br><br>Lungile Management, ECO<br><br>Lungile Management, ECO |
| **Sensory disturbance of fauna<br>Associated with operational activities and with increased human presence in the area<br>Pollution associated with operational activities and residents (e.g., fuel spills, use of cleaning chemicals, management of waste products)** | | -The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.<br><br>-Disturbance by residents of birds breeding and foraging in the area should be minimized.<br>Provide adequate briefing for site personnel and residents.<br><br>-Any bird nests that are found during the operational period must be reported to the Environmental Control Officer (ECO) and residents should always be aware of the importance of birds in their built environment. | ECO to ensure compliance and reporting thereof. | Throughout operations<br><br>Throughout operations<br><br>Throughout operations | Lungile Management<br><br>Lungile Management<br><br>Lungile Management, ECO |
| **Pollution associated with operational activities and residents (e.g., fuel spills, use of cleaning chemicals, management of waste products)** | | -Great care must be taken that no pollutants or other waste pollute the area or enter local water systems during the operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences.<br><br>-Workers must be suitably trained to deal with any | ECO to ensure compliance and reporting thereof. | Pre-construction, Throughout construction & operations<br><br>Throughout operations | Lungile Management, ECO<br><br>Lungile Management, ECO |

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| | | such spills.<br><br>-Facilities to handle pollution and waste must be provided to residents. | | Throughout operations | Lungile Management |
| **Electrocution and collision hazards of avian fauna** | | -Normal safety measures for electrical installations as used by Eskom | | Pre-construction and during construction | Lungile Management, ECO |
| **Environmental contamination from chicken excrement, bedding, feed, carcasses and other operational waste** | Ensure that excrement, carcasses, feed, and other operational waste and hazardous materials are appropriately and effectively contained and disposed of without detriment to the environment. | -Ensure that the facility is designed in accordance with international best practice norms, and with advice from an appropriate specialist, to ensure that there is no environmental contamination from effluent, fodder, carcasses and other waste, and to ensure that there is also effective storm water management. | -ECO to develop a waste management plan and ensure implementation and adherence thereof.<br><br>-Regular site inspection to ensure | Pre-construction | CSIR, Lungile Management, with advise from agricultural experts |
| | | -Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medications. | that the proposed mitigation measures are being implemented. | Throughout operation | Lungile Management, Farm Management, EHS |
| | | -Adhere to best practice chicken husbandry and waste disposal norms. | -Produce monthly reports to show compliance. | Throughout operation | CSIR, Lungile Management, Farm Management, with advise from agricultural experts |
| | | -All hazardous waste should be disposed of at an appropriate licensed facility for this. | | Throughout operation | Lungile Management, Farm Management |
| | | -Waste recycling should be incorporated into the facility's operations as far as possible. | | Throughout operation | Lungile Management, Farm Management |
| | | -Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices. | | Throughout operation | Lungile Management, Farm Management, EHS |
| | | -Establish appropriate emergency procedures for accidental contamination of the surroundings. | | Pre-construction | CSIR, Lungile Management |
| | Ensure that there are appropriate control measures in place for any contamination event. | -Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists. | | A.s.a.p. following contamination | Lungile Management, Farm Management, EHS |
| | | -Educate workers about the facility's waste emergency procedures with training and notices. | | At least annually during operation | Lungile Management, Farm Management, EHS |
| **Poor / Inappropriate control of animal pests** | Control the access and proliferation of pests as far | -Ensure that floors are sloped and slatted to facilitate drainage. | -ECO to develop a waste management | Pre-construction | CSIR, Lungile Management, Construction Crew |

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| **from poor waste management and hygiene, and insufficient, inappropriate and/or ineffectual pest control** | as possible. | -Ensure that there is effective storm water drainage around the facility.<br><br>-Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water.<br><br>-Effectively seal and maintain all pipes and reservoirs containing slurry, to prevent animals from accessing the effluent.<br><br>-Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible.<br><br>-Check that fan louvers (if installed) work properly, and close fans completely when off.<br><br>-Prevent and manage unwanted animal access to fodder.<br><br>-Clean floors regularly.<br><br>-Clean up excess fodder regularly from under troughs and feed bins.<br><br>-Keep areas surrounding the facility free of spilled manure and litter.<br><br>-Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.<br><br>-Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects.<br><br>-Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.<br><br>-Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination.<br><br>-Ensure that measures to control pests are tightly restricted to areas where these are problematic. | plan and ensure implementation and adherence thereof.<br>-Regular site inspection to ensure that the proposed mitigation measures are being implemented.<br>-Produce monthly reports to show compliance. | All phases<br><br>Construction and operation<br><br>Construction and operation<br><br>Pre-construction, construction and operation<br><br>Throughout operation<br><br>Pre-construction, construction and operation<br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>During operation | CSIR, Lungile Management, Farm Management<br>Construction Crew, Farm Management<br><br>Construction Crew, Farm Management<br><br>CSIR, Lungile Management, Farm Management<br><br>Farm Management and Team<br><br>Lungile Management, Farm Management and Team<br>Farm Management and Team<br><br>Farm Management and Team<br><br>Farm Management and Team<br><br>Farm Management and Team<br><br>Farm Management and Team<br><br>Farm Management and Team<br><br>Farm Management and Team |

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| | | -Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist. | | During operation | Farm Management and Team |
| | Avoid affecting non-target animals. | -Rodenticides are not advised. | | During operation | Farm Management and Team |
| **Disease transmission from poor waste management and hygiene, and insufficient, inappropriate and/or ineffectual pest control** | Ensure that excrement, carcasses, feed, and other operational waste and hazardous materials are appropriately and effectively contained and disposed of without detriment to the environment.<br><br>Ensure that there are appropriate control measures in place for any contamination event.<br><br>Control the access and proliferation of pests as far as possible. | - As described above.<br><br>- As described above.<br><br>- As described above. | -ECO to develop a waste management plan and ensure implementation and adherence thereof.<br>-Regular site inspection to ensure that the proposed mitigation measures are being implemented.<br>-Produce monthly reports to show compliance. | As described above.<br><br>As described above.<br><br>As described above. | As described above.<br><br>As described above.<br><br>As described above. |
| **Introduction and proliferation of alien species from influx of vehicles, people and materials, site disturbance, and lack of alien species control** | Limit / Regulate access by potential vectors of alien flora.<br><br>Maintain a tidy production facility. | -Carefully limit / regulate access by vehicles and materials to the site.<br><br>-Prohibit the introduction of domestic animals such as dogs and cats.<br><br>-Minimize the accumulation and dispersal of excess fodder on site.<br><br>-Employ best practices regarding tilling of soil and weed management. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation | Lungile Management, Farm Management<br><br>Lungile Management, Farm Management<br><br>Farm Management and Team<br><br>Farm Management and Team |

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| | By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit. | -Plant only locally indigenous flora if landscaping needs to be done.<br><br>-Remove Category species using mechanical methods, and minimize soil disturbance as far as possible. Alien wood could be donated to the surrounding community. | | Throughout operation | Lungile Management, Farm Management, with advice from a Botanist / Horticulturist<br>Lungile Management, Farm Management and Team, with advice from a Botanist / Horticulturist |
| **Sensory disturbance of fauna from increased vehicle and human activity, noise, dust and light** | Minimize essential lighting<br><br>Minimize unavoidable noise<br><br>Prevent unnecessary light and noise pollution | -Install motion-sensitive lights.<br><br>-Ensure that all outdoor lights are angled downwards and/or fitted with hoods.<br><br>-Use bulbs that emit warm, long wavelength (yellow-red) light, or use UV filters or glass housings on lamps to filter out UV.<br><br>-Avoid using metal halide, mercury or other bulbs that emit high UV (blue-white) light that is highly and usually fatally attractive to insects.<br><br>-Conduct regular maintenance of machinery, fans and other noisy equipment.<br><br>-Encourage workers to minimize light and noise pollution through training and notices. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Construction and operation<br>Construction and operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation<br><br>Throughout operation | Lungile Management, Farm Management<br>Lungile Management, Farm Management<br><br>Lungile Management and Team<br><br>Lungile Management and Team<br><br>Lungile Management and Team<br><br>Lungile Management |
| **Decommissioning Phase** | | | | | |
| **Introduction and proliferation of alien species from influx of vehicles, people and materials, site disturbance, and lack of alien species control** | | -Remove Category species using mechanical methods, and minimize soil disturbance as far as possible.<br><br>-Alien wood could be donated to the surrounding community | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Throughout decommissioning<br><br>Throughout decommissioning | Lungile Management, ECO<br><br>Lungile Management, ECO |
| **Increased dust and erosion from destruction of infrastructure, earth-moving activities, and increased vehicle traffic** | | -Limit vehicles, people and materials to the decommissioning site.<br><br>-Commence (and preferably complete) decommissioning during winter, when the risk of erosion should be least. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Throughout decommissioning<br><br>During decommissioning | Lungile Management<br><br>Lungile Management |

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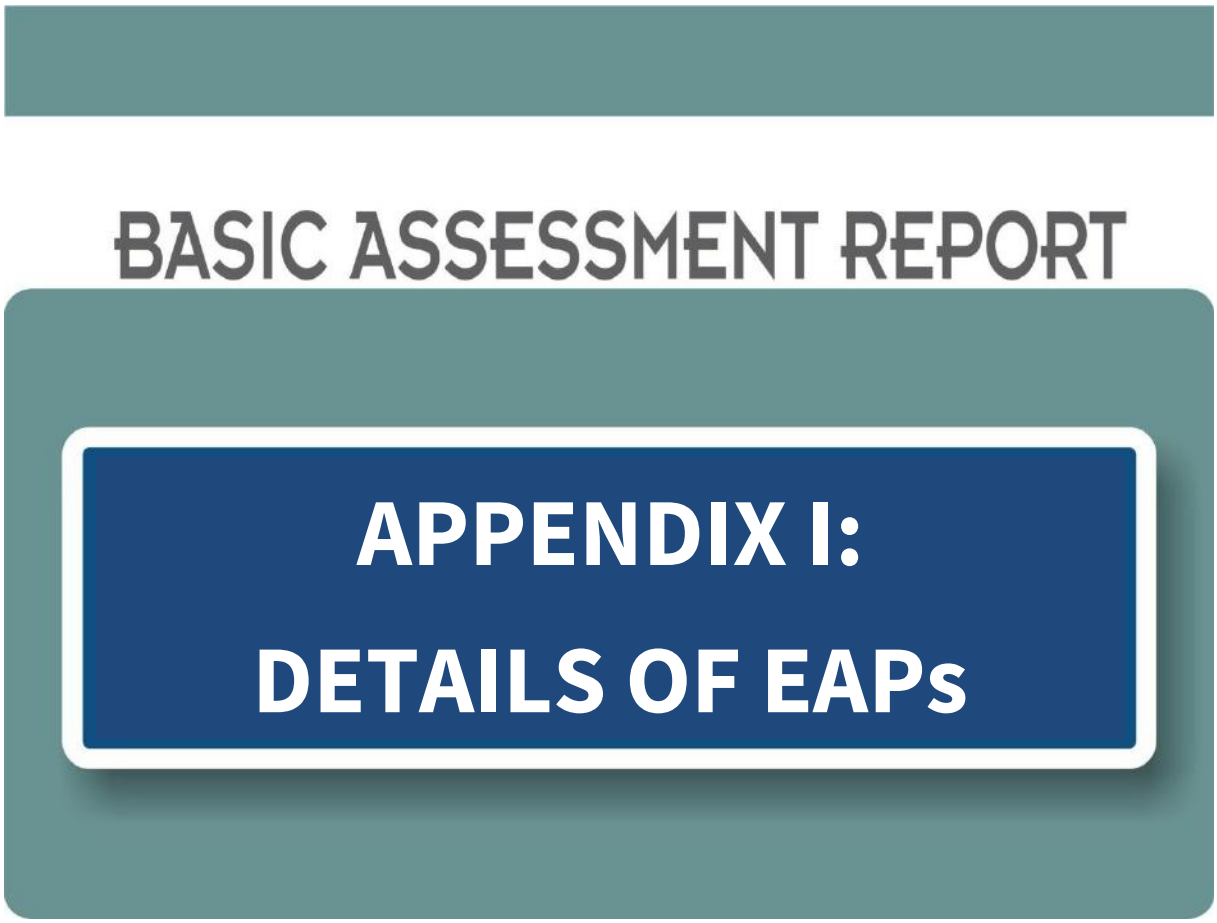
| | | -Revegetate denude areas with locally indigenous flora a.s.a.p.<br><br>-Implement erosion protection measures on site.<br><br>-Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.<br><br>-Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting. | | Throughout decommissioning<br><br>Throughout decommissioning<br><br>Throughout decommissioning<br><br>Throughout decommissioning | Lungile Management, ECO<br><br>Lungile Management, ECO<br><br>Lungile Management, ECO<br><br>Lungile Management, ECO |
| **Sensory disturbance of fauna from noise, dust and light associated with decommissioning activities** | | -Commence (and preferably complete) decommissioning during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.<br><br>-Minimize noise to limit its impact on sensitive fauna.<br><br>-Limit demolition activities to day time hours.<br><br>-Minimize or eliminate security and decommissioning lighting, to reduce the disturbance of nocturnal fauna. | Lungile Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr | Throughout decommissioning<br><br>Throughout decommissioning<br><br>Throughout decommissioning<br><br>Throughout decommissioning | Lungile Management<br><br>Lungile Management<br><br>Lungile Management<br><br>Lungile Management |

**ENVIRONMENTAL AWARENESS AND TRAINING PLAN**

Lungile Poultry Farm (Pty) Ltd Management has to appoint an independent Environmental Control Officer whose duty is to also implement an effective environmental awareness plan aimed to educate workers and contractors in terms of the biodiversity on site, environmental risks associated with the proposed development and land management of the site. Training and/or awareness should be raised and effectively communicated prior to the commencement of the construction phase. Training sessions should incorporate the management plans addressed in this EMPr as well as any new information and documentation provided by the ECO, as well as that of the Environmental Health & Safety Officer. The ECO would be the most suitable person to conduct these training sessions, identifying sensitive environments as well as all the risks and impacts, such as effluence, associated with the chicken broiler and the methods in which to deal with the impacts in order to avoid environmental degradation. Training sessions can be monitored by providing an attendance register indicating the workers that received training as well as evidence of the training and/or awareness received. These sessions would also need to be carried out throughout the operational phase of the chicken broiler, at least once a year, or as new information becomes available.




## CONTENTS

**Appendix I 1: Minnelise Levendal (Project Leader)**

**Appendix I 2: Rirhandzu Marivate (Project Manager)**

# DETAILS OF EAP AND EXPERTISE

## A1: Minnelise Levendal (Project Leader)

CSIR
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South Africa

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Fax: +27 21 888 2693
Email: mlevendal@csir.co.za

### CURRICULUM VITAE OF MINNELISE LEVENDAL – PROJECT LEADER

| | |
|---|---|
| **Name of firm** | CSIR |
| **Name of staff** | Minnelise Levendal |
| **Profession** | Environmental Assessment and Management |
| **Position in firm** | Project Manager |
| **Years' experience** | 8 years |
| **Nationality** | South African |
| **Languages** | Afrikaans and English |

### CONTACT DETAILS:

**Postal Address:** P O Box 320, Stellenbosch, 7599
**Telephone Number:** 021-888 2495/2661
**Cell:** 0833098159
**Fax:** 0865051341
**e-mail:** mlevendal@csir.co.za

### BIOSKETCH:

Minnelise joined the CSIR Environmental Management Services group (EMS) in 2008. She is focussing primarily on managing Environmental Impact Assessments (EIAs), Basic Assessments (BAs) and Environmental Screening studies for renewable energy projects including wind and solar projects. These include an EIA for a wind energy facility near Swellendam, Western Cape South Africa for BioTherm (Authorisation granted in September 2011) and a similar EIA for BioTherm in Laingsburg, Western Cape (in progress). She is also managing two wind farm EIAs and a solar Photovoltaic BA for WKN-Windcurrent SA in the Eastern Cape. Minnelise was the project manager for the Basic Assessment for the erection of ten wind monitoring masts at different sites in South Africa as part of the national wind atlas project of the Department of Energy in 2009 and 2010..She was also a member of the Project Implementation Team who managed the drafting of South Africa's Second National Communication under the United Nations Framework Convention on Climate Change. The national Department of Environmental Affairs appointed the South African Botanical Institute (SANBI) to undertake this project. SANBI subsequently appointed the CSIR to manage this project.

## EDUCATION:

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|---|---|---|
| ▪ M.Sc. (Botany) | Stellenbosch University | 1998 |
| ▪ B.Sc. (Hons.) (Botany) | University of the Western Cape | 1994 |
| ▪ B.Sc. (Education) | University of the Western Cape | 1993 |

## MEMBERSHIPS:

- International Association for Impact Assessment (IAIA), Western Cape (member of their steering committee from 2001-2003)
- IUCN Commission on Education and Communication (CEC); World Conservation Learning Network (WCLN)
- American Association for the Advancement of Science (AAAS)
- Society of Conservation Biology (SCB)

## EMPLOYMENT RECORD:

- **1995:** Peninsula Technicon. Lecturer in the Horticulture Department.
- **1996:** University of the Western Cape. Lecturer in the Botany Department.
- **1999:** University of Stellenbosch. Research assistant in the Botany Department (3 months)
- **1999:** Bengurion University (Israel). Research assistant (Working in the Arava valley, Negev – Israel; 2 months). Research undertaken was published (see first publication in publication list)
- **1999-2004:** Assistant Director at the Department of Environmental Affairs and Development Planning (DEA&DP). Work involved assessing Environmental Impact Assessments and Environmental Management Plans; promoting environmental management and sustainable development.
- **2004 to present:** Employed by the CSIR in Stellenbosch:
- September 2004 – May 2008: Biodiversity and Ecosystems Services Group (NRE)
- May 2008 to present: Environmental Management Services Group (EMS)

## PROJECT EXPERIENCE RECORD:

The following table presents a list of projects undertaken at the CSIR as well as the role played in each project:

| Completion Date | Project description | Role | Client |
|---|---|---|---|
| 2011 *(in progress)* | EIA for the proposed Electrawinds Swartberg wind energy project near Moorreesburg in the Western Cape | Project Manager | Electrawinds |
| 2010-2011 *(in progress)* | EIA for the proposed Ubuntu wind energy project, Eastern Cape | Project Manager | WKN Windkraft SA |
| 2010-2011 *(in progress)* | EIA for the proposed Banna ba pifhu wind energy project, Eastern Cape | Project Manager | WKN Windkraft SA |
| 2010-2011 | BA for a powerline near Swellendam in the Western Cape | Project Manager | BioTherm Energy (Pty Ltd |
| 2010-2011 *(Environmental Authorisation granted in September 2011)* | EIA for a proposed wind farm near Swellendam in the Western Cape | Project Manager | BioTherm Energy (Pty Ltd |
| 2010 (complete) | Basic Assessment for the erection of two wind monitoring masts near Swellendam and Bredasdorp in the Western Cape | Project Manager | BioTherm Energy (Pty Ltd |
| 2010 | Basic Assessment for the erection of two | Project | Windcurrent (Pty Ltd |

| Completion Date | Project description | Role | Client |
|---|---|---|---|
| (complete) | wind monitoring masts near Jeffrey's Bay in the Eastern Cape | Manager | |
| 2009-2010 (*(Environmental Authorisations granted during 2010)* | Basic Assessment Process for the proposed erection of 10 wind monitoring masts in SA as part of the national wind atlas project | Project Manager | Department of Energy through SANERI; GEF |
| 2010 | South Africa's Second National Communication under the United Nations Framework Convention on Climate Change | Project Manager | SANBI |
| 2009 *(Environmental Authorisation granted in 2009)* | Basic Assessment Report for a proposed boundary wall at the Port of Port Elizabeth, Eastern Cape | Project Manager | Transnet Ltd |
| 2008 | Developing an Invasive Alien Plant Strategy for the Wild Coast, Eastern Cape | Co-author | Eastern Cape Parks Board |
| 2006-2008 | Monitoring and Evaluation of aspects of Biodiversity | Project Leader | Internal project awarded through the Young Researchers Fund |
| 2006 | Integrated veldfire management in South Africa. An assessment of current conditions and future approaches. | Co- author | Working on Fire |
| 2004-2005 | Biodiversity Strategy and Action Plan Wild Coast, Eastern Cape, SA | Co-author | Wilderness Foundation |
| 2005 | Western Cape State of the Environment Report: Biodiversity section. (Year One). | Co- author and Project Manager | Department of Environmental Affairs and Development Planning |

## PUBLICATIONS:

**Bowie, M**. (néé Levendal) and Ward, D. (2004). Water status of the mistletoe *Plicosepalus acaciae* parasitic on isolated Negev Desert populations of *Acacia raddiana* differing in level of mortality. Journal of Arid Environments 56: 487-508.

Wand, S.J.E., Esler, K.J. and **Bowie, M.R** (2001). Seasonal photosynthetic temperature responses and changes in $^{13}C$ under varying temperature regimes in leaf-succulent and drought-deciduous shrubs from the Succulent Karoo, South Africa. South African Journal of Botany 67:235-243.

**Bowie, M.R**., Wand, S.J.E. and Esler, K.J. (2000). Seasonal gas exchange responses under three different temperature treatments in a leaf-succulent and a drought-deciduous shrub from the Succulent Karoo. South African Journal of Botany 66:118-123.

## LANGUAGES

| ***Language*** | ***Speaking*** | ***Reading*** | ***Writing*** |
|---|---|---|---|
| *English* | *Excellent* | *Excellent* | *Excellent* |
| *Afrikaans* | *Excellent* | *Excellent* | *Excellent* |

Minnelise Levendal

June 2018

## A2: CURRICULUM VITAE: RIRHANDZU MARIVATE

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Email : rmarivate@csir.co.za

| | |
|---|---|
| **Position in Firm:** | Junior Environmental Assessment Practitioner (305759) |
| **Full Name:** | Marivate, Rirhandzu Anna |
| **Specialisation:** | Environmental & Ecological Science |
| **Professional Registration:** | Cand. Sci. Nat. Environmental Sciences – Reg Number: 100147/14 |
| **Date of Birth:** | 23 February 1989 |
| **Nationality:** | South African |

**BIOSKETCH**

Rirhandzu holds a Bachelor degree in Zoology & Geology, Honours in Ecology, Environment and Conservation from the University of the Witwatersrand; and has environmental research experience with the University of Cape Town. The research focus has been within the domain of socioecology, looking at investigating local ecological knowledge of stakeholders on the provisioning of freshwater resources and its impacts on the management for of the Berg river in the Western Cape, South Africa. The research looked at how perception on resource utilisation affects management priorities, and creating a matrix of perceptions would be used a tool for better decision making within the Berg River Catchment Management Areas. Rirhandzu is currently studying towards her Master in Philosophy in Sustainable Development at the University of Stellenbosch. Here current research interest is looking at environmental planning and management within municipalities and how to optimise green spaces by including ecosystem goods and services to build resilience within those municipalities.

Since 2014, Rirhandzu has worked at the Council for Scientific and Industrial Research (CSIR) as an Environmental Assessment Practitioner (EAP) Intern within the Environmental Management Services (EMS) group, and from 2015 as a Junior Environmental Practitioner for the same group. Her duties include Assistance to other EAPs within EMS in their projects; Research in environmental assessment topics (e.g. indications, best practice, legislation); Report writing and project management; Participating in various forms of environmental assessments (BAs, EIAs, SEAs); consultation with stakeholders and public meetings; and Project administration (e.g. contracting and invoicing). She is particularly involved with the Special Needs and Skills Development (SNSD) Programme, which looks at assisting Community Trusts, Small, Micro to Medium Enterprises, with environmental services. She has also been involved with the Monitoring and Evaluation of the National Strategy for Sustainable Development by the Department of Environmental Affairs (DEA). Rirhandzu has established good client relationships and partnerships with the Land Bank, Department of Agriculture, Forestry and Fisheries (DAFF), and Department of Mineral Resources (DMR) through the SNSD Programme. She is involved as a stakeholder in the continuous consultations for the Development of Environmental Indices in response to the National Development Plan (NDP), led by the DEA.

Rirhandzu further involved with the Applied Centre for Climate and Earth Systems Sciences (ACCESS- NRE) as a national representative for the Student NEC and as a member of their Advisory Board for their Habitable Planet Programme. The HPW programme aims to educate undergraduate and high school learners in environmental and earth systems sciences, with the goal of encouraging them to pursue science careers.

**EXPERIENCE**

| Completion Date | Project description | Role | Client |
|---|---|---|---|
| 2014 (in progress) | **Special Needs and Skills Development Programme:** Programme management and conducting of Basic Assessments for disadvantaged communities/businesses/enterprises | **Project Manager;** Stakeholder Co-ordination; Project Support; Mentorship; Ecological Input | National Department of Environmental Affairs (DEA), South Africa |
| 2013- 2014 | **Monitoring and Evaluation** for the National Strategy for Sustainable Development and Action Plan. | **Project Member;** Stakeholder engagement, Researcher, Report Writing | National Department of Environmental Affairs (DEA), South Africa |

| Completion Date | Project description | Role | Client |
|---|---|---|---|
| 2013-2015 | **Strategic Environmental Assessment (SEA)** for wind and solar PV energy in South Africa. | Data Management | National Department of Environmental Affairs (DEA), South Africa |
| 2014-2016 | **Strategic Environmental Assessment (SEA)** for Electricity Grid Infrastructure (EGI). | Stakeholder Engagement | National Department of Environmental Affairs (DEA), South Africa |
| 2014 | **Screening Study (SS)** for the Development of Biochar and Composting Facilities to support land restoration near the proposed Ntambelanga Dam, Umzimvubu Catchment, Eastern Cape**.** | **Project Manager,** Project Research & Report Writing | National Department of Environmental Affairs (DEA), South Africa |
| 2015 | **Environmental Screening Study (ESS)** for projects undertaken in the Amatikulu Aquaculture Development Zone, KwaZulu-Natal. | **Project Manager,** Project Research & Report Writing | National Department of Agriculture, Forestry & Fisheries (DAFF), S Africa |
| 2015-2016 | **Development of Sustainability Indicators** for the National Integrated State of the Environment Report for Namibia. | **Project Manager**, Project Research & Report Writing | Ministry of Environment and Tourism (MET), Namibia |
| 2016 | **Basic Assessment** for the development of a 5.5ha pig production facility and a 2.5 ha chicken broiler facility on Farm Rietvalei, Portion 1 & 6, near Delmas, Mpumalanga. | **Project Manager** | Mokate Estates (Pty) Ltd |
| 2016 | **Basic Assessment** for the development of a 0.6 hectare Chicken Layer Facility on a 7.8 hectare farm in Mashau-Bodwe Village, Makhado District, Limpopo. | **Project Manager** | Wanga Poultry (Pty) Ltd |
| 2016 | **Sustainable Development Appraisal for Gold Standard** on a microprogramme of the NOVA Brickstar Wood Stove in the Mahlaba Area, Limpopo. | **Project Member**, Project Researcher, Translator | Gold Standard Foundation |
| 2017 (In Progress) | **Sustainable Development Goal Lab** on "Mainstreaming resilience into climate change adaptation and disaster risk planning." | **Project Member** | Future Earth; Stockholm Resilience Centre; University of Tokyo |
| 2017 (In progress) | **Basic Assessment** for the proposed development of a leisure and cultural village on Farm Moiloa 412-JO, Dinokana Village, North West. | **Project Manager** | Makadima Leisure & Cultural Village 101 (Pty) Ltd |
| 2017 (In progress) | **Basic Assessment** for the expansion of a Chicken Layer Facility on a 4.4 hectare farm on plot 226 Withok Estate, Brakpan, Ekurhuleni District, Gauteng | **Project Manager** | Lewin AgriBusiness (Pty) Ltd |
| 2017 (In progress) | **Basic Assessment** for the expansion of a Chicken Broiler Facility on a 2.57 hectare farm on plot 62, Mapleton, Ekurhuleni District, Gauteng. | **Project Manager** | Mthunzi Chicken Supplier (Pty) Ltd |

## PAST EMPLOYMENT RECORD

- **2014-2015** CSIR Environmental Management Services (EMS) Environmental Scientist and Assessment Practitioner (Intern).
- **2011-2013** UCT Environmental & Geographical Science Department (N Methner; K Vickery) Researcher & Teaching Assistant
- **2010** WITS School of Animal Plant & Environmental Sciences (Prof K Balkwill) Teaching Assistant.
- **2009** ESKOM Generation Environmental Management (D Herbst) Environmental Officer (Intern).
- **2009** WITS School of Geosciences (Dr G Drennan; Dr M Evans) Teaching & Field Assistant.
- **2008** WITS School of Animal Plant & Environmental Sciences (T Gardiner; Dr W Twine) Environmental Control & Field Assistant.
- **2008** Jane Goodall Institute (Dr L Duncan) Field Assistant.

## QUALIFICATIONS

- **2010 University of the Witwatersrand (Wits) BSc Honours (Ecology, Environment and Conservation)**
  *Coursework:* Approaches to Science, Experimental Design and Biostatistics, Introduction to Statistics Computer programme R, Introduction to Geographic Information Systems, Global Change: Impact on Soils, Plants and the Environment, Ecological Engineering and Phytoremediation, Ethnoecology.

*Thesis*: Species Composition and Population Structure of Trees Protected in Cultivated Fields of Rural Villages in the Bushbuckridge Region, Mpumalanga Province (Supervisors: Dr Wayne Twine, Prof Ed Witkowski)

- **2006 – 2009 University of the Witwatersrand (Wits) BSc (Zoology & Ecology)**
  *Senior Courses:* Research Report Writing; Exploration and Environmental Geochemistry; Introduction to Palaeoclimatology; Environmental Geomorphology; Diversity, Ecology and Economic Importance of Algae; Functional Ecology in Changing Environments; Ecological Communities and Biodiversity Conservation; Structural Geology; Igneous Petrology; Physics of the Earth and Plate Tectonics; Ore Petrology and Mineralisation Processes

## SHORT-COURSES, CONFERENCES AND WORKSHOPS

- 2017 Ecosystem-Based Adaptation: Developing Capacity for Implementation, SANBI, Pretoria National Botanical Gardens, June 2017.
- 2015 Practical Adaptation for vulnerable communities by Adaptation Network, Kirstenbosch Botanical Gardens, Cape Town, August 2015.
- 2015 International Association for Impact Assessors South Africa (IAIAsa) National Annual Conference, August 2016, KZN.
- 2015 Sharpening the Tool: New Techniques & Methods in Environmental Impact Assessments, SE Solutions, Stellenbosch, Western Cape
- 2014 CiLLA Project Management I Course on July 2014 at CSIR Stellenbosch
- 2014 International Association for Impact Assessors South Africa (IAIAsa) Air Quality Management (AQM) Workshop on June 2014 in Western Cape
- 2014 South African Environmental Observation Network (SAEON) Graduate Student Network (GSN) Annual Conference September 2014, Eastern Cape.
- 2014 IAIAsa National Conference from August 2014 at Midrand, Gauteng
- 2014 African Student Energy (ASE) Annual Summit Cape Peninsula University of Technology June 2014, Western Cape
- 2014 International Association for Impact Association South Africa (IAIAsa) New National Environmental Management Act (NEMA) regulations March 2014 Western Cape
- 2014 Applied Centre for Climate and Earth Systems Sciences (ACCESS) facilitation for teacher training January 2014,WC.
- 2012 International Conference for Freshwater Governance for Sustainable Development November 2012, KwaZulu-Natal
- 2012 Society of South African Geographers (SSAG) Annual Conference at University of Cape Town June 2012, Western Cape
- 2011 Applied Centre for Climate and Earth System Sciences (ACCESS) teacher training, Western Cape
- 2011 BlueBuck Environmental Network Annual Summit at Rhodes University, Eastern Cape
- 2010 Biodiversity and People Mini-Symposium, University of the Witwatersrand, October 2010, Mpumalanga

## LANGUAGES

| | Speaking | Reading | Writing |
|---|---|---|---|
| **Setswana** | Excellent | Excellent | Excellent |
| **Xitsonga** | Excellent | Excellent | Excellent |
| **English** | Excellent | Excellent | Excellent |

## PROFESSIONAL REGISTRATIONS

- IAIA: Member of International Association of Impact Assessment South Africa (IAIAsa) since 5 February 2014.
- SACNASP: Registered as Candidate Natural Scientist with South African Council for Natural Scientific Professions (SACNASP) since July 2014. Registration number: 100147/14