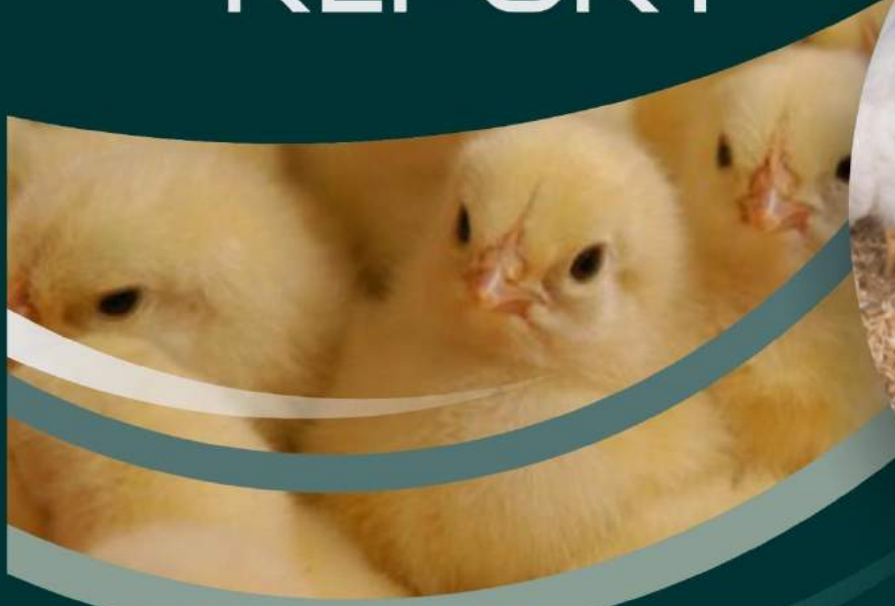
Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT



CSIR Report Number:
CSIR/IU/EMS/ER/2016/0002/A

Prepared for:
Nkunzi Agrilutural Co-Operative (Pty) Ltd

October 2017

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October 2017

Prepared for:
Nkunzi Agrilutural Co-Operative (Pty) Ltd

Prepared by:
CSIR
P O Box 320, Stellenbosch, 7599
Tel: +27 21 888 2408
Fax: +27 21 888 2473

Lead Authors:
Minnelise Levendal and Samukele Ngema

REPORT DETAILS

Title:	Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.
Purpose of this report:	The purpose of this BA Report is to: • Present the proposed project and the need for the project; • Describe the affected environment at a sufficient level of detail to facilitate informed decision-making; • Provide an overview of the BA Process being followed, including public consultation; • Assess the predicted positive and negative impacts of the project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; • Provide an Environmental Management Programme (EMPr) for the proposed project. • Provide a Maintenance Management Plan (MMP) for the proposed project. This BA Report is being 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 Gauteng Department of Agriculture and Rural development (GDARD) for decision-making.
Prepared for:	Nkunzi Agricultural Co-Operative (Pty) Ltd
Prepared by:	CSIR P O Box 320, Stellenbosch, 7599 Tel: +27 21 888 2408 Fax: +27 21 888 2493
Authors:	Samukele Ngema Reviewer: Minnelise Levendal
CSIR Report Number:	CSIR/IU/EMS/ER/2016/0002/A
Date:	October 2017
To be cited as:	SIR, 2017. Basic Assessment for the proposed development of a chicken broiler facility on Plot 1109, Remainder of Klippan 102 JR, Winterveld, Gauteng.CSIR Report Number CSIR/IU/EMS/ER/2016/0002/A

OPPORTUNITY FOR REVIEW

Opportunity for Review:

This Draft Basic Assessment Report and Draft Environmental Management Programme (EMPr) is released for review by stakeholders. Review comments are to be submitted to the project manager below:

Project Manager – Samukele Ngema

Council for Scientific and Industrial Research (CSIR)
Postal Address: P. O. Box 320, Stellenbosch, 7599
Phone: 021 888 2408
Fax: 021 888 2693
Email: sngema@csir.co.za

CONTENTS

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*** SAHRA information Service letters from municipalities - ***Not applicable*** Water supply information - ***Not applicable at this stage***
Appendix G	Specialist Reports
Appendix H	Environmental Management Programme
Appendix I	CVs of the EAPs (project team who prepared the report)

TABLES

FIGURES

EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

The Nkunzi Agricultural Co-Operative is a small scale commercial farming enterprise that was established in 2015. This Co-Operative comprises of 5 members and is proposing to establish a start-up enterprise comprising of a commercial chicken broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng. The farm currently has a single dilapidated buildings but otherwise vacant. The proposed development footprint is 1 hectare, to comprise solely of chicken broiler facilities (office, silo, and reservoir) and at a later stage small scale crop farming of a variety of vegetables. The proposed operations of the project will be the producing of 80 000 chicks per six week cycle. These will then be distributed to meat packers in the area, for slaughtering and packaging.

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) 324,325 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 324, 325 and 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)	More than 1000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days.
	5 (iv)	More than 25000 chicks younger than 20 days per facility situated outside an urban area.
	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- the undertaking of a linear activity; or ii) Maintenance purposes undertaken in accordance with a maintenance management plan.

These listed activities require Environmental Authorisation from the competent authority, i.e. the Gauteng Department of Agriculture and Rural Development (GDARD).

PROJECT DESCRIPTION

The proposed site is located on Plot 1109, Remainder of Farm Klippan 102 JR in Winterveld. The project is within the 24th Ward of the Tshwane Metropolitan Municipality in Gauteng province. The proposed project involves the construction of broiler chicken facilities on the 4.2 hectare plot of land.

The said project aims to grow 80 000 chicks into chickens over a six week cycle, which are then sold to a contracted buyer. 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 to the best of the projects ability. The preferred project development footprint totals 0.9 hectares with there being an intention at some point to grow crop on the remaining 4.2 hectare plot of land. Upon completion the chicken broiler will include the following:

- 4 x Chicken House
- 1 x Office
- 1 x Water Reservoir
- 1 x Change Rooms & Showers

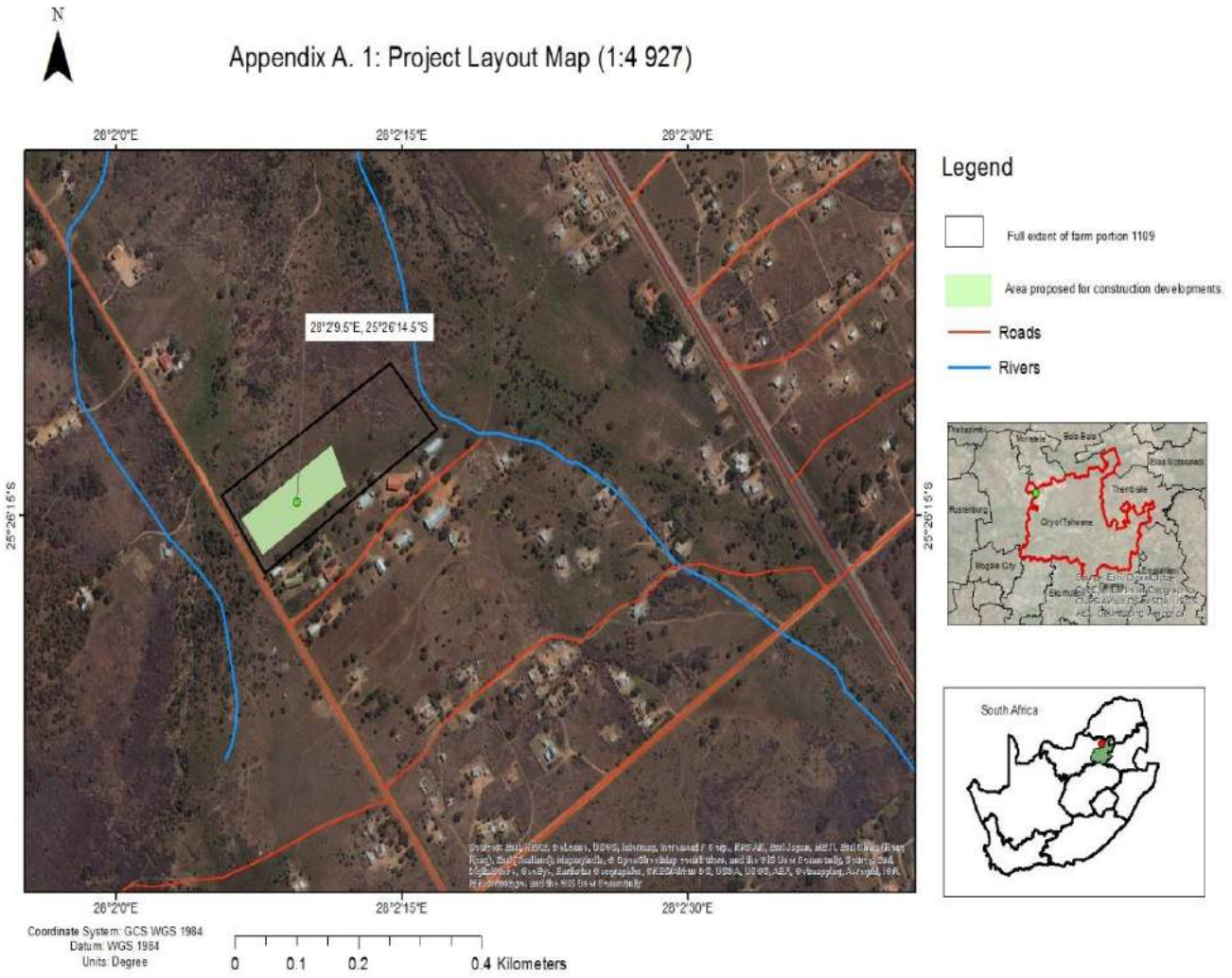

Figure 1: Location of the proposed development for a chicken broiler facility of Nkunzi Agricultural Co-Operative on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Tshwane.

IMPACT ASSESSMENT

Two specialist studies were conducted as part of the BA Process, i.e. an Ecological study and a Heritage Impact Assessment. Seen below:

Table S.2: Summary of Impacts

POTENTIAL ECOLOGICAL IMPACTS	Significance Rating Without Mitigation	Significance Rating With Mitigation
Construction Phase		
Loss or degradation of local wetland areas	**High**	**Moderate**
Loss of terrestrial vegetation and faunal habitat	**Moderate**	**Low**
Loss of Conservation Important (CI) or medicinal flora	**Moderate**	**Low**
Loss of CI fauna	**Moderate**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Increased dust and erosion	**Moderate**	**Low**
Sensory disturbance of fauna	**Low**	**Low**
Operational Phase		
Loss or degradation of local wetland areas	**High**	**Low**
Environmental contamination (including odours)	**High**	**Moderate**
Poor / Inappropriate control of vertebrate pests	**Moderate**	**Low**
Disease transmission	**Moderate**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Loss of CI or medicinal flora	**Moderate**	**Low**
Loss of CI fauna	**Moderate**	**Low**
Sensory disturbance of fauna	**Low**	**Low**
Decommissioning Phase		
Loss or degradation of local wetland areas	**High**	**Low**
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
Destruction of Structures	Low	Low
Operational Phase		
Existence of new structure on the landscape	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.

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 Tshwane Metropolitan 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.

GLOSSARY

BA	Basic Assessment
BID	Background Information Document
CSIR	Council for Scientific and Industrial Research
DEA	National Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
NWA	National Water Act (Act 36 of 1998)
NEM: AQA	National Environment Management: Air Quality Act (Act 39 of 2004)
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008)
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
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 – 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 i) the 21 digit Surveyor General code of each cadastral land parcel;	√	Section A Appendix A, B
(ii) where available, the physical address and farm name;		
(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- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity (iii) is to be undertaken;	√	Section B
(d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered and being applied for; and (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- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development	√	Section C 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 (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: (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (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; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (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- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (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; (vii) positive and negative impacts that the proposed activity and alternatives will have on the	√	Section E 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; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (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- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (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 Appendix H
(j) an assessment of each identified potentially significant impact and risk, including- (I) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	√	Section E 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; (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 (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: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (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 proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT

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our future through science

GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
2. This application form is current as of 8 December 2014. It is the responsibility of the EAP to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
3. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.**
4. **A draft Basic Assessment Report (1 hard copy and two CD's) must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application.**
5. Five (5) copies (3 hard copies and 2 CDs-PDF) of the final report and attachments must be handed in at offices of the relevant competent authority, as detailed below.
6. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
7. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
8. An incomplete report may lead to an application for environmental authorisation being refused.
9. **Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**
10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.
11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.
12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the of the Environmental Affairs Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the of the Environmental Affairs Branch
Ground floor Diamond Building
11 Diagonal Street, Johannesburg

Administrative Unit telephone number: (011) 240 3377
Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:	
File Reference Number:	
Application Number:	
Date Received:	

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

N/A

Is a closure plan applicable for this application and has it been included in this report? No

if not, state reasons for not including the closure plan.

This application is for the development of a chicken broiler facility which will exist for the foreseeable future, therefore there are no intentions to close the facility.

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity? **Yes**

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person? Yes

If no, state reasons for not attaching the list.

Have State Departments including the competent authority commented? No

If no, why?

The BA Report is currently being released for a 30-day review period. Following the review period any comments received from State Departments (including the competent authority) will be incorporated into the final BAR which will be submitted to Gauteng Department of Agriculture and Rural Development for decision-making.

INTRODUCTION

Project Background

The proposed site is located on Plot 1109, Remainder of Farm Klippan 102 JR, in Winterveld. The project is within the 24th Ward of the Tshwane Metropolitan Municipality in Gauteng province. The proposed project involves the construction of broiler chicken facilities on the 4.2 hectare plot of land.

The said project aims to grow 80 000 chicks into chickens over a six week cycle, which are then sold to a contracted buyer. 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 to the best of the projects ability. The preferred project development footprint totals 0.9 hectares with there being an intention at some point to grow crop on the remaining 4.2 hectare plot of land. Upon completion the chicken broiler will include the following:

- 4 x Chicken House
- 1 x Office
- 1 x Water Reservoir
- 1 x Change Rooms & Showers

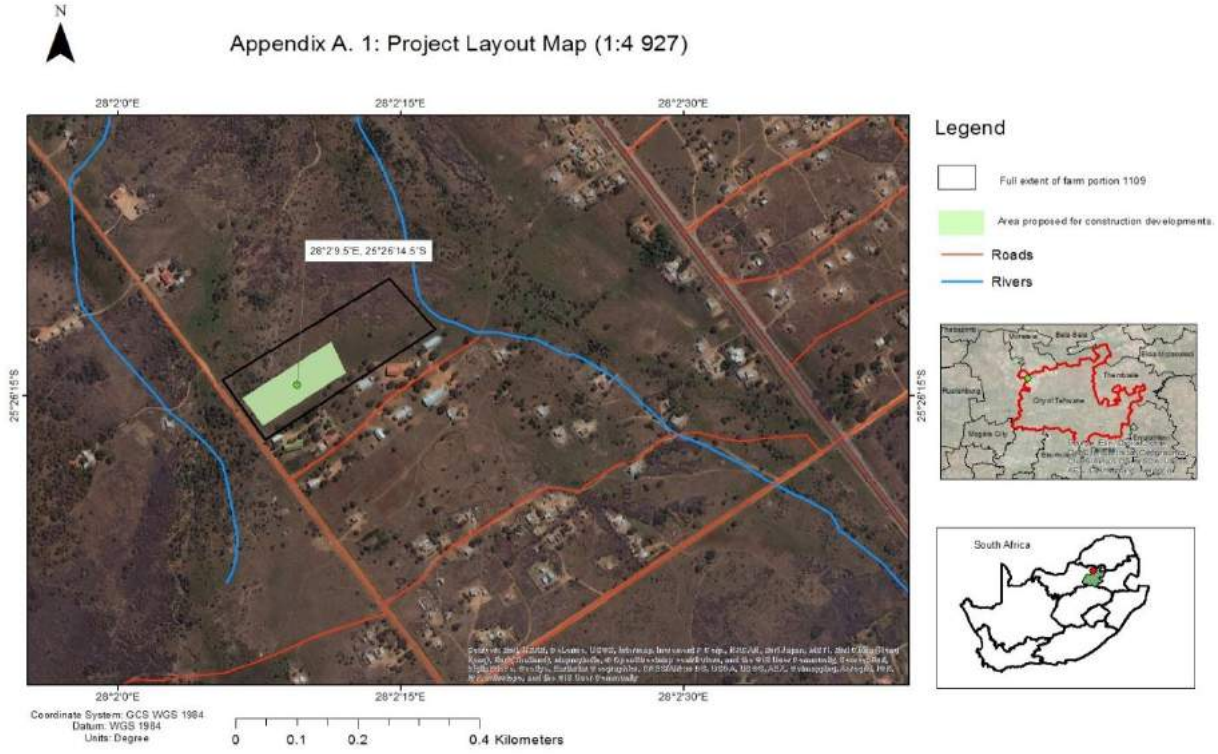

Figure 2: Location of the proposed development for a chicken broiler facility of Nkunzi Agricultural Co-Operative on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Tshwane.

CONTENTS

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

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

Basic Assessment for the proposal of constructing Broiler Chicken, raising up to 80 000 day old chicks per six week cycle for sale, Winterveld, Gauteng Province.

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	NO
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

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
Environmental Impact Assessment Regulations, 2014	National & Provincial	4 December 2014
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
Gauteng Provincial Environmental Framework, 2014	Provincial	November 2014
Tshwane Integrated Development Plan: 2011-2016	Provincial & Local	28 April 2011
Tshwane Regional Spatial Development Framework: 2013	Provincial & Local	27 March 2013

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: 1. Creating jobs and improving livelihoods; 2. Expanding infrastructure; 3. Transition to a low-carbon economy; 4. Transforming urban and rural spaces; 5. Improving education and training; 6. Providing quality health care; 7. Fighting corruption and enhancing accountability; 8. Transforming society and uniting the nation.
Tshwane Integrated Development Plan: 2011-2016 Tshwane Regional Spatial Development Framework: 2013	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. The proposed project falls within ward 24 of Region 1 of the Spatial Development Framework and is the north west quadrants of the CoT. 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 Regional IDP (Region 1) for CoT, 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 National Environmental Management Act (NEMA) EIA Regulations published in GNR 983, 984 and 985 on the 4 December 2014 Government Gazette Number 38282 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 Notices:	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)	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)
	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	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.

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.

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	**Site Location and Layout:** This proposed project, a chicken broiler facility has a site which is located on Plot 1109, Remainder of Farm Klippan 102 JR, in Winterveld. The project is within the 24th Ward of the Tshwane Metropolitan Municipality in Gauteng province. At an approximate distance of 1 kilometer from the main M39 road which runs from Soshanguve up to the North West province. T The proposed project involves the construction of broiler chicken facilities on the 4.2 hectare plot of land. The said project aims to grow 80 000 chicks into chickens over a six week cycle, which are then sold to a contracted buyer. 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, 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 1 hectares with there being an intention at some point to grow crop on the remaining 4.2 hectare plot of land. Upon completion the chicken broiler will include the following: Construction of: - 4 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 (40 000 birds per house) - Office block - Change Room & Showers 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)

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	Description
		- 1 x Curtain System of 120m x 2.5 m - 1 x 20m² waste storage area. The broiler 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 broiler 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. The plot has a house on the site which has services from the municipality where water and electricity is provided. There will be a need to apply for both a water use license and electric connections for commercial purposes should the need arise to increase both these inputs. There is however two boreholes which still need specialist feasibility studies. Access roads to and on the site are already in existence.
2	Property Alternative	There have been no alternative properties or locations identified for the proposed project due to the applicants lack of funding. Therefore this is the only piece of land the applicant can perform 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 work out an agreement with the current land owner of Plot 1109 of Winterveld Agricultural Holding. Further it is close to a major road allowing easy of transportation. The applicant has been a chicken distributer for almost 10 years now and this has become a industry which they regard as their only skill which is leading to their current and future employment.
	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 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

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	Description
		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 tasked 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 **Nkunzi Agricultural Co-Operative** 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.

Nkunzi Agricultural Co-Operative 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. **Nkunzi Agricultural Co-Operative** is leasing the land from a private individual with Land Consent Use and Lease Agreement. 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 **Nkunzi Agricultural Co-Operative** 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 broiler 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 **Nkunzi Agricultural Co-Operative**. 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 **Nkunzi Agricultural Co-Operative** 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)**	1 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	4.2 ha
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:

N/A

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

Describe the type of access road planned:

N/A

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

Describe the type of access road planned:

N/A

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).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated **0** Number of times

(only complete when applicable)

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 (NSS, May 2017) 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 (NSS, 2017) 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 site layout is due to the realised sensitivities of the site, the originally proposed layout by the applicant can be found in a rough sketch in Appendix C).**

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
2) Indicate on a plan(s) the different environments identified
3) Complete Section B for each of the above areas identified
4) Attach to this form in a chronological order
5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route	**N/A**	times

Instructions for completion of Section B for location/route alternatives

1) For each location/route alternative identified the entire Section B needs to be completed
2 Each alterative location/route needs to be clearly indicated at the top of the next page
3 Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives	**N/A**	times	(complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route	**N/A**	(complete only when appropriate for above)
Section B – Location/route Alternative No.	**N/A**	(complete only when appropriate for above)

1. PROPERTY DESCRIPTION

Property description: (Including Physical Address and Farm name, portion etc.)	Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

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):
	28.035982	**25.437359**

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	R	0	2	9	2	0	0	0	0	1	1	0	9	0	0	0	0	0
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)	YES	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):**
º	º

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):**
º	º

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):**
º	º

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

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?	YES	NO

Please note: The Department may request specialist input/studies in respect of the above.

7. 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 (NSS, 2017) 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 % =	Natural veld with scattered aliens % =50	Natural veld with heavy alien infestation % =	Veld dominated by alien species % =	Landscaped (vegetation) % =
Sport field % =	Previously Cultivated land % =40	Paved surface (hard landscaping) % =	Building or other structure % =2	Bare soil % =8

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Are there any rare or endangered flora or fauna species (including red list species) present on the site If YES, specify and explain:	[redacted]	NO
[redacted]		
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. If YES, specify and explain:	[redacted]	NO
[redacted]		
Are there any special or sensitive habitats or other natural features present on the site? If YES, specify and explain:	YES	[redacted]

The wetland on site was classified, following Ollis et al. (2013), as a Seep without a channelled outflow. Seeps are wetland areas located on gently to steeply sloping land that are dominated by colluvial (i.e. gravity driven), unidirectional movement of water and material down-slope. The seep identified in the study area is considered not to have a channelled outflow. This means that water exits the seep by means of a combination of diffuse surface flow, interflow, evaporation and infiltration. These systems are normally associated with groundwater discharges, although flow through them may be supplemented by surface water contribution (which is more likely the dominant case here). The Level 1-4 wetland classification (Ollis et al. 2013) for the HGM unit is given in Table 2. The current wetland extent is depicted in Figure 3.

Table 2: Showing the levels of extent which types of wetlands are protected.

Table 8-9 Wetland classification

NAME	HGM Unit	1
LEVEL 1	System	INLAND
LEVEL 2	DWA Ecoregion	8.05
	NFEPA WetVeg	CBG 3
LEVEL 3	Landscape Unit	Slope and Valley floor
LEVEL 4	4a	Seep
	4b	Without Channelled outflow
	4c	NA
STATUS	Threat	VU
	Protection	NP

Key: VU = Vulnerable; HGM = Hydrogeomorphic Unit; CBG= Central Bushveld Group

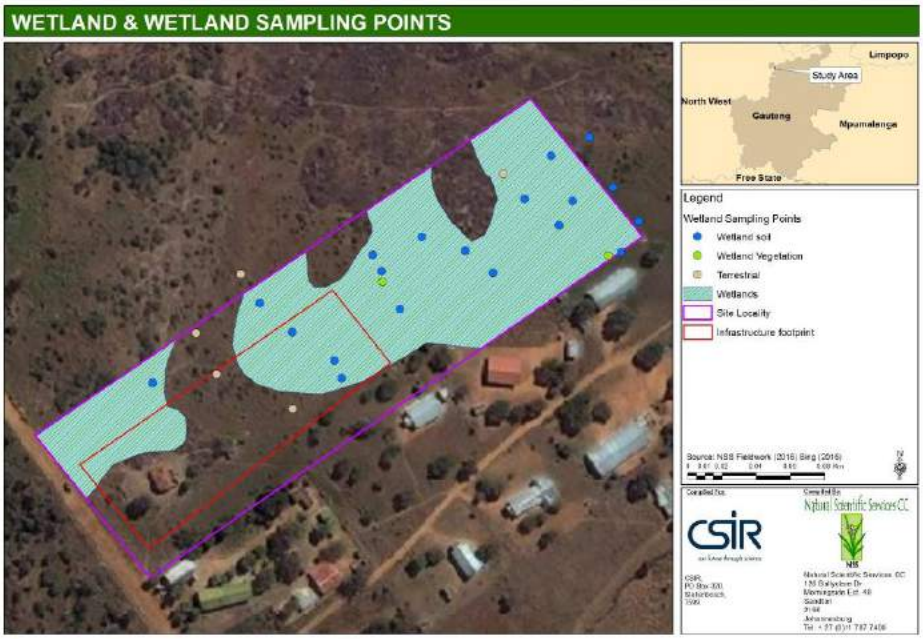

Figure 8-10 Current wetland extent

Figure 3: Delineation of the extent of the wetland found on the proposed project site

YES	NO

Was a specialist consulted to assist with completing this section
If yes complete specialist details

Name of the specialist:	Natural Scientific Services CC (NSS) *Contributors and Authors:* Susan Abell

Qualification(s) of the specialist:	MSc Resource Conservation Biology (Ecology) University of the Witwatersrand, Johannesburg (2000 – 2001) BSc Hons University of the Witwatersrand, Johannesburg (1999) BSc University of the Witwatersrand, Johannesburg (1998		
Postal address:	126 Ballyclare Dr Morningside ext 40 Sandton, Johannesburg		
Postal code:	2195		
Telephone:	(011) 787-7400	Cell:	[redacted]
E-mail:	susan@nss-sa.co.za	Fax:	[redacted]
Are any further specialist studies recommended by the specialist?		YES	NO
If YES, specify:	[redacted]		
If YES, is such a report(s) attached?		YES	NO
If YES list the specialist reports attached below	[redacted]		

Signature of specialist: _____ Date:

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.**

Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

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	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial[AN]	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport[N]	23. Train station or shunting yard[N]	24. Railway line[N]	25. Major road (4 lanes or more)[N]
26. Sewage treatment plant[A]	27. Landfill or waste treatment site[A]	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33.Spoil heap or slimes dam[A]	34. Small Holdings	
Other land uses (describe):				

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	2, 34	9	8	2, 8
1	1, 2	1, 2	1, 2	8
1	9		18	8
1	34	1	1	1
1	1	1	1	1

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

Ecological Opinion/Scan for Nkunzi Agricultural Co-Operative for the proposed Chicken Broiler Production Facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng Province.
Natural Scientific Services (NSS), 2017
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 Gauteng Province, concentrated in Region 1 of the Tshwane Metropolitan Municipality and the Winterveld area specifically. The project falls within Ward 24 of The City of Tshwane. Households and communities within Ward 24 should therefore be provided preference when implementing socio-economic policies and mitigation measures.

This northern section of the region which includes the Klipkruisfontein, Ga-Rankuwa, Mabopane, Soshanguve and Winterveldt areas. This same area accounts for one third of the city's population and located in low-income settlements, as stated in the City of Tshwane's Region 1: Regional Integrated Development Plan 2014-2015. According to the latest population report (Statistics South Africa, 2011), the total population for the Winterveld ward 24, where the project is located, is 47737 with 13564 households at a density shown in Figure 4. The average household size for Ward 24 is 3.5 people per household. The majority of the Winterveld population is falls within the youth category, a majority being between 20 and 34 years of age. The least populated age group being that of over 70 years. This large percentage of youth in the area will mean additional pressure on job creation in future. It also implies a high dependency ratio, which in this case is 50.9% as a large number of people not yet economically active. The racial make up of the area is made up of the following as shown in Table 3 below and Table 4 indicates the gender distribution.

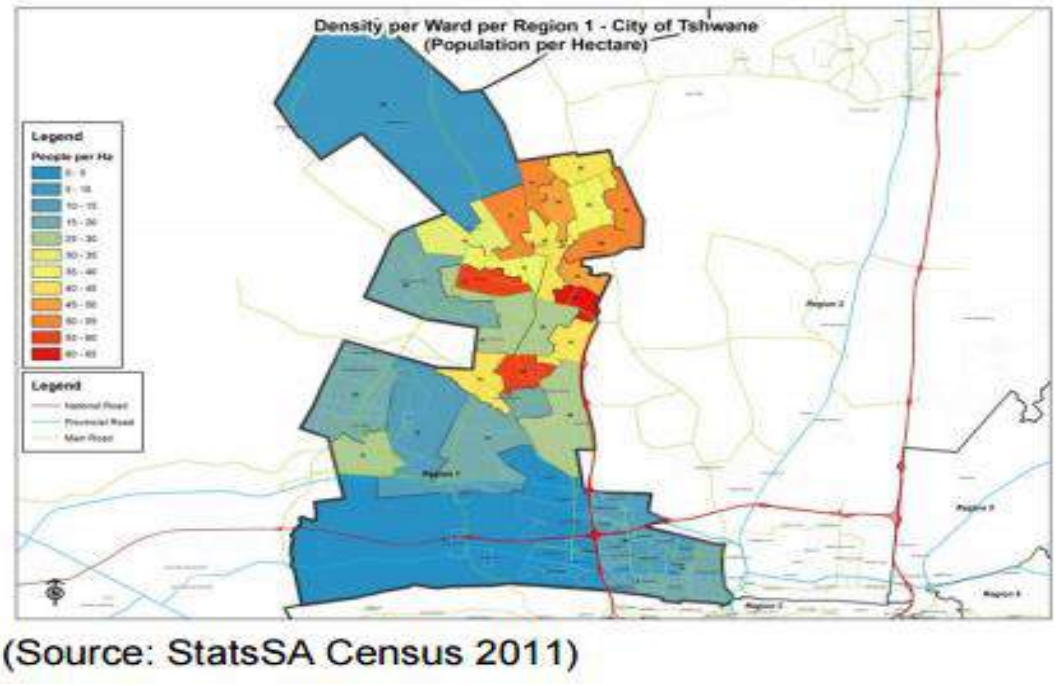

Figure 4: Population Density per ward in Winterveld, Tshwane (StasSA 2011)

Table 3: Racial demographic composition Winterveld (StasSA 2011)

Table 4: Gender Demographic Composition Winterveld (StasSA)

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

The language most spoken at home within the Winterveld area is Xitsonga 21,9%, followed by Setswana 19.9% and IsiNdebele 19.1%. In terms of education, 12.8% of adults have no schooling whatsoever and 25.6% of adults are schooled up to Grade 12. In general, the level of education in the region is low which makes access to employment and economic growth a challenge. According to Statistics South Africa (2011), minority of the households (1.4%) have access to a flush toilet (with septic tank) and 24.6% with a flushing toilet (connected to sewerage system). 67.8.% of households in Winterveld have access to electricity for cooking, heating and lighting. In terms of tenure status, 12.5% occupied rent free, 37.5% fully own their dwellings and rented dwellings account for 12.5%. The main sources of water for households in the area are 85.9% Regional/Local water scheme, only 4.6% borehole and the remainder a combination of water vendors, rain water tanks, springs and dams.

9.2 Baseline economic information

Unemployment is a challenging factor in Region 1, where according to the City of Tshwane 2011-2016 IDP, approximately 31% of the population is unemployed, making this number higher than the national average of 25.2% as shown in Figure 5 below. A factor that may be contributing to this status quo could be accorded to relatively low education levels and the lack of access to opportunity. According to the IDP Winterveldt municipality's unemployment rate being high among the Black population with the gender categories as shown in Table 5 below.

Table 5: Unemployment Demographic Composition Winterveld (StasSA 2011)

Unemployment according to Gender	
Gender	**Percentage**
Male	14%
Female	15.5%

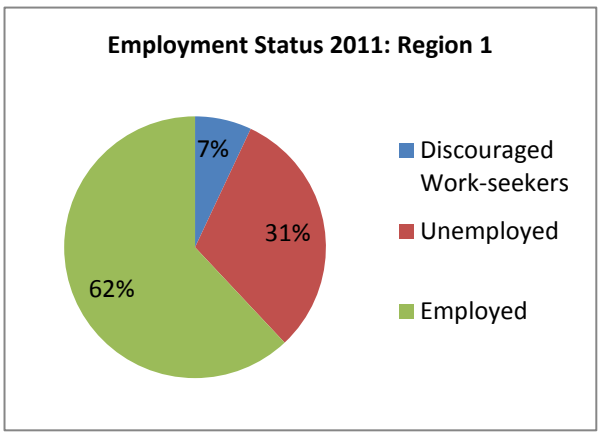

Figure 5: Regional Employment Status Winterveld (StasSA 2011)

The economy of the City of Tshwane is driven by industrial development and remains to be the largest economic contributor of this metropolitan, however this is concentrated in the central part of the municipalities CBD. The area of Region 1 is seen as a rural with little in the way of identifying a distinct industry in the area making it difficult to find work in any specific industry for the population of the area. The incomes of those who tend to find work in the Winterveld area tend to be on the Lower end of the scale as shown in Table 6 below. Nkunzi Agicultural Co-Operative has thus identified an opportunity in the Winterveld that through the proposed Chicken Broiler will add great socio-economic value to the area both economically and through allowing local employment opportunities, as well as contributing on a broader scale to the farming industry of South Africa.

Table 6: Income Distribution of Winterveld (StatsSA 2011)

Income Distribution of Winterveld	
Income	**Percentage**
No income	23,1%
R1 - R4,800	6,6%
R4,801 - R9,600	9,7%
R9,601 - R19,600	18,3%
R19,601 - R38,200	20,5%
R38,201 - R76,400	12,5%
R76,401 - R153,800	6,1%
R153,801 - R307,600	2,4%
R307,601 - R614,400	0,7%
R614,001 - R1,228,800	0,1%
R1,228,801 - R2,457,600	0,1%
R2,457,601+	0,1%

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:

Heritage Impact Assessment for proposed agricultural development by Nkunzi Agricultural Co-Operative (Pty) Ltd on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

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?	YES	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 10118) the project was required to perform a Heritage Impact Assessment (HIA) to explore the archaeological and paleontological, for which they are the competent authority. The Provincial Heritage Resources Authority Gauteng (PHRAG) was also informed about the proposed development and provided an opportunity to comment during the first round of Public Participation. A letter from PHRAG in response to the BID is included in Appendix F, in which a consideration of heritage resources was requested by PHRAG. A heritage specialist, ASHA Consulting, was appointed to comment on the sensitivity of heritage resources on site. The report from ASHA Consulting 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	NO
If yes, has any comments been received from the local authority?	YES	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 comments will be incorporated into the final BA Report which will be submitted to GDARD 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?	YES	NO

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

A Comment was received in response to the circulation of the Background Information Document and are as follow: Comment: Department of Agriculture Forestry and Fisheries (DAFF), Directorate of Land Use and Soil Management acknowledged receipt of proposed project application documents on 12 September 2017 and was received from Mr HJ Buys pp(DAFF Director: Land Use and Soil Management).

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

N/A

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

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
4) Each alterative needs to be clearly indicated in the box below
5 Attach the above documents in a chronological order

Section D has been duplicated for alternatives | **0** | times (complete only when appropriate)

Section D Alternative No. | "insert alternative number" | (complete only when appropriate for above)

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

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. Broiler 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 broiler 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 broiler development 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 odor from the chicken broiler waste, these are a result of the anaerobic metabolic process occurring. Further, odor from a chicken broiler 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 kiloliters

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/ Tshwane Metropolitan 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 issues/comments that were raised by Interested and Affected Parties following the release of the Background Information Document and prior to the release of the Draft Basic Assessment Report can be seen in the comments and responses report which is attached as Appendix E4:

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):

The issues/comments that were raised by Interested and Affected Parties following the release of the Background Information Document and prior to the release of the Draft Basic Assessment Report and the response given by the EAP can be seen in the comments and responses report which is attached as Appendix E4.

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).

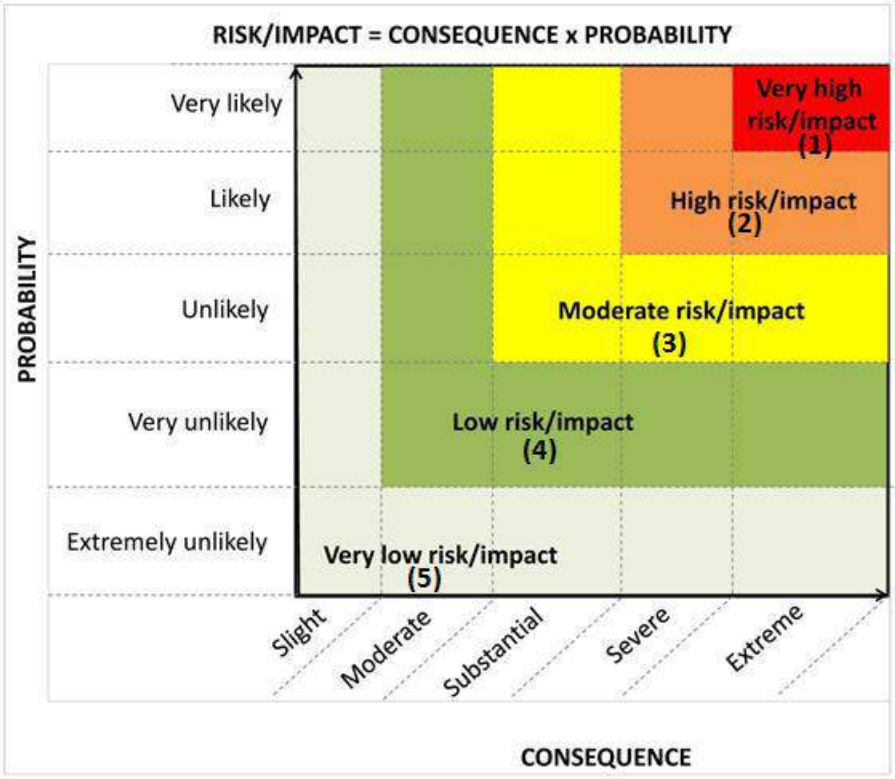

Figure 2-1: Guide to assessing risk/impact significance as a result of consequence and probability.

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 or degradation of local wetland areas from increased vehicle traffic, construction activities, dust, erosion and possible sedimentation and spills.	Local	Long-Term	High	Definite	Moderate	Moderate	High Negative	High	No	Yes	▪ Modify the layout of planned infrastructure to avoid wetland areas and their buffers. ▪ Demarcate or fence in the construction site. Highlight all prohibited activities to workers through training and notices. ▪ Commence (and preferably complete) construction activities during winter when the risk of erosion and wetland sedimentation should be least. ▪ Design measures to effectively control vehicle access, vehicle speed, dust, stormwater run-off, erosion and sedimentation on the road. ▪ -Implement the measures that were designed to control impacts on the road preferably during winter, when the risk of erosion should be least.	Medium
Loss of terrestrial vegetation and faunal habitat from clearing of vegetation, and increased vehicle and human activity.	Site Specific	Permanent	Medium	Highly Probable	Moderate	Low	Moderate Negative	High	No	Yes	▪ Modify the layout of planned infrastructure to avoid important floral communities and large indigenous trees. ▪ Identify and mark indigenous trees on the ground. Those that are small and cannot be avoided should be transplanted elsewhere on site. ▪ Demarcate or fence in the construction site. ▪ Highlight all prohibited activities to workers through training and notices. ▪ Commence (and preferably complete) construction activities during winter, when the risk of disturbing growing plants should be least. ▪ Briefly and effectively stockpile topsoil preferably 1-1.5m in height. ▪ Use the topsoil to allow natural vegetation to establish in disturbed areas. If recovery is slow, then a seed mix for the area (using indigenous grass species listed within this report) should be sourced and planted. ▪ Do not undertake any landscaping with alien flora.	Low
Loss of CI or medicinal flora from clearing of vegetation, and increased vehicle and human activity including harvesting.	Local	Permanent	Medium	Highly Probable	Low	Moderate	Moderate Negative	High	No	Yes	▪ Obtain permits to remove CI species (if detected –no CI species were detected during the site visit). Typical specie include geophytes such as Gladiolus, Boophone, Orchid species etc. ▪ Transplant CI and medicinally important floral specimens from the infrastructure footprint to suitable and safe locations elsewhere on site or nearby. ▪ Obtain guidance from a suitably qualified vegetation specialist or horticulturist regarding the collection, propagation/storage and transplantation of plants. ▪ Highlight all prohibited activities to workers through training and notices. ▪ Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control	Low

											(e.g. fencing).	
Loss of CI fauna from clearing of vegetation, earth-moving activities, and increased vehicle and human activity including harvesting.	Local	Permanent	Medium	Probable	Low	Moderate	Moderate Negative	High	No	Yes	▪ Appoint an appropriate specialist to relocate any detected CI fauna from water, termitaria, trees and soil that will be disturbed. ▪ Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least. ▪ Check open trenches for trapped animals (e.g. reptiles, frogs and small terrestrial mammals), and relocate trapped animals with advice from an appropriate specialist. ▪ Educate workers about dangerous animals (e.g. snakes, scorpions, bees) and highlight all prohibited activities to workers through training and notices. ▪ Prohibit harvesting of CI and other indigenous fauna on site by community members through notices and site access control (e.g. fencing).	Low
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 Negative	High	No	Yes	▪ Demarcate or fence in the construction site. ▪ Carefully limit / regulate access by vehicles and materials to the construction site. ▪ Prohibit the introduction of domestic animals such as dogs and cats. ▪ Keep construction activities neat and tidy. ▪ When complete, remove all sand piles, and landscape all uneven ground while re-establishing a good topsoil layer. ▪ Plant only locally indigenous flora if landscaping needs to be done. ▪ Remove Category species using mechanical methods, and minimize soil disturbance as far as possible. Alien wood could be donated to the surrounding community.	Low
Increased dust and erosion from clearing of vegetation, 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 construction site. ▪ Commence (and preferably complete) construction during winter, when the risk of erosion should be least. ▪ Revegetate denude areas with locally indigenous flora a.s.a.p. ▪ Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed. ▪ Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.	Very Low
Sensory disturbance of fauna from increased vehicle and human activity, noise, dust and light.	Local	Long Term	Low	Probable	Moderate	Low	Low Negative	High	No	Yes	▪ Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least. ▪ Minimize noise to limit its impact on calling and other sensitive fauna (e.g. frogs). ▪ Limit construction activities to day time hours. ▪ Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna.	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 Negative	High	No	No	None	Very Low
Destruction of structures	Site	Permanent	Moderate	Definite	Non-Reversable	High	Low Negative	High	No	No	None	Low
Existence of new structure on the landscape	Site	Long Term	Low	Highly Probable	Moderate	High	Very Low Negative	High	No	No	None	Very Low
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 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: • **All identified impacts will not occur (no clearance of natural vegetation).** • **All structures on the site will remain.**												
Indirect Impacts • **No new construction employment will be created.** • **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 or degradation of local wetland areas from increased vehicle traffic, dust, erosion and possible sedimentation and spills	Local	Long Term	High	Highly Probable	Moderate	Moderate	High Negative	High	No	Yes	▪ Monitor and maintain the road impact control measures to ensure that they remain effective. ▪ Ensure an approved Storm Water Management Plan is in place, that will highlight the separation of clean and dirty water and prevent contamination into the larger system. ▪ Highlight all prohibited activities to workers through training and notices.	Low
Environmental contamination from chicken excrement, bedding, feed, carcasses and other	Local	Long Term	High	Highly Probable	Low	Moderate	High 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.	Moderate

operational waste											▪ Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medications. ▪ Adhere to best practice chicken husbandry and waste disposal norms. ▪ All hazardous waste should be disposed of at an appropriate licensed facility for this. ▪ Waste recycling should be incorporated into the facility's operations as far as possible. ▪ Educate workers about the facilitys waste management and handling of hazardous substances with regular training and notices. ▪ Establish appropriate emergency procedures for accidental contamination of the surroundings. ▪ Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists. ▪ 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 Neutral	High	No	Yes	▪ Ensure that floors are sloped and slatted to facilitate drainage. ▪ Ensure that there is effective storm water drainage around the facility. ▪ Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water. ▪ Effectively seal and maintain all pipes and reservoirs containing slurry, to prevent animals from accessing the effluent. ▪ Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible. ▪ Check that fan louvers (if installed) work properly, and close fans completely when off. ▪ Prevent and manage unwanted animal access to fodder. ▪ Clean floors regularly. ▪ Clean up excess fodder regularly from under troughs and feed bins. ▪ Keep areas surrounding the facility free of spilled manure and litter. ▪ Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities. ▪ Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects. ▪ Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps. ▪ Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination. ▪ Ensure that measures to control pests are tightly restricted to areas where these are problematic. ▪ Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist. ▪ Rodenticides are not advised.	Low
Disease transmission from poor waste management and hygiene, and insufficient,	Local	Long Term	High	Probable	Moderate	Moderate	Moderate Negative	High	No	Yes	▪ Ensure that floors are sloped and slatted to facilitate drainage. ▪ Ensure that there is effective storm water drainage around the facility. ▪ Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water. ▪ Effectively seal and maintain all pipes and reservoirs containing	Low

inapproriate and/or ineffectual pest control											slurry, to prevent animals from accessing the effluent. ▪ Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible. ▪ Check that fan louvers (if installed) work properly, and close fans completely when off. ▪ Prevent and manage unwanted animal access to fodder. ▪ Clean floors regularly. ▪ Clean up excess fodder regularly from under troughs and feed bins. ▪ Keep areas surrounding the facility free of spilled manure and litter. ▪ Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities. ▪ Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects. ▪ Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps. ▪ Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination. ▪ Ensure that measures to control pests are tightly restricted to areas where these are problematic. ▪ Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist. ▪ Rodenticides are not advised.	
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 Negative	High	No	Yes	▪ Carefully limit / regulate access by vehicles and materials to the site. ▪ Prohibit the introduction of domestic animals such as dogs and cats. ▪ Minimize the accumulation and dispersal of excess fodder on site. ▪ Employ best practices regarding tilling of soil and weed management. ▪ Plant only locally indigenous flora if landscaping needs to be done. ▪ Remove Category species using mechanical methods, and minimize soil disturbance as far as possible. Alien wood could be donated to the surrounding community.	Low
Loss of CI or medicinal flora from clearing of vegetation, and increased vehicle and human activity including harvesting	Local	Permanent	Moderate	Highly Probable	Low	Moderate	Moderate Negative	High	No	Yes	▪ Highlight all prohibited activities to workers through training and notices. ▪ Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control (e.g. fencing).	Low
Loss of CI fauna from clearing of vegetation, earth-moving activities, and increased vehicle and human activity including harvesting	Local	Permanent	Moderate	Probable	Low	Moderate	Moderate Negative	High	No	Yes	▪ Educate workers about dangerous animals (e.g. snakes, scorpions, bees) and highlight all prohibited activities to workers through training and notices. ▪ Prohibit harvesting of CI and other indigenous fauna on site by community members through notices and site access control (e.g. fencing).	Low

Sensory disturbance of fauna from increased vehicle and human activity, noise, dust and light	Local	Long Term	Moderate	Probable	Moderate	Low	Low Negative	High	No	Yes	▪ Install motion-sensitive lights. ▪ Ensure that all outdoor lights are angled downwards and/or fitted with hoods. ▪ Use bulbs that emit warm, long wavelength (yellow-red) light, or use UV filters or glass housings on lamps to filter out UV. ▪ Avoid using metal halide, mercury or other bulbs that emit high UV (blue-white) light that is highly and usually fatally attractive to insects. ▪ Conduct regular maintenance of machinery, fans and other noisy equipment. ▪ Encourage workers to minimize light and noise pollution through training and notices.	Low
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**
Existence of new structure on the landscape	Site	Long Term	Low	Highly Probable	Moderate	High	Very Low Negative	High	No	No	None	Very Low
Impacts to heritage resources	Site	Permanent	Low	Definite	Non-Reversible	High	Very Low 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 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 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**
Air Quality impact:	**None**
Waste generation:	**Low(The inhabitants will still produce a small amount of waste)**
Indirect Impacts **- There won't be any contribution to the poultry industry output.** **- There will be improving of food security in the district municipality** **- 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.

Ecological Opinion/Scan for Nkunzi Agricultural Co-Operative for the propsed Broiler Chicken Facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng Province. (Appendix G)

Heritage Impact Assessment: Basic Assessment for the proposed development of a Broiler Chicken Facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng Province (Appendix G)

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 2015/2016 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 NSS 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												
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 or degradation of local wetland areas from decommissioning activities, increased vehicle traffic, dust, erosion, sedimentation and possible spills	Local	Long Term	High	Highly Probable	Moderate	Moderate	High Negative	High	No	Yes	▪ Demarcate or fence in the decommissioning site. ▪ Highlight all prohibited activities to workers through training and notices. ▪ Commence (and preferably complete) decommissioning activities during winter when the risk of erosion and wetland sedimentation should be least. ▪ Monitor and maintain the road impact control measures to ensure that they remain effective.	Low
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 Negative	High	No	Yes	▪ Remove Category species using mechanical methods, and minimize soil disturbance as far as possible. ▪ 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	High	No	Yes	▪ Limit vehicles, people and materials to the decommissioning site. ▪ Commence (and preferably complete) decommissioning during winter, when the risk of erosion should be least. ▪ Revegetate denude areas with locally indigenous flora a.s.a.p. ▪ Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed. ▪ 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 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. ▪ Minimize noise to limit its impact on sensitive fauna. ▪ Limit demolition activities to day time hours. ▪ 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.

Ecological Opinion/Scan for Nkunzi Agricultural Co-Operative for the propsed Broiler Chicken Facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng Province. (Appendix G)

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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 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 chickens 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 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 broiler facility is located on land which is still in its natural state and has not been previously transformed. The only transformation to occur on the land is the building of a small residential house within the last 60 years. 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 broiler facilities and supporting infrastructure is unavoidable. This may result in the exposing of soil leading to potential erosion and dust from the wind. The occurance 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. However the site has been previously transformed, resulting in low new vegetation loss. As stated in the 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 a large portion of the infrastructural area is positioned within a wetland system and its associated buffer. 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 along the edge of the existing houses may potentially avoid the wetland and stringent mitigation and management could limit any contamination.

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 chicks 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 broiler 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, it is NSS's (Specialist) opinion that based on the brief field scan of the site and on the available information to date, there is a potential fatal flaw associated with the project and that provided the mitigation set out is adhered to NSS have 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.

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 chick production to supply the poultry industry. This opportunity to improve the local socio-economic situation and to use best practice chicken broiler farming methods, including improved chick welfare, will be lost. There wont 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
- Impact on Conservation Important species
- Introduction and increase in alien vegetation
- Impact/ loss of wetland habitat
- Potential for pollution of water sources
- Waste generation
- Impact of pests and disease transmission
- Impact of traffic
- 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 broiler 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 broiler 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 broiler 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 Region 1 in the City of Tshwane, (Figure below).

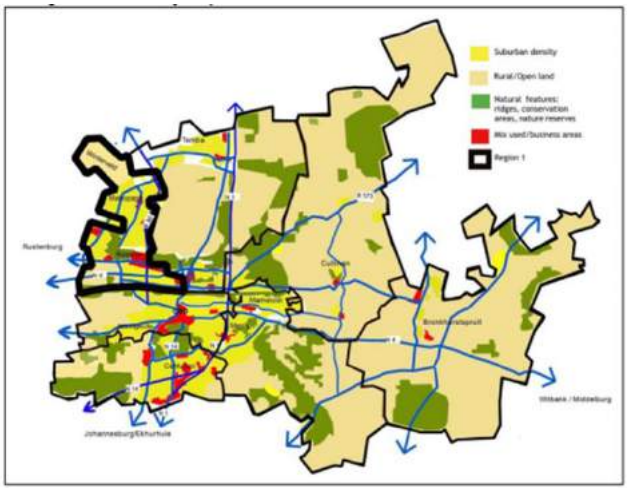

Figure 6: The location of Region 1 in the City of Tshwane Regional Integrated Development Plan 2016-2021

The proposed project falls within an area determined as Rural/Open Land, and the SDF's intention is to create vibrant equitable and sustainable rural communities. This can be achieved through food provision as well as providing work opportunities. The figure below indicates the key developmental features of Region 1.

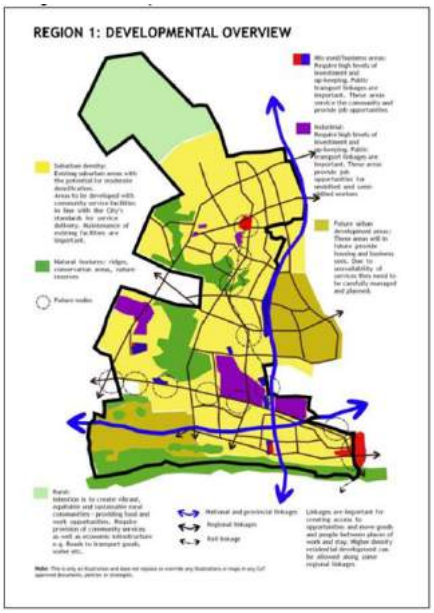

Figure 7: Regional Developmental Overview for Region 1- Integrate Development Plan 2016-2021

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.

This 2016-2021 IDP also states that the current socio-economic and development situation in the region, as well as the region's spatial/developmental opportunities, strengths, weaknesses and threats should help inform a service delivery response relevant to the regions conditions and ultimately the City of Tshwane's vision. The proposed project could therefore contribute to the local economic opportunities, ultimately impacting socio-economic development of the area; in support of the region's spatial development opportunities.

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 NEEDS AND DESIREBILITY OF THE PROPOSED DEVELOPMENT (AS PER NOTICE 792 OF 2012, OR THE UPDATED VERSION OF THIS GUIDELINE)

Questions (Notice 792, NEMA, 2012)		Answers
Part 1: Need		
1	Is the land use associated with the activity being applied for considered within the timeframe intended by the existing approved SDF agreed to be the relevant environmental authority?	Yes. The proposed land use is in line with the City of Tshwane's Regional Spatial Development Framework 2016 – 2021 and Municipal Spatial Development Framework's Strategic Objective 2 of Economic growth and development. As part of this objective, emphasis is also placed on Rural development programmes to improve livelihoods and stimulate employment.
2	Should the development, or if applicable, expansion of the town/area concerned in terms of this land use occurs here at this point in time?	Yes. The proposed activity will result in optimal use of rural land. According to the Region 1: Regional Integrated Development Plan, 2016-2021, 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.
3	Does the community/area need the activity and the associated land use concerned? This refers to the strategic as well as local level.	Yes. The current operations of the business supply chicks to poultry producers in the local economy serving within the Mabopane, Soshanguve, Ga-Rankuwa and the Tshwane Market. Local poultry producers have been approached and signed intent to purchase orders and they have shown great interest in developing agriculture in South Africa. The project aims to assist the issues of unemployment in the areas. This opportunity is expected to be of economic benefit and contribution to the poultry industry in the area.
4	Are the necessary services with adequate capacity currently available (at the time of application) or must additional capacity be created to cater for the development?	Yes. The proposed development can be adequately serviced by the existing infrastructure and planned infrastructure which is not of municipal service. The proposed project will make use of borehole water, for which a water use licence will be applied for. There already exists an electric connection to the sight.
5	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of the services and opportunity cost)?	Yes. The proposed development is currently provided for in the infrastructure planning of the municipality in the form of electricity however, not water. There is potential for a slight increase in terms of electricity. It is a small operation and will therefore not impact greatly on municipal services. Therefore, the proposed project will not have major implications for the infrastructure planning.
6	Is the project part of a national programme to address an issue of national concern or importance?	Although this project draws from no specific objectives of the National Development Plan of South Africa, the proposed chicken broiler production would however contribute to the country's collective objective of promoting sustainable food security. With this contribution to small and medium sized agricultural initiatives in the area. This hopefully resulting in the growth of jobs and the growth of the area's economic base resulting in poverty alleviation. The proposed project will also have a positive contribution towards food safety and security in South Africa.

Questions (Notice 792, NEMA, 2012)		Answers
Part 2: Desirability		
1	Is the development the best practicable environmental option for this land/site?	Yes. The proposed development is occurring on previously transformed land, via agriculture and other farming activities. Due to its' small size, as well as previous land use practices and it now laying vacant, the proposed small-scale chicken broiler facility is appropriate, and the environmental impacts associated with this use are minimal if the correct mitigation measures are taken.
2	Would the approval of this application compromise the integrity of the existing approved and credible IDP and SDF as agreed to by the relevant authorities?	No. The proposed project intends to align its' objectives with that of the Regions SDF, which are directly linked to Tshwane's 2016 - 20121 IDP and 2055 vision. It aims to aligned to the following objectives: ▪ Promote shared economic growth and job creation ▪ Improve financial sustainability ▪ Continue institutional development, transformation and innovation
3	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	No. The agricultural sector is one of the identified targeted for sectors in the Gauteng Growth and Development Strategy. The proposed development falls within areas demarcated for agriculture to stimulate economic activity, as identified in the 2014 Gauteng Provincial EMF, and therefore the integrity of the existing environmental management priorities for the area will not be compromised by this development, if the mitigation measures proposed are adhered to. It is also evident in view of the provincial SDF that there is also an emphasis on preserving a strong agricultural base.
4	Do location factors favour this land use at this place? (this relates to the contextualization of the proposed land use on this site within its broader context).	Yes. The site falls within an area demarcated for agricultural development in the greater framework of the province. This is also attributed to agriculture having a strong social element in that it provides employment and housing to a significant proportion of the population, creating a unique social environment associated within rural areas. However there may be limitations due to the potential damage it can do to the Natural Environmental and loss there of.
5	How will the activity of the land use associated with the activity being applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	The development of the proposed development associated infrastructure measuring around 8 ha in size will exert an impact on the environment; but based on the findings of the Ecological Impact Assessment (Appendix G), and as per the ecologist recommendation and the locality of the site, the impacts associated with this proposed development can be mitigated and in implementing those measures effectively can have a less significant impact.
6	How will the development impact on people's health and well-being? (E.g. In terms of noise, odours, visual character and sense of place, etc.)?	There will be a noticeable impact on people as it is a new development and the neighbours being residential land uses. There would be a large impact visually and sense of place as there is nothing there now.

Questions (Notice 792, NEMA, 2012)		Answers
7	Will the proposed activity or the land use associated with the activity being applied for, result in unacceptable opportunity costs?	No. The South Africa broiler chicken industry is the fastest growing industry in South Africa at 6% annually. However, with foreign countries dumping their products in this industry it may lead to some strain in the feasibility of the project should this activity of dumping persist or increase. Production turnaround for chicken broiler is quick and demand fundamentals for this product are unlikely to change. This industry also presents opportunities in that there is a huge potential in the rural markets and exports to the SADEC region.
8	Will the proposed land use result in unacceptable cumulative impacts?	No. The proposed project and associated activities have identified 3 cumulative impacts, with two of these having a low significant impact upon mitigation. The socio-economic impact will not be mitigated as mitigation will not result in job creation and improvement of the local socio-economic status. The measures outlined in the attached EMPr serve as mitigation methods to prevent the current and proposed project from having any serious long term cumulative impacts on the receiving environment.

10. 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

11. 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

Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT

SECTION F: APPENDICES

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** SAHRA information Service letters from municipalities - **Not applicable** Water supply information - **Not applicable at this stage**
Appendix G	Specialist Reports
Appendix H	Environmental Management Programme
Appendix I	CVs of the BA Project team

Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT

SECTION F: APPENDICES

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)
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Appendix D	Route position information – **N/A**
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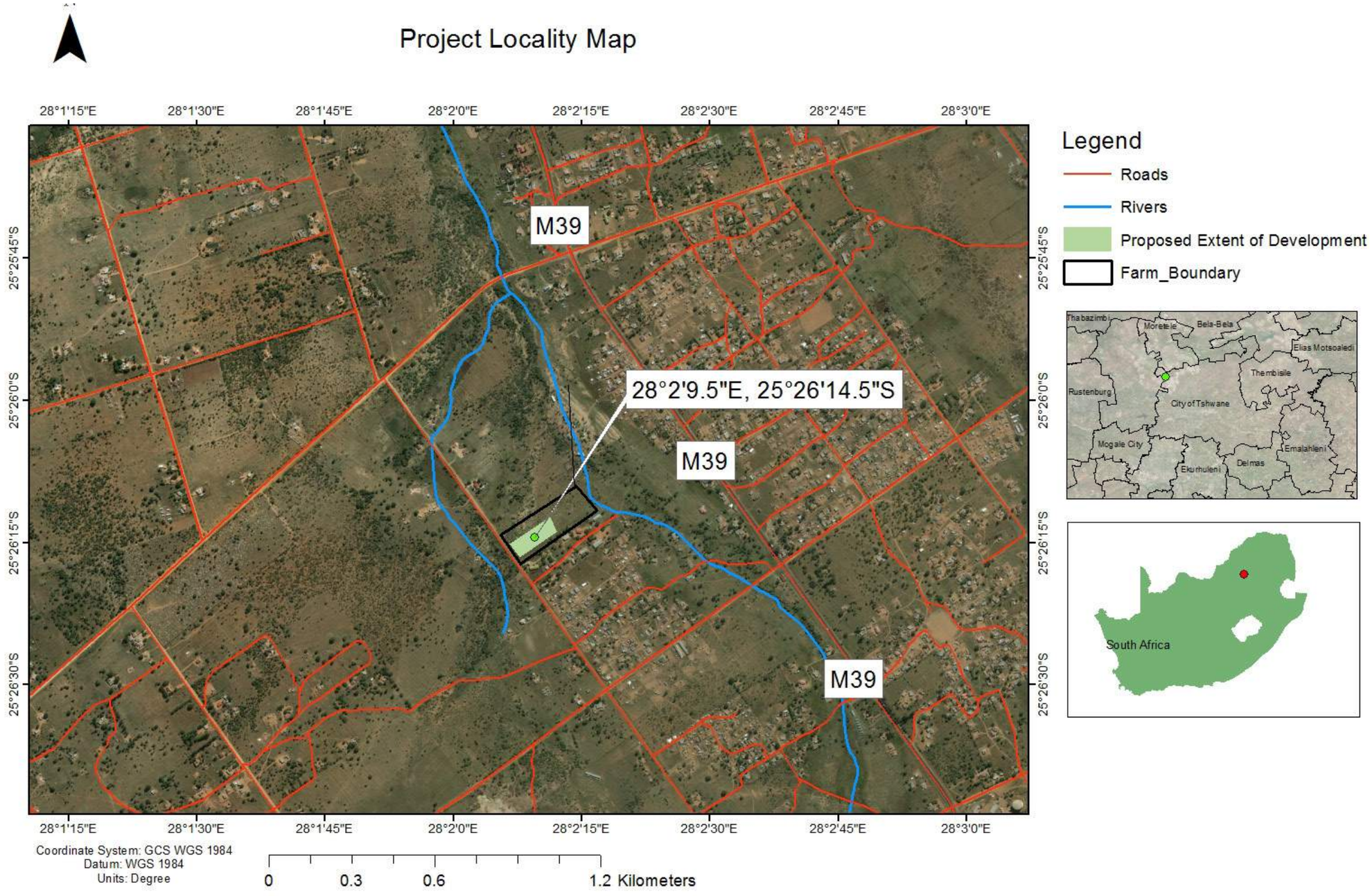
Appendix G	Specialist Reports
Appendix H	Environmental Management Programme
Appendix I	CVs of the BA Project team

BASIC ASSESSMENT REPORT

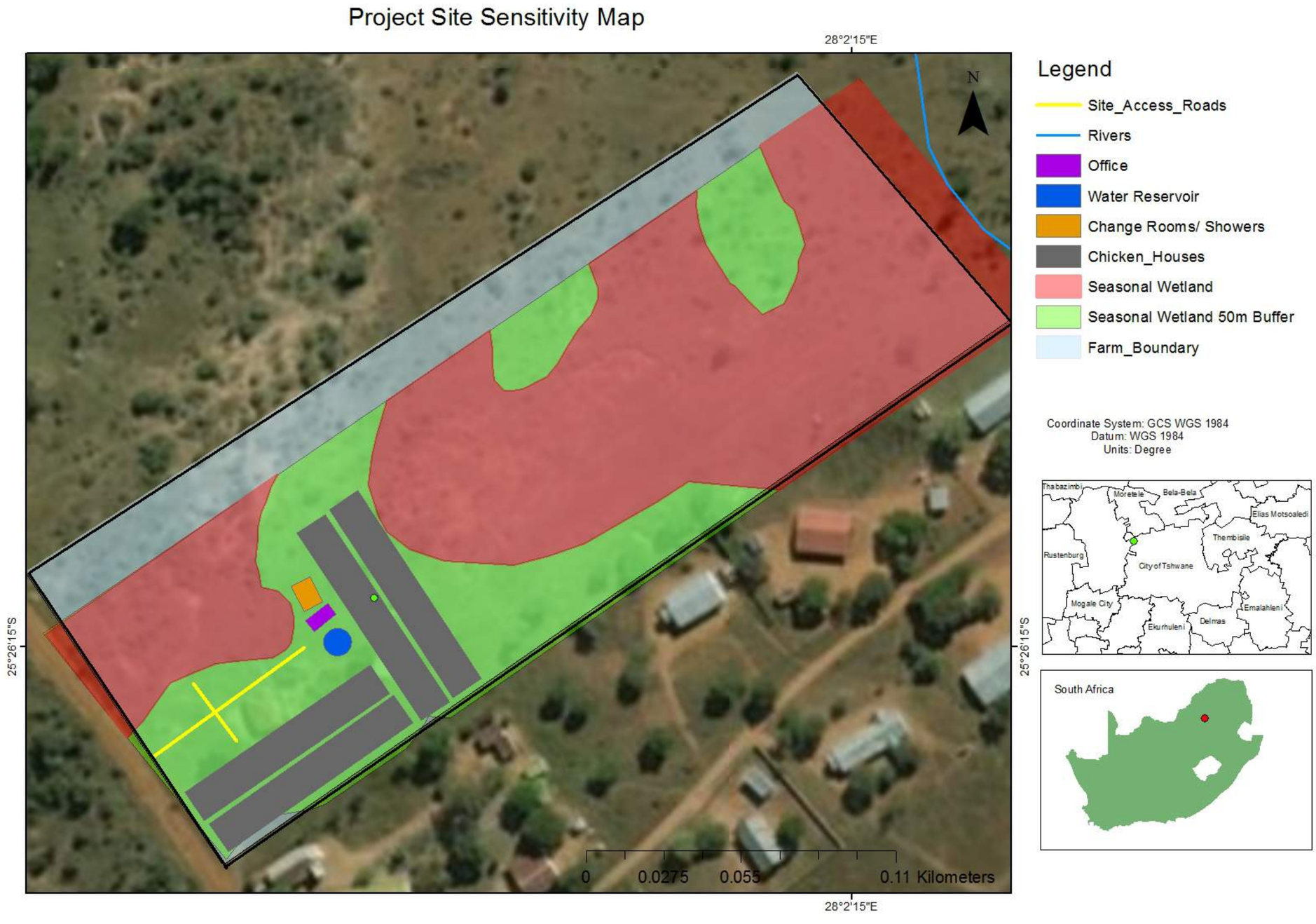
APPENDIX A: SITE LAYOUT PLANS

CONTENTS

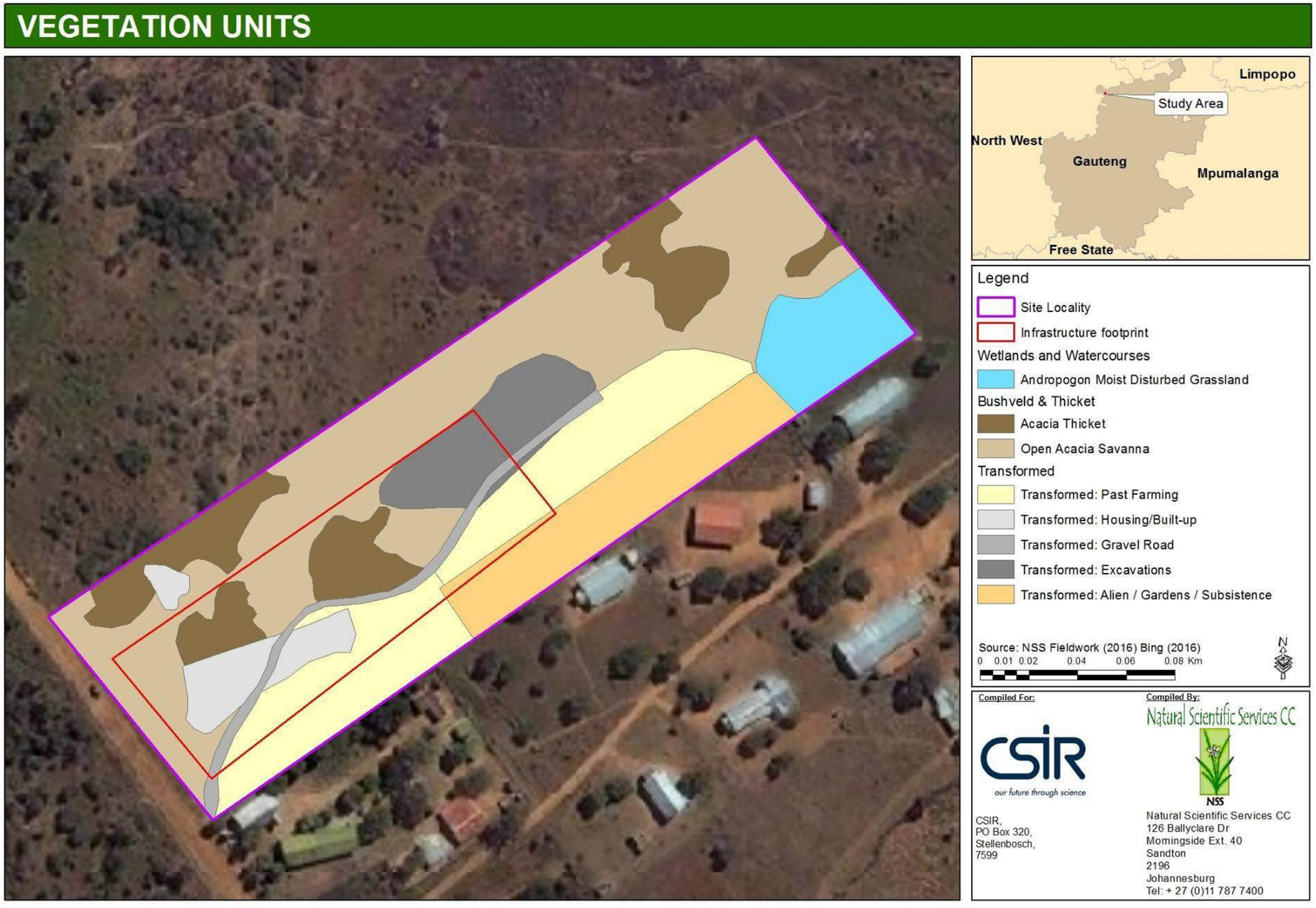
Appendix 1.A: Nkunzi Site Location on Plot 1109 Winterveld Agricultural Holdings, Winterveld, Pretoria.



Appendix 1.B: Nkunzi Site Layout of current infrastructure and proposed chicken broiler facilities including sensitivities on site.



Appendix 1.C: Layout of vegetation found on the Nkunzi Site

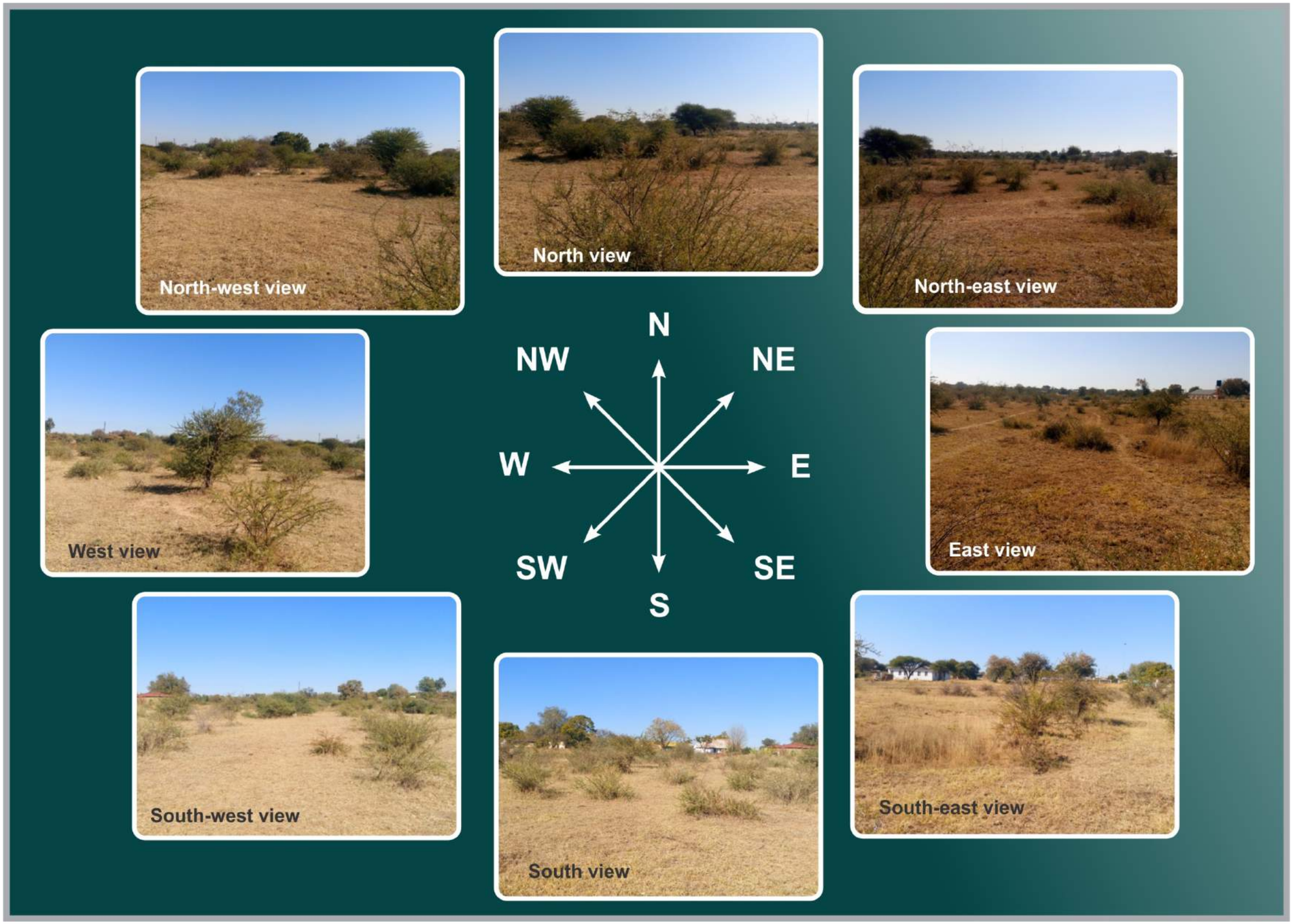


BASIC ASSESSMENT REPORT

APPENDIX B: PHOTOGRAPHS

CONTENTS

Appendix B: Nkunzi Agricultural Co-Operative site photographs taken in the eight major compass directions

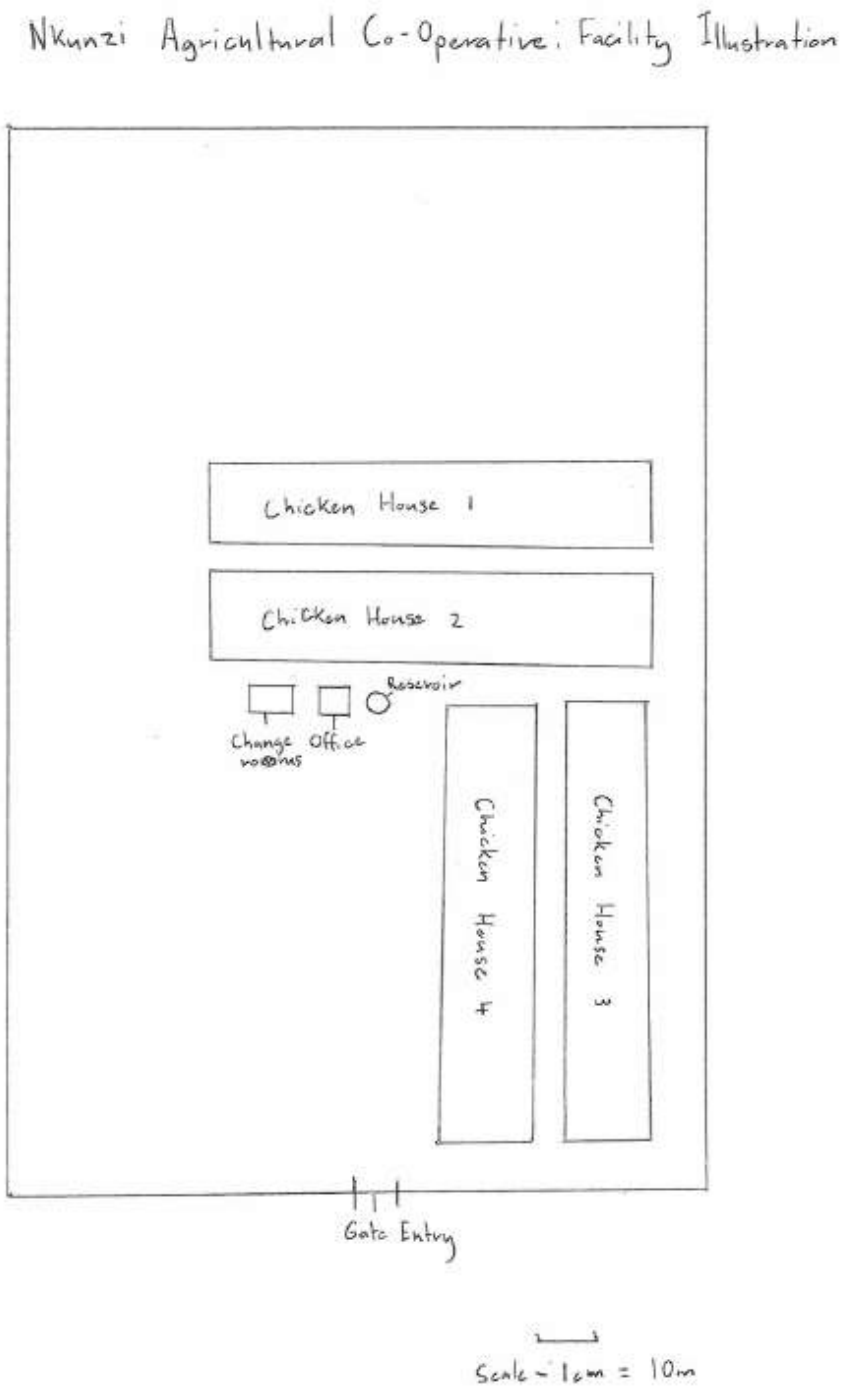


BASIC ASSESSMENT REPORT

APPENDIX C: FACILITY ILLUSTRATION

CONTENTS

Appendix C: Facility illustration(s)



BASIC ASSESSMENT REPORT

APPENDIX D: Route position information

N/A

BASIC ASSESSMENT REPORT

APPENDIX E: PUBLIC PARTICIPATION

CONTENTS

Appendix E.1: Proof of site notice

Nkunzi Agricultural Co-Operative Broiler Chicken Raising Facility on Plot 1109 Winterveld Agricultural Holding Ext 1, Thswane, Gauteng

Refference Number: CSIR/IU/EMS/ER/2016/0002/A
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, of the National Environmental Management Act, 1998 (Act No 107 of 1998), that **Nkunzi Agricultural Co-Operative,** proposes a small-scale broiler chicken raising facility on 4.2 hectares of the Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld area of Pretoria North, Gauteng Province.

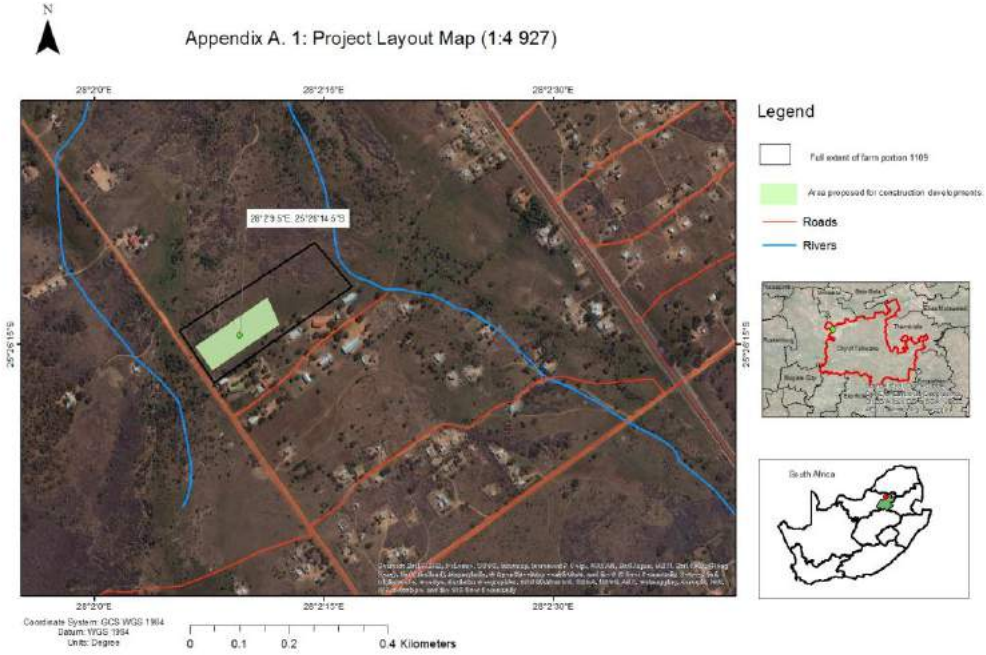
The Council for Scientific and Industrial Research (CSIR), as the independent Environmental Assessment Practitioner, will manage the required Basic Assessment process for the proposed project. The project will be registered with the Gauteng Department of Agriculture and Rural Development (GDARD). The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

Government Notice	Listed Activity Number
GNR 983, 8 December 2014	5: ii & iv
GNR 983, 8 December 2014	27
GNR 985, 8 December 2014	12

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:

Ms. Babalwa Mqokeli
PO Box 320, Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2473
Email: bmqokeli@csir.co.za

Locality Map depicting the location of the Proposed Project



Background Information Document

Basic Assessment for the proposed Nkunzi Agricultural Co-Operative Broiler Chicken Raising facility on Plot 1109, Winterveld Agricultural Holding Ext 1, Winterveld, Gauteng

Prepared by CSIR on behalf of Nkunzi Agricultural Co-Operative
CSIR REFERENCE NUMBER: CSIR/IU/EMS/ER/2016/0002/A
23 August 2016

Kelly Stroebel
kstroebel@csir.co.za
Tel: (021) 888 2432

You are invited to participate in the following process:

Basic Assessment for the proposed Nkunzi Agricultural Co-Operative Broiler Chicken Raising facility on Plot 1109, Winterveld Agricultural Holding Ext 1, Gauteng

INTRODUCTION TO THE PROPOSED PROJECT

Nkunzi Agricultural Co-Operative is proposing a small-scale broiler chicken raising endeavour on a 4.2 hectares piece of land Plot 1109, Winterveld Agricultural Holding Ext 1, in the Winterveld area of Pretoria North, Gauteng Province.

This area falls under the Tshwane Metropolitan Municipality, and is approximately 35 km north of Pretoria (Figure 1). The proposed project will include the following components:

- Office building with shower facilities
- A bulk feed silo
- Eighty thousand broiler chicken raised for 6 week cycle
- Two 1800 square meter chicken houses (forty thousand chicks each)
- Water used from a borehole
- Electricity from a generator

Nkunzi Agricultural Co-Operative aims at making a positive contribution to the country's gross domestic product through contributing towards job creation and the generation of wealth and thus contributing to constant improvement of the general wellbeing of the nation. Nkunzi Agricultural Co-Operative is being provided *pro-bono* environmental services by the DEA/CSIR's Special Needs and Skills Development Programme, which aims to assist small-medium micro-enterprises with obtaining Environmental Authorization in order to enhance local economic development.

SUMMARY OF THE BASIC ASSESSMENT PROCESS

In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 983, 984 and 985 on the 4 December 2014 Government Gazette Number 38282, and NEM:WA Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083, 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 983, 8 December 2014	5	(ii) more than 5000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days (iv) more than 25000 chicks younger than 20 days per facility situated outside an urban area

Relevant notice:	Activity No (s) (in terms of the relevant notice) :	Description of each listed activity as per the Government Notice:
GN. R 983, 8 December 2014	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. (ii) Maintenance purposes undertaken in accordance with a maintenance management plan.

The proposed project requires Environmental Authorization (EA) from the Department of Agriculture and Rural Development, Gauteng (GDARD). The Basic Assessment process that will be undertaken for this project is summarised in the following steps below:

Step 1: Notify Authorities and potential Interested and affected parties (I&APs) (30 days) (current stage)

The first stage in the process entails notifying all potential I&APs of the proposed project, by sending out a Background Information Document (BID), and providing I&APs with an opportunity to register as an I&AP. I&APs are required to register their interest on the project database within 30 days hereof.

Step 2: Basic Assessment Report (BAR) for Public Comment (30 days)

The BA process is undertaken in order to identify and assess potential environmental impacts, both positive and negative, that may be associated with the project. Mitigation and management measures will be identified to reduce potential negative impacts and will be included in the Environmental Management Programme (EMPr) for this project. The BAR will include comments received from all I&APs on this document and findings of the specialist study.

Step 3: BAR to be submitted to DMR for decision-making

The BAR will be drafted and will be submitted to GDARD for decision-making. The comments and issues raised will be included in the BAR. All I&APs will be provided with written notification on whether the project has been granted or refused EA and about the appeal process.

HOW CAN YOU GET INVOLVED?

1. By mailing, emailing or faxing a comment form to the Environmental Assessment Practitioner indicated below/telephonically contacting the Environmental Assessment Practitioner if you have a query, comment, or require further information regarding the BA process.
2. By reviewing the various reports and provide comments within the stipulated comment periods provided (i.e. the BID and BAR).

To register as an I&AP or to comment on the project, please complete Comment/Registration Form that has been included with this BID and kindly send to **Ms. Kelly Stroebel** on or before 22 September 2016**:**

Ms. Kelly Stroebel

Email: *kstroebel@csir.co.za*

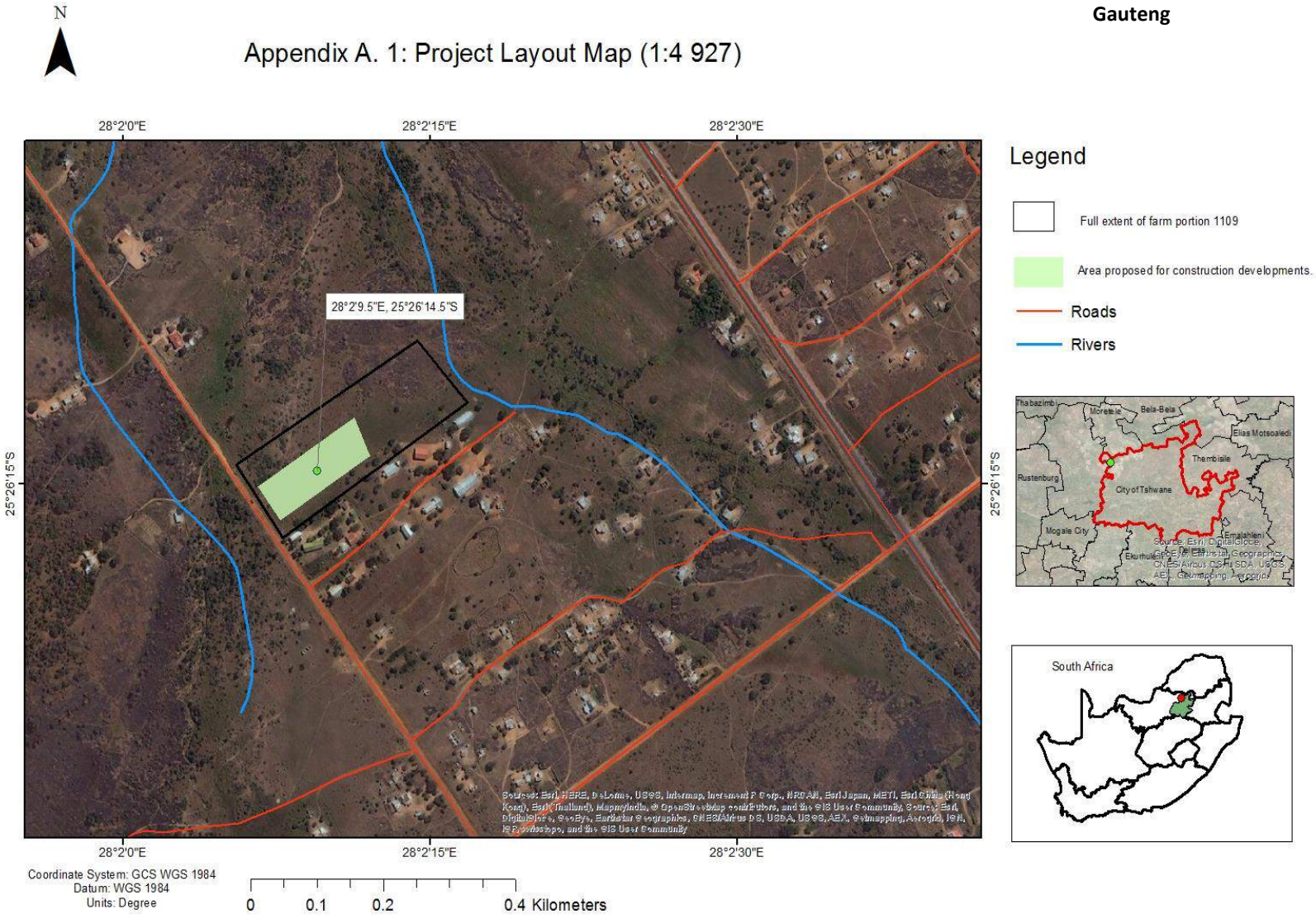
Tel: 021-888-2432

Fax: 021-888-2473

Address: CSIR, PO Box 320, Stellenbosch, 7599

Website: *http://www.csir.co.za/ems/specialneeds/*

Figure 1: Location of the Proposed Nkunzi Co-Operative Chicken Broiler Production facility on Plot 1109, Winterveld Agricultural Holding Ext 1, Gauteng



Appendix E2: Letter to Interested and Affected Parties to notify them of the proposed chicken broiler facility project (Background Information Document and Postal List: Project Announcement (including letter 1, comment form and BID)- 23 August 2016

CSIR Implementation Unit
PO Box 320
Stellenbosch
7599
South Africa
Tel: +27 21 888 2432
Fax: +27 21 888 2473
Email: kstroebel@csir.co.za

23 August 2016

Dear Interested and/or Affected Party,

PROJECT ANNOUNCEMENT

BASIC ASSESSMENT FOR THE PROPOSED NKUNZI AGRICULTURAL CO-OPERATIVE BROILER CHICKEN RAISING FACILITY ON PLOT 1109, WINTERVELD AGRICULTURAL HOLDING EXT 1, TSHWANE

REFERENCE NUMBER: CSIR/IU/EMS/ER/2016/0002/A

The National Department of Environmental Affairs (DEA) and the Council for Scientific and Industrial Research (CSIR) have initiated the Special Needs and Skills Development Programme, whereby small-medium micro-enterprises and community trusts who are lacking financial means are provided with *pro-bono* environmental services to decrease the burden of the cost associated with starting a business. **Nkunzi Agricultural Co-Operative** has been identified as an eligible client for this service and is proposing to develop a small-scale broiler chicken raising on 4.2 hectares of Plot 1109, Winterveld Agricultural Holding Ext 1, located in the Winterveld area of Pretoria North, Gauteng Province.

In terms of Government Notice Regulations (GNR) 983, 984 and 985 of 8 December 2014 of the National Environmental Management Act (Act 107 of 1998) published in Government Gazette 38282 on 4 December 2014, Environmental Authorisation from the Competent Authority, in this case the Gauteng Department of Agriculture and Rural Development, is required prior to the undertaking of any activity triggered within GNR 983, 984 and/or 985. The CSIR, as the independent Environmental Assessment Practitioner (EAP), will be managing the Basic Assessment and Public Participation Process for this proposed project.

In line with the Environmental Impact Assessment requirements of December 2014, Interested and Affected Parties (I&APs) must be notified and are requested to register for this project in order to receive future correspondence on this project and/or provide comments on issues of concern that will be considered during the Basic Assessment process. Please find enclosed with this letter a **Background Information Document (BID)** and a **Comment and Registration form**. You have until on or before **22 September 2016** to register and submit your comments for this project. To register and submit comments for the project please complete the Registration Form together with your full name, contact details (preferred method of notification, e.g., full postal or email address), fax/phone number(s) and an indication of any direct business, financial, personal or other interest you have in the application to the contact person listed below.

Yours sincerely,

Ms. Kelly Stroebel (Project Manager)

Postal address: PO Box 320, Stellenbosch, 7599, South Africa
Tel: 021 888 2432
Fax: 021 888 2473
E-mail: kstroebel@csir.co.za
Website: http://www.csir.co.za/ems/specialneeds/

Name & Signature of person responsible for post: John : JR 23.8.2016

12 items – NORMAL post (Nkunzi – Sent on 23 Aug 2016)

NMS0076 / RUN / 02100 / 021SE

Dept of Environmental Affairs – National Mmatlala Rabothata Fedsure Building Private Bag X447 Pretoria 0001	Dept of Rural Development & Land Reform Bonginkosi Zulu Fedsure Building Private Bag X447 Pretoria 0001	Dept of Agriculture, Forestry & Fisheries Mashudu Marubini Private Bag X138 Pretoria 0001
National Dept of Mineral Resources Kgauta Mokoena Private Bag X59 Arcadia 0007	National Dept of Mineral Resources Khayalethu Matrose Private Bag X59 Arcadia 0007	Dept of Agriculture, Forestry & Fisheries Ms Thoko Buthelezi Private Bag X120 Pretoria 0001
Department of Metro-Police A/Cmdr. T Sibiya 2161 Lucas Mangope Drive Block U Mabopane 0190	Mr Jackson Mamosebo 11 Mohlala Winterveld 0982	Office of the Executive Mayor Councillor Kgosientso Ramokgopa PO Box 440 Pretoria 0001
Municipal Manager Mr Jason Ngobeni PO Box 440 Pretoria 0001	Dept of Agriculture and Rural Development Mr Lebogang Maile PO Box 8769 Johannesburg 2000	Dept of Agriculture and Rural Development Ms Thandeka Mbasa-Sigabi PO Box 8769 Johannesburg 2000

Email 1 to I&APs: Project Announcement (23 August 2016)

From: Samukele Ngema

To: Kelly Stroebel; Minnelise Levendal; Samukele Ngema

BC advocacy@birdlife.org.za; mashuduma@daff.gov.za; thokob@daff.gov.za; kgauta.mokoena@dmr.gov.za; khayalethu.matrose@dmr.gov.za; ncamisile.nkabinde@drdlr.gov.za; MohapiN@dwa.gov.za; MuthraparsadN@dwa.gov.za; mrabothata@environment.gov.za; SHlela@environment.gov.za; tnemarude@environment.gov.za; motsisl@eskom.co.za; adamp@ewt.org.za; ewt@ewt.org.za; stephaniea@ewt.org.za; Agnes.Vumazonke@gauteng.gov.za; Daphney.Ngoasheng@gauteng.gov.za; Edward.Mosuwe@gauteng.gov.za; Goodwill.nkosi@gauteng.gov.za; Jane.Hlongwane@gauteng.gov.za; Khanyisa.Nkuna@gauteng.gov.za; Mamokwe.makoloka@gauteng.gov.za; maphata.ramphele@gauteng.gov.za; Namhla.Siqaza@gauteng.gov.za; Ntlakanipho.Nkontwana@gauteng.gov.za; Phindile.Mbanjwa@gauteng.gov.za; phumeza.langa@gauteng.gov.za; phumza.ndlede@gauteng.gov.za; Ronald.Swartz@gauteng.gov.za; Shoki.tshabalala@gauteng.gov.za; Sofia.Yusuf@gauteng.gov.za; Tebogo.Photo@gauteng.gov.za; Thabo.Ntuli@gauteng.gov.za; Thandeka.Mbasa@gauteng.gov.za; Thokozile.Makgato@gauteng.gov.za; tumelo.maimane@gauteng.gov.za; Vivian.Moloi@gauteng.gov.za; lindiwenathi767@gmail.com; pakgosana@lantic.net; anneliza@nda.agric.za; dsibayi@sahra.org.za; MMolefane@thedti.gov.za; amolemoM@tshwane.gov.za; benjaminman@tshwane.gov.za; citymanager@tshwane.gov.za; dayalanp@tshwane.gov.za; FhatuwaniT@tshwane.gov.za ; FransMa@tshwane.gov.za; gabrielkau@tshwane.gov.za; GeraldG@tshwane.gov.za; jabulanima@tshwane.gov.za; jamesmu@tshwane.gov.za; JapieL2@tshwane.gov.za; joandb@tshwane.gov.za; LivhuwaniN@tshwane.gov.za; loratok@tshwane.gov.za; LuckieS@tshwane.gov.za; lufunots@tshwane.gov.za; LulamaN@tshwane.gov.za; makgorometjem@tshwane.gov.za; mapasekam@tshwane.gov.za; MariaMat@tshwane.gov.za; MthobeliK@tshwane.gov.za; Navapi@tshwane.gov.za; NomasontoN@tshwane.gov.za; NthabisengMok@tshwane.gov.za; NtlogelengM@tshwane.gov.za; OscarM@tshwane.gov.za; OupaR@tshwane.gov.za; PatrickMp@tshwane.gov.za; PietMas@tshwane.gov.za; SelbyB@Tshwane.gov.za(...)

Date: 23/08/2016 09:24

Subject: Notification of Release of BID for Basic Assessment for the Proposed Development of a Chicken Broiler Enterprise, and Associated Infrastructure, Winterveldt, Pretoria

Attachments: Letter to I&APs- Nkunzi Agricultural Co-Operative (Pty) Ltd 23 August 2016.pdf; Nkunzi Agricultural Co-Operative (Pty) Ltd BID 23 August 2016.pdf; Nkunzi Agricultural Co-Operative (Pty) Ltd- Comments & Reg Form.docx

Good day,

You are hereby notified about the release of the Background Information Document (BID) regarding a Basic Assessment for the proposed development of a chicken broiler enterprise on Plot 1109 Winterveldt Agricultural Holdings Ext 1 in Winterveldt, Pretoria. Please find attached the BID, which has been released for 30 day review, and the Registration/ Comment Form. Please return the comment form with your comments or any issues relating to this project on or before 22 September 2016.

Should the contents of this project not pertain to you, kindly forward the documents to the person in your department that is affected. Additionally, please forward their contact details to the CSIR Project Manager or ask the affected party to contact the CSIR Project Manager. Should you wish to be registered or de-registered from receiving any further information during the Basic Assessment and Public Participation Process, kindly contact the CSIR Project Manager. Correspondence in this regard should preferably be written, i.e. Email, Fax or Letter.

Contact: Ms. Kelly Stroebel
Email: kstroebel@csir.co.za
Tel: 021 888 2432
Fax: 021 888 2693
Postal: PO Box 320
Stellenbosch
7599
South Africa

Proof of delivery of email: Project announcement (23 Agust 2016)

amolemoM@tshwane.gov.za Transferred
Transferred 23/08/2016 09:25
Transferred 23/08/2016 09:25
BC: amolemoM@tshwane.gov.za
GeraldG@tshwane.gov.za Transferred
Transferred 23/08/2016 09:25
BC: GeraldG@tshwane.gov.za
johannesMA@tshwane.gov.za Undelivered 421 service unavailable
Transferred 27/08/2016 09:58
Undeliverable 27/08/2016 09:58 421 service unavailable
BC: johannesMA@tshwane.gov.za
loratok@tshwane.gov.za Transferred
WalterK@tshwane.gov.za Transferred
Transferred 23/08/2016 09:25
BC: WalterK@tshwane.gov.za
AbelMal@tshwane.gov.za Undelivered 421 service unavailable
BC: AbelMal@tshwane.gov.za
adamp@ewt.org.za Transferred
Transferred 23/08/2016 09:25
BC: adamp@ewt.org.za
advocacy@birdlife.org.za Transferred
Transferred 23/08/2016 09:25
BC: advocacy@birdlife.org.za
Agnes.Vumazonke@gauteng.gov.za Transfer Delayed
Transfer Delayed 23/08/2016 09:24
Transferred 23/08/2016 09:45
BC: Agnes.Vumazonke@gauteng.gov.za
anneliza@nda.agric.za Transferred
Transferred 23/08/2016 09:25
BC: anneliza@nda.agric.za
benjaminman@tshwane.gov.za Transferred
Transferred 23/08/2016 09:25
Transferred 23/08/2016 09:25
BC: benjaminman@tshwane.gov.za
citymanager@tshwane.gov.za Transferred
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BC: citymanager@tshwane.gov.za
Daphney.Ngoasheng@gauteng.gov.za Transfer Delayed
Transfer Delayed 23/08/2016 09:24
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BC: Daphney.Ngoasheng@gauteng.gov.za
dayalanp@tshwane.gov.za Transferred
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BC: dayalanp@tshwane.gov.za
dsibayi@sahra.org.za Transferred
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Edward.Mosuwe@gauteng.gov.za Transfer Delayed
Transfer Delayed 23/08/2016 09:24

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ewt@ewt.org.za Transferred

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FhatuwaniT@tshwane.gov.za Transferred

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BC: FhatuwaniT@tshwane.gov.za

FransMa@tshwane.gov.za Transferred

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BC: FransMa@tshwane.gov.za

gabrielkau@tshwane.gov.za Transferred

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BC: gabrielkau@tshwane.gov.za

GeraldG@tshwane.gov.za Undelivered 421 service unavailable

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	27/08/2016 10:01	
Undeliverable	27/08/2016 10:01	421 service unavailable

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Transferred	23/08/2016 09:45	

BC: Goodwill.nkosi@gauteng.gov.za

jabulanima@tshwane.gov.za Transferred

Transferred	23/08/2016 09:25	

BC: jabulanima@tshwane.gov.za

jamesmu@tshwane.gov.za Transferred

Transferred	23/08/2016 09:25	

BC: jamesmu@tshwane.gov.za

Jane.Hlongwane@gauteng.gov.za Transfer Delayed

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Transferred	23/08/2016 09:45	

BC: Jane.Hlongwane@gauteng.gov.za

JapieL2@tshwane.gov.za Transferred

Transferred	23/08/2016 09:25	

BC: JapieL2@tshwane.gov.za

joandb@tshwane.gov.za Transferred

Transferred	23/08/2016 09:25	

BC: joandb@tshwane.gov.za

Read

Kelly Stroebel

kellym@ewt.org.za Transferred

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Read 23/08/2016 09:24

To: KStroebel@csir.co.za

kgauta.mokoena@dmr.gov.za Transferred

Transferred 23/08/2016 09:25

BC: kgauta.mokoena@dmr.gov.za

Khanyisa.Nkuna@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: Khanyisa.Nkuna@gauteng.gov.za

khayalethu.matrose@dmr.gov.za Transferred

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BC: khayalethu.matrose@dmr.gov.za

landelaM@tshwane.gov.za Undelivered 421 service unavailable

Transfer Failed

27/08/2016 09:57

Undeliverable 27/08/2016 09:57 421 service unavailable

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lindiwenathi767@gmail.com Transferred

Transferred 23/08/2016 09:25

BC: lindiwenathi767@gmail.com

LivhuwaniN@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: LivhuwaniN@tshwane.gov.za

LuckieS@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: LuckieS@tshwane.gov.za

lufunots@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: lufunots@tshwane.gov.za

LulamaN@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: LulamaN@tshwane.gov.za

makgorometjem@tshwane.gov.za Transferred

Mamokwe.makoloka@gauteng.gov.za Undelivered

mamphekoamos@yahoo/ amosmam@tshwane.gov.za Undelivered

mapasekam@tshwane.gov.za Transferred

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BC: mapasekam@tshwane.gov.za

maphata.ramphele@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: maphata.ramphele@gauteng.gov.za

MariaMat@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: MariaMat@tshwane.gov.za

mashuduma@daff.gov.za Transferred

mashuduma@daff.gov.za Transferred

Transferred 23/08/2016 09:25

BC: mashuduma@daff.gov.za

Minnelise Levendal Emptied

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Read 23/08/2016 09:30
Replied 23/08/2016 09:30
Deleted 23/10/2016 01:10
Emptied 30/10/2016 01:13

To: MLevendal@csir.co.za

mknight@upe.ac.za Transferred

Transferred 23/08/2016 09:25

BC: mknight@upe.ac.za

MMolefane@thedti.gov.za Transferred

Transferred 23/08/2016 09:25

BC: MMolefane@thedti.gov.za

MohapiN@dwa.gov.za Transferred

Transferred 23/08/2016 09:25

BC: MohapiN@dwa.gov.za

motsisl@eskom.co.za Transferred

mphok@tshwane.gov.za Undelivered

mrabothata@environment.gov.za Transferred

Transferred 23/08/2016 09:25

BC: mrabothata@environment.gov.za

MthobeliK@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: MthobeliK@tshwane.gov.za

MuthraparsadN@dwa.gov.za Transferred

Transferred 23/08/2016 09:25

BC: MuthraparsadN@dwa.gov.za

Namhla.Siqaza@gauteng.gov.za Transfer Delayed

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Transferred 23/08/2016 09:45

BC: Namhla.Siqaza@gauteng.gov.za

Navapi@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: Navapi@tshwane.gov.za

ncamisile.nkabinde@drdlr.gov.za Transferred

Transferred 23/08/2016 09:26

BC: ncamisile.nkabinde@drdlr.gov.za

NomasontoN@tshwane.gov.za Transferred

NontoM@tshwane.gov.za Undelivered

NthabisengMok@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: NthabisengMok@tshwane.gov.za

Ntlakanipho.Nkontwana@gauteng.gov.za Undelivered

NtlogelengM@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: NtlogelengM@tshwane.gov.za

NtuthuS@tshwane.gov.za Transferred

Transferred 27/08/2016 09:58

BC: NtuthuS@tshwane.gov.za

OscarM@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: OscarM@tshwane.gov.za

OupaR@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: OupaR@tshwane.gov.za

pakgosana@lantic.net Transferred

Transferred 23/08/2016 09:25

BC: pakgosana@lantic.net

PatrickMp@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: PatrickMp@tshwane.gov.za

Phindile.Mbanjwa@gauteng.gov.za Transfer Delayed

phumeza.langa@gauteng.gov.za Undelivered

phumza.ndlede@gauteng.gov.za Undelivered

PietMas@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: PietMas@tshwane.gov.za

Ronald.Swartz@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: Ronald.Swartz@gauteng.gov.za

Samukele Ngema Read

Delivered 23/08/2016 09:24

Read 23/08/2016 09:24

To: SNgema@csir.co.za

SelbyB@Tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: SelbyB@tshwane.gov.za

SHlela@environment.gov.za Transferred

Transferred 23/08/2016 09:25

BC: SHlela@environment.gov.za

Shoki.tshabalala@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: Shoki.tshabalala@gauteng.gov.za

Sofia.Yusuf@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: Sofia.Yusuf@gauteng.gov.za

stephaniea@ewt.org.za Transferred

Transferred 23/08/2016 09:25

BC: stephaniea@ewt.org.za

Tebogo.Photo@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: Tebogo.Photo@gauteng.gov.za

TembekaM@tshwane.gov.za Transferred

Thabo.Ntuli@gauteng.gov.za Undelivered

Thandeka.Mbasa@gauteng.gov.za Undelivered

theaco@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: theaco@tshwane.gov.za

thokob@daff.gov.za Transferred

Transferred 23/08/2016 09:25

BC: thokob@daff.gov.za

Thokozile.Makgato@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: Thokozile.Makgato@gauteng.gov.za

TichM@tshwane.gov.za Undelivered

tinyikom@tshwane.gov.za Transferred

Transferred 23/08/2016 09:25

BC: tinyikom@tshwane.gov.za

tnemarude@environment.gov.za Transferred

Transferred 23/08/2016 09:25

BC: tnemarude@environment.gov.za

tumelo.maimane@gauteng.gov.za Transfer Delayed

Transfer Delayed 23/08/2016 09:24

Transferred 23/08/2016 09:45

BC: tumelo.maimane@gauteng.gov.za

tumi.lehabe@wessa.co.za Transferred

Transferred 23/08/2016 09:25

BC: tumi.lehabe@wessa.co.za

UmarB@tshwane.gov.za Undelivered

Vivian.Moloi@gauteng.gov.za Transfer Delayed

Appendix E.3: Proof of newspaper advertisements

Newspaper Advertisement (English) placed in Heidelberg/Nigel Heraut on 24 August 2016

A Man Knocked Down but not Out

Ethopian Shop owner, Melese Hebamo stands inside his empty shop months after the lootings rampage following the announcement of Thoko Didiza as ANC's Tshwane Mayoral candidate

By Taletso Modiga

Things might appear still and normalised after the violence of the Tshwane Unrest, but for one spaza shop owner, life is far from normalcy. It was around 1:30am, June, when Ethiopian shop owner, Melese Hebamo received a phone call from a friend who also owns a spaza shop, tipping him about the lootings of shops that had been going on in the area. "A friend told me to hide my stock because people were breaking into shops of foreign nationals", he said. Shortly after, Hebamo went to sleep in the back room. Within moments after, he heard a sound in his front yard but ignored it. The second time around, he heard another sound, and alarm bells went off in his head. "I knew they had arrived", said Hebamo. A group of residents had come to loot his shop in Mabopane, Block B. They used a metal object to break the entrance of the shop and bent the wire fence.

Once they got inside, he could tell by the noises that they were up to no good. "As they were helping themselves to my stock, all I could think about was my own safety. I hid in the back room and later jumped next door. I had to protect myself", he said. As he looked outside, he saw about seven cars parked outside his shop. Within minutes, they had wiped out all his stock. "I waited for them to leave and returned to the scene", he said. "All I could see were empty shelves. They had taken everything", he continued. Apart from his stock, they also took his clothes, shoes, his DVD player and television. The looters also took money he had saved.

"I came back from the back room and discovered that all the money was gone. All my stock was taken. I only found a little money that I had hidden and a few packets of cigarettes", said Hebamo. After the incident, Hebamo closed his shop down for one and a half months while he tried to make ends meet to buy new stock. "I went to my friend in Limpopo so he could help me cover the expenses lost", he said. "Friends were my main source of support. The looters had taken my stock and all the money I had, so it was very hard for me to recover", he remarked.

A day later, Hebamo went to the police station in Block B to report the crime, and waited about three hours before the police could attend to him. "I waited so long before the police could help me. I was reporting a very serious crime, and the police took their time", said Hebamo. "South Africans who came to report crimes like cell-phone theft were helped immediately. It was only when I offered to pay a fee of R150 that the police recorded my case", he continued.

Now that he has reopened his shop, business is not looking up for Hebamo after a month long absence.

Those who were at one point his supporters now buy elsewhere, and it is hard to keep up with the competition.

In spite of this, Hebamo plans on saving some money to buy more stock, make special prices and thus appeal to old and new customers.

When reflecting on how the looting has impacted his life, Hebamo said: "It's difficult. This occurrence impacted me heavily. It made life very hard for me, and I am still trying to fix the loss."

Despite his challenges, Hebamo remains hopeful – "It will get better in time. With hard work and persistence, customers will slowly return and it will be business as usual."

Empty shelves inside Hebamo's shop in Mabopane

Notice of Basic Assessment (BA) Process

Reference Number: CSIR/IU/EMS/ER/2016/0002/A

Basic Assessment for the proposed Nkunzi Agricultural Co-Operative Broiler Chicken Raising Facility on Plot 1109, Winterveld Agricultural Holding, Ext 1, Gauteng

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, of the National Environmental Management Act, 1998 (Act No 107 of 1998), that **Nkunzi Agricultural Co-Operative** proposes a small-scale **Broiler Chicken Raising Facility** on 4.2 hectares of Plot 1109 Winterveld Agricultural Holding Ext 1 located in the Winterveld area of Pretoria North, Gauteng Province.

The Council for Scientific and Industrial Research (CSIR) is the Environmental Assessment Practitioner (EAP) who will be managing the process. In terms of the NEMA EIA Regulations published in Government Notice Regulation (GNR) 983 on 4 December 2014 Government Gazette No 38282, and NEM:WA Regulation published in GNR 921 on 29 November 2013 Government Gazette No 37083, a BA process and Waste Management License is required as the project triggers the following listed activities:

GNR 983 5 and 27

You are invited to register as an interested and/or Affected Party (I&AP) and/or to provide any written comments on the BA process. To obtain further information, to comment and/or to register as an I&AP, please provide your full name, full postal address, phone numbers, email address and state your area of interest and/or concern to: **Ms. Kelly Stroebel, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2473 or Email: kstroebel@csir.co.za**. You have until or before **22nd September 2016** to do so (30 days from the date of this publication - including weekends, but excluding public holidays).

CSIR

NSFAS invites 2017 applications

THE NATIONAL Student Financial Aid Scheme (NSFAS) is inviting applications for the 2017 academic year.Grade 12 learners and post-matrics may submit applications. The NSFAS Student Centred Model has been live from 1 August 2016. However, students who were not previously funded or not funded in 2016 will only be able to apply from 1 September.Applications close on 30 November.

"All new applications (matriculants) must be submitted directly to NSFAS online (www.nsfas.org.za). Students who have never received NSFAS funding must apply online. All students who were previously funded by NSFAS and are not funded in 2016 must apply online.

"All students who have signed their Loan Agreement Forms (LAF) or Schedule of Particulars (SOP) for 2016 and are currently receiving NSFAS funding do not have to reapply.Funding will be granted provided the funded student meets the NSFAS academic requirements," said NSFAS.

All funded NSFAS students are requested to update their information online. Students must log onto www.nsfas.org.za and create the MyNSFAS account to verify their details.

"Matriculants who have already submitted their NSFAS applications before 1 August 2016 to any university or Technical and Vocational Education and Training (TVET) college must not reapply. The institution will send your application directly to NSFAS Head Office," said NSFAS.

All paper application forms can be sent to NSFAS Head Office in Cape Town either by email to apply@nsfas.org.za or fax 086 644 2822 or by post to: The 2017 Online Applications, NSFAS Loans & Bursaries Department, Private Bag X4, Plumstead, 7801.

For further details, applicants can contact NSFAS Offices on 0860 067 327 (share call) or www.nsfas.org.za.

Contents of the Newspaper Advertisement (English) placed in Sosh Times on 23 August 2016

Notice of Basic Assessment (BA) Process

Reference Number: CSIR/IU/EMS/ER/2016/0002/A

Basic Assessment for the proposed Nkunzi Agricultural Co-Operative Broiler Chicken Raising Facility on Plot 1109, Winterveld Agricultural Holding, Ext 1, Gauteng

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, of the National Environmental Management Act, 1998 (Act No 107 of 1998), that **Nkunzi Agricultural Co-Operative** proposes a small-scale **Broiler Chicken Raising Facility** on 4.2 hectares of Plot 1109 Winterveld Agricultural Holding Ext 1 located in the Winterveld area of Pretoria North, Gauteng Province.

The Council for Scientific and Industrial Research (CSIR) is the Environmental Assessment Practitioner (EAP) who will be managing the process. In terms of the NEMA EIA Regulations published in Government Notice Regulation (GNR) 983 on 4 December 2014 Government Gazette No 38282, and NEM:WA Regulation published in GNR 921 on 29 November 2013 Government Gazette No 37083, a BA process and Waste Management License is required as the project triggers the following listed activities:

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CSIR

Appendix E.4: Communications from interested and affected parties

agriculture,
forestry & fisheries
Department:
Agriculture, forestry & fisheries
REPUBLIC OF SOUTH AFRICA

Directorate Land Use and Soil Management, Private Bag x120, Gezina Pretoria, 0031
Delpen Building, c/o Annie Botha & Union Streets, Riviera

From: Director: Land Use and Soil Management
Tel: (012) 319 7634 **Fax:** (012) 329 5938 **e-mail:** nhlakad@daff.gov.za

CSIR
PO Box 320
Stellenbosch
7599

12 September 2016

Dear Si/Madam

This serves as a notice of receipt and confirms that your application has been captured in our electronic AgriLand tracking and management system. It is strongly recommended that you use the on-line AgriLand application facility in future.

Detail of your application as captured:

Application type: Applicability
Your reference: **Chicken Broiler**
Property Description: ***Winterveld AH x 1, Holding 1109***
Dated: ***23 August 2016***

Please use the following reference number in all enquiries:

AgriLand reference number: 2016_09_0131

Enquiries can be made to the above postal, fax or e-mail address.

Yours sincerely,

HJ Buys
pp DIRECTOR: LAND USE AND SOIL MANAGEMENT

http://www.agis.agric.za/agriland

Appendix E.5: Minutes of any public and/or stakeholder meetings
Not Applicable

Appendix E.6: Comments and Responses Report
(To be received after draft Basic Report)

Appendix E.7: Comments from I&APs on Basic Assessment (BA) Report-
(To be received after draft Basic Report).

Appendix E.8: Comments from I&APs on amendments to the BA Report-
N/A at this stage of the BA process.

Appendix E.9: Copy of the register of I&APs

National Departments	Name
Department of Environmental Affairs- National	Mmatlala Rabothata
Department of Environmental Affairs- National	Sibusisiwe Hlela
Department of Environmental Affairs- National	Takalani Nemarude
Department of Rural Development and Land Reform	Bonginkosi Zulu
Department of Agriculture, Forestry and Fisheries	Mashudu Marubini
National Department of Mineral Resources	Kgauta Mokoena
National Department of Water Affairs	Ms Ndileka K mohapi
National Department of Water Affairs	Namisha Muthraparsad
National Department Mineral Resources	Khayalethu Matrose
National Department of Trade and Industry	Maoto Molefane
Department of Agriculture, Forestry and Fisheries	Ms Thoko Buthelezi

Provincial Government: Gauteng Province	
Department of Agriculture and Rural Development	Mr Lebogang Maile
	Ms Thandeka Mbasa- Sigabi
Department of Community Safety	Ms Sizakele Nkosi-Malobane
	Adv Mongezi Tshongweni
Department of Cooperative Governance and Traditional Affairs	Mr Paul Mashatile
	Ms Ntlakanipho Nkontwana
Department of Economic Development	Mr Lebogang Maile
	Ms Phindile Mbanjwa
Department of Education	Mr Panyaza Lesufi
	Mr Edward Mosuwe
Department of Health	Ms Qedani Mahlangu
	Dr Hugh Gosnell
Department of Human Settlement	Mr Paul Mashatile
	Ms Daphney Ngoasheng
Department of Infrastructure Development	Ms Jacob Mamabolo
	Mr Bethuel Netshiswinzhe
Department of Roads and Transport	Mr Ismail Vadi
	Mr Ronald Swartz
Department of Social Development	Nandi Mayathula-Khoza
	Ms Shoki Tshabalala
Department of Sport, Arts, Culture and Recreation	Nonhlanhla Faith Mazibuko
	Ms Namhla Siqaza

Department of Provincial Tresuary	Ms Barbara Creecy
	Ms Nomfundo Tshabalala

Local Government: City of Twsane	
Office of the Executive Mayor	Councillor Kgosientso Ramokgopa
Municipal Manager	Mr Jason Ngobeni
Ward Councillors (Ward 24)	Amos H Mampheko
Neighbours	Mr Kgosana (Church Representative)
	Mr. Jackson Mamosebo
	Mr. Matsao
Department of Environmental Management	Mr Mthobeli Kolisa
	Mr Fhatuwani Tshivhase (Acting)
Department of Environmental Management	Mr Patrick Mphahlele
Department of Service Infrastructure	Mr James P Murphy (Acting)
	Mr Frans Manganye (Acting)
Department of Service Infrastructure	Mr Piet Maseema (Acting)
Department of Economic Development	Ms Tembeka Mhlekwa
	Mr Lufuno Tshikovhi
	Mr Benjamin Manasoe
Department of Economic Development	Ms Lulama Ndlovu
Department of City Planning and Development	Mr Makgorometje Augustine Makgata
Department of Housing and Human Settlement	Ms Amolemo Mothoagae
	Ms Landela Mahlati
Department of Housing and Human Settlement	Ms Nonto Memela
Department of communications, Marketing and Events	Ms Nomasonto Ndlovu
	Mr Selby Bokaba
	Ms Tinyiko Mokgob
Department of communications, Marketing and Events	Mr Tich Mekhoe (Acting)
Department of Corporate and Shared Services	Mr Gerald Shingange (Acting)
	Dr Maria Motebang
	Mr Gerald Shingange
	Mr Oscar Moalusi
	Mr Oupa Ramaswiela
Department of Corporate and Shared Services	Mr Luckie Sihlangu
Department of Emergency Services	Ms Joan K De Beer
	Mr Gabriel Kau
	Mr Japie Lengoabala
	Mr Sam Nkosi
Department of Emergency Services	Mr Johannes Masilela

Department of Finacial Services	Mr Umar Banda
	Mr Dayalan Pillay
Department of Finacial Services	Ms Nthabiseng M. Mokete
Department of Health and Social Development	Mr Mpho Kekana
	Mr Livhuwani Nemuthenga
	Ms Ntlogeleng Mogotsi
Department of Health and Social Development	Mr Abel T Malaka
Department of Metro-Police	A/Cmdr. T Sibiya
Department of Sports and Recreational Services	Ms Nomasonto Ndlovu (Acting)
	Mr Walter Kutumela
Department of Sports and Recreational Services	Ms Ntuthu Sipambo
Department of Transport and Roads	Mr Nava Pillay (Acting)
	Ms Lorato Kegakilwe-Piki
Department of Transport and Roads	Mr Jabulani Mapumulo (Acting)

Other Organisations	Dr. Mike Knight
SANParks: Planning and Development	Dr. Howard Hendriks
South African National Parks (SANParks)	Mr Dumisani Sibayi
South African Heritage Resources Agency (SAHRA)	Anneliza Collett
AgriLand	Freyni du Toit
Grasslands Society of South Africa	Tumi Lehabe
WESSA	Stephanie Aken
EWT	Adam Pires
EWT	Dr Harriet Davies- Mostert
EWT: Conservation Science	Maphata Ramphele
The Provincial Heritage Resources Authority Gauteng	Simon Gear
Birdlife South Africa	Lungile Motsisi
Eskom: Servitude and Investigations Department	Dr. Mike Knight

BASIC ASSESSMENT REPORT

APPENDIX F: Water use license(s) authorisation & SAHRA information

CONTENTS

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

Provincial Heritage Resources Authority Gauteng Letter

PROVINCIAL HERITAGE RESOURCES AUTHORITY - GAUTENG
PRIVATE BAG X33, JOHANNESBURG, 2000
35 RISSIK STREET, SURREY HOUSE
JOHANNESBURG, 2000
TEL: 011 355 2609

Our Ref : H134/16
Enquiries : Tebogo Molokomme
Meeting Date : 10 February 2017

CSIR
Tel: 021 888 2432
E-mail: kstroebel@csir.co.za

Dear Sir/Madam

Background Information Document: Basic Assessment for the proposed Nkunzi Agricultural Co-Operative Boiler Raising facility on Plot 1109, Winterveld Agricultural Holding Ext 1, Winterveld, Gauteng

1. The above-mentioned application was discussed by the PHRA-G Heritage Impact Assessment (HIA) Committee on Friday, 10 February 2017.

2. After reviewing your report, the following recommendations were made:

a) A Heritage Impact Assessment (HIA) must be conducted which must amongst other things:
- clearly identify and map the heritage resources on the earmarked property/area.
- give the historical background of the area.
- show how the proposed work might have an impact on heritage resources
- outline mitigation measures
- give a report on the Public Participation process during the assessment process

b) The Committee kindly requests that you send only the requested information as explained above, and no other reports that need the other authorities' approval.

c) The requested information will assist the Committee in making an informed decision.

Kind Regards
Tebogo Molokomme

For the Heritage Impact Assessment (HIA) Committee
Provincial Heritage Resources Authority – Gauteng (PHRA-G)

Page 1 of 1

Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT

APPENDIX G.1:

Ecological Opinion/Scan for the proposed agricultural development in the Blue Valley Agricultural Holdings, Gauteng Province.

ECOLOGICAL OPINION/SCAN

FOR A PROPOSED BROILER CHICKEN FACILITY ON PLOT 1109, RE OF FARM KLIPPAN 102 JR, WINTERVELD, GAUTENG

Compiled By:

Natural Scientific Services

64A Coleraine Drive
Riverclub Ext 7
Sandton
2191
Tel: (011) 787-7400
Fax: (011) 784-7599

NSS Ref No: 2292
Date: February 2017

Compiled For:

CSIR (Council for Scientific and Industrial Research)
CAS - EMS unit

11 Jan Celliers Street
Stellenbosch
7600
Tel: (021) 888 2432
Fax: (021) 888 2473

All pictures taken on site

BROILER CHICKEN FACILITY ON PLOT 1109, RE OF FARM KLIPPAN 102 JR, WINTERVELD, GAUTENG

ECOSCAN REPORT

Compiled For:

CSIR Stellenbosch (CAS, EMS)
11 Jan Cilliers Street
Stellenbosch, 7600
Western Cape, South Africa
Tel: (021) 888 2432
Fax: (021) 888 2473

Compiled By:

Natural Scientific Services CC

126 Ballyclare Drive
Morningside Extension 40
Sandton, Johannesburg
Tel: (011) 787-7400
Fax: (011) 784-7599

Ref No: 2292
Date: April 2017

EXECUTIVE SUMMARY

Natural Scientific Services CC was appointed by the Council for Scientific and Industrial Research to perform a terrestrial ecoscan assessment (a brief floral and faunal assessment) for a proposed broiler chicken facility on Plot 1109 on the Remainder of the Farm Klippan 102JR in the Winterveld Agricultural Holdings in Gauteng Province.

Desktop research and findings from our site visit in November 2016 indicated that biodiversity on the proposed development site has been disturbed to some extent by past crop cultivation and currently by *inter alia* livestock grazing, excavation (top soil harvesting) activities, harvesting of firewood, and the utilisation of hunting dogs. The seasonal drainage system is considered to represent the most conservation important (CI) local biodiversity features. At a small rain-filled depression on site, evidence of Bullfrog breeding (in the form of a dead adult male and live tadpoles) was found. This was more than likely African Bullfrog.

Summarized in the **Table** below are potential impacts of the proposed development on biodiversity, without and with mitigation. Without mitigation, the most significant potential impacts include:

- Loss or degradation of *in situ* and neighbouring wetland areas during all phases of the project - especially construction.
- Environmental contamination from poor waste management during operation.
- Further introduction and proliferation of alien flora with influx of vehicles and materials, site disturbance, and in the absence of effective control during all phases of the project.

Table Summary of impact significance, without and with mitigation

POTENTIAL IMPACTS	SIGNIFICANCE	
CONSTRUCTION	**Without mitigation**	**With mitigation**
Loss or degradation of local wetland areas	**High**	**Medium**
Loss of terrestrial vegetation and faunal habitat	**Medium**	**Low**
Loss of CI or medicinal flora	**Medium**	**Low**
Loss of CI fauna	**Medium**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Increased dust and erosion	**Medium**	**Low**
Sensory disturbance of fauna	**Low**	**Low**
OPERATION		
Loss or degradation of local wetland areas	**High**	**Low**
Environmental contamination	**High**	**Medium**
Poor / Inappropriate control of animal pests	**Medium**	**Low**
Disease transmission	**Medium**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Loss of CI or medicinal flora	**Medium**	**Low**

POTENTIAL IMPACTS	SIGNIFICANCE	
Loss of CI fauna	**Medium**	**Low**
Sensory disturbance of fauna	**Low**	**Low**
DECOMMISSIONING		
Loss or degradation of local wetland areas	**High**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Increased dust and erosion	**Medium**	**Low**
Sensory disturbance of fauna	**Low**	**Low**

DECLARATION

I, Susan Abell, in my capacity as a specialist consultant, hereby declare that I -

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has 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 National Environmental Management Act, 1998 (Act 107 of 1998);
- Will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
- As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member;
- Based on information provided to me by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional ability; and
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field.

Susan Abell *Pr.Sci.Nat.*
SACNASP Reg. No. 400116/05
(Ecological & Environmental Science)

28 April 2017
Date

LIST OF ACRONYMS & ABBREVIATIONS

ACRONYM	DESCRIPTION
ADU	Animal Demography Unit – a research unit of the Department of Zoology at the University of Cape Town
AGIS	Agricultural Geo-referenced Information System
AL	Alien
AoS	Areas of Significance
ARC	Agricultural Research Council
B	Breeding
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CAS	Consulting and Analytical Services
CBA	Critical Biodiversity Area
CI	Conservation Important
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
C-Plan	Conservation Plan
CR	Critically Endangered
CR PE	Critically Endangered, Possibly Extinct
CSIR	Council for Scientific and Industrial Research
D	Declining population trend
DD	Data Deficient
DDD	Data Deficient - Insufficient Information
DDT	Data Deficient - Taxonomically Problematic
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DWA	Department of Water Affairs (previously known as DWAF)
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation (previously known as DWAF and DWA)
ECA	Environmental Conservation Act (Act 73 of 1989)
EI	Ecological Importance
EIMS	Environmental Impact Management Services (Pty) Ltd
EMC	Ecological Management Class
EIS	Ecological Importance and Sensitivity
EMS	Environmental Management Services
EN	Endangered
EN*	Considered Endangered but status not finalised
End	Endemic
ES	Ecological Sensitivity
ESA	Ecological Support Area
EW	Extinct in the Wild
EWT	Endangered Wildlife Trust
EX	Extinct
FEPA	Freshwater Ecosystem Priority Area
GG	Government Gazette

ACRONYM	DESCRIPTION
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
HGM	Hydro – geomorphic
I	Increasing population trend
IA	Impact Assessment
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature and Natural Resources, based in Gland, Switzerland
LC	Least Concern
LoO	Likelihood of Occurrence of a taxon in an area
NBI	National Botanical Institute
NEM:AQA	National Environmental Management: Air Quality Act (Act 39 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
NEM:WA	National Environmental Management: Waste Act
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEPAD	New Partnership for Africa's Development
NFA	National Forests Act (Act 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas project
NHRA	National Heritage Resources Act (Act 25 of 1999)
NMPRDA	National Mineral and Petroleum Resources Development Act (Act 28 of 2002)
NPA	National Priority Area
NSS	Natural Scientific Services CC
NT	Near Threatened
NVFFA	National Veld and Forest Fire Act (Act 101 of 1998)
NWA	National Water Act (Act 36 of 1998)
OG	Ordinary Game
PES	Present Ecological State
PG	Protected Game
POSA	Plants of South Africa
Pr.Nat.Sci.	Professional Natural Scientist
PRECIS	The National Herbarium of Pretoria's Computerized Information System
PS	Protected Species
PWA	Protected Wild Animal
QDS	Quarter Degree Square – the basic unit used by the Surveyor General for creation of 1:50 000 topographical maps
S	Stable population trend
SABAP 1 & 2	First and second Southern African Bird Atlas Projects, managed by the ADU
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SoER	State of the Environment Report
ToPS	Threatened or Protected Species
TSP	Threatened Species Programme -– a programme managed by SANBI to assess the Red Data status of South African plants

ACRONYM	DESCRIPTION
U	Unknown population trend
UJ	University of Johannesburg
UP	University of Pretoria
VU	Vulnerable
WA	Wild Animal
WITS	University of the Witwatersrand
WMA	Water Management Area
WSA	Water Services Act

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1. Introduction

South African legislation affirms the national commitment to conservation. The National Environmental Management Act (NEMA; Act 107 of 1998) provides for "the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations." The National Environmental Management: Biodiversity Act (NEMBA; Act 10 of 2004) affords *inter alia*: the management and conservation of South Africa's biodiversity within the framework of NEMA; the protection of species and ecosystems that warrant national protection; and the sustainable use of indigenous biological resources. The National Water Act (NWA; Act 36 of 1998) is the principle legal instrument relating to water resource management in South Africa. All wetlands are protected under the NWA, wherein numerous measures are stipulated "which are together intended to ensure the comprehensive protection of all water resources."

The Council for Scientific and Industrial Research's (CSIR's) "Special Needs Skills and Development Programme" is currently undertaking the necessary environmental authorisations under NEMA, NEMBA and the NWA for a broiler chicken facility in the north-western corner of Gauteng Province. To this end the CSIR appointed Natural Scientific Services CC (NSS) to perform an ecological scan (a brief terrestrial floral and faunal assessment) for the proposed project.

Biodiversity is defined as "…***the variability among living organisms from all sources including…terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems***" (The Convention of Biological Diversity, 1992). In other words, plants, animals and micro-organisms, their genes, and the ecosystems that living organisms inhabit, are all facets of biodiversity.

2. Terms of Reference

The ecoscan was performed according to the methodology agreed between the CSIR and NSS, and this report includes:

- A broad description of (relevant) biophysical attributes of the study area;
- A list of applicable legislation, guidelines, standards and criteria to be considered in project planning;
- A broad determination of the (national and provincial) conservation importance of local biodiversity;
- A description of *in situ* vegetation and floral communities, including their structure, dominant plant species composition, faunal species and community condition;
- Discussion about observed and potentially occurring fauna and floral conservation important (e.g. Protected, Red List and medicinal) species;
- An assessment of potential impacts of the proposed project on biodiversity, and recommended measures to mitigate these.

3. Project Team

All aspects of the EcoScan were performed by NSS (**Table 3-1**). The NSS team has extensive experience in completing biodiversity assessments involving floral, faunal, wetland and aquatic work, as well as Environmental Impact Assessments, Environmental Management Programme Reports, Strategic Management Plans and Environmental Management Plans for the conservation, mining, waste, commercial and industrial sectors.

In terms of accreditation and professional registrations the following is applicable to NSS:

- Senior team members are registered Professional Natural Scientists in the ecological, environmental, and zoological fields.
- The senior wetland members are acknowledged by the Department of Water and Sanitation (DWS) as a competent wetland delineator.

Table 3-1 NSS project team

ROLE	NAME	QUALIFICATIONS
Flora / Review	Susan Abell	M.Sc. Resource Conservation Biology (WITS). Pr.Sci.Nat. registered (400116/05) – Ecology & Environmental Science
Fauna	Dr Caroline Lötter	Ph.D. – Zoology (UP). Pr.Sci.Nat. registered (400182/09) – Zoology.
Wetlands	Tyron Clark	M.Sc. – Zoology ...in progress Wetland Delineation and Management Certified (UFS)
GIS Mapping	Tim Blignaut	B.Sc. Honours - Geography (UJ).

4. Applicable Legislation, Policies & Guidelines

Legislation, policies and guidelines, which could apply to impacts of the proposed project on biodiversity, are listed below. Although the list is comprehensive, additional legislation, policies and guidelines that have not been mentioned may apply.

4.1. International Agreements

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- (Bonn) Convention on the Conservation of Migratory Species of Wild Animals.
- Convention on Biological Diversity including eco-systems and genetic resources.
- Agenda 21 regarding the sustainable development at global and national levels.
- Johannesburg Declaration and Plan of Implementation for sustainable development.

4.2. Regional Agreements

- Action Plan of the Environmental Initiative of NEPAD for sustainable development in Africa.

4.3. National Legislation

- Conservation of Agricultural Resources Act (Act 43 of 1983).
- Environmental Conservation Act (Act 73 of 1989).
- Constitution of the Republic of South Africa (Act 108 of 1996).
- Water Services Act (Act 108 of 1997).
- National Water Act (Act 36 of 1998).
- National Forests Act (Act 84 of 1998) and Protected Tree Species.
- National Veld and Forest Fire Act (Act 101 of 1998).
- National Environmental Management Act (NEMA; Act 107 of 1998).
- National Heritage Resources Act (Act 25 of 1999).
- National Mineral and Petroleum Resources Development Act (Act 28 of 2002).
- Draft Sustainable Utilization of Agricultural Resources Bill (2003).
- National Environmental Management: Protected Areas Act (Act 57 of 2003).
- National Environmental Management: Biodiversity Act (NEMBA; Act 10 of 2004):
    - National list of Ecosystems Threatened and in need of Protection (Government Gazette [GG] 34809, Government Notice [GN] 1002, 9 December 2011).
    - Alien and Invasive Species Regulations (GG 37885, 1 August 2014).
    - Threatened or Protected Species Regulations (GG 587, GN 38600, 31 March 2015).
- National Environmental Management: Air Quality Act (Act 39 of 2004).
- National Environmental Management: Waste Act (Act 59 of 2008).

4.4. National Policies, Guidelines & Programmes

- National Aquatic Ecosystem Health Monitoring Program including the River Health Programme (initiated by the DWAF, now the DWA), which has recently been replaced with the River Eco-status Monitoring Programme.
- South African Water Quality Guidelines (DWAF 1996).
- White Paper on Environmental Management Policy for South Africa (1998).
- National Spatial Biodiversity Assessment (Driver *et al*. 2004) including Priority Areas and Threatened Ecosystems.
- National Biodiversity Strategy and Action Plan (DEAT 2005).
- National Freshwater Ecosystem Priority Areas project (Driver *et al*. 2011).
- Mining and Biodiversity Guideline (DEA *et al.* 2013).
- National Water Resource Strategy (DWAF 2013).
- Draft national guidelines on biodiversity offsets (DEA 2012 and 2015).

4.5. Provincial Legislation, Policies & Guidelines

- Gauteng Nature Conservation Ordinance (Ordinance 12 of 1983), amended by the Gauteng General Law Amendment Act (Act 4 of 2005).
- Gauteng Provincial Integrated Waste Management Policy (GDARD 2006).
- Gauteng Conservation Plan (C-Plan). Version 3.3 (GDARD 2011).
- Gauteng Protected Areas Expansion Strategy (GDARD 2011).
- Gauteng State of the Environment Report (SoER; GDARD 2012).
- Draft Gauteng Biodiversity Offset Guidelines (GDARD 2013).
- GDARD Requirements for Biodiversity Assessments. Version 3 (GDARD 2014).
- Draft Gauteng Nature Conservation Bill (GDARD 2014) – to repeal the Gauteng Nature Conservation Ordinance (Ordinance 12 of 1983).
- GDARD Red List Plant Species Guidelines (GDARD 2015).

5. Project Description

Nkunzi Agricultural Co-Operative (Nkunzi) proposes to develop a small-scale broiler chicken raising endeavour comprising/involving:

- An office building with shower facilities;
- A bulk feed silo;
- Eighty thousand broiler chickens raised per six week cycle.;
- Two 1,800m^2 chicken houses housing 40,000 chicks each;
- Water used from a borehole; and
- Electricity from a generator.

6. Study Region

6.1. Locality & Land-use

The approximately 4.2ha development site is situated on Plot 1109 (Winterveld Agricultural Holdings Ext. 1) on the Remainder of the Farm Klippan 102JR, in the Winterveld area of Pretoria North, Gauteng Province (**Figure 3 1**). The area falls under the Tshwane Metropolitan Municipality, and is approximately 35km north of Pretoria. The site is approximately 3.5km west of the Tswaing Meteorite Crater Reserve, and approximately 4.5km north-west of Soshanguve. Available satellite imagery indicates, and our field observations confirmed that approximately 43% of the proposed development site comprises previously cultivated land, topsoil excavations and built infrastructure. Surrounding forms of land use include human settlement and subsistence farming.

Figure 6-1 Photographs of the site

6.2. Climate

The regional climate features effectively three seasons, namely a cool dry season from May to mid–August, a hot dry season from mid–August to about October, and a hot wet season from about November to April. The regional vegetation type is characterized by mean annual precipitation of 500mm-700mm, and mean monthly maximum and minimum temperatures of approximately 35.3°C and -3.1°C for November and June, respectively. Frost is fairly infrequent (Mucina & Rutherford 2006).

Shown in **Figure 6-3** is the monthly amount of rainfall measured at Pretoria between January 2015 and November 2016 (data obtained from AccuWeather 2016). This approximate rainfall data indicate that during the 12-month period preceding our site visit on 24 November 2016, the region had received an average annual amount of ~589mm rain. The approximate temperature data in **Figure 6-3** indicate that temperatures were typically warm during November 2016. Evidence during the fieldvisit by the large number of filled vleis, pans and depressions showed that the region had recently received good rain. On site, conditions were damp, warm, and overcast (albeit a little windy) and, therefore, highly favourable for the floral and faunal survey work.

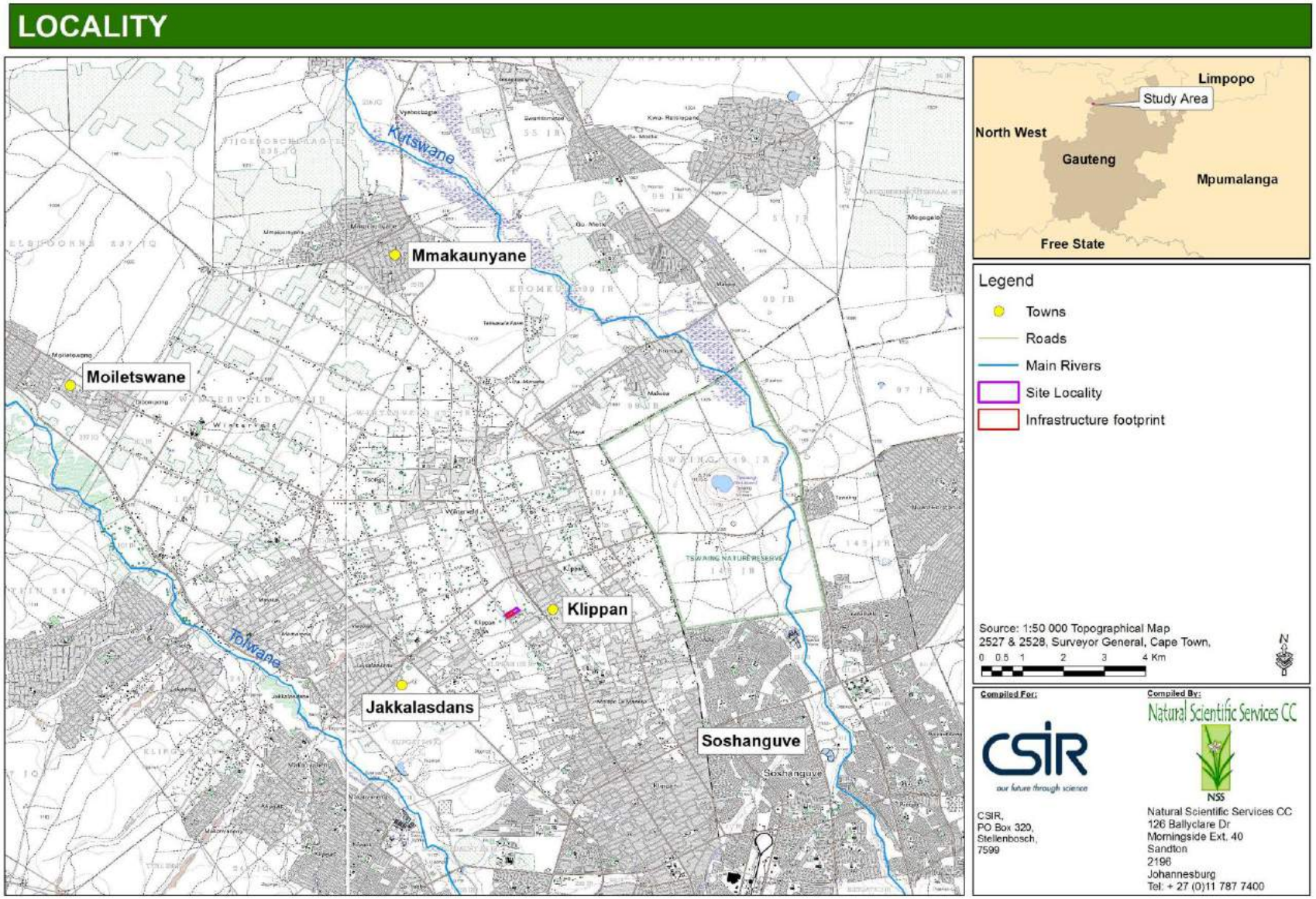


Figure 6-2 Localition of Plot 1109 and the proposed development site

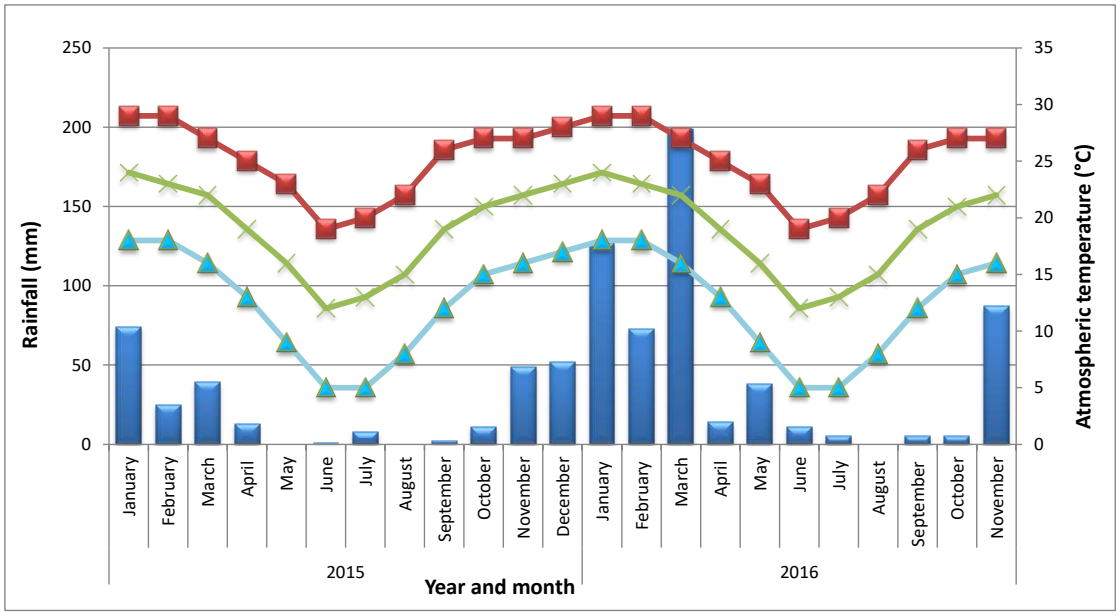


Figure 6-3 Monthly rainfall and temperature measured at Pretoria (AccuWeather 2016)

6.3. Hydrology

The proposed development site is situated in ecoregion 8.05 and quaternary catchment A23J (**Figure 6-4**), which has been rated with Moderate Ecological Sensitivity. The Kutswane River is the nearest major drainage line to the site. The Kutswane River is a tributary of the Pienaars River, which drains into the Crocodile River. These (and a moderate diversity of other rivers) collectively comprise the Crocodile (West) and Marico Water Management Area. With approximately half the length of the rivers containing Critically Endangered ecosystems, this WMA is particularly hard pressed to meet South Africa's goal for freshwater ecosystem conservation without a focused effort to rehabilitate some systems. Conservation action in the WMA should be focussed on maintaining the last remaining good condition rivers, and strategically rehabilitating some of the moderately-modified rivers (Nel & Driver 2012).The Crocodile River eventually feeds into the Limpopo River, which flows through the Kruger National Park before entering Mozambique.

6.4. Land Types

"Land types," which have been identified by the ARC's Institute for Soil, Climate and Water, represent areas that are uniform with respect to climate, terrain form, geology and soil. The data, obtained through the Agricultural Geo-referenced Information System (AGIS, 2010), provide useful baseline information on land capability (especially agricultural potential). According to this data, Plot 1109 is situated in a single land type referred to as Fa4 (**Figure 6-5**).

The underlying geology comprises predominantly red granite of the Bushveld Complex (Bushveld granophyre in places in the south), with occasional dykes of diabase and syenite. Rocks and shallow soils such as the Mispah, Klipfontein, Glenrosa and Paardeberg soil types occur on the upper sections of topographic catenas. Valley slopes and bottoms

typically feature soils such as the Uitskot, Denhere, Leeudoorn, Makuya, Kwezana and Paleisheuwel soil types. The flat terrain across Plot 1109 lies at an elevation of approximately 1 146 m a.s.l.

6.5. Vegetation

The proposed development site is situated in the Savanna Biome, within the SVcb 12 Central Sandy Bushveld regional vegetation type (**Figure 6-5**) as defined by Mucina & Rutherford (2006). Central Sandy Bushveld features tall, deciduous *Terminalia sericea* and *Burkea africana* woodland on deep, sandy soils (with the former often dominant on the lower slopes of sandy catenas) and low, broad–leaved *Combretum* woodland on shallow rocky or gravelly soils. Species of *Acacia*, *Ziziphus*, and *Euclea* are found on flats and lower slopes on eutrophic sands and some less sandy soils. *Acacia tortilis* may dominate some areas along valleys. Dystrophic sands support a grass–dominated herbaceous layer with relatively low basal cover. Dominant floral species within the Central Sandy Bushveld vegetation type are listed in **Table 6-1**.

Table 6-1 Dominant flora comprising the Central Sandy Bushveld vegetation type

GROWTH FORM	DOMINANT SPECIES
Tall Trees:	*Acacia burkei* (d), *Acacia robusta*, *Sclerocarya birrea* subsp. *caffra*
Small Trees:	*Burkea africana* (d), *Combretum apiculatum* (d), *Combretum zeyheri* (d), *Terminalia sericea* (d), *Ochna pulchra*, *Peltophorum africanum*, *Searsia leptodictya.*
Tall Shrubs:	*Combretum hereroense*, *Grewia bicolor*, *Grewia monticola*, *Strychnos pungens*.
Low Shrubs:	*Agathisanthemum bojeri* (d), *Indigofera filipes* (d), *Felicia fascicularis*, *Gnidia sericocephala*.
Geoxylic Suffrutex:	*Dichapetalum cymosum* (d).
Woody Climber:	*Asparagus buchananii*.
Graminoids:	*Brachiaria nigropedata* (d), *Eragrostis pallens* (d), *Eragrostis rigidior* (d), *Hyperthelia dissoluta* (d), *Panicum maximum* (d), *Perotis patens* (d), *Anthephora pubescens*, *Aristida scabrivalvis* subsp. *scabrivalvis*, *Brachiaria serrata*, *Elionurus muticus*, *Eragrostis nindensis*, *Loudetia simplex*, *Schmidtia pappophoroides*, *Themeda triandra*, *Trachypogon spicatus*.
Herbs:	*Dicerocaryum senecioides* (d), *Barleria macrostegia*, *Blepharis integrifolia*, *Crabbea angustifolia*, *Evolvulus alsinoides*, *Geigeria burkei*, *Hermannia lancifolia*, *Indigofera daleoides*, *Justicia anagalloides*, *Kyphocarpa angustifolia*, *Lophiocarpus tenuissimus*, *Waltheria indica*, *Xerophyta humilis*.
Geophytic Herb:	*Hypoxis hemerocallidea.*
Succulent Herb:	*Aloe greatheadii* var. *davyana*.

According to Mucina & Rutherford (2006), the Central Sandy Bushveld vegetation type is regarded as **Vulnerable**. About 24% of the vegetation type has been transformed; 19% by crop cultivation and 4% by urbanization. Much of the vegetation type, within a broad arc south of the Springbokvlakte, is heavily populated by rural communities.

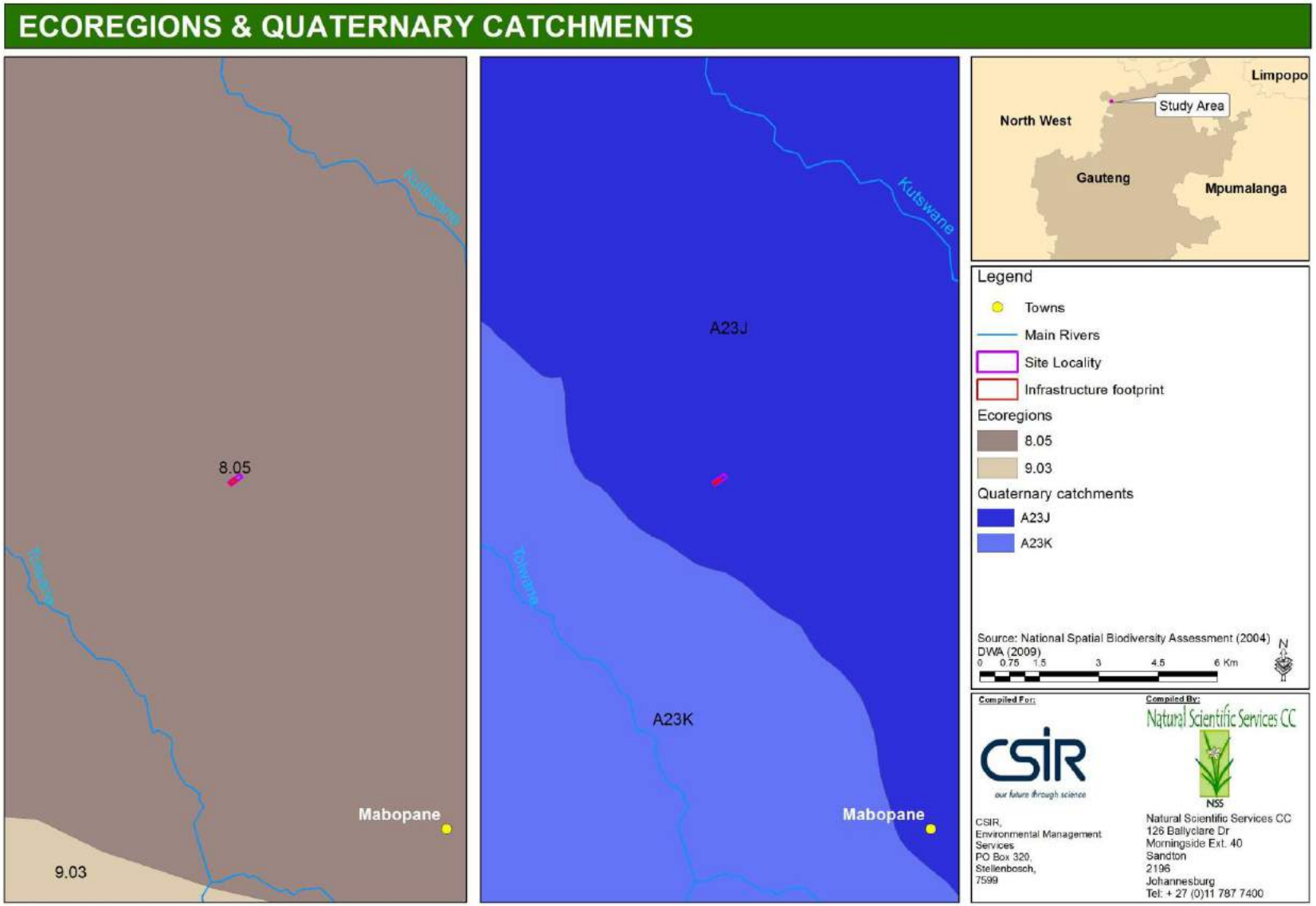


Figure 6-4 Ecoregion and quaternary catchment wherein the development site is situated

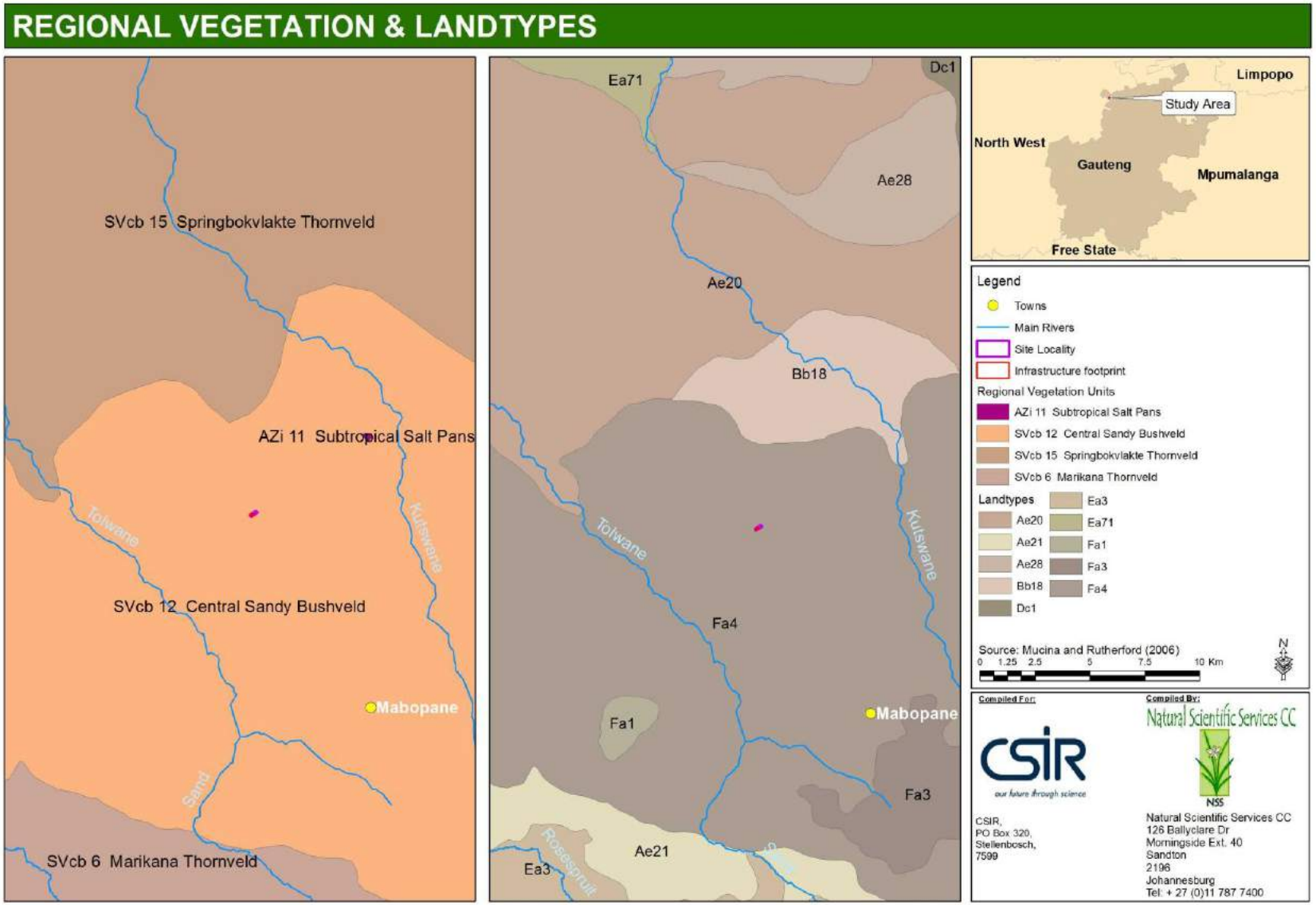


Figure 6-5 **Regional vegetation and land type wherein the development site is situated**

7. Methodology

The ecological scan involved desktop research and fieldwork, which was performed during a site visit on 24 November 2016.

7.1. Vegetation & Floral Communities

Due to the small extent of the site, past transformations (over 43%) and the homogeneous nature, the sampling methods such as Braun-Blanquet cover-abundance approach (Mueller-Dombois & Ellenberg, 1974) was used as a basis to form broader habitat units but the data was not analysed using TWINSPAN. The vegetation component therefore included:

- A desktop assessment of the vegetation within the region and potential community structure based on the information obtained from:
  - SANBI's[1] Plants of South Africa (POSA) 2528AC QDS
  - Mucina & Rutherford's (2006) vegetation map of southern Africa.
  - GDARDs C-Plan v3.3.
  - CI plant species records in the study region (mainly obtained through POSA)
- A one day field investigation walking transects through the site:
  - Noting species, habitats and cover abundance. Sampling points are presented in **Figure 7-1**. Plant taxa were identified to species level (some cases, *cf* would be used if identification was limiting – *cf* means 'confer' or 'looks like'). Scientific names follow POSA (Accessed, March 2017).
  - Recording any observed alien and invasive plant species on site was also conducted. The identification of declared weeds and invader species as promulgated under: the NEMBA August 2014 regulations (GG37885); and the amended regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).
- Reporting including vegetation community descriptions, mapping of broad habitat types / vegetation communities and CI species analysis. For CI floral species, Likelihood of Occurrence (LO) rating is assigned to each species based on the availability of suitable habitat using the following scale: Present; Highly likely; Possible; Unlikely or No Habitat available.

[1] The South African National Biodiversity Institute

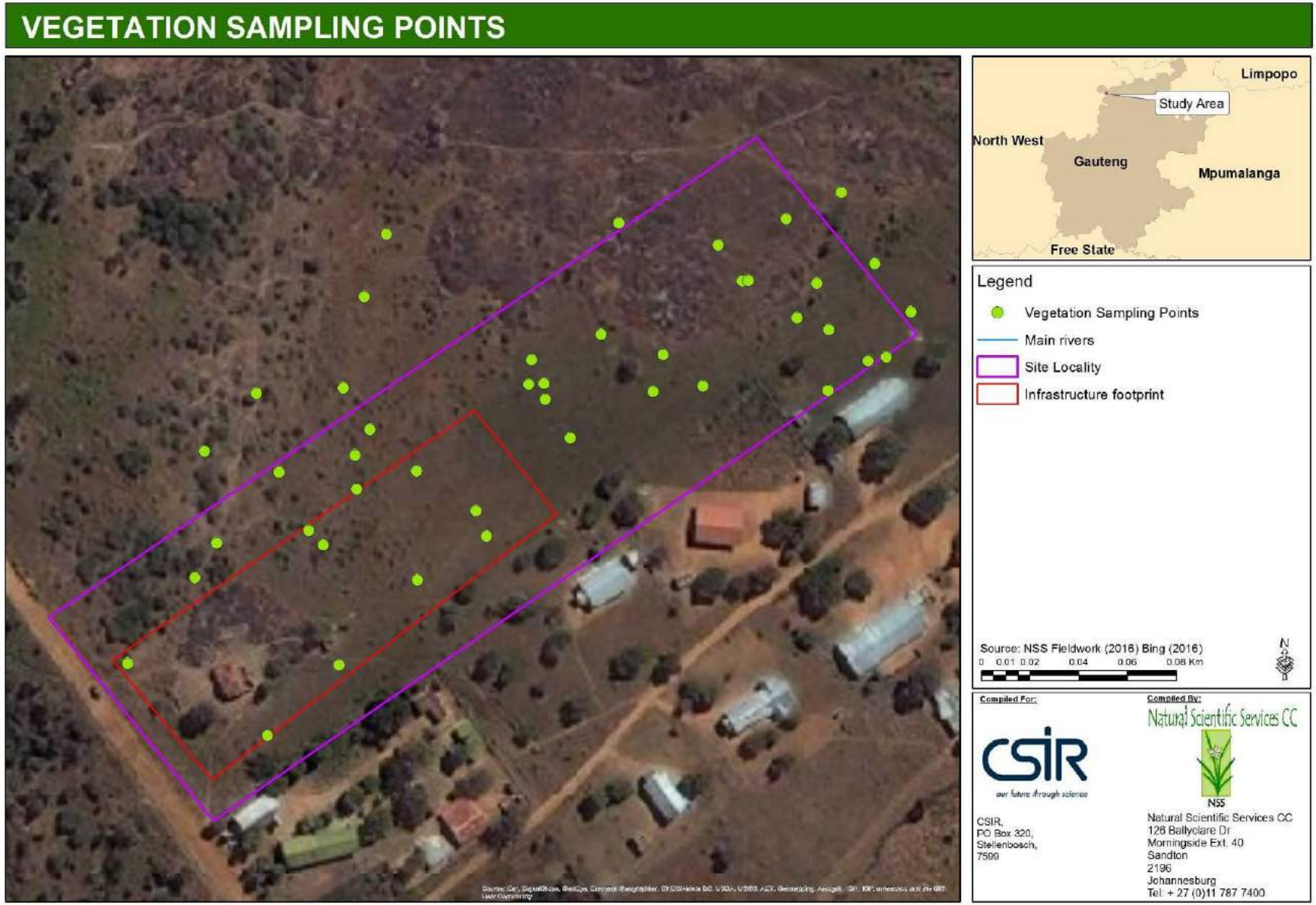


Figure 7-1 Main vegetation sampling points

7.1.1. Limitations

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 (November) site visit may be due to:

- The short duration of fieldwork as well as the timing of the fieldwork (just after the rains). The 2015/2016 season has experienced below average rainfall and is considered to be in a drought period. This period extended into the early portion of the 2016/2017 summer. This has influenced flowering and species abundance at other sites that have NSS has revisited in 2016.
- 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.

7.2. Fauna

7.2.1. Desktop Research

A list of species potentially occurring in the study area was compiled for:

- Mammals, including bats, using the published species distribution maps in Friedmann & Daly (2004) and Stuart & Stuart (2007), and Monadjem *et al*. (2010), respectively, and online species distribution data from MammalMAP (2016) for quarter degree square (QDS) 2528AC.
- Birds, using the list of bird species for QDS 2528AC from the Roberts VII (2013) mobile phone app., and the latest online list of bird species for pentad 2525_2800 from the second Southern African Bird Atlas Project (SABAP 2), which included records of bird species that were observed in QDS 2528AC during the first SABAP (SABAP 1).
- Reptiles, using the published species distribution maps in Bates *et al*. (2014), and online species distribution data from ReptileMAP (2016) for the relevant QDS.
- Frogs, using the published species distribution maps in Minter *et al*. (2004), and online species distribution data from FrogMAP (2016) for the relevant QDS.
- Butterflies, using the published species distribution maps in Mecenero *et al.* (2013), and online species distribution data from LepiMAP (2016) for the relevant QDS.
- Odonata, using the published distribution maps in Samways (2008), and online species distribution data from OdonataMAP (2016) for the relevant QDS.
- Scorpions, using the published species distribution maps in Leeming (2003). ScorpionMAP (2016) did not have any species records for QDS 2528AC.

The lists were refined based on faunal records for the area, which were received from GDARD (*pers. comm.* 2016), and our field observations, where the Likelihood of Occurrence (LoO) of each species was rated using the following scale:

1. Present: the species, or signs of its presence, was recorded.
2. High: the species is highly likely to occur.
3. Moderate: the species may occur.
4. Low: the species is unlikely to occur.

7.2.2. Fieldwork

Faunal observations were made while driving, walking, and inspecting different habitats on site and in the area. Taxa were identified based on observations of dead or live specimens, spoor, droppings, burrows and other evidence. Rocks and logs were turned to find reptiles, scorpions, frogs and invertebrates. A sweep net was used to catch butterflies and odonata.

7.2.3. Conservation Status of Species

The appended faunal lists indicate the status of relevant species according to:

- The latest (2015) list of Threatened or Protected Species (ToPS) under the National Environmental Management: Biodiversity Act (NEMBA 2004).
- The latest list of Threatened or Protected Species under the relevant provincial legislation, in this case, the Transvaal Nature Conservation Ordinance of 1983.
- The latest national or regional Red List assessment for:
  - Mammals by the SANBI & EWT (2016).
  - Birds by Taylor *et al*. (2015).
  - Reptiles by Bates *et al.* (2014).
  - Frogs by Minter *et al.* (2004).
  - Butterflies by Mecenero *et al.* (2013).
  - Dragonflies and damselflies (odonata) by Samways (2006).
- The IUCN Red List, where the global Red List status of a taxon has not been assessed during the relevant afore-mentioned national or regional Red List assessment.

An atlas and Red List assessment for South African scorpion species has not yet been published. Due to spatio-temporal variation in human disturbances, the conservation status of some species differs between the NEMBA, provincial legislation and the relevant regional or national Red List assessment publication. Unless otherwise stated, the *most* threatened status of a species is provided in text, whether this is at a global or other spatial scale. Shown in **Figure 7-2** are the IUCN's Red List categories, which have been adopted to a large extent in regional / national assessments of animal taxa.

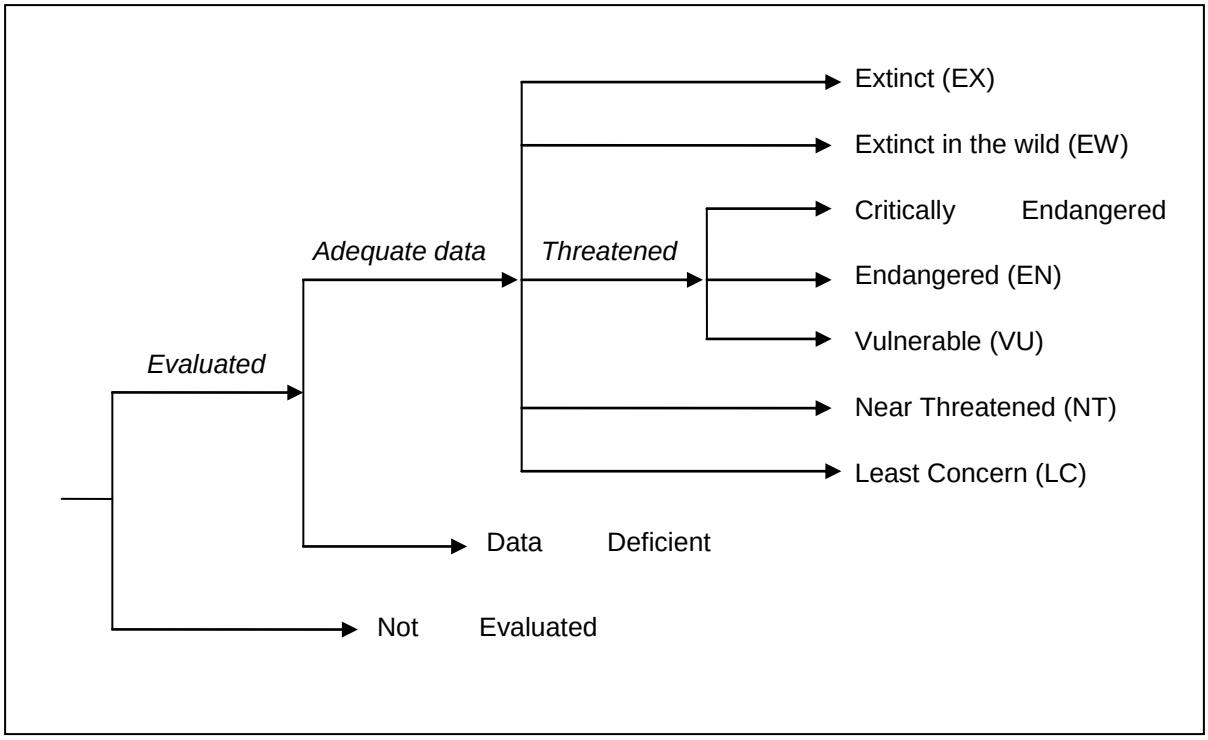


Figure 7-2 IUCN Red List categories

7.2.4. Limitations

- The investigation was an Ecoscan and therefore, the site visit was limited to day time hours and, therefore, not all potentially occurring (i.e. nocturnal) species were likely to be detected.
- Some species, which are uncommon, small, migratory, secretive or otherwise difficult to detect may not have been detected even though they were potentially present.

7.3. Wetlands

NSS was not commissioned to perform a wetland assessment, however, when on site in November 2016, the team noticed the typical wetland indicators, both vegetation and soil wetness and therefore pursued with a delineation and in-field assessment.

7.3.1. Wetland Desktop Assessment

Prior to any field investigations being undertaken, the area was surveyed at a desktop level using 1:50 000 topographical maps, Google Earth™ Imagery, contour data, provincial and national databases, as reference material to determine the layout of potential wetlands on the Study Site.

7.3.2. Wetland Classification

All wetlands were classified using the recently-published "Classification system for Wetlands and other Aquatic Ecosystems in South Africa" by Ollis *et al*. (2013), hereafter referred to as "the Classification System." Ecosystems included by the Classification System encompass

all those that are listed under the Ramsar Convention as "wetlands[2]," and include all freshwater (non-marine) systems. The Classification System recognizes three broad inland systems: rivers, wetlands and open water bodies. Like Kotze ***et al's*** (2008) classification of wetlands based on hydro-geomorphic (HGM) units, the Ollis *et al*. (2013) Classification System asserts that the functioning of an inland aquatic ecosystem is determined fundamentally by hydrology and geomorphology. The Classification System has a six-tiered structure where under the determination of a system's HGM unit (Level 4):

Level 1 – Type of system (marine, estuarine or inland).
Level 2 – Regional setting (Level 1 Ecoregions; NFEPA WetVeg units; etc.).
Level 3 – Landscape unit (valley floor, slope, plain, and bench).
Level 4 – Hydro-geomorphic (HGM) unit.
Level 5 – Hydrological regime.
Level 6 – Descriptors (natural vs. artificial; salinity; pH; etc.).

7.3.3. Wetland Extent

The wetland delineation methods used in the field were the same as those outlined in the DWS field procedure for identification and delineation of wetlands and riparian areas (DWAF, 2005). The following three indicators described by DWAF (2005) were used:

- Terrain Unit Indicator: The topography of the area was used to determine where in the landscape wetlands were likely to occur. McVicar *et al*. (1977) defines five terrain units (**Figure 7-3**). Most wetlands will be found in valley bottoms (unit 5), but can occur on crests, mid slopes and foot slopes (units 1, 3 and 4).

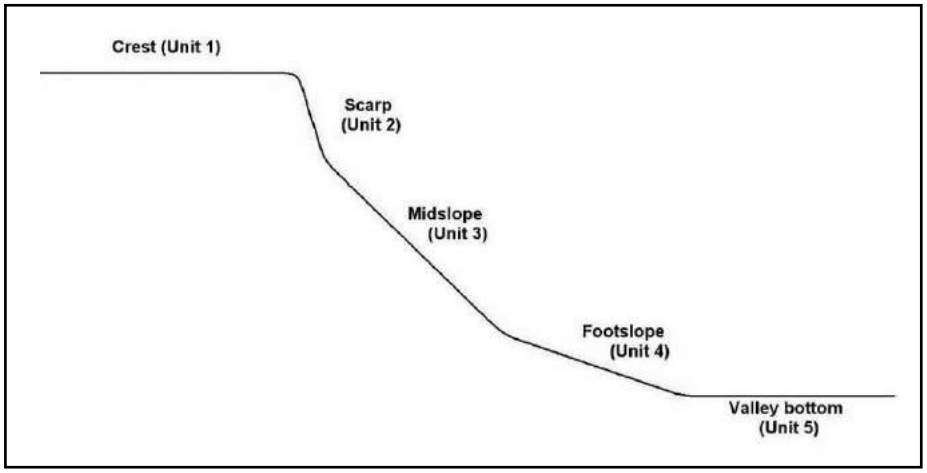


Figure 7-3 Simple depiction of terrain units (adapted from DWAF, 2005)

[2] Under the Convention on Wetlands (Ramsar, Iran, 1971) "wetlands" are defined by Articles 1.1 and 2.1 as: Article 1.1: "*For the purpose of this Convention wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres*." Article 2.1 provides that wetlands: "*may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands*".

- *Soil Wetness Indicator*: The soil wetness and duration of wetness are indicated by the colour of the soil. A grey soil matrix such as a G-horizon is an indication of wetness for prolonged periods of time and mottles indicate a fluctuating water table. In terms of the DWS guidelines (DWAF, 2005), signs of soil wetness must be found within the top 50 cm of the soil surface to classify as a wetland. The permanent zone of a wetland is therefore characterised by grey soil, the seasonal zone has a high frequency of low chroma mottles and the temporary zone has less, high chroma, mottles. These mottles are normally most prominent just below the A-horizon. Mottles may occur in non-wetland soils that have a high chroma matrix, and the colour of the matrix must always be considered in conjunction with the presence of mottles.
- *Vegetation Indicator*: Vegetation is a key component of the wetland definition in the National Water Act, 1998 (Act No 36 of 1998), and vegetation can be used as an indicator of wetland conditions. The presence / absence of hydrophytes provide a useful additional criterion in determining the boundaries of wetlands. Due to the extensive agriculture o site, the use of this indicator was limited.

7.3.4. Wetland Present Ecological State (PES)

The PES of the wetland systems identified within the site was assessed using the Level 1 WET-HEALTH tool of Macfarlane *et al.* (2008). The WET-HEALTH tool is designed to assess the health or integrity of a wetland. To assess wetland health, the tool uses indicators based on the main wetland drivers: geomorphology, hydrology and vegetation.

Macfarlane *et al.* (2008) explain that the application and methodology of WET-HEALTH uses:

- An impact-based approach, for those activities that do not produce clearly visible responses in wetland structure and function. The impact of irrigation or afforestation in the catchment, for example, produces invisible impacts on water inputs. This is the main approach used in the hydrological assessment.
- An indicator-based approach, for activities that produce clearly visible responses in wetland structure and function, e.g. erosion or alien plants. This approach is mainly used in the assessment of geomorphology and vegetation health.

With WET-HEALTH a wetland is first classified into HGM units (Level 4 – Ollis *et al.* 2013), and each HGM unit is separately assessed in terms of the extent, intensity and magnitude of impacts on the hydrology, geomorphology and vegetation of the unit, which is translated into a health score as follows:

- The *extent* of impact is measured as the proportion (percentage) of a wetland and/or its catchment that is affected by an activity.
- The *intensity* of impact is estimated by evaluating the degree of alteration that results from a given activity.

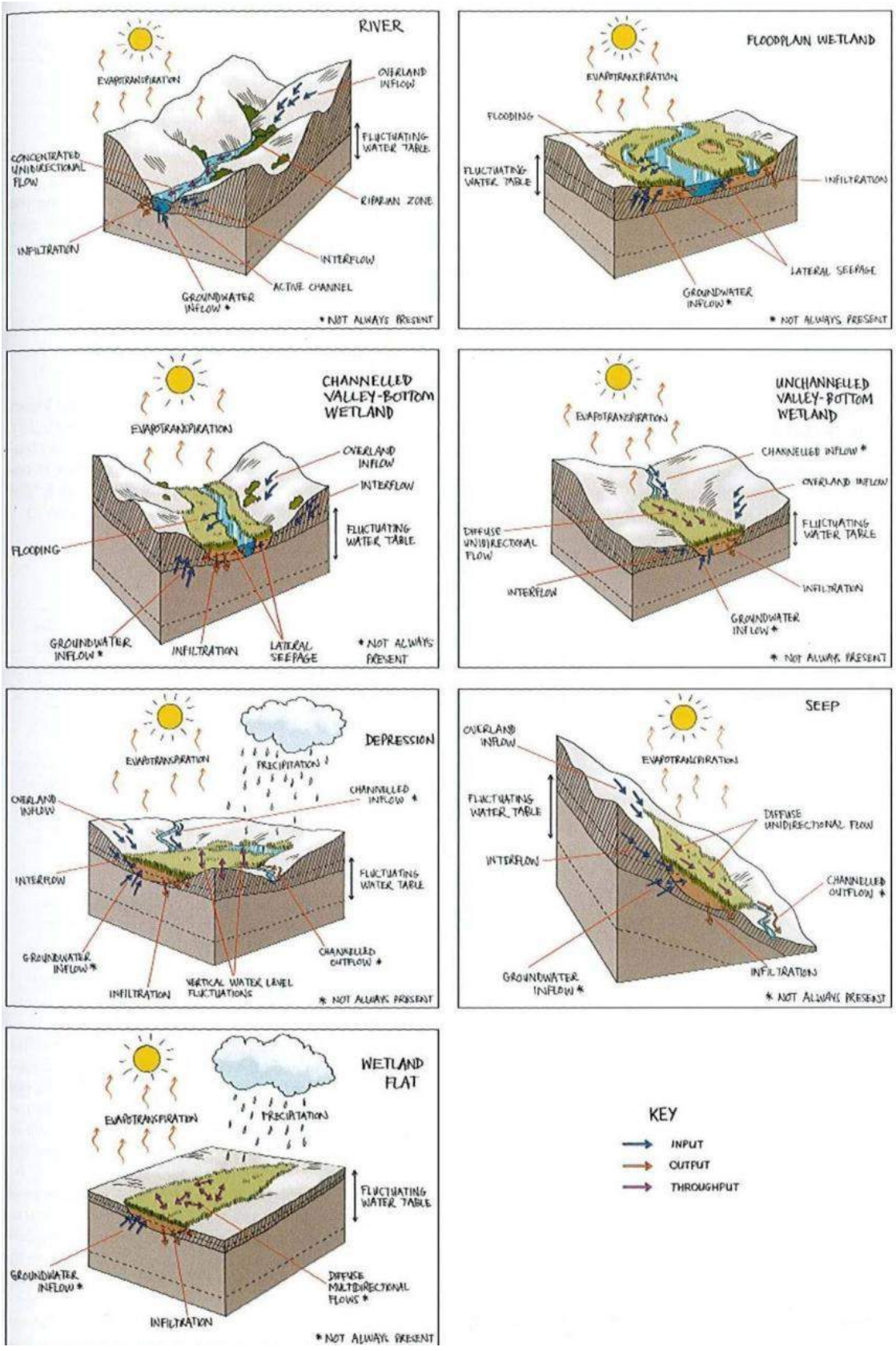


Figure 7-4 Primary wetland HGM types, highlighting dominant water inputs throughputs & outputs (Ollis *et al.* 2013)

- The *magnitude* of impact for individual activities is the product of extent and intensity.
- The magnitudes of all activities in each HGM unit are then combined in a structured and transparent way to calculate the overall impact of all activities that affect a unit's hydrology, geomorphology and vegetation, and wetland PES is expressed on a scale of A-F (**Table 7-1**).

In addition, the threat and/or vulnerability of a wetland must be assessed to determine its likely "trajectory of change" (**Table 7-2**). Overall wetland health is then jointly represented by the wetland's PES and trajectory of change. This approach not only provides an indication of hydrological, geomorphological and vegetation health, but also highlights the key causes of wetland degradation.

7.3.5. Wetland Functionality

The WET-EcoServices tool of Kotze *et al.* (2008) provides a means for rapidly assessing ecosystem services supplied by wetlands. More specifically, the tool was designed to help assess the goods and services that individual palustrine wetlands (i.e. marshes, floodplains, vleis and seeps) provide in terms of support planning and decision-making.

The wetland benefits included in the WET-EcoServices model are selected based on their importance for South African wetlands, and how readily these can be assessed. Benefits such as groundwater recharge or discharge and biomass export may be important but are difficult to characterise at a rapid assessment level, and have thus been excluded. Detailed in **Table 7-3** are the ecosystem services that are assessed during a rapid field assessment.

Table 7-1 Impact scores and Present Ecological State categories

ECOLOGICAL CATEGORY	DESCRIPTION	COMBINED IMPACT SCORE
A	**Unmodified, natural**	0-0.9
B	**Largely natural with few modifications**. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1-1.9
C	**Moderately modified**. A moderate change in ecosystem processes and loss of natural habitat has taken place but the natural habitat remains predominantly intact.	2-3.9
D	**Largely modified**. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4-5.9
E	**Seriously modified**. The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9
F	**Critically modified**. Modifications have reached a critical level and	8-10

ECOLOGICAL CATEGORY	DESCRIPTION	COMBINED IMPACT SCORE
	the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	
Source:	Modified from Macfarlane *et al.* (2008)	

Table 7-2 Trajectory of change classes, scores and symbols

TRAJECTORY CLASS	DESCRIPTION	CHANGE SCORE	CLASS RANGE	SYMBOL
Improve markedly	Condition is likely to improve substantially over the next five years	2	1.1 to 2	↑↑
Improve	Condition is likely to improve over the next five years	1	.3 to 1	↑
Remains stable	Condition is likely to remain stable over the next five years	0	-0.2 to +0.2	→
Deterioration slight	Condition is likely to deteriorate slightly over the next five years	-1	-0.3 to -1	↓
Deterioration substantial	Condition is likely to deteriorate substantially over the next five years	-2	-1.1 to 2	↓↓
Source:	Modified from Macfarlane *et al.* (2008)			

7.3.6. Wetland Ecological Importance & Sensitivity (EIS)

The assessment of wetland EIS was based on the DWAF (1999) guidelines. According to these guidelines, the "ecological importance" of a water resource is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. "Ecological sensitivity" refers to a system's ability to resist disturbance and its capability to recover from disturbance once this has occurred.

A wetland's EIS was then used to determine its Ecological Management Class (EMC). For this, a series of 10 determinants for EIS are assessed on a scale of 0 to 4, where 0 indicates no importance, and Level 4 indicates very high importance (**Table 7-4**). The median of the determinants is then used to assign a wetland's EMC (**Table 7-5**).

The determinants assessed include:

PRIMARY DETERMINANTS

- Rare and endangered species - interpreted as Red Data and other Conservation Important (CI) species.
- Populations of unique species.
- Species / Taxon richness.
- Diversity of habitat types or features.
- Migration route/breeding and feeding site for wetland species.
- Sensitivity to changes in the natural hydrological regime.

- Sensitivity to water quality changes.
- Flood storage, energy dissipation and particulate/element removal.

MODIFYING DETERMINANTS

- Protected status.
- Ecological integrity.

Table 7-3 WET-EcoServices model of wetland ecosystem services (Kotze *et al.* 2000)

Ecosystem Services supplied by Wetlands	Indirect Benefits	Regulating & supporting benefits	Flood attenuation	The spreading out and slowing down of floodwaters in the wetland, thereby reducing the severity of floods downstream
			Streamflow regulation	Sustaining streamflow during low flow periods
			Water quality enhancements: Sediment trapping	The trapping and retention in the wetland of sediment carried by runoff waters
			Water quality enhancements: Phosphate assimilation	Removal by the wetland of phosphates carried by runoff waters
			Water quality enhancements: Nitrate assimilation	Removal by the wetland of nitrates carried by runoff waters
			Water quality enhancements: Toxicant assimilation	Removal by the wetland of toxicants (e.g. metals, biocides and salts) carried by runoff water
			Water quality enhancements: Erosion control	Controlling of erosion at the wetland site, principally through the protection provided by vegetation
			Carbon storage	The trapping of carbon by the wetland, principally as soil organic matter
	Direct Benefits	**Biodiversity maintenance**		Through the provision of habitat and maintenance of natural process by the wetland, a contribution is made to maintaining biodiversity
		Biodiversity maintenance is not an ecosystem service as such, but encompasses attributes widely acknowledged as having potentially high value to society		
		Provisioning benefits	Provision of water for human use	The provision of water extracted directly from the wetland for domestic, agriculture or other purposes
			Provision of harvestable resources	The provision of natural resources from the wetland, including livestock grazing, craft plants, fish, etc.
			Provision of cultivated foods	The provision of areas in the wetland favourable for the cultivation of foods
		Cultural benefits	Cultural heritage	Places of special cultural significance in the wetland, e.g., for baptisms or gathering of culturally significant plants
			Tourism and recreation	Sites of value for tourism and recreation in the wetland, often associated with scenic beauty and abundant birdlife
			Education and research	Sites of value in the wetland for education or research

Table 7-4 Scoring guideline

SCORE GUIDELINE	CONFIDENCE RATING
Very high = 4	Very high confidence = 4
High = 3	High confidence = 3
Moderate = 2	Moderate confidence = 2
Marginal/Low = 1	Marginal/Low confidence = 1
None = 0	

Table 7-5 Ecological importance and sensitivity categories – Interpretation of median scores for biotic and habitat determinants

RANGE OF MEDIAN	ECOLOGICAL IMPORTANCE & SENSITIVITY (EIS)	RECOMMENDED EMC
>3 and <=4	**Very high** Wetlands that are considered ecologically important and sensitive on a national / international level. The biodiversity of these systems is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	A
>2 and <=3	**High** Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these systems may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	B
>1 and <=2	**Moderate** Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	C
>0 and <=1	**Low/Marginal** Wetlands which are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	D

7.3.7. Buffers

A buffer is a strip of land surrounding a wetland in which activities are controlled or restricted. Wetland buffers serve to: reduce the impact of adjacent land uses; slow potentially erosive run-off; capture sediments; absorb nutrients; and provide habitats for wetland-dependant organisms.

The Gauteng Minimum Biodiversity Guidelines were used to assign a buffer to the wetlands(GDARD, 2014). These guidelines refer to a minimum of a 50m buffer from the edge of the watercourse outside of the urban edge.

7.4. Impact Assessment

The Impact Assessment (IA) was performed according to the CSIR's IA methodology, which takes into account:

- Impact nature (direct, indirect and cumulative);
- Impact status (positive, negative or neutral);
- Impact spatial extent (**Table 7-6**);

- Impact duration (**Table 7-7**);
- Potential impact intensity (**Table 7-8**);
- Impact reversibility (high, moderate, low or irreversible);
- Irreplaceability of the impacted resource (high, moderate, low or replaceable);
- Impact probability (**Table 7-9**);
- Our confidence in the ratings (high, moderate or low);

Overall impact significance (**Table 7-10**) is calculated as:

Impact significance = Impact magnitude x Impact probability

where

Impact magnitude = Potential impact intensity + Impact duration + Impact extent

Table 7-6 Rating of impact spatial extent

EXTENT DESCRIPTION	SCORE
Site specific	1
Local (<2km from site)	2
Regional (within 30km of site)	3
National	4
International/Global	5

Table 7-7 Rating of impact duration

DURATION DESCRIPTION	SCORE
Temporary (less than 2 years) or duration of the construction period. This impact is fully reversible. *E.g. the construction noise temporary impact that is highly reversible as it will stop at the end of the construction period*	1
Short term (2 to 5 years). This impact is reversible.	2
Medium term (5 to 15 years). The impact is reversible with the implementation of appropriate mitigation and management actions.	3
Long term (>15 years but where the impact will cease after the operational life of the activity). The impact is reversible with the implementation of appropriate mitigation and management actions. *E.g. the noise impact caused by the desalination plant is a long term impact but can be considered to be highly reversible at the end of the project life, when the project is decommissioned*	4
Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient). This impact is irreversible. *E.g. The loss of a palaeontological resource on site caused by construction activities is permanent and would be irreversible.*	5

Table 7-8 Rating of potential impact intensity

NEGATIVE POTENTIAL INTENSITY DESCRIPTION	RATING	SCORE
Potential to severely impact human health (morbidity/mortality); or to lead to loss of species[3] (fauna and/or flora)	Very High/Fatal Flaw	16
Potential to reduce faunal/flora population or to lead to severe reduction/alteration of natural process, loss of livelihoods / sever impact on quality of life[4], individual economic loss	High	8
Potential to reduce environmental quality – air, soil, water. Potential Loss of habitat, loss of heritage, reduced amenity	Medium	4
Nuisance	Medium-Low	2
Negative change – with no other consequence	Low	1
POSITIVE POTENTIAL INTENSITY DESCRIPTION	**RATING**	**SCORE**
Potential Net improvement in human welfare	High	8
Potential to improve environmental quality – air, soil, water. Improved individual livelihoods	Medium	4
Potential to lead to Economic Development	Medium-Low	2
Potential positive change – with no other consequence	Low	1

"Irreplaceable loss of a resource" must be factored into the potential intensity rating of an impact

Table 7-9 Rating of impact probability

PROBABILITY DESCRIPTION	SCORE
Improbable (little or no chance of occurring <10%)	0.1
Low probability(10 - 25% chance of occurring)	0.25
Probable (25 - 50% chance of occurring)	0.5
Highly probable (50 – 90% chance of occurring)	0.75
Definite (>90% chance of occurring).	1

Table 7-10 Rating of overall impact significance

SCORE	RATING	SIGNIFICANCE DESCRIPTION
18-26	**Fatally flawed**	The project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating.
10-17	**High**	The impacts will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making.
5-9	**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.
<5	**Low**	The impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making.

[3]*Note that a loss of species is a global issue and is differentiated from a loss of "floral/faunal" populations.*

[4]*Note that a visual impact or air emissions for example could be considered as severely impacting on quality of life should it constitute more than a nuisance but not being life threatening.*

8. Results

8.1. Vegetation Structure

8.1.1. Comparative Regional Vegetation

SANBI frequently collect/collate floral data within Southern Africa and update their PRECIS database system (National Herbarium Pretoria (PRE) Computerised Information System) which is captured according to quarter degree squares (QDSs). This is referred to the POSA database. For this study, the Study Site falls within 2528AC and is adjacent to 2527BD. These two QDGs yielded 289 species within 71 families. The dominant families being, POACEAE, FABACEAE and ASTERACEAE, with the graminoids (grasses) representing 27.27%, herbs representing 27.27%, and the wooded component representing over 29% of the total species listed for the area (**Table 8.1**). In terms of the site, structural representation was following the trend presented within the larger region, with wooded species, and graminoids being the most dominant – typical of savanna habitats (**Table 8.1**). However, a large component of the sampled vegetation also represented dwarf shrubs and herbs.

Table 8-1 Top 12 dominant families and most dominant growth forms obtained from the POSA website for the QDS 2527BD and 2528AC and on site

IMPORTANT FAMILIES	No. OF SPP	GROWTH FORMS	% TOTAL SPP	ON SITE
POACEAE	75	Graminoid	27.27	**22.38**
FABACEAE	25	Herb	27.27	**19.41**
ASTERACEAE	23	Shrub to Small Trees	16.73	**26.86**
MALVACEAE	19	Dwarf shrub	9.45	**8.95**
APOCYNACEAE	10	Geophyte	4	**8.95**
LAMIACEAE	8	Climber, herb	2.91	-
ACANTHACEAE	8	Tree	2.91	1.49
CYPERACEAE	7	Cyperoid	2.55	2.98
RUBIACEAE	7	Bryophyte	1.82	1.49
ANACARDIACEAE	6	Hydrophyte	1.09	1.49
CONVOLVULACEAE	6	Parasite	1.09	1.49
COMBRETACEAE	5	Succulents	-	2.98

*mainly dominated by alien species

8.1.2. On Site - Vegetation Communities

Three main groupings emerge from the field investigations (**Table 8-2**) namely:

- Wetlands and Watercourses
- Bushveld & Thicket
- Transformed

The transformed communities represented over 43% of the site and were either in the form of past farming, topsoil harvesting, or built up (housing and church structures) with gardens

and subsistence farming (**Figure 8-1** and **Figure 8-3**). Aerial imagery extracted from Google Earth dated back to 2004 showed relatively similar land uses to today. Other than the topsoil excavations, the majority of the site has not changed over the last 13 years (**Figure 8-4**).

Three semi-natural to natural communities are located on site. These are the *Acacia* Mixed Thicket; Open *Acacia* Savanna; and the *Andropogon* Moist Disturbed Grassland (**Figure 8-1** and **Figure 8-3**). The *Acacia* communities showed some signs of wetness in patches where vegetation consisted of sedges including *Cyperus* and forbs such as *Persicaria.* In some areas where vegetation indicators were lacking, soil wetness characteristics were defined (refer to **Section 8.3**).

Table 8-2 Broad Habitat/Vegetation communities

Vegetation Community	Conservation Significance	Area -%
Wetlands and Watercourses		
Andropogon Moist Disturbed Grassland	Moderate-High	6.01
Bushveld & Thicket		
Acacia Mixed Thicket	Moderate	13.03
Open *Acacia* Savanna	Moderate	37.59
Transformed		
Transformed: Past Farming	Moderate-Low	18.79
Transformed: Housing/ Built Up	Low	4.35
Transformed: Gravel Road	Low	2.55
Transformed: Excavations	Low	6.77
Transformed - Aliens / Gardening/ Subsistence Farming	Low	10.91

The Open *Acacia* Savanna patches displayed a unique array of low lying herb species these included: *Aptosimum elongatum, Chlorophytum fasciculatum, Corchorus cf. asplenifolius, Drimiopsis burkei subsp. burkei, Eriospermum spp, Justicia betonica, Justicia flava, Kohautia amatymbica, Kyllinga alba, Ledebouria ovatifolia, Polygala spp, Riccia spp, Ruellia cordata, Vahlia capensis, Waltheria indica* and *Xerophyta humilis.*

In terms of the *Acacia* Mixed Thicket patches, these were dominated by *Acacia karoo, Acacia caffra, Acacia mellifera* subsp. *mellifera* and *Acacia tortilis*. There were, however, a number of broad leaf species that were also present. These included: *Grewia flava, Lantana rugosa, Searsia leptodictya, Ehretia rigida, Gymnosporia buxifolia, Combretum apiculatum* subsp*. apiculatum, Diospyros lycioides* subsp*. lycioides, Ziziphus mucronata* subsp*. mucronata, Pappea capensis* and *Ozoroa paniculosa.*

Open *Acacia* Savanna

Acacia Mixed Thicket

Transformed - Built-up Areas

Wetland Patches

Transformed – Past Fields

Harvesting of topsoil / excavations

Figure 8-1 Photographs of the different habitats within and surrounding the site

Xerophyta humilis

Waltheria indica

Acacia mellifera

Aptosimum elongatum

Justicia betonica

Senna italica

Kyllinga alba

Figure 8-2 Examples of Species found on site

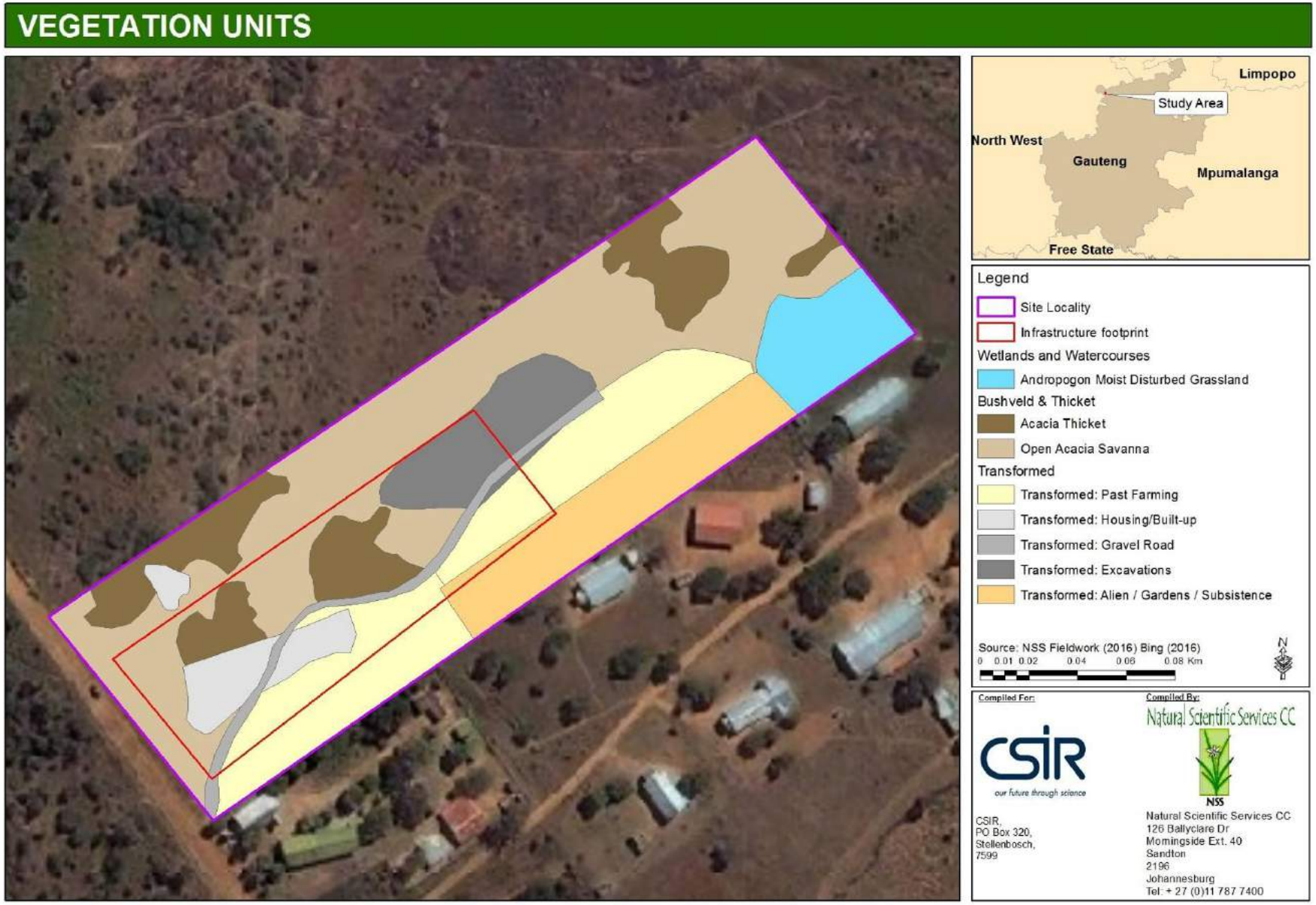


Figure 8-3 Vegetation communities within the study area

2005 *2017*

Figure 8-4 Google Earth Imagery showing limited landuse changes over time

8.1.3. Conservation Important Species

It is well documented that heterogeneous landscapes, diverse geology and a range of environmental conditions, provide a diverse number of habitats for plant species (Pickett, *et.al*. 1997; O'Farrell, 2006; KNNCS, 1999). These areas are normally associated with high levels of species endemism and richness. For example, at least 74% of the 23 threatened Highveld plant taxa occur on the crests and slopes of ridges and hills (Pfab & Victor 2002). However, homogenous landscapes, either natural or that have been transformed through historical farming practices and infrastructural development contain minimal diversity and endemism. The current Study Site is over 43% transformed through past agricultural practices, top soil harvesting, etc and is actually underutilised in terms of grazing and fire management. Although considered a brief Vegetation Scan report, NSS has included a section on Conservation Important (CI) species that were detected or could possibly be detected on site. Within this section the CI species are discussed. These include the National Threatened Plant Species Programme (TSP) lists, any Protected species according to the Nature Conservation Ordinance (12 of 1983) and any specific Endemic or Rare species.

The Threatened Plant Species Programme (TSP) is an ongoing assessment that revises all threatened plant species assessments made by Craig Hilton-Taylor (1996), using IUCN Red Listing Criteria modified from Davis *et al.* (1986). According to the TSP Red Data list of South African plant taxa (accessed March 2016), there are 77 Red Data listed species (**Table 8-3**) out of a possible 2074 species within Gauteng Province (including Data Deficient species) of which 1 species are Critically Endangered (CR), 10 Endangered (EN), 13 are Vulnerable (VU) and 19 are Near Threatened.

Table 8-3 Numbers of conservation important plant species per Red Data category within South Africa and Gauteng (date accessed: March 2017, POSA updated 2012)

Threat Status	South Africa	GAUTENG	2528AC
EX (Extinct)	28	1	-
EW (Extinct in the wild)	7	0	-

Threat Status	South Africa	GAUTENG	2528AC
CR PE (Critically Endangered, Possibly Extinct)	57	0	-
CR (Critically Endangered)	332	1	-
EN (Endangered)	716	10	1
VU (Vulnerable)	1217	13	-
NT (Near Threatened)	402	19	-
Critically Rare (known to occur only at a single site)	153	0	-
Rare (Limited population but not exposed to any direct or potential threat)	1212	4	-
Declining (not threatened but processes are causing a continuing decline in the population)	47	9	1
LC (Least Concern)	13 856	1997	206
DDD (Data Deficient - Insufficient Information)	348	1	-
DDT (Data Deficient - Taxonomically Problematic)	904	19	1
Total spp (including those not evaluated)	**23 399**	**2074**	**289**

**Date accessed – March 2017

From the POSA website (2527BD and 2528CA QDS) as well as surrounding studies, a number of CI species has been recorded in the greater region (**Table 8-5**). This includes the Endangered *Brachystelma discoideum,* which could occur within the more sandy *Open Acacia Bushveld* within the Study Site. The survey was conducted during its flowering time, but the species was not detected during the survey. From the 11 species listed, habitat potentially exists for approximately 10 species. The survey was conducted in mid summer, during the flowering time of most of the species. In addition to these species, no Protected species under the Nature Conservation Ordinance, 12 of 1983 were detected or under the National Forests Act 1998 (Act No 84 of 1998). Protected Species may not be cut, disturbed, damaged, destroyed without obtaining a permit from Gauteng Province or a delegated authority.

8.1.4. Alien and Invasives Species

Alien, especially invasive[5] plant species are a major threat to the ecological functioning of natural systems and to the productive use of land. In the region, several alien plants are widely scattered but often at low densities; these include *Cereus jamacaru, Eucalyptus species, Lantana camara, Melia azedarach, Opuntia ficus-indica* and *Sesbania punicea.* For the Study Site approximately 43% is transformed but this does not present dense infestations of alien species. Although a

Alien Invasive Categories according to NEM:BA; Act 10 of 2004:

Category 1a
Species requiring compulsory control.
Category 1b
Invasive species controlled by an invasive species management programme
Category 2
Invasive species controlled by area
Category 3
Invasive species controlled by activity

[5] Two main pieces of national legislation are applicable to alien, invasive plants, namely the:

- Conservation of Agriculture Resources Act (CARA; Act 43 of 1983); and
- National Environmental Management: Biodiversity Act (NEM:BA; Act 10 of 2004):

number of indigenous pioneer species are present. (**Figure 8-5**).

In the brief scan of the site, a minimum of 6 species were recorded. Only one of these is listed as a Category 1b species in NEMBA. *Jacaranda mimosifolia* is only considered a Category1b in rural areas (**Table 8-4**). Within the wetter areas, species such as *Persicaria cf lapathifolia* and *Pseudognaphalium luteo-album* were present and *Gomphrena celosioides* and *Portulaca oleracea* were prevalent in the past fields.

Table 8-4 Alien and Invasive Species detected during the survey

Family	Species	Growth forms	CARA	NEMBA
ASTERACEAE	*Cosmos bipinnatus* Cav.	Herb	Weed	-
AMARANTHACEAE	*Gomphrena celosioides* Mart.	Herb	Weed	-
BIGNONIACEAE	*Jacaranda mimosifolia* D.Don	Tree	3	1b in rural areas
POLYGONACEAE	*Persicaria cf lapathifolia*	Herb	Weed	-
PORTULACACEAE	*Portulaca species*	Herb	Weed	-
ASTERACEAE	*Pseudognaphalium luteo-album* (L.) Hilliard & B.L.Burtt	Herb, shrub	Weed	-

Pseudognaphalium luteo-album

Jacaranda mimosifolia

Figure 8-5 Photographs of Alien species on Site

Table 8-5 Potential CI species based on information obtained from 2527BD and 2528CA QDG as well as from surrounding studies

FAMILY	SPECIES	STATUS	FLOWERING TIME	HABITAT	LoO
MYROTHAMNACEAE	*Myrothamnus flabellifolius Welw.*	DDT	Spring-Summer	In shallow soil over sheets of rock	No Habitat
HYPOXIDACEAE	*Hypoxis hemerocallidea*	DEC	Summer	Occurs in a wide range of habitats	Possible
HYACINTHACEAE	*Drimia altissima (L.f.) Ker Gawl.*	Declining	September-February	Hot, dry bushveld and thicket.	Possible
HYACINTHACEAE	*Drimia elata Jacq.*	DDT	Summer	Grassland and Bushveld	Possible
HYACINTHACEAE	*Drimia sanguinea (Schinz) Jessop*	NT	August-December	Open veld and scrubby woodland in a variety of soil types.	Possible
ASTERACEAE	*Callilepis leptophylla Harv.*	Declining	August-January & May	Grassland or open woodland, often on rocky outcrops or rocky hillslopes.	Possible
APOCYNACEAE	*Brachystelma discoideum R.A.Dyer*	EN	November	Savanna in gravelly sandy soil.	Possible
AMARYLLIDACEAE	*Boophone disticha (L.f.) Herb.*	Declining	October-January	Dry grassland and rocky areas.	Possible
AMARYLLIDACEAE	*Crinum macowanii Baker*	Declining	October-January	Grassland, along rivers, in gravelly soil or on sandy flats.	Possible
FABACEAE	*Cullen holubii* (Burtt Davy) C.H.Stirt.	VU	Unknown	Springbokvlakte Thornveld	Possible
POACEAE	*Mosdenia leptostachys*	Regional Endemic		Springbokvlakte Thornveld	Possible

* Endangered – EN; Near Threatened – NT; Declining-DEC; Data Deficient Taxonomically – DDT

8.2. Fauna

Provided in the appended lists under **13.2-13.8** is the name and conservation status of each mammal, bird, reptile, frog, butterfly, odonata (dragonfly and damselfly) and scorpion species that has been recorded, or is considered highly likely or likely to occur in the study area.

8.2.1. Mammals

Given the observed high level of human, livestock and hunting dog activity, only approximately 40 mammal species are considered highly likely or likely to occur at least sporadically in the study area (**Appendix 13.2**). During the site visit, the only observed evidence of native mammals included mounds of the Southern African / Common Mole-rat (**Figure 8-6**). Anthropogenic disturbance aside, regionally occurring rupiculous mammal species (e.g. Rock Dormouse, Eastern Rock Elephant Shrew, Rock Hyrax, and Namaqua Rock Mouse) and aquatic mammal species (e.g. otters) are unlikely to occur due to the absence of suitable habitat on site. Lack of suitable habitat, over-grazing, and high levels of dog and human activity are considered to preclude regionally-occurring Protected and/or threatened mammal species such as the Near Threatened (NT) Southern African Hedgehog, Serval and Swamp Musk Shrew.

Common Mole-rat (*Cryptomys hottentotus*) mounds

Figure 8-6 Evidence of mammal species on site

8.2.2. Birds

Approximately 411 bird species are listed for QDS 2528AC (Roberts VII 2013), of which 230 were rated with a high or moderate LoO in the study area. Approximately 286 bird species have been recorded in pentad 2525_2800 (SABAP 2 2016), and 43 bird species were detected during the brief site visit (**Appendix 13.3**). Rupicolous or montane birds (e.g. rock thrushes, Jackal Buzzard, Rock Kestrel and Verreaux's Eagle) and most regionally-occurring water birds (e.g. bitterns, cormorants, crakes, grebes, flamingos, kingfishers, night herons, pelicans, sandpipers, stints, etc.) are unlikely to occur due to the absence of rocky / montane and significant aquatic / wetland habitat on site. The bird species that were recorded during the site visit (**Figure 8-7**) represent common, widespread species that are more or less

tolerant of human, livestock and dog activity (e.g. barbets, bishops, cuckoos, doves, larks, prinias, shrikes, swallows and swifts). The Alien Common Myna was also recorded on site.

Crowned Lapwing
(*Vanellus coronatus*)

Sabota Lark
(*Calendulauda sabota*)

Great Spotted Cuckoo
(*Clamator glandarius*)

Figure 8-7 Evidence of bird species on site

Only three bird species with a Protected or threatened status are considered likely to occur at least occasionally in the study area (**Table 8-6**).

- The regionally Vulnerable (VU) Lanner Falcon favours open grassland or woodland in the vicinity of cliff or electricity pylon breeding sites (Roberts VII 2013). Although cliffs and large pylons appear to be absent /limited, small birds and other suitable prey for Lanner Falcons are common in the study area. Given that this species was recorded in pentad 2515_2750 during April 2016 (SABAP 2 2016), it was rated with a moderate LoO in the study area.
- The globally and regionally NT Red-footed Falcon favours open semi-arid and arid savannas, and preys mainly on insects, especially termites and grasshoppers (Roberts VII 2013). Although it has not yet been recorded in pentad 2515_2750 by SABAP 2 observers (SABAP 2 2016), it was nonetheless rated with a moderate LoO in the study area.
- The regionally NT European Roller overwinters in South Africa primarily in dry wooded savanna and bushy plains, and is known to forage in agricultural habitats including fallow lands. It has not yet been recorded in pentad 2515_2750 by SABAP 2 observers (SABAP 2 2016), but was rated with a moderate LoO in the study area.

Table 8-6 Potentially occurring conservation important bird species

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Falco biarmicus	Lanner Falcon		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	3
Falco vespertinus	Red-footed Falcon		PG Schedule 2 Section 15(1)(a)	NT	NT	1	1	3
Coracias garrulus	European Roller		PG Schedule 2 Section 15(1)(a)	LC	NT	1	1	3

Status: LC = Least Concern; NT = Near Threatened; PG = Protected Game; VU = Vulnerable
Likelihood of Occurrence (LoO): 1 = Present; 3 = Moderate
Sources: Transvaal Nature Conservation Ordinance (1983); Roberts VII (2013); NEMBA ToPS (2015); Taylor *et al.* (2015); SABAP 2 (2016)

8.2.3. Reptiles

Approximately 55 reptile species are considered highly likely or likely to occur at least occasionally in the study area (**Appendix 13.4**). Regionally-occurring rupicolous reptile species (e.g. the Southern Rock Agama, Common and Jone's girdled lizards, Turner's and Spotted Dwarf geckos, and Rock Monitor) and strongly aquatic reptile species (e.g. the South African Marsh and Serrated Hinged terrapins, South Eastern and Western Natal green snakes, and Water Monitor) are unlikely to occur due to the absence of suitable habitat on site. Regionally-occurring CI reptile species including the NT Coppery Grass Lizard and Striped Harlequin Snake, and the Protected Southern African Python, are considered unlikely to occur due to lack of suitable habitat and the high levels of human, livestock and dog activity in the study area.

8.2.4. Frogs

Approximately 16 frog species are considered highly likely or likely to occur in the study area (**Appendix 13.5**). During the site visit, Common Caco, Bubbling Kassina and Striped Grass Frog were heard calling nearby. The presence of Striped Grass Frog indicated that a nearby permanent water source is available, which might support breeding also by toads and other frog species. In addition, a recently killed male bullfrog and his live school of tadpoles was found at a small (approximately 3m x 3m) rain-filled depression on site (**Figure 8-8**). The bullfrog's cause of death is not known, but was likely human-inflicted. It was identified as an African Bullfrog based on its body size and skin patterning (Yetman, 2012). It should be noted, however, that in northern Gauteng (and elsewhere), some Giant Bullfrogs closely resemble African Bullfrogs, and to date, bullfrog genetic samples from northern Gauteng (including the nearby Tswaing Crater) have only confirmed the presence of Giant Bullfrogs (Yetman, 2012). **In other words, it is possible that the observed species was in fact a Giant Bullfrog (Table 8-7).**

- The Giant Bullfrog is listed as regionally NT by Minter *et al.* (2004). It is threatened mainly by habitat loss, but it's mortality on roads, and it's harvesting for food and the pet trade are also problematic. For most of the year bullfrogs are buried in a state of torpor, and are typically active aboveground for a night or two after heavy rain in November-January. Bullfrog breeding is limited to a few days in the year and occurs in

shallow, standing, seasonal water with emergent grassy vegetation. Bullfrog foraging appears to be concentrated around their burrows, which may be situated up to 1km from their breeding site (Yetman & Ferguson 2011).

Bullfrog breeding site

School of bullfrog tadpoles

Bullfrog tadpoles

Dead male bullfrog

Figure 8-8 Photographic evidence of bullfrog breeding on site

Table 8-7 Potentially occurring conservation important frog species

SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO	
					QDS	SITE
Pyxicephalus adspersus	Giant Bullfrog	**PG Schedule 2 Section 15(1)(a)**	LC (D)	**NT**	2	2

Status: D = Declining; LC = Least Concern; NT = Near Threatened; PG = Protected Game
Likelihood of Occurrence (LoO): 2 = High; 3 = Moderate
Sources: Transvaal Nature Conservation Ordinance (1983); Minter *et al.* (2004); NEMBA ToPS (2015); FrogMAP (2016); IUCN (2016)

8.2.5. Butterflies

Based on the published butterfly distribution maps in Mecenero *et al.* (2013), approximately 161 butterfly species are considered highly likely to occur in QDS 2528AC, and 41 were rated with a moderate LoO. LepiMAP (2016) holds records for 136 butterfly species from QDS 2528AC (**Appendix 13.6**), most of which are likely to occur on, or at least pass through the site (**Figure 8-9**). The regionally-occurring but rare Marsh Sylph, Hilltop Hopper and Potchefstroom Blue butterflies are unlikely to occur on site due to lack of suitable habitat for these species.

Brown-veined White (*Belenois aurota*)

Figure 8-9 Evidence of butterfly species on site

8.2.6. Odonata

Based on the published odonatan distribution maps in Samways (2006), approximately 31 dragonfly and damselfly species are considered highly likely to occur in QDS 2528AC, and 21 were rated with a moderate LoO in the QDS (**Appendix 13.6**). The regionally-occurring and nationally VU Cryptic Spreadwing, which is known from Mosdene Swamps, Naboomspruit in Limpopo Province, is unlikely to occur on site. Although this species inhabits pools and swamps in hot savanna, these must be accompanied by an abundance of tall grass, reeds and nearby thick bush. The rain-filled depression on site does not meet all these criteria.

8.2.7. Scorpions

Approximately eight scorpion species are considered highly likely or likely to occur in the study area (**Appendix 13.8**). Scorpion species most likely to occur based on their distributions, and observed habitat conditions (esp. substrates and shelter) on site, include the widespread *Uroplectes vittatus,* which is found under the bark of trees or under fallen logs, and *Opistophthalmus glabifrons* which is found in loamy soils (Leeming 2007). Regionally-occurring rupiculous scorpion species (e.g. *Uroplectes planimanus* and *Opistophthalmus pugnax*) are unlikely to occur given the lack of rocky habitat on site. None of the potentially occurring scorpion species has a threatened or Protected status.

8.3. Wetlands

Wetland sampling points and delineations are depicted in **Figure 8-10**. Results of the Wetland Assessment are summarised in **Table 8.8** and discussed below.

Table 8-8 Wetland summary HGM Unit 1

HGM Unit 1 – Seep with channelled outflow			
			
HGM Unit 1 and Sampling Points	Seep	Seep	
			
	Mottling in Dundee soils	*Cyperus* cf. *congestus*	
SETTING			
Coordinates (Centroid)	25°26'12.25" S28°2'12.29"E	Level 1: System	Inland
Altitude (m.a.s.l)	1145	Level 2a: Ecoregion	8.05
Aspect	North	Level 2b: NFEPA WetVeg	Central Bushveld Group 3
Regional vegetation	SVcb12	Level 3: Landscape unit	Slope and valley floor
Quaternary catchment	A21J	Level 4a:	Seep
CPLAN V3.3	ESA (marginal)	Level 4b:	With channelled outflow
Area (ha)	1.8		
SITE DESCRIPTION			
Overview	A small northerly draining ephemeral seep system without a channelled outflow in a rural bushveld setting.		
Wetland indicators	Vegetation, topographic and soil indicators present.		
Impacts	Houses, localised soil harvesting, small scale cultivation (past) and grazing (current).		
Dominant species	*Andropogon eucomis, Kylinga erecta, Lobelia flaccida, Cyperus* cf. *congestus and Paspalum dilatatum*.		
Soil characteristics	Light brown alluvial deposits mostly Dundee (DU 10)		
Present Ecological State (PES)			
Hydrology	Geomorphology	Vegetation	
C	**B**	**C**	
Wetland Ecosystem Services			
Biodiversity ,maintenance, regulating and provisional services			
Wetland Importance and Sensitivity			
Hydrological	Ecological	Cultural	
High (2.6)	**Moderate (1.9)**	**Moderate (1.6)**	

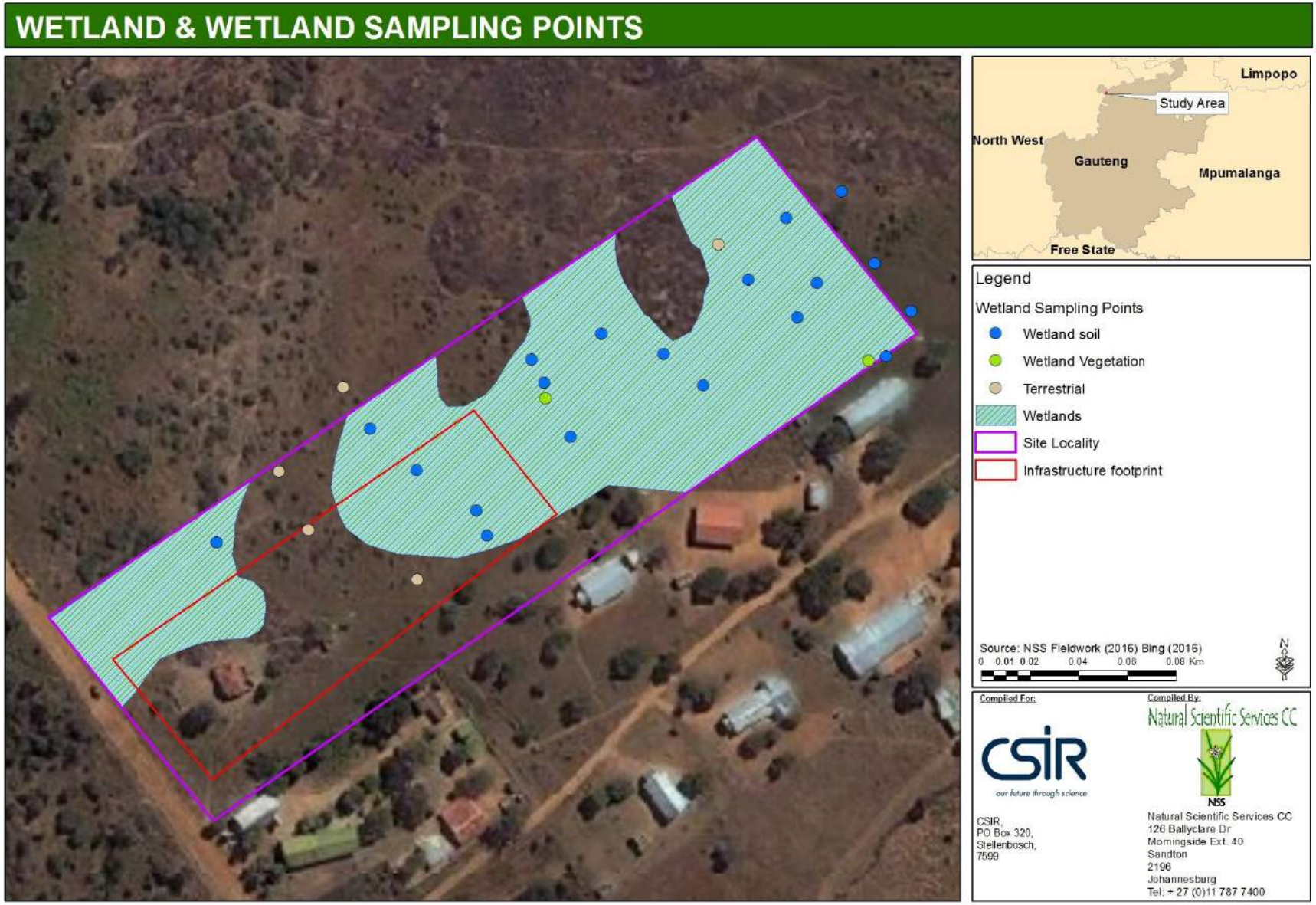


Figure 8-10 Current wetland extent

8.3.1. Wetland Classification and Extent

The wetland on site was classified, following Ollis *et al.* (2013), as a Seep without a channelled outflow. Seeps are wetland areas located on gently to steeply sloping land that are dominated by colluvial (i.e. gravity driven), unidirectional movement of water and material down-slope. The seep identified in the study area is considered not to have a channelled outflow. This means that water exits the seep by means of a combination of diffuse surface flow, interflow, evaporation and infiltration. These systems are normally associated with groundwater discharges, although flow through them may be supplemented by surface water contribution (which is more likely the dominant case here). The Level 1-4 wetland classification (Ollis *et al.* 2013) for the HGM unit is given in **Table 8-9.** The current wetland extent is depicted in **Figure 8-10**.

Table 8-9 Wetland classification

NAME	**HGM Unit**	1
LEVEL 1	**System**	INLAND
LEVEL 2	**DWA Ecoregion**	8.05
	NFEPA WetVeg	CBG 3
LEVEL 3	**Landscape Unit**	Slope and Valley floor
LEVEL 4	**4a**	Seep
	4b	Without Channelled outflow
	4c	NA
STATUS	**Threat**	VU
	Protection	NP

Key: VU = Vulnerable; HGM = Hydrogeomorphic Unit; CBG= Central Bushveld Group

8.3.2. Wetland Present Ecological State

A summary of the PES of the wetland HGM unit identified on site is provided in **Table 8-10** and discussed in greater detail per wetland driver (hydrology, geomorphology and vegetation) below. Examples of the main existing wetland impacts are given in **Figure 8-11**. Overall HGM Unit 1 scored C for hydrology, B for geomorphology and C for vegetation.

b

Topsoil harvesting | Signs of grazing | Houses and alien trees

Figure 8-11 Existing wetland impacts

In terms of hydrology changes in water input characteristics from the catchment is expected to be low due to the low extent and intensity of rural settlement and other impacts in the

catchment. No major discharge points are evident and as such catchment activities likely to result in minor reductions to water input. Additionally no eutrophication or major alterations to the water quality of the system (from the reference state) is to be expected. A small increase in floodpeaks is expected due to the hardened surfaces as a result of the settlements. Within the HGM unit a slight reduction in surface roughness (due to grazing) and some severe but localised topsoil removal has likely decreased the retention capacity of the wetland, hence its Moderately Modified rating. The system's geomorphology remains in a largely natural state. Although the increased surface roughness, decreased vegetative roughness and soil type (Dundee DU10) suggest a relatively high risk for gully formation, its relatively flat gradient is likely to play a role in ameliorating erosional effects. Some localised topsoil harvesting has resulted in a loss of wetland organic matter however the severity of the loss is low due to the ephemeral nature of the system and complete lack of peat. In terms of vegetation, a large proportion of the site remains in a relatively natural state and is a good representation of the prevailing Central Sandy Bushveld. However a small residence, soil disturbances and subsistence cultivation practices have degraded the vegetation integrity, hence its designation as Moderately Modified. In spite of this alien and invasive species encroachment is negligible.

Table 8-10 Wetland present ecological state

NAME	Ha	EXTENT (%)	HYDROLOGY		GEOMORPHOLOGY		VEGETATION	
			IMPACT	CHANGE	IMPACT	CHANGE	IMPACT	CHANGE
HGM Unit 1	1.8	100	3.5	-1	1.6	-1	3.1	-1
PES category			C	↓	B	↓	C	↓

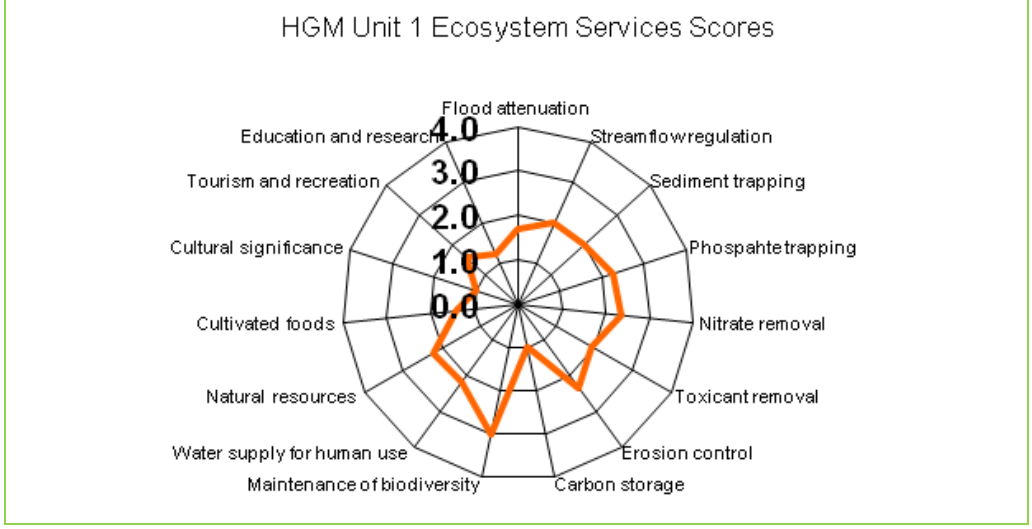
8.3.3. Wetland Ecosystem Services

The results of the eco-system services assessment for the HGM unit are summarised in **Table 8-11**. In its current state, this system is particularly important from a biodiversity maintenance perspective (due to its evident capacity to support bullfrogs) and provides important regulating (particularly in terms of nutrient removal and erosion control) as well as provisional benefits (due to its capacity to provide clean water and crops to the rural community).

Table 8-11 Ecosystem services supplied by the identified wetland HGM units

			HYDRO-GEOMORPHIC SETTING	RATING HGM UNIT 1
Ecosystem Services	Indirect benefits	Regulating/supporting	Flood attenuation	Intermediate
			Streamflow regulation	Intermediate
			Sediment trapping	Intermediate
			Phosphate trapping	Moderately High
			Nitrate removal	Moderately High
			Toxicant removal	Intermediate
			Erosion control	Moderately High
			Carbon storage	Moderately Low
	Direct benefits		Maintenance of biodiversity	High
		Provisional	Water supply for human use	Moderately High
			Natural resources	Moderately High

			Cultivated foods	**Moderately Low**
		Cultural	Cultural significance	**Moderately Low**
			Tourism and recreation	**Intermediate**
			Education and research	**Moderately Low**



8.3.4. Wetland Importance and Sensitivity

The results of the EIS assessment for the system identified on site are summarised in **Table 8-12**. The ecological importance of the system was scored as High. Although the site is unlikely to support a high diversity of conservation important species it does evidently support bullfrogs. Two species occur sympatrically in the region the Giant Bullfrog and African Bullfrog. Of these Giant Bullfrog is the more conservation important with a red list status of Near-threatened. It is possible that this is the species that occurs on site. The wetland is of particular significance in this regard as a small depression within it is being used for breeding (tadpoles observed). Otherwise the wetland is not likely to support large populations of any other unique wetland fauna or flora. Furthermore the absence of any large open water bodies or mudflats suggests that any significant congregations of migratory waterfowl are unlikely. However upper catchment wetland systems such as this are under severe levels of threat from sprawling settlements (evident from Google Earth time series).

The NFEPA Wet Veg database recognises the Central Bushveld Group 3 seeps such as this are listed as Critically Endangered and Not Protected. Furthermore the regional vegetation unit is classified as Vulnerable according to Mucina & Rutherford (2006). The hydrological importance was rated as Moderate due to the HGM unit's significant contribution to biodiversity maintenance, nutrient removal and erosion control while its importance and sensitivity from a human perspective also scored Moderate due to its role in the provision of important resources (water and crops). Additionally the system is situated at the head of a catchment which ultimately drains the A23J-00782 reach of the Kutswane River. This reach has a PES rating (from an aquatic perspective) of D Largely Modified and an EI rating of Moderate and ES rating of Low.

Table 8-12 Wetland importance and sensitivity

WETLAND IMPORTANCE AND SENSITIVITY			
NAME	ECOLOGICAL	HYDROLOGICAL	HUMAN
HGM Unit 1	High (2.6)	Moderate(1.9)	Moderate (1.6)

9. Areas of Significance

The site significance assessment, which includes a significance map for terrestrial biodiversity on the site, was based on the findings from the ecological scan, as well as relevant international, national and provincial planning and other biodiversity conservation initiatives as described below.

9.1. International Areas of Conservation Significance

The site does not fall into any proclaimed:

- *Ramsar Site.*
- *World Heritage Site.*
- *Important Bird Area (IBA)* – see **Figure 9-1**.

9.2. National and Regional Areas of Conservation Significance

As inferred earlier in this report, a number of biodiversity features with recognised national or provincial conservation importance, require consideration.

9.2.1. Protected Areas

As mentioned earlier, the proposed development site is situated approximately 3.5km west of the **Tswaing Meteorite Crater Reserve** (**Figure 9-1**). Tswaing is a meteorite impact crater that is now approximately 1km in diameter and 100m deep. It is estimated to be 220,000 ± 52,000 years old (Wikipedia 2016). The crater is surrounded by dense bush and the crater lake, which is approximately 100m in diameter and filled by rain and spring water. The lake once contained high concentrations of salt and soda ash that were mined for 44 years until 1956. “Just east of the crater is the Soutpanspruit, which feeds a rare wetland system that is home to game, a large number of bird species, smaller mammals such as otters, genets, brown hyenas, civets and steenbok, reptiles and frogs” (www.gauteng.net).

9.2.2. Terrestrial Priority Areas & Threatened Ecosystems

The Terrestrial Component (Rouget *et al.* 2004) of the National Spatial Biodiversity Assessment integrated data on species, habitats and ecological processes to identify areas of greatest terrestrial biodiversity significance. This resulted in the identification of nine spatial terrestrial Priority Areas, which represent high concentrations of biodiversity features and/or areas where there are few options for meeting biodiversity targets. The proposed development site is situated within the **Bushveld-Bankenveld Priority Area** (**Figure 9-2**), which faces the highest pressure of the nine identified national Priority Areas (NBI 2004).

A list of Threatened Ecosystems within each terrestrial Priority Area was gazetted on 9 December 2011 under the NEMBA (Act 10 of 2004). The Threatened Ecosystems occupy 9.5% of South Africa, and were selected according to six criteria which included;(1) irreversible habitat loss,(2) ecosystem degradation,(3) rate of habitat loss,(4) limited habitat extent and imminent threat,(5) threatened plant species associations, and (6) threatened animal species associations. The proposed development site is not situated within a recognized terrestrial Threatened Ecosystem (**Figure 9-2**).

9.2.3. Water Resources

A broad spectrum of international, regional and national legislation and guidelines applies to the protection of wetlands and their biodiversity. The National Water Act (NWA; Act 36 of 1998) is the principle legal instrument relating to water resource management in South Africa. Under the NWA, all wetlands and their buffer zones are protected.

The NWA points out that it is:

> "*the National Government's overall responsibility for and authority over the nation's water resources and their use, including the equitable allocation of water for beneficial use, the redistribution of water, and international water matters."*

According to Chapter 3 of the NWA on the protection of water resources:

> *"The protection of water resources is fundamentally related to their use, development, conservation, management and control. Parts 1, 2 and 3 of this Chapter lay down a series of measures which are together intended to ensure the comprehensive protection of all water resources."*

9.2.4. Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas project (NFEPA; Driver *et al.* 2011) provides strategic spatial priorities for conserving freshwater ecosystems and supporting sustainable use of water resources in South Africa. Freshwater Ecosystem Priority Areas (FEPAs) were identified using a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries. The NFEPA spatial data indicate that the two nearest major drainage lines, i.e. the Kutswane and Tolwane rivers, have not yet been classified. However, the Tswaing Crater lake, which is approximately 5.5km north-west of the site, is classified as a wetland FEPA (**Figure 9-3**).

The NFEPA guidelines state that FEPAs should be regarded as ecologically important and as generally sensitive to changes in water quality and quantity, owing to their role in protecting freshwater ecosystems and supporting sustainable use of water resources. FEPAs that are in a good condition should remain so, and FEPAs that are not in a good condition should be rehabilitated to their best attainable ecological condition. Land-use practices or activities that

will lead to deterioration in the current condition of a FEPA are considered unacceptable, and land-use practices or activities that will make rehabilitation of a FEPA difficult or impossible are also considered unacceptable.

9.2.5. Gauteng C-Plan v.3.3.

The Gauteng Conservation or C- Plan is the outcome of systematic conservation planning by the Gauteng Department of Agriculture and Rural Development (GDARD), for improved conservation of biodiversity in the province. According to the latest available C-Plan, there are no provincial Critical Biodiversity Areas (CBAs) in the study region. However, the small, seasonal drainage lines that run past the north-east and north-western boundaries of the site, represent provincial Ecological Support Areas (ESAs; **Figure 9-4**).

ESAs are not essential for meeting provincial biodiversity targets, but play an important role in supporting CBAs and/or in delivering ecosystem services (GDARD 2014). In Gauteng, Irreplaceable and other Critical Biodiversity Areas (CBAs) were identified using data on land cover, vegetation, threatened species, aquatic features and features pertaining to climate change. ESAs include dolomite outcrops, rivers, pans, other wetlands, corridors for climate change and species migration, rocky ridges, and biodiversity priority areas aligned with existing Metropolitan Open Space Systems in Johannesburg, Ekurhuleni and Tshwane (GDARD 2014).

9.3. Local Areas of Conservation Significance

The conservation significance of local biodiversity was rated and mapped based on:

- Ecological sensitivity (including renewability/success for rehabilitation);
- Level/Extent of disturbance.
- Presence of CI species (identified at the vegetation unit/habitat level); and
- Conservation value (at a regional, national, provincial and local scale).

Identified habitat units within the study site were ranked into ***High***, ***Medium-high***, ***Medium, Medium-low*** or ***Low*** classes in terms of significance. This was undertaken according to a sensitivity-value analysis (scoring in **Table 9.1**) and included input based on knowledge of the area, on the ground investigations and experience when dealing with ecological systems and processes.

Table 9-1 Scoring Range for the Areas of Significance

Category	Scoring Range	
	Upper	Lower
High	15	11.1
Moderate - High	11	7.1
Moderate	7	3.1
Moderate - Low	3	-0.9
Low	-1	-5

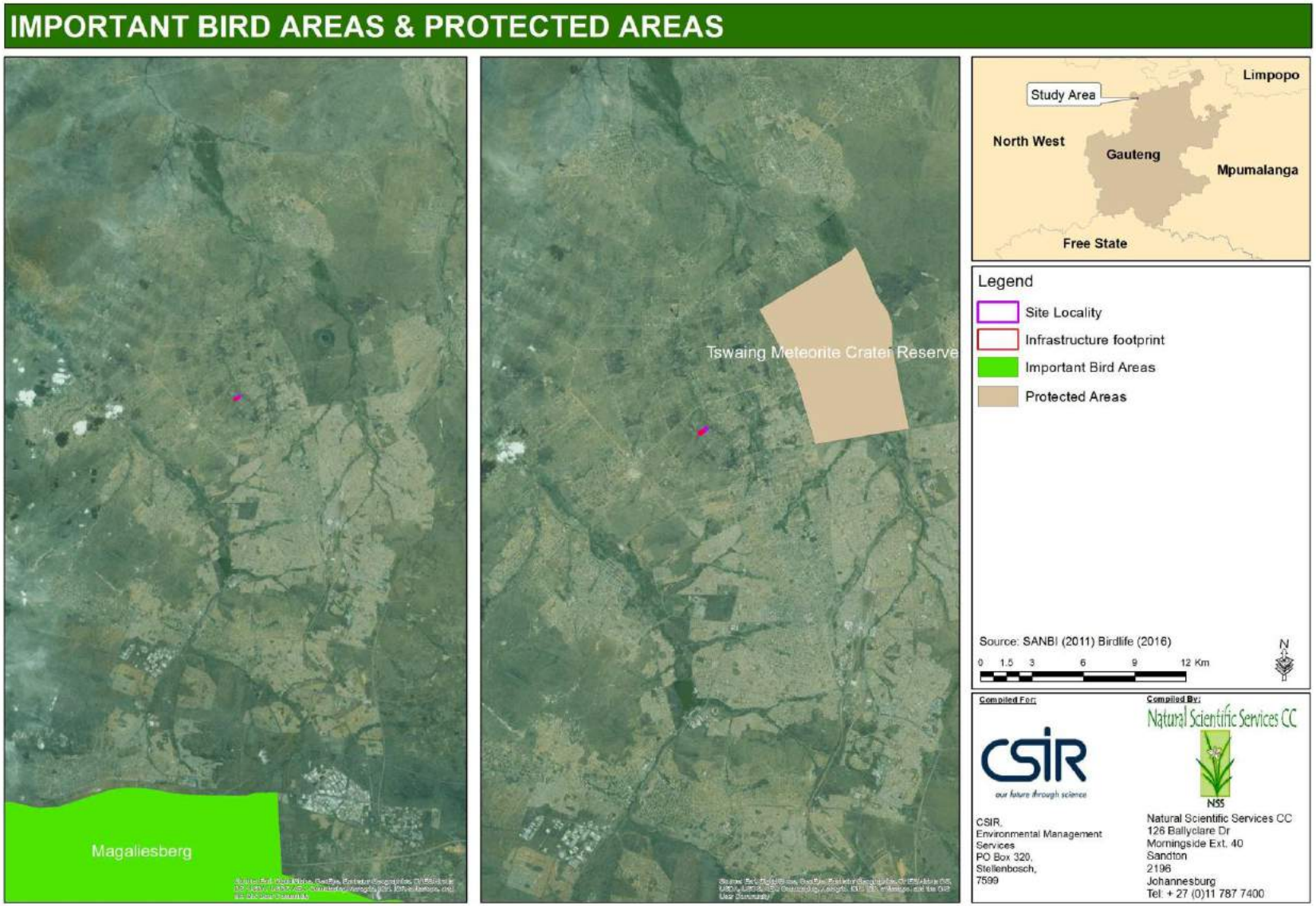


Figure 9-1 Location of the site in relation to Important Bird Areas, and Protected Areas

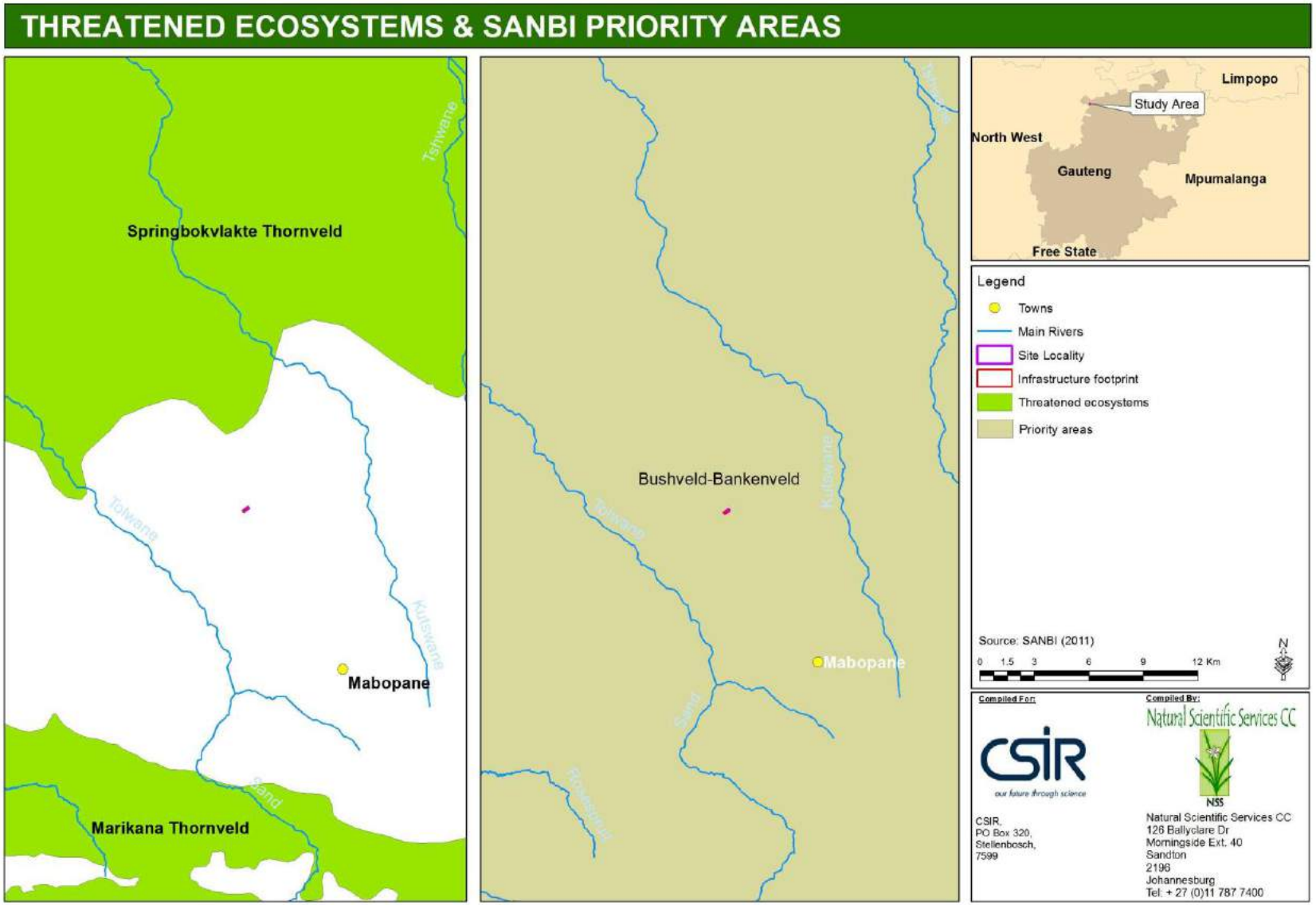


Figure 9-2 Location of the site relative to regional terrestrial Priority Areas and Threatened Ecosystems

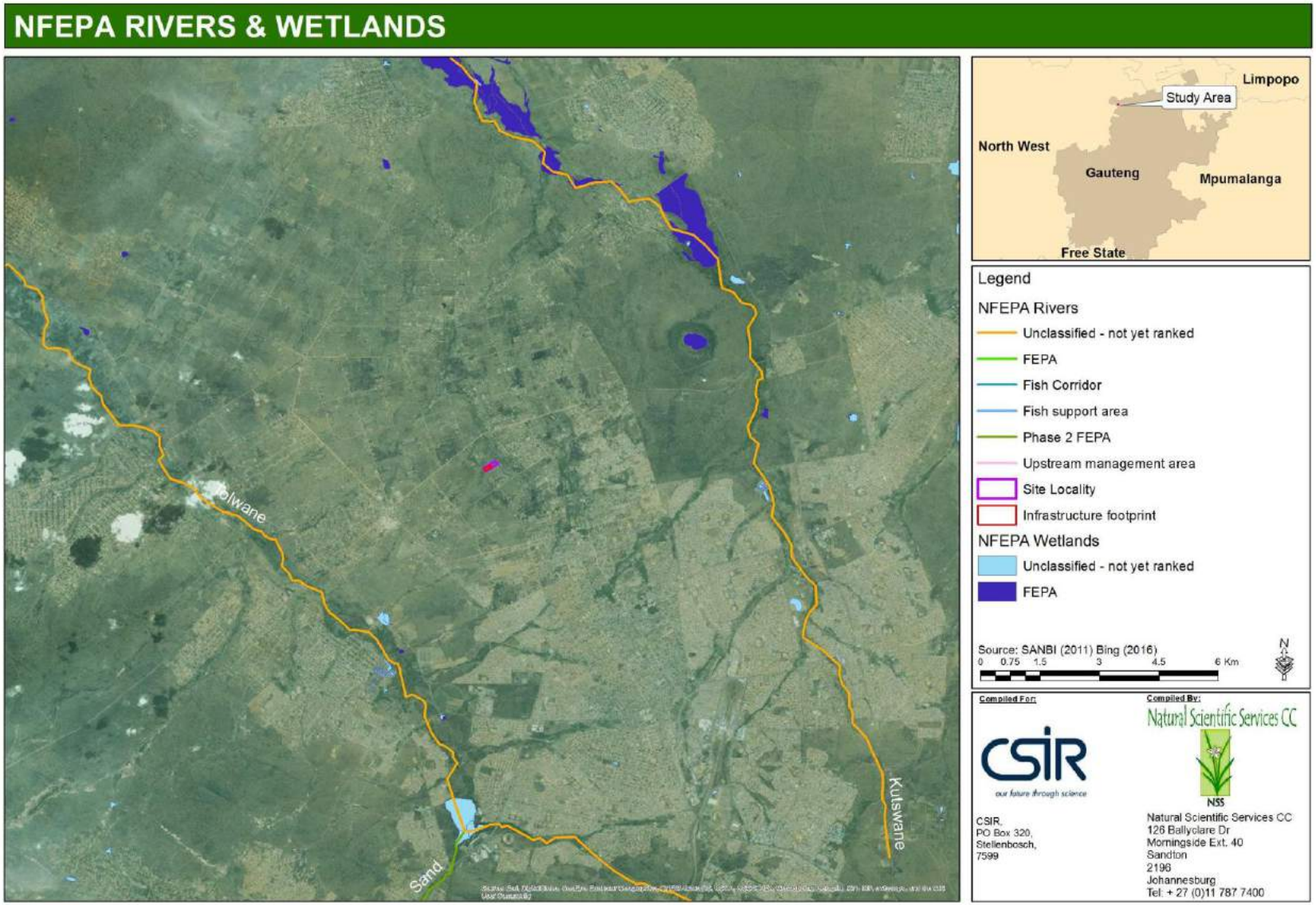


Figure 9-3 Location of the site in relation to regional Freshwater Ecosystem Priority Areas

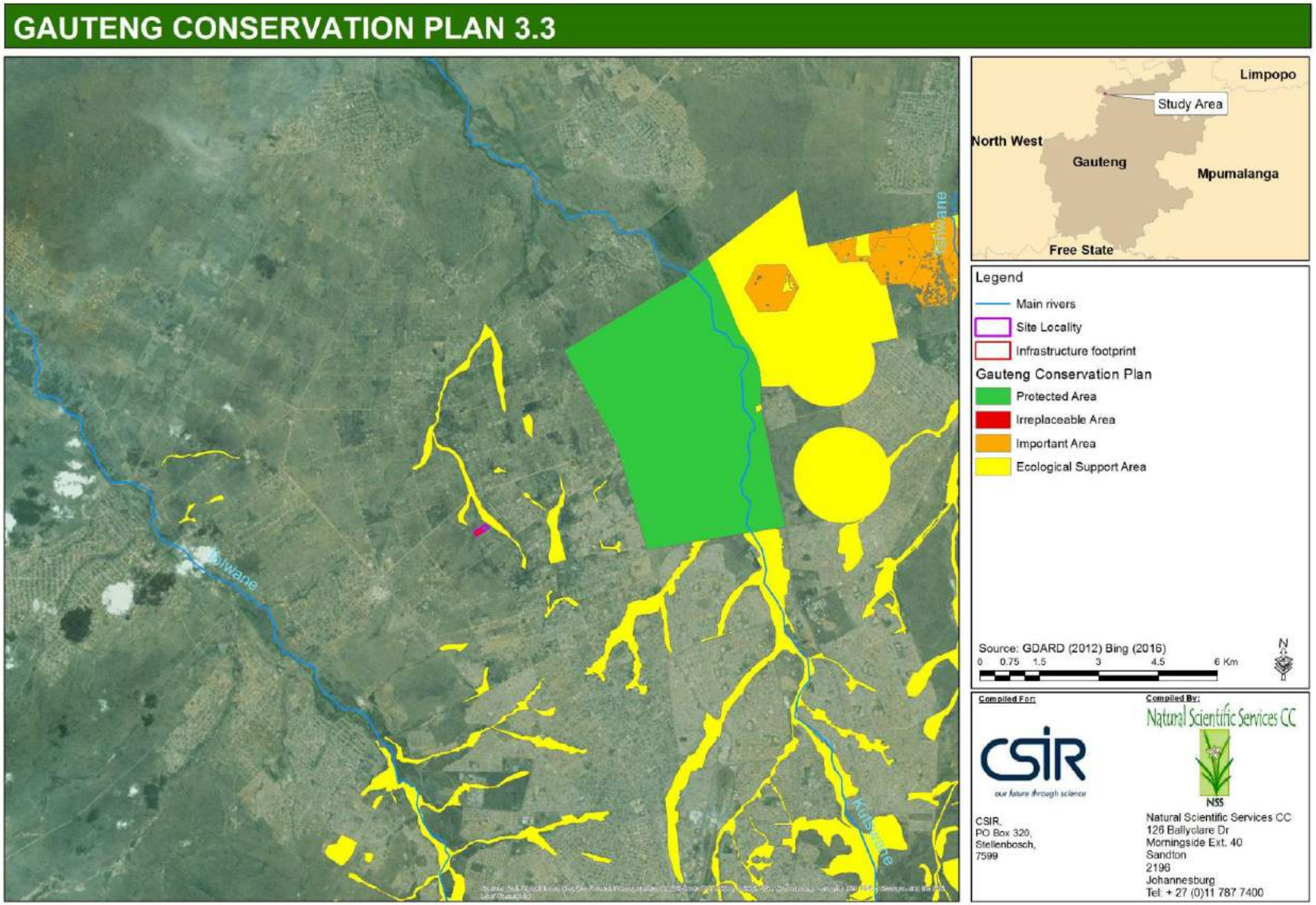


Figure 9-4 Location of the site in relation to Gauteng CBAs and ESAs

Based on our findings and relevant national and provincial biodiversity conservation planning initiatives, a combined biodiversity significance map for the site was compiled (**Figure 9-5**), where:

- **High** rated areas include:
  - All *in situ* and neighbouring wetland areas. This is because on a national scale all wetlands are Protected, and in Gauteng, all wetlands are to be assigned as sensitive (GDARD 2014) and the neighbouring drainage lines have been classified as provincial Ecological Support Areas (GDARD 2012). This encompasses the area in which the bullfrog and tadpoles were located. A buffer has not been assigned due to the uncertainty of whether this is Giant Bullfrog.
- **Moderate-High** rated areas include:
  - A minimum 50m buffer around all local wetland areas.
- **Moderate** rated areas include:
  - *Acacia* Thicket
  - Open *Acacia* Savanna
- **Moderate-Low** rated areas include:
  - Transformed: Past Farming as there is signs of some recovery and limited alien species
- **Low** rated areas include:
  - Housing/ Built Up & Gravel Roads
  - Harvested Topsoil areas / excavations
  - Aliens / Gardening/ Farming

The Areas of Significance (AoS) map should guide the proposed development where:

- Disturbances should preferentially occur in Moderate – Low and Low sensitive areas.
- **High** sensitive areas should be avoided.
- **Moderate-High** sensitive areas should be subject to very limited disturbance and rigorous mitigation.
- **Moderate** sensitive areas may be disturbed with effective mitigation.
- **Moderate-Low** sensitive areas may be disturbed with minimal or no mitigation.
- **Low** sensitive areas should be rehabilitated if not developed.

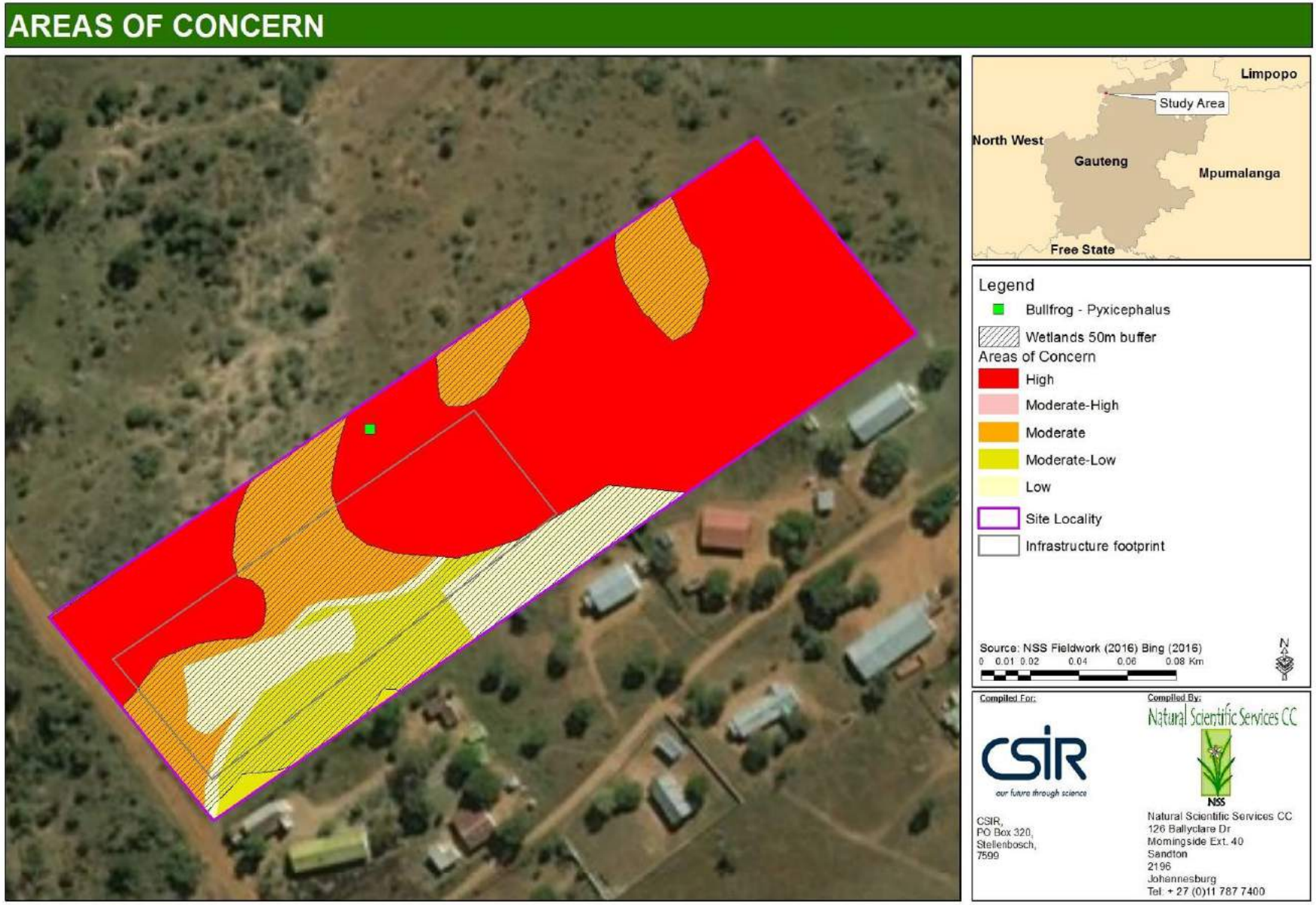


Figure 9-5 Areas of biodiversity conservation significance

10. Impacts & Mitigation

Potential impacts of the proposed project on biodiversity are summarized in **Table 11-1**, and briefly discussed below, followed by recommended measures to mitigate these during relevant phases of the development.

10.1. Impacts

10.1.1. Direct loss of wetlands and deterioration of wetland drivers

Construction activities will cause destruction of the small rain-filled depression on site where bullfrog breeding was observed, as well as other *in situ* areas where soil mottling indicated the presence of wetland conditions. In addition, construction activities and increased traffic on surrounding roads during all phases of the project could cause degradation of larger drainage system (classified as provincial Ecological Support Areas) due to increased dust, erosion and sedimentation. The construction of the proposed chicken house will result in the direct loss of 0.86 ha. The site is 6km upstream of the Kutswane River, so the likelihood of impacts reaching the system is considered to be low. However, given the presence of bullfrogs, the high conservation importance of Central Bushveld Group 3 (CR) seeps a well as the national and provincial importance of wetlands, loss or degradation of this system is rated as being of **High** significance.

10.1.2. Loss of terrestrial vegetation and faunal habitat

Although the site is situated in the **Vulnerable** Central Sandy Bushveld vegetation type, construction of the chicken facility will result in the destruction of only 0.86ha of semi-natural habitat. Given the small size and transformed nature of the site, the loss of terrestrial vegetation and (otherwise widely available) terrestrial faunal habitat was rated with **Medium** significance.

10.1.3. Loss of CI or medicinal flora

Due to the small size and disturbed nature of the site, only a few observed and potentially occurring CI or medicinal plant species such as *Harpagophytum cf. zeyheri* will be lost as a result of vegetation clearing during construction, and possible increased human harvesting during all phases of the development. This potential loss of CI flora was rated with **Medium** significance.

10.1.4. Loss of CI fauna

Of greatest concern is the potentially occurring NT Giant Bullfrog. In addition to destruction of a suitable (albeit small) breeding site during construction, earth-moving activities could also destroy bullfrogs that are buried underground on site. Furthermore, bullfrogs would be adversely affected by increased traffic and possible human harvesting during all phases of

the project. The potential impact of the project on the NT Giant Bullfrog was rated with **Medium** significance.

10.1.5. Introduction and proliferation of alien plant species

The proposed project will increase the local existing diversity (i.e. species richness and abundance) of alien flora as a result of soil disturbance, as well as the introduction of alien seed with the influx of vehicles and materials during all phases of the project. Given the **Vulnerable** status of the regional Central Sandy Bushveld vegetation type, this potential impact was rated with **High** significance in the absence of effective control measures.

10.1.6. Increased dust and erosion

Clearing of vegetation and earth-moving activities during construction are likely to increase bare ground, dust and the land's susceptibility to erosion. These impacts are, however, likely to have a limited and short term impact and were, therefore, rated with **Medium** significance.

10.1.7. Sensory disturbance of fauna

Sensory disturbance of fauna from increased dust, noise and light pollution will likely cause some additional fauna to vacate the area, at least temporarily during construction and decommissioning. Considering, however, that remaining fauna in the study area, including few or no CI species, are currently accustomed to a noticeable level of noise, light and dust, this impact was rated with **Low** significance.

10.1.8. Environmental contamination

Various contaminants are present in chicken effluent including nutrients, pathogens, veterinary pharmaceuticals (including inter alia antibiotics), and naturally excreted hormones. Inappropriate slurry management and improper disposal of carcasses as well as excess fodder, chemicals (e.g. pesticides) and any other operational waste could cause contamination / eutrophication of local soils. Moreover, considering that across much of the site, soil mottling was indicative of wetland conditions, and that a major drainage system (classified as provincial Ecological Support Areas) are situated in close proximity to the site, this potential impact was rated with **High** significance.

10.1.9. Poor / Inappropriate control of animal pests

During operation, substandard animal husbandry / hygiene and waste generation in the form of chicken effluent and excess fodder could facilitate aggregation and/or breeding of invertebrate pests such as flies, weevils, ants, termites, cockroaches, fleas, lice, mites, ticks, etc. Poor waste management and hygiene practices also have the potential to attract vertebrate pests including rodents (Black Rat, House Mouse), mammalian Carnivores (Black-backed Jackal, dogs, cats) and birds (Common Myna, Pied Crow, Sacred Ibis). Proliferation of alien pest species could adversely affect indigenous fauna through competition, predation and disease transmission, and inappropriate poisoning of pests could affect non-target predatory and scavenging animals. As most observed fauna represent

widespread, common species that are more or less tolerant of human settlement, this potential impact was rated with **Medium** significance.

10.1.10. Disease transmission

Diseases could be transmitted either directly from chickens and their effluent, or indirectly from an increased prevalence of pests, which could in turn adversely affect the population dynamics of native fauna in the surrounding area. Given the high prevalence of dogs in the study area, which would readily scavenge on any accessible chicken carcasses, excrement and possibly other waste, the potential impact of a possible disease outbreak was rated with **Medium** significance.

10.1.11. Altered burning

As the site is situated in an area amidst increasing human settlement, wild fires will no doubt be deliberately avoided and extinguished for human and infrastructural safety. Although lack of fire should cause remaining fragments of local vegetation to become more woody / bush-encroached, this is unlikely to occur with the observed high levels of harvesting of fire wood and other plant material. Within this context the impact of the project on the natural incidence of wild fires was rated with **Low** significance.

10.2. Management and Mitigation Recommendations

Recommended management and mitigation measures are detailed in **Table 11-2.** With successful implementation of the recommended measures, the significance of most of the mpacts can be reduced to **Low,** as highlighted in **Table 10-1**.

Table 10-1 Summary of impact significance, without and with mitigation

POTENTIAL IMPACTS	SIGNIFICANCE	
CONSTRUCTION	**Without mitigation**	**With mitigation**
Loss or degradation of local wetland areas	**High**	**Medium**
Loss of terrestrial vegetation and faunal habitat	**Medium**	**Low**
Loss of CI or medicinal flora	**Medium**	**Low**
Loss of CI fauna	**Medium**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Increased dust and erosion	**Medium**	**Low**
Sensory disturbance of fauna	**Low**	**Low**
OPERATION		
Loss or degradation of local wetland areas	**High**	**Low**
Environmental contamination	**High**	**Medium**
Poor / Inappropriate control of animal pests	**Medium**	**Low**
Disease transmission	**Medium**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Loss of CI or medicinal flora	**Medium**	**Low**
Loss of CI fauna	**Medium**	**Low**
Sensory disturbance of fauna	**Low**	**Low**
DECOMMISSIONING		

POTENTIAL IMPACTS	SIGNIFICANCE	
Loss or degradation of local wetland areas	**High**	**Low**
Introduction and proliferation of alien species	**High**	**Low**
Increased dust and erosion	**Medium**	**Low**
Sensory disturbance of fauna	**Low**	**Low**

11. Concluding Remarks

With the implementation of the mitigation measures suggested in this report, the significance of impacts on site can be reduced. However, NSS does raise the concern that a large portion of the infrastructural area is positioned within a wetland system and its associated buffer. 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 along the edge of the existing houses may potentially avoid the wetland and stringent mitigation and management could limit any contamination.

Table 11-1 Impact Assessment

POTENTIAL IMPACTS	MITIGATION	STATUS	EXTENT		DURATION		INTENSITY		REVERSIBILITY	IRREPLACEABILITY	PROBABILITY		SIGNIFICANCE		CONFIDENCE	
			RATING	SCORE	RATING	SCORE	RATING	SCORE	RATING	RATING	RATING	SCORE	RATING	SCORE	RATING	SCORE
CONSTRUCTION																
Loss or degradation of local wetland areas																
from increased vehicle traffic, construction activities, dust, erosion and possible sedimentation and spills	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Moderate reversibility	Moderate irreplaceability	Definite (>90% chance)	1	**High**	**14,00**	High	3
	With	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	**Medium**	**3,00**	High	3
Loss of terrestrial vegetation and faunal habitat																
from clearing of vegetation, and increased vehicle and human activity	Without	Negative	Site specific	1	Permanent	5	Medium-low	2	Moderate reversibility	Low irreplaceability	Definite (>90% chance)	1	**Medium**	**8,00**	High	3
	With	Negative	Site specific	1	Short term (2-5 years)	2	Low	1	Moderate reversibility	Low irreplaceability	Definite (>90% chance)	1	**Low**	**4,00**	High	3
Loss of CI or medicinal flora																
from clearing of vegetation, and increased vehicle and human activity including harvesting	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Low reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**Medium**	**8,25**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Loss of CI fauna																
from clearing of vegetation, earth-moving activities, and increased vehicle and human activity including harvesting	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Low reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Medium**	**5,50**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Introduction and proliferation of alien species																
from influx of vehicles, people and materials, site disturbance, and lack of alien species control	Without	Negative	Local (<2km from site)	2	Permanent	5	High	8	Moderate reversibility	Moderate irreplaceability	Definite (>90% chance)	1	**High**	**15,00**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Increased dust and erosion																
from clearing of vegetation, earth-moving activities, and increased vehicle traffic	Without	Negative	Local (<2km from site)	2	Medium term (5-15 years)	3	High	8	Moderate reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**Medium**	**9,75**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Medium-low	2	High reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0,25	**Low**	**1,00**	High	3
Sensory disturbance of fauna																
from increased vehicle and human activity, noise, dust and light	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**4,00**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
OPERATION																
Loss or degradation of local wetland areas																
from increased vehicle traffic, dust, erosion and possible sedimentation and spills	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Moderate reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**High**	**10,50**	High	3
	With	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	**Medium**	**1,50**	High	3
Environmental contamination																
from chicken excrement, bedding, feed, carcasses and other operational waste	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Low reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**High**	**10,50**	High	3
	With	Negative	Site specific	1	Short term (2-5 years)	2	Medium	4	High reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0,25	**Low**	**1,75**	High	3
Poor / Inappropriate control of animal pests																
from poor waste management and hygiene, and insufficient, inapproriate and/or ineffectual pest control	Without	Neutral	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Moderate reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**Medium**	**7,50**	High	3
	With	Neutral	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Disease transmission																
from poor waste management and hygiene, and insufficient, inapproriate and/or ineffectual pest control	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Moderate reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Medium**	**7,00**	High	3
	With	Negative	Local (<2km from site)	2	Temporary (<2 years)	1	Medium	4	High reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0,25	**Low**	**1,75**	High	3
Introduction and proliferation of alien species																
from influx of vehicles, people and materials,	Without	Negative	Local (<2km from site)	2	Permanent	5	High	8	Moderate reversibility	Moderate irreplaceability	Definite (>90%	1	**High**	**15,00**	High	3

POTENTIAL IMPACTS	MITIGATION	STATUS	EXTENT		DURATION		INTENSITY		REVERSIBILITY	IRREPLACEABILITY	PROBABILITY		SIGNIFICANCE		CONFIDENCE	
			RATING	SCORE	RATING	SCORE	RATING	SCORE	RATING	RATING	RATING	SCORE	RATING	SCORE	RATING	SCORE
site disturbance, and lack of alien species control											chance)					
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Loss of CI or medicinal flora																
from clearing of vegetation, and increased vehicle and human activity including harvesting	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Low reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**Medium**	**8,25**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Loss of CI fauna																
from clearing of vegetation, earth-moving activities, and increased vehicle and human activity including harvesting	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Low reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Medium**	**5,50**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Sensory disturbance of fauna																
from increased vehicle and human activity, noise, dust and light	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**4,00**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
DECOMMISSIONING																
Loss or degradation of local wetland areas																
from increased vehicle traffic, dust, erosion and possible sedimentation and spills	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Moderate reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**High**	**10,50**	High	3
	With	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	1	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Introduction and proliferation of alien species																
from influx of vehicles and people, site disturbance, and lack of alien species control	Without	Negative	Local (<2km from site)	2	Permanent	5	High	8	Moderate reversibility	Moderate irreplaceability	Definite (>90% chance)	1	**High**	**15,00**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3
Increased dust and erosion																
from destruction of infrastructure, earth-moving activities, and increased vehicle traffic	Without	Negative	Local (<2km from site)	2	Medium term (5-15 years)	3	High	8	Moderate reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0,75	**Medium**	**9,75**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Medium-low	2	High reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0,25	**Low**	**1,00**	High	3
Sensory disturbance of fauna																
from increased vehicle and human activity, noise and dust	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**4,00**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Low irreplaceability	Probable (25-50% chance)	0,5	**Low**	**1,50**	High	3

Table 11-2 Mitigation measures

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
CONSTRUCTION				
Loss or degradation of local wetland areas				
Minimize loss and degradation of wetland areas and their buffers.	Avoid disturbing *in situ* and neighbouring wetland areas and their buffers.	*Modify the layout of planned infrastructure to avoid wetland areas and their buffers.	Pre-construction	CSIR, Nkunzi Management
		*Demarcate or fence in the construction site.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Highlight all prohibited activities to workers through training and notices.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Commence (and preferably complete) construction activities during winter when the risk of erosion and wetland sedimentation should be least.	Prior to and during construction	Nkunzi Management, Construction Crew
	Establish measures on the access road to reduce dust, erosion and sedimentation.	*Design measures to effectively control vehicle access, vehicle speed, dust, stormwater run-off, erosion and sedimentation on the road.	Pre-construction	CSIR, Nkunzi Management
		*Implement the measures that were designed to control impacts on the road preferably during winter, when the risk of erosion should be least.	During construction	Nkunzi Management, Construction Crew
Loss of terrestrial vegetation and faunal habitat				
Minimize loss and degradation of terrestrial vegetation and faunal habitat.	Avoid unnecessary loss of existing indigenous vegetation and faunal habitats.	*Modify the layout of planned infrastructure to avoid important floral communities and large indigenous trees.	Pre-construction	CSIR, Nkunzi Management, with advice from a Botanist / Horticulturist
		*Identify and mark indigenous trees on the ground. Those that are small and cannot be avoided should be transplanted elsewhere on site.	Pre-construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
		*Demarcate or fence in the construction site.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Highlight all prohibited activities to workers through training and notices.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Commence (and preferably complete) construction activities during winter, when the risk of disturbing growing plants should be least.	Prior to and during construction	Nkunzi Management, Construction Crew
	Promote re-establishment of indigenous vegetation in disturbed areas.	*Briefly and effectively stockpile topsoil preferably 1-1.5m in height.	During construction	Nkunzi Management, Construction Crew
		*Use the topsoil to allow natural vegetation to establish in disturbed areas. If recovery is slow, then a seed mix for the area (using indigenous grass species listed within this report) should be sourced and planted.	During construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
		*Do not undertake any landscaping with alien flora.	During construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
Loss of CI or medicinal flora				
Minimize loss of CI and medicinally important flora.	Adhere to law and best practice guidelines regarding CI and medicinally important flora.	*Obtain permits to remove CI species (if detected –no CI species were detected during the site visit). Typical specie include geophytes such as Gladiolus, Boophone, Orchid species etc.	Pre-construction	CSIR, Nkunzi Management
		*Transplant CI and medicinally important floral specimens from the infrastructure footprint to suitable and safe locations elsewhere on site or nearby.	Pre-construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
		*Obtain guidance from a suitably qualified vegetation specialist or horticulturist regarding the collection, propagation/storage and transplantation of plants.	During construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
	Prohibit harvesting of CI and medicinally important flora	*Highlight all prohibited activities to workers through training and notices.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control (e.g. fencing).	During construction	Nkunzi Management
Loss of CI fauna				
Minimize mortality and displacement of fauna, especially CI species such as the NT Giant Bullfrog.	Adhere to law and best practice guidelines regarding the displacement of CI faunal species.	*Appoint an appropriate specialist to relocate any detected CI fauna from water, termitaria, trees and soil that will be disturbed.	Pre-construction	Nkunzi Management with advice from a Zoologist / Ecologist
		*Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Check open trenches for trapped animals (e.g. reptiles, frogs and small terrestrial mammals), and relocate trapped animals with advice from an appropriate specialist.	Daily during construction	Nkunzi Management, Construction Crew, with advice from a Zoologist / Ecologist
	Prohibit disturbance and harvesting of CI and other indigenous fauna	*Educate workers about dangerous animals (e.g. snakes, scorpions, bees) and highlight all prohibited activities to workers through training and notices.	Prior to and during construction	Nkunzi Management
		*Prohibit harvesting of CI and other indigenous fauna on site by community members through notices and site access control (e.g. fencing).	During construction	Nkunzi Management
Introduction and proliferation of alien species				
Minimize the introduction	Limit / Regulate access by potential vectors	*Demarcate or fence in the construction site.	Prior to and during construction	Nkunzi Management, Construction Crew

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
and proliferation of invasive alien species during construction.	of alien flora.	*Carefully limit / regulate access by vehicles and materials to the construction site.	Prior to and during construction	Nkunzi Management, Construction Crew
		*Prohibit the introduction of domestic animals such as dogs and cats.	During construction	Nkunzi Management, Farm Management
	Maintain a tidy construction site.	*Keep construction activities neat and tidy.	During construction	Nkunzi Management, Construction Crew
		* When complete, remove all sand piles, and landscape all uneven ground while re-establishing a good topsoil layer.	During construction	Nkunzi Management, Construction Crew
		*Plant only locally indigenous flora if landscaping needs to be done.	During construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit.	*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	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
Increased dust and erosion				
Minimize dust and erosion.	Implement effective measures to control dust and erosion.	*Limit vehicles, people and materials to the construction site.	During construction	Nkunzi Management, Construction Crew
		*Commence (and preferably complete) construction during winter, when the risk of erosion should be least.	During construction	Nkunzi Management, Construction Crew
		*Revegetate denude areas with locally indigenous flora a.s.a.p.	During construction	Nkunzi Management, Construction Crew
		*Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.	During construction	Nkunzi Management, Construction Crew
		*Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.	During construction	Nkunzi Management, Construction Crew
Sensory disturbance of fauna				
Minimize sensory disturbance of fauna.	Time construction activities to minimize sensory disturbance of fauna.	*Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Prior to and during construction	Nkunzi Management, Construction Crew
	Minimize noise pollution.	*Minimize noise to limit its impact on calling and other sensitive fauna (e.g. frogs).	During construction	Nkunzi Management, Construction Crew
	Minimize light pollution.	*Limit construction activities to day time hours.	During construction	Nkunzi Management, Construction Crew
		*Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna.	During construction	Construction Crew
OPERATION				
Loss or degradation of local wetland areas				
Minimize loss and degradation of wetland areas and their buffers.	Maintain measures on the access road to reduce dust, erosion and sedimentation.	*Monitor and maintain the road impact control measures to ensure that they remain effective.	Throughout operation	Nkunzi Management, Farm Management
		* Ensure an approved Storm Water Management Plan is in place, that will highlight the separation of clean and dirty water and prevent contamination into the larger system.		CSIR, Nkunzi Management, planning from surface water experts
		*Highlight all prohibited activities to workers through training and notices.	During operation	Nkunzi Management, Farm Management
Environmental contamination				
Avoid environmental contamination.	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.	Pre-construction	CSIR, Nkunzi 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.	Throughout operation	Nkunzi Management, Farm Management
		*Adhere to best practice chicken husbandry and waste disposal norms.	Throughout operation	CSIR, Nkunzi Management, Farm Management, with advise from agricultural experts
		*All hazardous waste should be disposed of at an appropriate licensed facility for this.	Throughout operation	Nkunzi Management, Farm Management
		*Waste recycling should be incorporated into the facility's operations as far as possible.	Throughout operation	Nkunzi Management, Farm Management
		*Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices.	Throughout operation	Nkunzi Management, Farm Management

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
	Ensure that there are appropriate control measures in place for any contamination event.	*Establish appropriate emergency procedures for accidental contamination of the surroundings.	Pre-construction	CSIR, Nkunzi Management
		*Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists.	A.s.a.p. following contamination	Nkunzi Management, Farm Management, with advise from appropriate contamination and environmental specialists
		*Educate workers about the facility's waste emergency procedures with training and notices.	At least annually during operation	Nkunzi Management, Farm Management
Poor / Inappropriate control of animal pests				
Ensure effective pest control that does not affect non-target animals.	Control the access and proliferation of pests as far as possible.	*Ensure that floors are sloped and slatted to facilitate drainage.	Pre-construction	CSIR, Nkunzi Management, Construction Crew
		*Ensure that there is effective storm water drainage around the facility.	All phases	CSIR, Nkunzi Management, Farm Management
		*Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water.	Construction and operation	Construction Crew, Farm Management
		*Effectively seal and maintain all pipes and reservoirs containing slurry, to prevent animals from accessing the effluent.	Construction and operation	Construction Crew, Farm Management
		*Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible.	Pre-construction, construction and operation	CSIR, Nkunzi Management, Farm Management
		*Check that fan louvers (if installed) work properly, and close fans completely when off.	Throughout operation	Farm Management and Team
		*Prevent and manage unwanted animal access to fodder.	Pre-construction, construction and operation	Nkunzi Management, Farm Management and Team
		*Clean floors regularly.	Throughout operation	Farm Management and Team
		*Clean up excess fodder regularly from under troughs and feed bins.	Throughout operation	Farm Management and Team
		* Keep areas surrounding the facility free of spilled manure and litter.	Throughout operation	Farm Management and Team
		*Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.	Throughout operation	Farm Management and Team
		*Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects.	Throughout operation	Farm Management and Team
		*Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.	Throughout operation	Farm Management and Team
		*Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination.	During operation	Farm Management and Team
	Avoid affecting non-target animals.	*Ensure that measures to control pests are tightly restricted to areas where these are problematic.	During operation	Farm Management and Team
		*Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist.	During operation	Farm Management and Team
		*Rodenticides are not advised.	During operation	Farm Management and Team
Disease transmission				
Avoid transmission of diseases to wildlife.	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.	As described above.	As described above.	As described above.
	Ensure that there are appropriate control measures in place for any contamination event.	As described above.	As described above.	As described above.
	Control the access and proliferation of pests as far as possible.	As described above.	As described above.	As described above.
Introduction and proliferation of alien species				
Minimize the introduction and proliferation of invasive alien species during operation.	Limit / Regulate access by potential vectors of alien flora.	*Carefully limit / regulate access by vehicles and materials to the site.	Throughout operation	Nkunzi Management, Farm Management
		*Prohibit the introduction of domestic animals such as dogs and cats.	Throughout operation	Nkunzi Management, Farm Management
	Maintain a tidy production facility.	*Minimize the accumulation and dispersal of excess fodder on site.	Throughout operation	Farm Management and Team

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
		*Employ best practices regarding tilling of soil and weed management.	Throughout operation	Farm Management and Team
		*Plant only locally indigenous flora if landscaping needs to be done.	Throughout operation	Nkunzi Management, Farm Management, with advice from a Botanist / Horticulturist
	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit.	*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	Nkunzi Management, Farm Management and Team, with advice from a Botanist / Horticulturist
Loss of CI or medicinal flora				
Prohibit harvesting of CI and medicinally important flora.	Harvesting of indigenous flora for medicine, fire wood, building materials, and other purposes must be prohibited.	*Highlight all prohibited activities to workers through training and notices.	Prior to and during operation	Nkunzi Management, Farm Management
		*Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control (e.g. fencing).	Throughout operation	Nkunzi Management, Farm Management
Loss of CI fauna				
Prohibit harvesting of CI and other fauna.	Harvesting of indigenous fauna for food, sport, medicine, and other purposes must be prohibited.	*Educate workers about dangerous animals (e.g. snakes, scorpions, bees) and highlight all prohibited activities to workers through training and notices.	Prior to and during operation	Nkunzi Management, Farm Management
		*Prohibit harvesting of CI and other indigenous fauna on site by community members through notices and site access control (e.g. fencing).	Throughout operation	Nkunzi Management, Farm Management
Sensory disturbance of fauna				
Minimize sensory disturbance of fauna.	Minimize essential lighting	*Install motion-sensitive lights.	Construction and operation	Nkunzi Management, Farm Management
		*Ensure that all outdoor lights are angled downwards and/or fitted with hoods.	Construction and operation	Nkunzi Management, Farm Management
		*Use bulbs that emit warm, long wavelength (yellow-red) light, or use UV filters or glass housings on lamps to filter out UV.	Throughout operation	Farm Management and Team
		*Avoid using metal halide, mercury or other bulbs that emit high UV (blue-white) light that is highly and usually fatally attractive to insects.	Throughout operation	Farm Management and Team
	Minimize unavoidable noise	*Conduct regular maintenance of machinery, fans and other noisy equipment.	Throughout operation	Farm Management and Team
	Prevent unneccessary light and noise pollution	*Encourage workers to minimize light and noise pollution through training and notices.	Throughout operation	Nkunzi Management, Farm Management
DECOMMISSIONING				
Loss or degradation of local wetland areas				
Minimize loss and degradation of wetland areas and their buffers.	Avoid disturbing *in situ* and neighbouring wetland areas and their buffers.	*Demarcate or fence in the decommissiong site.	Prior to and during decommissioning	Nkunzi Management, Decommissioning Crew
		*Highlight all prohibited activities to workers through training and notices.	Prior to and during decommissioning	Nkunzi Management, Decommissioning Crew
		*Commence (and preferably complete) decommissioning activities during winter when the risk of erosion and wetland sedimentation should be least.	Prior to and during decommissioning	Nkunzi Management, Decommissioning Crew
	Maintain measures on the access road to reduce dust, erosion and sedimentation.	*Monitor and maintain the road impact control measures to ensure that they remain effective.	Until there is no more project-associated activity on site	CSIR, Nkunzi Management
Introduction and proliferation of alien species				
Minimize the introduction and proliferation of invasive alien species during decommissioning.	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit.	*Remove Category species using mechanical methods, and minimize soil disturbance as far as possible. Alien wood could be donated to the surrounding community.	Throughout decommissioning until all Category 1b and Category 2 alien species have been effectively removed from the site.	Nkunzi Management, Farm Management
Increased dust and erosion				
Minimize dust and erosion.	Implement effective measures to control dust and erosion.	*Limit vehicles, people and materials to the decommissioning site.	During decommissioning	Nkunzi Management, Decommissioning Crew
		*Commence (and preferably complete) decommissioning during winter, when the risk of erosion should be least.	During decommissioning	Nkunzi Management, Decommissioning Crew
		*Revegetate denude areas with locally indigenous flora a.s.a.p.	During decommissioning	Nkunzi Management, Decommissioning Crew
		*Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.	During decommissioning	Nkunzi Management, Decommissioning Crew

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
		*Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.	During decommissioning	Nkunzi Management, Decommissioning Crew
Sensory disturbance of fauna				
Minimize sensory disturbance of fauna.	Time demolition and other noisy decommissioning activities to minimize sensory disturbance of fauna.	*Commence (and preferably complete) decommissioning during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Prior to and during decommissioning	Nkunzi Management, Decommissioning Crew
	Minimize noise pollution.	*Minimize noise to limit its impact on sensitive fauna.	During decommissioning	Nkunzi Management, Decommissioning Crew
	Minimize light pollution.	*Limit demolition activities to day time hours.	During decommissioning	Nkunzi Management, Decommissioning Crew
		*Minimize or eliminate security and decommissioning lighting, to reduce the disturbance of nocturnal fauna.	During decommissioning	Decommissioning Crew

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13. Appendices

13.1. Species List for the Site

Family		Species	Growth forms
ACANTHACEAE		*Justicia betonica L.*	Dwarf Shrub
ACANTHACEAE		*Justicia flava (Vahl) Vahl*	Dwarf Shrub
ACANTHACEAE		*Ruellia cordata Thunb.*	Dwarf Shrub
AMARANTHACEAE	*	*Gomphrena celosioides Mart.*	Herb
ANACARDIACEAE		*Ozoroa paniculosa*	Shrub, tree
ANACARDIACEAE		*Searsia leptodictya (Diels) T.S.Yi, A.J.Mill. & J.Wen forma leptodictya*	Shrub, tree
ANTHERICACEAE		*Chlorophytum fasciculatum (Baker) Kativu*	Herb
ASPARAGACEAE		*Asparagus laricinus Burch.*	Shrub
ASPHODELACEAE		*Aloe greatheadii Schonland var. davyana (Schonland) Glen & D.S.Hardy*	Succulent
ASTERACEAE		*Berkheya radula (Harv.) De Wild.*	Herb
ASTERACEAE	*	*Cosmos bipinnatus Cav.*	Herb
ASTERACEAE		*Felicia muricata (Thunb.) Nees subsp. muricata*	Shrub
ASTERACEAE	*	*Pseudognaphalium luteo-album (L.) Hilliard & B.L.Burtt*	Herb
BIGNONIACEAE	*	*Jacaranda mimosifolia D.Don*	Tree
BORAGINACEAE		*Ehretia rigida (Thunb.) Druce subsp. nervifolia Retief & A.E.van Wyk*	Shrub, tree
CELASTRACEAE		*Gymnosporia buxifolia (L.) Szyszyl.*	Shrub, tree
COMBRETACEAE		*Combretum apiculatum Sond. subsp. apiculatum*	Shrub, tree
CYPERACEAE		*Cyperus rupestris Kunth var. rupestris*	Cyperoid
CYPERACEAE		*Kyllinga alba Nees*	Cyperoid
EBENACEAE		*Diospyros lycioides Desf. subsp. lycioides*	Shrub, tree
EBENACEAE		*Euclea undulata Thunb.*	Shrub, tree
ERIOSPERMACEAE		*Eriospermum spp*	Geophyte
FABACEAE		*Acacia caffra (Thunb.) Willd.*	Shrub, tree
FABACEAE		*Acacia karroo Hayne*	Shrub, tree
FABACEAE		*Acacia mellifera (Vahl) Benth. subsp. mellifera*	Shrub, tree
FABACEAE		*Acacia tortilis (Forssk.) Hayne subsp. heteracantha (Burch.) Brenan*	Shrub, tree
FABACEAE		*Dichrostachys cinerea (L.) Wight & Arn. subsp. africana Brenan & Brummitt var. setulosa (Welw. ex Oliv.) Brenan & Brummitt*	Shrub, tree
FABACEAE		*Senna italica Mill.*	Shrub
HYACINTHACEAE		*Drimiopsis burkei Baker subsp. burkei*	Geophyte
HYACINTHACEAE		*Ledebouria spp*	Geophyte
HYACINTHACEAE		*Ledebouria ovatifolia (Baker) Jessop*	Geophyte
HYACINTHACEAE		*Ornithogalum spp*	Geophyte
HYPERICACEAE		*Hypericum spp*	Herb
MALVACEAE		*Corchorus cf. asplenifolius Burch.*	Herb
MALVACEAE		*Grewia flava DC.*	Shrub
MALVACEAE		*Waltheria indica L.*	Herb
PEDALIACEAE		*Harpagophytum cf. zeyheri Decne.*	Trailing herb
POACEAE		*Andropogon eucomus Nees*	Graminoid
POACEAE		*Aristida congesta Roem. & Schult. subsp. congesta*	Graminoid
POACEAE		*Cynodon dactylon (L.) Pers.*	Graminoid
POACEAE		*Eragrostis chloromelas Steud.*	Graminoid

Family		Species	Growth forms
POACEAE		*Eragrostis gummiflua Nees*	Graminoid
POACEAE		*Eragrostis rigidior Pilg.*	Graminoid
POACEAE		*Eragrostis sp.*	Graminoid
POACEAE		*Eragrostis superba Peyr.*	Graminoid
POACEAE		*Eustachys paspaloides (Vahl) Lanza & Mattei*	Graminoid
POACEAE		*Heteropogon contortus (L.) Roem. & Schult.*	Graminoid
POACEAE		*Melinis repens (Willd.) Zizka subsp. repens*	Graminoid
POACEAE		*Setaria sp.*	Graminoid
POACEAE		*Sporobolus africanus (Poir.) Robyns & Tournay*	Graminoid
POACEAE		*Sporobolus nitens*	Graminoid
POACEAE		*Sporobolus spp*	Graminoid
POLYGALACEAE		*Polygala hottentotta C.Presl*	Dwarf shrub
POLYGONACEAE	*	*Persicaria lapathifolia (L.) Gray*	Hydrophyte
PORTULACACEAE	*	*Portulaca cf. oleracea L.*	Succulent
RHAMNACEAE		*Ziziphus mucronata Willd. subsp. mucronata*	Shrub, tree
RICCIACEAE		*Riccia spp*	Bryophyte
RUBIACEAE		*Kohautia amatymbica Eckl. & Zeyh.*	Herb
SAPINDACEAE		*Pappea capensis Eckl. & Zeyh.*	Shrub, tree
SCROPHULARIACEAE		*Aptosimum elongatum*	Dwarf shrub
SOLANACEAE		*Solanum campylacanthum Hochst. ex A.Rich. subsp. panduriforme (Drège ex Dunal) J.Samuels*	Dwarf shrub
VAHLIACEAE		*Vahlia capensis Thunb.*	Herb
VELLOZIACEAE		*Xerophyta humilis (Baker) T.Durand & Schinz*	Herb
VERBENACEAE		*Lantana rugosa Thunb.*	Shrub
VISCACEAE		*Viscum spp*	Parasite
ZYGOPHYLLACEAE		*Tribulus terrestris L.*	Herb

13.2. Mammal list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA RED LIST STATUS	LoO QDS	LoO SITE
BATHYERGIDAE	**Mole-rats**						
Cryptomys hottentotus	Southern African Mole-rat			LC (S)	LC	2	1
BOVIDAE	**Even-toed antelope**						
Aepyceros melampus	Impala			LC (S)	LC	3	4
Raphicerus campestris	Steenbok		**PG Schedule 2 Section 15(1)(a)**	LC (S)	LC	2	4
Sylvicapra grimmia	Bush Duiker			LC (S)	LC	1	4
Tragelaphus angasii	Nyala		**PG Schedule 2 Section 15(1)(a)**	LC (S)	LC	3	4
Tragelaphus scriptus	Bushbuck			LC (S)	LC	3	4
Tragelaphus strepsiceros	Greater Kudu			LC (S)	LC	2	4
CANIDAE	**Dogs, foxes, jackals & relatives**						
Canis mesomelas	Black-backed Jackal			LC (S)	LC	2	4
Vulpes chama	Cape Fox	**PS**		LC (S)	LC	3	4
CERCOPITHECIDAE	**Baboon & monkeys**						
Cercopithecus pygerythrus pygerythrus	Vervet Monkey			LC (S)	LC	1	4
Papio ursinus	Chacma Baboon			LC (S)	LC	3	4
CHRYSOCHLORIDAE	**Golden moles**						
Chrysospalax villosus	Rough-haired Golden Mole			**VU (U)**	**VU**	3	4
Neamblysomus julianae	Juliana's Golden Mole			**VU (U)**	**EN**	3	4
EMBALLONURIDAE	**Tomb bats**						
Taphozous mauritianus	Mauritian Tomb Bat			LC (U)	LC	2	2
ERINACEIDAE	**Hedgehog**						
Atelerix frontalis (frontalis)	Southern African Hedgehog		**PG Schedule 2 Section 15(1)(a)**	LC (S)	**NT**	2	4
FELIDAE	**Cats**						
Caracal caracal	Caracal			LC (U)	LC	2	4
Felis nigripes	Black-footed Cat	**PS**		**VU (D)**	**VU**	3	4
Felis silvestris	Wildcat			LC (D)	LC	2	4
Leptailurus serval	Serval	**PS**		LC (S)	**NT**	2	4
GALAGIDAE	**Bushbabies**						
Galago moholi	Moholi Bushbaby			LC (S)	LC	1	2
GLIRIDAE	**Dormice**						
Graphiurus murinus	Forest African Dormouse			LC (S)	LC	2	2
Graphiurus platyops	Flat-headed African Dormouse			LC (U)	LC	2	4

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA RED LIST STATUS	LoO QDS	LoO SITE
HERPESTIDAE	**Meerkat & mongooses**						
Atilax paludinosus	Marsh Mongoose			LC (D)	LC	1	4
Cynictis penicillata	Yellow Mongoose			LC (S)	LC	2	3
Helogale parvula	Common Dwarf Mongoose			LC (S)	LC	3	4
Herpestes sanguineus	Slender Mongoose			LC (S)	LC	2	3
Ichneumia albicauda	White-tailed Mongoose			LC (S)	LC	3	4
Mungos mungo	Banded Mongoose			LC (S)	LC	3	4
Suricata suricatta	Meerkat			LC (U)	LC	3	4
HIPPOSIDERIDAE	**Leaf-nosed & related bats**						
Cloeotis percivali	Percival's Short-eared Trident Bat			LC (U)	**EN**	3	4
HYAENIDAE	**Aardwolf & hyenas**						
Hyaena brunnea	Brown Hyena	**PS**	**PG Schedule 2 Section 15(1)(a)**	**NT (D)**	**NT**	3	4
Proteles cristata	Aardwolf		**PG Schedule 2 Section 15(1)(a)**	LC (S)	LC	1	4
HYSTRICIDAE	**Porcupine**						
Hystrix africaeaustralis	Cape Porcupine			LC (S)	LC	2	4
LEPORIDAE	**Hares & rabbits**						
Lepus saxatilis	Scrub Hare			LC (D)	LC	2	3
Pronolagus randensis	Jameson's Red Rock Hare			LC (U)	LC	2	4
MACROSCELIDIDAE	**Elephant shrews**						
Elephantulus brachyrhynchus	Short-snouted Elephant Shrew			LC (U)	LC	1	2
Elephantulus myurus	Eastern Rock Elephant Shrew			LC (S)	LC	2	4
MOLOSSIDAE	**Free-tailed & related bats**						
Sauromys petrophilus	Roberts's Flat-headed Bat			LC (S)	LC	3	4
Tadarida aegyptiaca	Egyptian Free-tailed Bat			LC (U)	LC	2	2
MURIDAE	**Gerbils, rock mice, vlei rats & relatives**						
Aethomys ineptus	Tete Veld Aethomys			LC (U)	LC	1	2
Aethomys namaquensis	Namaqua Rock Mouse			LC (S)	LC	2	3
Dasymys capensis / incomatus	Water Rat			LC (U)	N/A	3	4
Gerbilliscus brantsii	Highveld Gerbil			LC (U)	LC	1	3
Gerbilliscus leucogaster	Bushveld Gerbil			LC (S)	LC	1	3
Lemniscomys rosalia	Single-Striped Lemniscomys			LC (S)	LC	1	2
Mastomys coucha	Southern African Mastomys			LC (S)	LC	1	2
Otomys angoniensis	Angoni Vlei Rat			LC (S)	LC	1	3
Otomys auratus / irroratus	Southern African Vlei Rat			LC (S)	LC	2	3

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA RED LIST STATUS	LoO QDS	LoO SITE
Rhabdomys pumilio	Xeric Four-striped Grass Rat			LC (S)	LC	2	2
Thallomys paedulcus	Acacia Thallomys			LC (U)	LC	1	3
MUSTELIDAE	**Badger, otters, polecat & weasel**						
Aonyx capensis	African Clawless Otter			LC (S)	**NT**	1	4
Hydrictis maculicollis	Spotted-necked Otter			LC (D)	**VU**	3d	4
Ictonyx striatus	Striped Polecat			LC (S)	LC	2	4
Mellivora capensis	Honey Badger			LC (D)	LC	3d	4
Poecilogale albinucha	African Striped Weasel			LC (U)	**NT**	2	4
NESOMYIDAE	**Climbing & fat mice & relatives**						
Dendromus melanotis	Gray African Climbing Mouse			LC (S)	LC	2	4
Dendromus mystacalis	Chestnut African Climbing Mouse			LC (S)	LC	2	4
Mystromys albicaudatus	African White-tailed Rat			**EN (D)**	**VU**	1	4
Saccostomus campestris	Southern African Pouched Mouse			LC (S)	LC	1	2
Steatomys krebsii	Kreb's African Fat Mouse			LC (S)	LC	3	3
Steatomys pratensis	Common African Fat Mouse			LC (S)	LC	1	2
NYCTERIDAE	**Slit-faced bats**						
Nycteris thebaica	Egyptian Slit-faced Bat			LC (U)	LC	2	2
ORYCTEROPODIDAE	**Aardvark**						
Orycteropus afer	Aardvark	**PS**	**PG Schedule 2 Section 15(1)(a)**	LC (U)	LC	2	4
PEDETIDAE	**Spring Hare**						
Pedetes capensis	South African Spring Hare			LC (U)	LC	1	4
PROCAVIIDAE	**Hyraxes**						
Procavia capensis	Rock Hyrax			LC (U)	LC	2	4
PTEROPODIDAE	**Fruit bats**						
Epomophorus wahlbergi	Wahlberg's Epauletted Fruit Bat			LC (S)	LC	3	3
RHINOLOPHIDAE	**Horseshoe bats**						
Rhinolophus blasii	Blasius's Horseshoe Bat			LC (D)	**NT**	3	4
Rhinolophus clivosus	Geoffroy's Horseshoe Bat			LC (U)	LC	2	3
Rhinolophus darlingi	Darling's Horseshoe Bat			LC (U)	LC	3	3
Rhinolophus simulator	Bushveld Horseshoe Bat			LC (D)	LC	2	2
SCIURIDAE	**Squirrels**						
Paraxerus cepapi	Smith's Bush Squirrel			LC (S)	LC	3	3
Xerus inauris	South African Ground Squirrel			LC (S)	LC	3	4
SORICIDAE	**Shrews**						

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA RED LIST STATUS	LoO QDS	LoO SITE
Crocidura cyanea	Reddish-gray Musk Shrew			LC (S)	LC	2	2
Crocidura fuscomurina	Bicolored Musk Shrew			LC (U)	LC	2	2
Crocidura hirta	Lesser Red Musk Shrew			LC (U)	LC	2	2
Crocidura mariquensis	Swamp Musk Shrew			LC (U)	**NT**	2	4
Crocidura silacea	Lesser Gray-brown Musk Shrew			LC (S)	LC	2	2
Myosorex varius	Forest Shrew			LC (S)	LC	3	4
Suncus infinitesimus	Least Dwarf Shrew			LC (U)	LC	3	4
Suncus lixus	Greater Dwarf Shrew			LC (U)	LC	3	4
Suncus varilla	Lesser Dwarf Shrew			LC (U)	LC	3	4
SUIDAE	**Hogs & pigs**						
Phacochoerus africanus	Common Warthog			LC (S)	LC	2	4
Potamochoerus larvatus (koiropotamus)	Bush-pig			LC (S)	LC	3	4
THRYONOMYIDAE	**Cane Rat**						
Thryonomys swinderianus	Greater Cane Rat			LC (U)	LC	2	4
VESPERTILIONIDAE	**House, pipistrelle, serotine & related bats**						
Miniopterus natalensis / shreibersii	Natal / Shreiber's Long-fingered Bat			LC (U)	LC	2	3
Myotis tricolor	Temminck's Myotis			LC (U)	LC	3	3
Neoromicia capensis	Cape Serotine			LC (S)	LC	1	2
Pipistrellus rusticus	Rusty Pipistrelle			LC (U)	LC	2	2
Scotophilus dinganii	Yellow-bellied House Bat			LC (U)	LC	1	2
Scotophilus viridis	Green House Bat			LC (U)	LC	2	2
VIVERRIDAE	**Civet & genets**						
Genetta genetta	Common Genet			LC (S)	LC	1	3
Genetta maculata	Common Large- / Rusty-spotted Genet			LC(U)	LC	2	3

Status: D = Declining; EN = Endangered; LC = Least Concern; NT = Near Threatened; PG = Protected Game; PS = Protected Species; PWA = Protected Wild Animal; S = Stable; U = Unknown; VU = Vulnerable

Likelihood of Occurrence (LoO): 1 = Present; 2 = High; 3 = Moderate; 4 = Low

Sources: Transvaal Nature Conservation Ordinance (1983); NEMBA ToPS (2015); IUCN (2016); MammalMAP (2016); SANBI & EWT (2016)

13.3. Bird list for the study area

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Apalis thoracica	Apalis, Bar-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Recurvirostra avosetta	Avocet, Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Turdoides jardineii	Babbler, Arrow-marked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Turdoides bicolor	Babbler, Southern Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Tricholaema leucomelas	Barbet, Acacia Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lybius torquatus	Barbet, Black-collared		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Trachyphonus vaillantii	Barbet, Crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Batis molitor	Batis, Chinspot		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Merops persicus	Bee-eater, Blue-cheeked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Merops apiaster	Bee-eater, European		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Merops pusillus	Bee-eater, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Merops nubicoides	Bee-eater, Southern Carmine		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Merops bullockoides	Bee-eater, White-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Euplectes orix	Bishop, Southern Red		WA Schedule 5 Section 43	LC	LC	1	1	1
Euplectes capensis	Bishop, Yellow		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Euplectes afer	Bishop, Yellow-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Botaurus stellaris	Bittern, Eurasian		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Ixobrychus minutus	Bittern, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Telophorus zeylonus	Bokmakierie		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Laniarius ferrugineus	Boubou, Southern		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Nilaus afer	Brubru		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Pycnonotus nigricans	Bulbul, African Red-eyed		WA Schedule 5 Section 43	LC	LC	1	1	3
Pycnonotus tricolor	Bulbul, Dark-capped		WA Schedule 5 Section 43	LC	LC	1	1	1
Emberiza capensis	Bunting, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Emberiza tahapisi	Bunting, Cinnamon-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Emberiza flaviventris	Bunting, Golden-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Emberiza impetuani	Bunting, Lark-like		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Malaconotus blanchoti	Bush-shrike, Grey-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Telophorus sulfureopectus	Bush-shrike, Orange-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Neotis denhami	Bustard, Denham's	VU	PG Schedule 2 Section 15(1)(a)	NT	VU	1		4

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Turnix sylvaticus	Buttonquail, Common (Kurrichane)		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Buteo vulpinus	Buzzard, Common (Steppe)		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Pernis apivorus	Buzzard, European Honey		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Buteo rufofuscus	Buzzard, Jackal		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Kaupifalco monogrammicus	Buzzard, Lizard		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Camaroptera brachyura	Camaroptera, Green-backed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	
Camaroptera brevicaudata	Camaroptera, Grey-backed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Crithagra atrogularis	Canary, Black-throated		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Crithagra flaviventris	Canary, Yellow		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Crithagra mozambicus	Canary, Yellow-fronted		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Cercomela familiaris	Chat, Familiar		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Thamnolaea cinnamomeiventris	Chat, Mocking Cliff		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Cisticola textrix	Cisticola, Cloud		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	3
Cisticola aridulus	Cisticola, Desert		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	3
Cisticola aberrans	Cisticola, Lazy		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Cisticola tinniens	Cisticola, Levaillant's		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Cisticola chiniana	Cisticola, Rattling		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	1
Cisticola rufilatus	Cisticola, Tinkling		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Cisticola ayresii	Cisticola, Wing-snapping		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	1
Cisticola juncidis	Cisticola, Zitting		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	3
Fulica cristata	Coot, Red-knobbed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Phalacrocorax africanus	Cormorant, Reed		**WA Schedule 5 Section 43**	LC	LC	1	1	4
Phalacrocorax carbo	Cormorant, White-breasted		**WA Schedule 5 Section 43**	LC	LC	1	1	4
Centropus burchellii	Coucal, Burchell's		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	1
Rhinoptilus chalcopterus	Courser, Bronze-winged		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Cursorius temminckii	Courser, Temminck's		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Crecopsis egregia	Crake, African		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Porzana pusilla	Crake, Baillon's		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Amaurornis flavirostris	Crake, Black		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Crex crex	Crake, Corn		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Porzana porzana	Crake, Spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Anthropoides paradiseus	Crane, Blue	PS	PG Schedule 2 Section 15(1)(a)	VU	NT	1	1	4
Sylvietta rufescens	Crombec, Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Corvus capensis	Crow, Cape		WA Schedule 5 Section 43	LC	LC	1	1	3
Corvus albus	Crow, Pied		WA Schedule 5 Section 43	LC	LC	1	1	1
Cuculus gularis	Cuckoo, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Cuculus clamosus	Cuckoo, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Chrysococcyx caprius	Cuckoo, Diederik		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Clamator glandarius	Cuckoo, Great Spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Clamator jacobinus	Cuckoo, Jacobin		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Chrysococcyx klaas	Cuckoo, Klaas's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Clamator levaillantii	Cuckoo, Levaillant's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Cuculus solitarius	Cuckoo, Red-chested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Campephaga flava	Cuckooshrike, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anhinga rufa	Darter, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Streptopelia capicola	Dove, Cape Turtle		WA Schedule 5 Section 43	LC	LC	1	1	1
Turtur chalcospilos	Dove, Emerald-spotted Wood		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Streptopelia senegalensis	Dove, Laughing		WA Schedule 5 Section 43	LC	LC	1	1	1
Oena capensis	Dove, Namaqua		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Streptopelia semitorquata	Dove, Red-eyed		WA Schedule 5 Section 43	LC	LC	1	1	3
Columba livia	Dove, Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Dicrurus adsimilis	Drongo, Fork-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anas sparsa	Duck, African Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Dendrocygna bicolor	Duck, Fulvous Whistling		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Sarkidiornis melanotos	Duck, Knob-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Oxyura maccoa	Duck, Maccoa		PG Schedule 2 Section 15(1)(a)	NT	NT	1		4
Thalassornis leuconotus	Duck, White-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Dendrocygna viduata	Duck, White-faced Whistling		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Anas undulata	Duck, Yellow-billed		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	4
Haliaeetus vocifer	Eagle, African Fish		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Aquila spilogaster	Eagle, African Hawk		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Hieraaetus ayresii	Eagle, Ayres's Hawk		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Circaetus pectoralis	Eagle, Black-chested Snake		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Hieraaetus pennatus	Eagle, Booted		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Circaetus cinereus	Eagle, Brown Snake		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Lophaetus occipitalis	Eagle, Long-crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Polemaetus bellicosus	Eagle, Martial	EN	PG Schedule 2 Section 15(1)(a)	VU	EN	1		4
Aquila nipalensis	Eagle, Steppe		PG Schedule 2 Section 15(1)(a)	EN	LC	1		4
Aquila rapax	Eagle, Tawny	EN	PG Schedule 2 Section 15(1)(a)	LC	EN	1	1	4
Aquila verreauxii	Eagle, Verreauxs'		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	4
Aquila wahlbergi	Eagle, Wahlberg's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Egretta alba	Egret, Great		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Egretta garzetta	Egret, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Egretta vinaceigula	Egret, Slaty		PG Schedule 2 Section 15(1)(a)	VU	NA	1		
Bubulcus ibis	Egret, Western Cattle		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Egretta intermedia	Egret, Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Eremomela usticollis	Eremomela, Burnt-necked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Eremomela icteropygialis	Eremomela, Yellow-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Falco amurensis	Falcon, Amur		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Falco biarmicus	Falcon, Lanner		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	3
Falco vespertinus	Falcon, Red-footed		PG Schedule 2 Section 15(1)(a)	NT	NT	1	1	3
Anomalospiza imberbis	Finch, Cuckoo		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Amadina fasciata	Finch, Cut-throat		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Amadina erythrocephala	Finch, Red-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sporopipes squamifrons	Finch, Scaly-feathered		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Podica senegalensis	Finfoot, African		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Lagonosticta rubricata	Firefinch, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Lagonosticta rhodopareia	Firefinch, Jameson's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lagonosticta senegala	Firefinch, Red-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lanius collaris	Fiscal, Southern (Common)		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Phoenicopterus roseus	Flamingo, Greater		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Phoeniconaias minor	Flamingo, Lesser		PG Schedule 2 Section 15(1)(a)	NT	NT	1		4
Sarothrura rufa	Flufftail, Red-chested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Terpsiphone viridis	Flycatcher, African Paradise		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Stenostira scita	Flycatcher, Fairy		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Sigelus silens	Flycatcher, Fiscal		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Myioparus plumbeus	Flycatcher, Grey Tit-		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Bradornis mariquensis	Flycatcher, Marico		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Bradornis pallidus	Flycatcher, Pale		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Melaenornis pammelaina	Flycatcher, Southern Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Muscicapa striata	Flycatcher, Spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Peliperdix coqui	Francolin, Coqui		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	4
Dendroperdix sephaena	Francolin, Crested		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	2
Scleroptila levaillantii	Francolin, Red-winged		OG Schedule 3 Section 15(1)(b)	LC	LC	1		4
Scleroptila shelleyi	Francolin, Shelley's		OG Schedule 3 Section 15(1)(b)	LC	LC	1		4
Corythaixoides concolor	Go-away-bird, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Limosa limosa	Godwit, Black-tailed		PG Schedule 2 Section 15(1)(a)	NT	NA	1		4
Nettapus auritus	Goose, African Pygmy		PG Schedule 2 Section 15(1)(a)	LC	VU	1		
Alopochen aegyptiacus	Goose, Egyptian		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	3
Plectropterus gambensis	Goose, Spur-winged		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	4
Melierax gabar	Goshawk, Gabar		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Melierax canorus	Goshawk, Pale Chanting		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sphenoeacus afer	Grassbird, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Podiceps nigricollis	Grebe, Black-necked		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Podiceps cristatus	Grebe, Great Crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Tachybaptus ruficollis	Grebe, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Tringa nebularia	Greenshank, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4

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Numida meleagris	Guineafowl, Helmeted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Chroicocephalus cirrocephalus	Gull, Grey-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Scopus umbretta	Hamerkop		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Circus ranivorus	Harrier, African Marsh		PG Schedule 2 Section 15(1)(a)	LC	EN	1		4
Circus pygargus	Harrier, Montagu's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Circus macrourus	Harrier, Pallid		PG Schedule 2 Section 15(1)(a)	NT	NT	1		4
Circus aeruginosus	Harrier, Western Marsh		PG Schedule 2 Section 15(1)(a)			1		
Aviceda cuculoides	Hawk, African Cuckoo		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Polyboroides typus	Hawk, African Harrier-		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Prionops plumatus	Helmet-shrike, White-crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Egretta ardesiaca	Heron, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Nycticorax nycticorax	Heron, Black-crowned Night		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Ardea melanocephala	Heron, Black-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Butorides striata	Heron, Green-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Ardea cinerea	Heron, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Ardea purpurea	Heron, Purple		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Ardeola ralloides	Heron, Squacco		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Falco subbuteo	Hobby, Eurasian		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Prodotiscus regulus	Honeybird, Brown-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Indicator indicator	Honeyguide, Greater		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Indicator minor	Honeyguide, Lesser		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Upupa africana	Hoopoe, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Tockus nasutus	Hornbill, African Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Tockus erythrorhynchus	Hornbill, Southern Red-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Tockus leucomelas	Hornbill, Southern Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Threskiornis aethiopicus	Ibis, African Sacred		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Plegadis falcinellus	Ibis, Glossy		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Bostrychia hagedash	Ibis, Hadeda		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Vidua funerea	Indigobird, Dusky		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Vidua purpurascens	Indigobird, Purple		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4

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Vidua chalybeata	Indigobird, Village		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Actophilornis africanus	Jacana, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Falco rupicoloides	Kestrel, Greater		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Falco naumanni	Kestrel, Lesser		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Falco rupicolus	Kestrel, Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Ispidina picta	Kingfisher, African Pygmy		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Halcyon albiventris	Kingfisher, Brown-hooded		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Megaceryle maximus	Kingfisher, Giant		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Halcyon leucocephala	Kingfisher, Grey-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Alcedo semitorquata	Kingfisher, Half-collared		PG Schedule 2 Section 15(1)(a)	LC	NT	1	1	4
Alcedo cristata	Kingfisher, Malachite		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Ceryle rudis	Kingfisher, Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Halcyon chelicuti	Kingfisher, Striped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Halcyon senegalensis	Kingfisher, Woodland		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Milvus migrans	Kite, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Elanus caeruleus	Kite, Black-shouldered		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Milvus aegyptius	Kite, Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Afrotis afraoides	Korhaan, Northern Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Lophotis ruficrista	Korhaan, Red-crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Eupodotis senegalensis	Korhaan, White-bellied		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Vanellus senegallus	Lapwing, African Wattled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Vanellus armatus	Lapwing, Blacksmith		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Vanellus coronatus	Lapwing, Crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Mirafra apiata	Lark, Cape Clapper		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Eremopterix leucotis	Lark, Chestnut-backed Sparrow-		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Pinarocorys nigricans	Lark, Dusky		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Mirafra fasciolata	Lark, Eastern Clapper		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Certhilauda semitorquata	Lark, Eastern Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Calendulauda africanoides	Lark, Fawn-coloured		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Mirafra rufocinnamomea	Lark, Flappet		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Mirafra cheniana	Lark, Melodious		PG Schedule 2 Section 15(1)(a)	NT	LC	1		4

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Mirafra passerina	Lark, Monotonous		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Spizocorys conirostris	Lark, Pink-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Calandrella cinerea	Lark, Red-capped		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Mirafra africana	Lark, Rufous-naped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Calendulauda sabota	Lark, Sabota		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Macronyx capensis	Longclaw, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Anas platyrhynchos	Mallard		PG Schedule 2 Section 15(1)(a)			1		
Spermestes cucullatus	Mannikin, Bronze		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Riparia cincta	Martin, Banded		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Riparia paludicola	Martin, Brown-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Delichon urbicum	Martin, Common House		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Hirundo fuligula	Martin, Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Riparia riparia	Martin, Sand		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Gallinula chloropus	Moorhen, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Urocolius indicus	Mousebird, Red-faced		WA Schedule 5 Section 43	LC	LC	1	1	1
Colius striatus	Mousebird, Speckled		WA Schedule 5 Section 43	LC	LC	1	1	2
Colius colius	Mousebird, White-backed		WA Schedule 5 Section 43	LC	LC	1	1	2
Acridotheres tristis	Myna, Common		PG Schedule 2 Section 15(1)(a)			1	1	1
Cisticola fulvicapilla	Neddicky		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Caprimulgus europaeus	Nightjar, European		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Caprimulgus pectoralis	Nightjar, Fiery-necked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Caprimulgus tristigma	Nightjar, Freckled		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Caprimulgus rufigena	Nightjar, Rufous-cheeked		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Oriolus larvatus	Oriole, Black-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Oriolus oriolus	Oriole, Eurasian Golden		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Struthio camelus	Ostrich, Common			LC	LC	1	1	4
Tyto capensis	Owl, African Grass		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Otus senegalensis	Owl, African Scops		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Bubo capensis	Owl, Cape Eagle-		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Asio capensis	Owl, Marsh		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Ptilopsis granti	Owl, Southern White-faced		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3

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Bubo africanus	Owl, Spotted Eagle-		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Bubo lacteus	Owl, Verreaux's Eagle-		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Tyto alba	Owl, Western Barn		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Glaucidium perlatum	Owlet, Pearl-spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Buphagus erythrorynchus	Oxpecker, Red-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Rostratula benghalensis	Painted-snipe, Greater		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4
Psittacula krameri	Parakeet, Rose-ringed		PG Schedule 2 Section 15(1)(a)			1		4
Poicephalus meyeri	Parrot, Meyer's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Pelecanus onocrotalus	Pelican, Great White		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Pelecanus rufescens	Pelican, Pink-backed		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Anthoscopus minutus	Penduline-tit, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Anthoscopus caroli	Penduline-tit, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Petronia superciliaris	Petronia, Yellow-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Treron calvus	Pigeon, African Green		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Columba arquatrix	Pigeon, African Olive		PG Schedule 2 Section 15(1)(a)	LC	LC	1		
Columba guinea	Pigeon, Speckled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Anthus cinnamomeus	Pipit, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Anthus vaalensis	Pipit, Buffy		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Anthus caffer	Pipit, Bushveld		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anthus similis	Pipit, Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Anthus leucophrys	Pipit, Plain-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Anthus lineiventris	Pipit, Striped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Anthus trivialis	Pipit, Tree		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Charadrius asiaticus	Plover, Caspian		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Charadrius hiaticula	Plover, Common Ringed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Charadrius pecuarius	Plover, Kittlitz's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Charadrius tricollaris	Plover, Three-banded		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Netta erythrophthalma	Pochard, Southern		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Glareola nordmanni	Pratincole, Black-winged		PG Schedule 2 Section 15(1)(a)	NT	NT	1		4
Prinia flavicans	Prinia, Black-chested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Prinia subflava	Prinia, Tawny-flanked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1

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Dryoscopus cubla	Puffback, Black-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Pytilia melba	Pytilia, Green-winged		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Ortygospiza atricollis	Quail-finch, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Coturnix coturnix	Quail, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Coturnix delegorguei	Quail, Harlequin		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Quelea quelea	Quelea, Red-billed		WA Schedule 5 Section 43	LC	LC	1	1	2
Rallus caerulescens	Rail, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Cossypha caffra	Robin-chat, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Cossypha humeralis	Robin-chat, White-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Cercotrichas paena	Robin, Kalahari Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Cercotrichas leucophrys	Robin, White-browed Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Coracias garrulus	Roller, European		PG Schedule 2 Section 15(1)(a)	LC	NT	1	1	3
Coracias caudatus	Roller, Lilac-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Coracias naevius	Roller, Purple		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Philomachus pugnax	Ruff		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Pterocles bicinctus	Sandgrouse, Double-banded		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Pterocles gutturalis	Sandgrouse, Yellow-throated		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4
Actitis hypoleucos	Sandpiper, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Calidris ferruginea	Sandpiper, Curlew		PG Schedule 2 Section 15(1)(a)	NT	LC	1	1	4
Tringa ochropus	Sandpiper, Green		PG Schedule 2 Section 15(1)(a)			1		4
Tringa stagnatilis	Sandpiper, Marsh		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Tringa glareola	Sandpiper, Wood		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Rhinopomastus cyanomelas	Scimitarbill, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sagittarius serpentarius	Secretarybird		PG Schedule 2 Section 15(1)(a)	VU	VU	1	1	4
Crithagra gularis	Seedeater, Streaky-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Tadorna cana	Shelduck, South African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Laniarius atrococcineus	Shrike, Crimson-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Lanius minor	Shrike, Lesser Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Corvinella melanoleuca	Shrike, Magpie		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lanius collurio	Shrike, Red-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Eurocephalus anguitimens	Shrike, Southern White-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2

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Gallinago nigripennis	Snipe, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Plocepasser mahali	Sparrow-weaver, White-browed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Passer melanurus	Sparrow, Cape		WA Schedule 5 Section 43	LC	LC	1	1	1
Passer motitensis	Sparrow, Great		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Passer domesticus	Sparrow, House		PG Schedule 2 Section 15(1)(a)			1	1	2
Passer diffusus	Sparrow, Southern Grey-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Accipiter melanoleucus	Sparrowhawk, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Accipiter minullus	Sparrowhawk, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Accipiter ovampensis	Sparrowhawk, Ovambo		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Platalea alba	Spoonbill, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Pternistis natalensis	Spurfowl, Natal		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	3
Pternistis swainsonii	Spurfowl, Swainson's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Lamprotornis australis	Starling, Burchell's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Lamprotornis nitens	Starling, Cape Glossy		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Lamprotornis bicolor	Starling, Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Onychognathus morio	Starling, Red-winged		WA Schedule 5 Section 43	LC	LC	1	1	3
Cinnyricinclus leucogaster	Starling, Violet-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Creatophora cinerea	Starling, Wattled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Himantopus himantopus	Stilt, Black-winged		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Calidris minuta	Stint, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Saxicola torquatus	Stonechat, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Ciconia abdimii	Stork, Abdim's		PG Schedule 2 Section 15(1)(a)	LC	NT	1	1	4
Leptoptilos crumeniferus	Stork, Marabou		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4
Ciconia ciconia	Stork, White		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Mycteria ibis	Stork, Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	EN	1		4
Chalcomitra amethystina	Sunbird, Amethyst		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Cinnyris afer	Sunbird, Greater Double-collared		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Cinnyris mariquensis	Sunbird, Marico		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Cinnyris talatala	Sunbird, White-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Hirundo rustica	Swallow, Barn		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Hirundo cucullata	Swallow, Greater Striped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Hirundo abyssinica	Swallow, Lesser Striped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Hirundo dimidiata	Swallow, Pearl-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Hirundo semirufa	Swallow, Red-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Hirundo spilodera	Swallow, South African Cliff		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Hirundo albigularis	Swallow, White-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Porphyrio madagascariensis	Swamphen, African (Purple)		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Apus barbatus	Swift, African Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Cypsiurus parvus	Swift, African Palm		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Tachymarptis melba	Swift, Alpine		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Apus apus	Swift, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Apus horus	Swift, Horus		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Apus affinis	Swift, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Apus caffer	Swift, White-rumped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Tchagra senegalus	Tchagra, Black-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Tchagra australis	Tchagra, Brown-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anas capensis	Teal, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Anas hottentota	Teal, Hottentot		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Anas erythrorhyncha	Teal, Red-billed		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	4
Sterna caspia	Tern, Caspian		PG Schedule 2 Section 15(1)(a)	LC	VU	1		
Chlidonias hybrida	Tern, Whiskered		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Chlidonias leucopterus	Tern, White-winged		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Burhinus capensis	Thick-knee, Spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Monticola rupestris	Thrush, Cape Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Psophocichla litsipsirupa	Thrush, Groundscraper		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Turdus smithi	Thrush, Karoo		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Turdus libonyanus	Thrush, Kurrichane		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Turdus olivaceus	Thrush, Olive		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Pogoniulus chrysoconus	Tinkerbird, Yellow-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Parisoma subcaeruleum	Tit-Babbler, Chestnut-vented		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Parus cinerascens	Tit, Ashy		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Parus niger	Tit, Southern Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Gyps coprotheres	Vulture, Cape	EN	PG Schedule 2 Section 15(1)(a)	EN	EN	1	1	4
Torgos tracheliotos	Vulture, Lappet-faced	EN	PG Schedule 2 Section 15(1)(a)	EN	EN	1		4
Gyps africanus	Vulture, White-backed	EN	PG Schedule 2 Section 15(1)(a)	CR	CR	1		4
Motacilla aguimp	Wagtail, African Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Motacilla capensis	Wagtail, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Motacilla flava	Wagtail, Western Yellow		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Acrocephalus baeticatus	Warbler, African Reed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Calamonastes fasciolatus	Warbler, Barred Wren-		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sylvia borin	Warbler, Garden		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Acrocephalus arundinaceus	Warbler, Great Reed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Hippolais icterina	Warbler, Icterine		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Acrocephalus gracilirostris	Warbler, Lesser Swamp		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Bradypterus baboecala	Warbler, Little Rush		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Acrocephalus palustris	Warbler, Marsh		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Hippolais olivetorum	Warbler, Olive-tree		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Locustella fluviatilis	Warbler, River		PG Schedule 2 Section 15(1)(a)	LC	LC	1		
Acrocephalus schoenobaenus	Warbler, Sedge		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Phylloscopus trochilus	Warbler, Willow		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Estrilda erythronotos	Waxbill, Black-faced		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Uraeginthus angolensis	Waxbill, Blue		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Estrilda astrild	Waxbill, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Amandava subflava	Waxbill, Orange-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Coccopygia melanotis	Waxbill, Swee		PG Schedule 2 Section 15(1)(a)	LC	LC	1		
Granatina granatina	Waxbill, Violet-eared		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Ploceus capensis	Weaver, Cape		WA Schedule 5 Section 43	LC	LC	1		4
Ploceus intermedius	Weaver, Lesser Masked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Bubalornis niger	Weaver, Red-billed Buffalo		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Anaplectes rubriceps	Weaver, Red-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3

SCIENTIFIC NAME	ALPHABETICAL COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO		
						QDS	PENTAD	SITE
Ploceus velatus	Weaver, Southern Masked		**WA Schedule 5 Section 43**	LC	LC	1	1	1
Amblyospiza albifrons	Weaver, Thick-billed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		
Ploceus cucullatus	Weaver, Village		**WA Schedule 5 Section 43**	LC	LC	1	1	3
Oenanthe pileata	Wheatear, Capped		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		3
Oenanthe monticola	Wheatear, Mountain		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Zosterops virens	White-eye, Cape		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Zosterops pallidus	White-eye, Orange River		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Sylvia communis	Whitethroat, Common		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		3
Vidua paradisaea	Whydah, Long-tailed Paradise		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Vidua macroura	Whydah, Pin-tailed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	3
Vidua regia	Whydah, Shaft-tailed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Euplectes progne	Widowbird, Long-tailed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Euplectes ardens	Widowbird, Red-collared		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Euplectes albonotatus	Widowbird, White-winged		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	1
Phoeniculus purpureus	Wood-hoopoe, Green		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	1
Dendropicos namaquus	Woodpecker, Bearded		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	4
Campethera bennettii	Woodpecker, Bennett's		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	3
Dendropicos fuscescens	Woodpecker, Cardinal		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Campethera abingoni	Woodpecker, Golden-tailed		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Jynx ruficollis	Wryneck, Red-throated		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4

Status: CR = Critically Endangered; EN = Endangered; LC = Least Concern; NT = Near Threatened; OG = Ordinary Game; PG = Protected Game; PS = Protected Species; VU = Vulnerable; WA = Wild Animal

Likelihood of Occurrence (LoO): 1 = Present; 2 = High; 3 = Moderate; 4 = Low

Sources: Transvaal Nature Conservation Ordinance (1983); Roberts VII (2013); NEMBA ToPS (2015); Taylor *et al.* (2015); SABAP 2 (2016)

13.4. Reptile list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO	
					QDS	SITE
AGAMIDAE	**Agamas**					
Acanthocercus atricollis atricollis	Southern Tree Agama		**PG Schedule 2 Section 15(1)(a)**	1LC	1	3
Agama aculeata distanti	Distant's Ground Agama		**PG Schedule 2 Section 15(1)(a)**	1LC	1	3
AMPHISBAENIDAE	**Worm lizards**					
Monopeltis infuscata	Dusky Worm Lizard		**PG Schedule 2 Section 15(1)(a)**	2LC	1	3
CHAMAELEONIDAE	**Chameleons**					
Chamaeleo dilepis dilepis	Common Flap-neck Chameleon		**PG Schedule 2 Section 15(1)(a)**	2LC*	2	3
COLUBRIDAE	**Typical snakes**					
Crotaphopeltis hotamboeia	Red-lipped Snake		**WA Schedule 5 Section 43**	2LC	1	2
Dasypeltis scabra	Rhombic Egg-eater		**WA Schedule 5 Section 43**	2LC	1	2
Dispholidus typus viridis	Northern Boomslang		**WA Schedule 5 Section 43**	2LC*	1	2
Philothamnus semivariegatus	Spotted Bush Snake		**WA Schedule 5 Section 43**	2LC	2	2
Telescopus semiannulatus semiannulatus	Eastern Tiger Snake		**WA Schedule 5 Section 43**	2LC	2	2
Thelotornis capensis capensis	Southern Twig Snake		**WA Schedule 5 Section 43**	1LC	1	2
ELAPIDAE	**Cobras, mambas & relatives**					
Aspidelaps scutatus scutatus	Speckled Shield Cobra		**WA Schedule 5 Section 43**	1LC	3	3
Naja annulifera	Snouted Cobra		**WA Schedule 5 Section 43**	2LC	1	2
Naja mossambica	Mozambique Spitting Cobra		**WA Schedule 5 Section 43**	2LC	1	2
GEKKONIDAE	**Geckos**					
Hemidactylus mabouia	Common Tropical House Gecko		**PG Schedule 2 Section 15(1)(a)**	2LC	2	2
Lygodactylus capensis capensis	Common Dwarf Gecko		**PG Schedule 2 Section 15(1)(a)**	1LC	2	2
Pachydactylus affinis	Transvaal Gecko		**PG Schedule 2 Section 15(1)(a)**	1LC	2	3
Pachydactylus capensis	Cape Gecko		**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
GERRHOSAURIDAE	**Plated lizards & seps**					
Gerrhosaurus flavigularis	Yellow-throated Plated Lizard		**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
LACERTIDAE	**Typical lizards**					
Ichnotropis capensis	Ornate Rough-scaled Lizard		**PG Schedule 2 Section 15(1)(a)**	1LC	2	3
Meroles squamulosus	Common Rough-scaled Lizard		**PG Schedule 2 Section 15(1)(a)**	1LC	2	3
Nucras holubi	Holub's Sandveld Lizard		**PG Schedule 2 Section 15(1)(a)**	2LC	1	3
Nucras intertexta	Spotted Sandveld Lizard		**PG Schedule 2 Section 15(1)(a)**	2LC	1	3
Nucras ornata	Ornate Sandveld Lizard		**PG Schedule 2 Section 15(1)(a)**	2LC	2	3

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS	LoO SITE
Pedioplanis lineoocellata lineoocellata	Spotted Sand Lizard		**PG Schedule 2 Section 15(1)(a)**	2LC	2	3
LAMPROPHIIDAE	**Lamprophid snakes**					
Amblyodipsas polylepis polylepis	Common Purple-glossed Snake		**WA Schedule 5 Section 43**	1LC	2	3
Aparallactus capensis	Black-headed Centipede-eater		**WA Schedule 5 Section 43**	2LC	1	2
Atractaspis bibronii	Bibron's Stiletto Snake		**WA Schedule 5 Section 43**	2LC	2	3
Atractaspis duerdeni	Duerden's Stiletto Snake		**WA Schedule 5 Section 43**	2LC	3	2
Boaedon capensis	Brown House Snake		**WA Schedule 5 Section 43**	2LC	1	2
Duberria lutrix lutrix	South African Slug-eater		**WA Schedule 5 Section 43**	1LC	3	3
Gonionotophis capensis capensis	Common File Snake		**WA Schedule 5 Section 43**	2LC	1	3
Gonionotophis nyassae	Black File Snake		**WA Schedule 5 Section 43**	2LC	1	3
Lycodonomorphus rufulus	Brown Water Snake		**WA Schedule 5 Section 43**	1LC	2	3
Lycophidion capense capense	Cape Wolf Snake		**WA Schedule 5 Section 43**	2LC	1	2
Prosymna bivittata	Two-striped Shovel-snout		**WA Schedule 5 Section 43**	1LC	3	2
Prosymna sundevallii	Sundevall's Shovel-snout		**WA Schedule 5 Section 43**	1LC	3	3
Psammophis brevirostris	Short-snouted Grass Snake		**WA Schedule 5 Section 43**	1LC	1	3
Psammophis subtaeniatus	Western Yellow-bellied Sand Snake		**WA Schedule 5 Section 43**	2LC	2	2
Psammophis trinasalis	Fork-marked Sand Snake		**WA Schedule 5 Section 43**	2LC	1	2
Psammophylax tritaeniatus	Striped Grass Snake		**WA Schedule 5 Section 43**	2LC	1	2
Pseudaspis cana	Mole Snake		**WA Schedule 5 Section 43**	2LC	2	2
LEPTOTYPHLOPIDAE	**Thread snakes**					
Leptotyphlops distanti	Distant's Thread Snake		**WA Schedule 5 Section 43**	1LC	1	2
Leptotyphlops incognitus	Incognito Thread Snake		**WA Schedule 5 Section 43**	1LC	2	2
Leptotyphlops scutifrons conjunctus	Eastern Thread Snake		**WA Schedule 5 Section 43**	1LC*	3	3
Leptotyphlops scutifrons scutifrons	Peters' Thread Snake		**WA Schedule 5 Section 43**	1LC*	2	2
SCINCIDAE	**Skinks**					
Acontias occidentalis	Western Legless Skink		**PG Schedule 2 Section 15(1)(a)**	1LC	3	3
Afroablepharus wahlbergii	Wahlberg's Snake-eyed Skink		**PG Schedule 2 Section 15(1)(a)**	2LC	1	3
Mochlus (sundevallii) sundevallii	Sundevall's Writhing Skink		**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
Trachylepis capensis	Cape Skink		**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
Trachylepis margaritifer	Rainbow Skink		**PG Schedule 2 Section 15(1)(a)**	2LC	3	4
Trachylepis varia	Variable Skink		**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
TYPHLOPIDAE	**Blind snakes**					

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO	
					QDS	SITE
Afrotyphlops bibronii	Bibron's Blind Snake		**WA Schedule 5 Section 43**	1LC	1	2
Rhinotyphlops lalandei	Delalande's Beaked Blind Snake		**WA Schedule 5 Section 43**	2LC	2	3
VIPERIDAE	**Adders**					
Bitis arietans arietans	Puff Adder		**WA Schedule 5 Section 43**	2LC	1	2
Bitis caudalis	Horned Adder		**WA Schedule 5 Section 43**	2LC	2	3
Causus rhombeatus	Rhombic Night Adder		**WA Schedule 5 Section 43**	2LC	2	2

Status: 1 = Global; 2 = Regional; LC = Least Concern; PG = Protected Game; WA = Wild Animal

Likelihood of Occurrence (LoO): 1 = Present; 2 = High; 3 = Moderate; 4 = Low

Sources: Transvaal Nature Conservation Ordinance (1983); Bates *et al.* (2014); NEMBA ToPS (2015); ReptileMAP (2016)

13.5. Frog list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO	
					QDS	SITE
BREVICIPITIDAE	**Rain frogs**					
Breviceps adspersus adspersus	Bushveld Rain Frog		LC (U)*	LC	2	2
BUFONIDAE	**True toads**					
Poyntonophrynus fenoulheti	Northern Pygmy Toad		LC (U)	LC	3	4
Poyntonophrynus vertebralis	Southern Pygmy Toad		LC (U)	LC	3	4
Schismaderma carens	Red Toad		LC (U)	LC	1	3
Sclerophrys garmani	Olive Toad		LC (U)	LC	3	3
Sclerophrys gutturalis	Guttural Toad		LC (I)	LC	1	2
Sclerophrys poweri	Power's Toad		LC (U)	LC	2	2
HYPEROLIIDAE	**Leaf-folding & reed frogs**					
Kassina senegalensis	Bubbling Kassina		LC (U)	LC	1	1
Semnodactylus wealii	Rattling Frog		LC (U)	LC	3	4
MICROHYLIDAE	**Rubber frogs**					
Phrynomantis bifasciatus	Banded Rubber Frog		LC (U)	LC	2	3
PHRYNOBATRACHIDAE	**Puddle frogs**					
Phrynobatrachus natalensis	Snoring Puddle Frog		LC (S)	LC	1	3
PIPIDAE	**African clawed frogs**					
Xenopus laevis	Common Platanna		LC (I)	LC	2	4
PTYCHADENIDAE	**Grass frogs**					
Ptychadena anchietae	Plain Grass Frog		LC (U)	LC	1	3
Ptychadena mossambica	Broad-banded Grass Frog		LC (U)	LC	3	3
Ptychadena porosissima	Striped Grass Frog		LC (U)	LC	1	1
PYXICEPHALIDAE	**Moss, river, sand & stream frogs**					
Amietia fuscigula	Cape River Frog		LC (S)	LC	3	4
Amietia quecketti	Queckett's River Frog		LC (S)	LC	1	4
Cacosternum boettgeri	Common Caco		LC (U)	LC	1	1
Pyxicephalus adspersus	Giant Bullfrog	**PG Schedule 2 Section 15(1)(a)**	LC (D)	**NT**	2	2
Pyxicephalus edulis	African Bullfrog		LC (U)	LC	3	1
Strongylopus fasciatus	Striped Stream Frog		LC (U)	LC	3	4
Tomopterna cryptotis	Tremolo Sand Frog		LC (S)	LC	2	2
Tomopterna natalensis	Natal Sand Frog		LC (U)	LC	2	2

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	LoO	
					QDS	SITE
RHACOPHORIDAE	**Foam Nest Frog**					
Chiromantis xerampelina	Southern Foam Nest Frog		LC (U)	LC	1	4

Status: D = Declining; I = Increasing; LC = Least Concern; NT = Near Threatened; PG = Protected Game; S = Stable; U = Unknown population trend; * Status assigned to species

Likelihood of Occurrence (LoO): 1 = Present; 2 = High; 3 = Moderate; 4 = Low

Sources: Transvaal Nature Conservation Ordinance (1983); Minter *et al.* (2004); Du Preez & Carruthers (2009); Measey (2011); IUCN (2013.1); ToPS List (2015); FrogMap (2016)

13.6. Butterfly list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
HESPERIIDAE	**Sandmen, skippers, sylphs & relatives**			
Abantis tettensis	Spotted Velvet Skipper		1LC	1
Borbo borbonica borbonica	Olive-haired Swift		1LC	3
Borbo fallax	False Swift		1LC	3
Borbo gemella	Twin Swift		1LC	3
Caprona pillaana	Ragged Skipper		1LC	1
Coeliades forestan forestan	Striped Policeman		1LC	1
Coeliades pisistratus	Two-pip Policeman		1LC	1
Eretis djaelaelae	Marbled Elf		1LC	3
Eretis umbra umbra	Small Marbled Elf		1LC End	2
Gegenes hottentota	Marsh Hottentot Skipper		1LC	3
Gegenes niso niso	Common Hottentot		1LC	1
Gegenes pumilio gambica	Dark Hottentot		1LC	1
Gomalia elma elma	Green-marbled Skipper			1
Kedestes barberae barberae	Barber's Ranger		1LC	2
Kedestes callicles	Pale Ranger		LC	1
Kedestes lepenula	Chequered Ranger		1LC	1
Kedestes macomo	Macomo Ranger		1LC	3
Kedestes nerva nerva	Scarce Ranger		1LC End	2
Kedestes wallengrenii wallengrenii	Wallengren's Ranger		1LC	3
Leucochitonea levubu	White-cloaked Skipper		1LC	1
Metisella malgacha malgacha	Grassveld Sylph		1LC End	3
Metisella meninx	Marsh Sylph		**1LC Rare Habitat Specialist**	1
Metisella willemi	Netted Sylph		1LC	2
Parosmodes morantii morantii	Morant's Orange		1LC	1
Pelopidas mathias	Black-banded Swift		1LC	2
Pelopidas thrax	White-banded Swift		1LC	1
Platylesches ayresii	Peppered Hopper		1LC	1
Platylesches dolomitica	Hilltop Hopper		**1LC Rare Low Density End**	3
Platylesches neba	Flower-girl Hopper		1LC	1
Sarangesa motozi	Elfin Skipper		1LC	3
Sarangesa phidyle	Small Elfin		1LC	1

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
Sarangesa seineri seineri	Dark Elfin		1LC	1
Spialia asterodia	Star Sandman		1LC	1
Spialia colotes transvaaliae	Bushveld Sandman		1LC	1
Spialia delagoae	Delagoa Sandman		1LC	1
Spialia depauperata australis	Wandering Sandman		1LC	1
Spialia diomus ferax	Common Sandman		1LC	1
Spialia dromus	Forest Sandman		1LC	3
Spialia mafa mafa	Mafa Sandman		1LC	2
Spialia paula	Mite Sandman		1LC	3
Spialia spio	Mountain Sandman		1LC	2
Tsitana tsita	Dismal Sylph		1LC	2
LYCAENIDAE	**Blues, coppers, opals & relatives**			
Actizera lucida	Rayed Blue		1LC	1
Alaena amazoula ochroma	Yellow Zulu		1LC	1
Aloeides aranda	Aranda Copper		1LC	2
Aloeides damarensis damarensis	Damara Copper		1LC	1
Aloeides henningi	Henning's Copper		1LC End	3
Aloeides molomo molomo	Molomo Copper		1LC End	3
Aloeides taikosama	Dusky Copper		1LC	1
Aloeides trimeni trimeni	Trimen's Copper		1LC	2
Anthene amarah amarah	Black Striped Hairtail		1LC	1
Anthene definita definita	Common Hairtail		1LC	1
Anthene dulcis dulcis	Mashuna Hairtail		1LC	1
Anthene livida livida	Pale Hairtail		1LC	1
Anthene millari	Millar's Hairtail		1LC	1
Anthene otacilia otacilia	Otacilia Hairtail		1LC	1
Anthene princeps	Lebombo Hairtail		1LC	1
Anthene talboti	Talbot's Hairtail		1LC	3
Aphnaeus hutchinsonii	Hutchinson's Highflier		1LC	1
Axiocerses amanga amanga	Bush Scarlet		1LC	1
Axiocerses coalescens	Black-tipped Scarlet		1LC	3
Axiocerses tjoane tjoane	Eastern Scarlet		1LC	1
Azanus jesous	Topaz Babul Blue		1LC	1
Azanus mirza	Pale Babul Blue		1LC End	1

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
Azanus moriqua	Black-bordered Babul Blue		1LC	1
Azanus natalensis	Natal Babul Blue		1LC	3
Azanus ubaldus	Velvet-spotted Babul Blue		1LC	1
Cacyreus lingeus	Bush Bronze		1LC	3
Cacyreus marshalli	Common Geranium Bronze		1LC	2
Cacyreus virilis	Mocker Bronze		1LC	2
Capys disjunctus	Russet Protea		1LC	3
Chilades trochylus	Grass Jewel		1LC	1
Chloroselas pseudozeritis pseudozeritis	Brilliant Gem		1LC	1
Cigaritis ella	Ella's Bar		1LC	1
Cigaritis mozambica	Mozambique Bar		1LC	3
Cigaritis natalensis	Natal Bar		1LC	1
Cigaritis phanes	Silvery Bar		1LC	2
Cnodontes penningtoni	Pennington's Buff		1LC	1
Crudaria leroma	Silver Spotted Grey		1LC	1
Cupidopsis cissus cissus	Common Meadow Blue		1LC	2
Cupidopsis jobates jobates	Tailed Meadow Blue		1LC	1
Eicochrysops messapus mahallakoaena	Cupreous Blue		1LC	1
Euchrysops dolorosa	Sabie Smoky Blue		1LC	2
Euchrysops malathana	Common Smoky Blue		1LC	1
Euchrysops osiris	Osiris Smoky Blue		1LC	1
Euchrysops subpallida	Ashen Smoky Blue		1LC	2
Hypolycaena philippus philippus	Purplebrown Hairstreak		1LC	1
Iolaus alienus alienus	Brown-line Sapphire		1LC	1
Iolaus mimosae rhodosense	Mimosa Sapphire		1LC	1
Iolaus pallene	Saffron Sapphire		1LC	1
Iolaus silarus silarus	Straight-line Sapphire		1LC	3
Iolaus trimeni	Trimen's Sapphire		1LC	1
Lachnocnema bibulus	Common Woolly Legs		1LC	2
Lachnocnema durbani	D'Urban's Woolly Legs		1LC	3
Lachnocnema laches	Southern Pied Woolly Legs		1LC	3
Lampides boeticus	Pea Blue		1LC	1

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
Lepidochrysops glauca	Silvery Blue		1LC	1
Lepidochrysops ignota	Zulu Blue		1LC End	3
Lepidochrysops letsea	Free State Blue		1LC	3
Lepidochrysops patricia	Patricia Blue		1LC	2
Lepidochrysops plebeia plebeia	Twin-spot Blue		1LC	1
Lepidochrysops procera	Potchefstroom Blue		**1LC Rare Habitat Specialist End**	3
Leptomyrina henningi henningi	Henning's Black-eye		1LC	1
Leptotes babaulti	Babault's Zebra Blue		1LC End	3
Leptotes brevidentatus	Short-toothed Zebra Blue		1LC	2
Leptotes jeanneli	Jeannel's Zebra Blue		1LC	3
Leptotes pirithous pirithous	Common Zebra Blue		1LC	1
Lycaena clarki	Eastern Sorrel Copper		1LC End	3
Myrina silenus ficedula	Common Fig Tree Blue		1LC	2
Oraidium barberae	Dwarf Blue		1LC	1
Pseudonacaduba sichela sichela	Dusky Line Blue		1LC	1
Stugeta bowkeri tearei	Bowker's Marbled Sapphire		1LC	1
Tarucus sybaris sybaris	Dotted Blue		1LC	1
Thestor basutus capeneri	Basuto Skolly		1LC	3
Tuxentius calice	White Pie		1LC	1
Tuxentius melaena melaena	Black Pie		1LC	1
Uranothauma nubifer nubifer	Black Heart		1LC	3
Virachola antalus	Brown Playboy		1LC	1
Virachola dinochares	Apricot Playboy		1LC	1
Zintha hintza hintza	Hintza Pierrot		1LC	1
Zizeeria knysna knysna	African / Sooty Grass Blue		1LC	1
Zizula hylax	Tiny / Gaika Grass Blue		1LC	1
NYMPHALIDAE	**Acraeas, browns, charaxes & relatives**			
Acraea aglaonice	Clear-spotted / Window Acraea		1LC	1
Acraea anemosa	Broad-bordered Acraea		1LC	1
Acraea axina	Little Acraea		1LC	1
Acraea barberi	Barber's Acraea		1LC	1
Acraea caldarena caldarena	Black-tipped Acraea		1LC	1
Acraea horta	Garden Acraea		1LC	1

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
Acraea lygus	Lygus Acraea		1LC	1
Acraea natalica	Natal Acraea		1LC	1
Acraea neobule neobule	Wandering Donkey Acraea		1LC	1
Acraea nohara nohara	Light Red Acraea		1LC	3
Acraea oncaea	Window Acraea		1LC	1
Acraea stenobea	Suffused Acraea		1LC	3
Amauris albimaculata albimaculata	Layman; Layman Friar		1LC	3
Byblia anvatara acheloia	Joker		1LC	1
Byblia ilithyia	Spotted Joker		1LC	1
Catacroptera cloanthe cloanthe	Pirate		1LC	2
Charaxes achaemenes achaemenes	Bushveld Charaxes	**Schedule 7 Section 45**	1LC	1
Charaxes brutus natalensis	White-barred Charaxes	**Schedule 7 Section 45**	1LC	1
Charaxes candiope	Green-veined Charaxes	**Schedule 7 Section 45**	1LC	1
Charaxes jahlusa rex	Pearl-spotted Charaxes	**Schedule 7 Section 45**	1LC	1
Charaxes jasius saturnus	Foxy Charaxes	**Schedule 7 Section 45**	1LC	1
Charaxes vansoni	Van Son's Charaxes	**Schedule 7 Section 45**	1LC	1
Charaxes zoolina	Club-tailed Charaxes	**Schedule 7 Section 45**	1LC	3
Coenyropsis natalii natalii	Natal Brown		1LC	1
Danaus chrysippus orientis	African Monarch, Plain Tiger		1LC	1
Eurytela dryope angulata	Golden Piper		1LC	3
Hamanumida daedalus	Guinea-fowl Butterfly		1LC	1
Heteropsis perspicua perspicua	Eyed Bush Brown		1LC	1
Hypolimnas misippus	Common Diadem		1LC	1
Junonia hierta cebrene	Yellow Pansy		1LC	1
Junonia oenone oenone	Blue Pansy		1LC	1
Junonia orithya madagascariensis	Eyed Pansy		1LC	1
Melanitis leda	Twilight Brown		1LC End	1
Neptis saclava marpessa	Spotted Sailer		1LC	1
Paternympha narycia	Spotted-eye Brown		1LC End	2
Phalanta phalantha aethiopica	African Leopard		1LC	1
Physcaeneura panda	Dark-webbed Ringlet		1LC	1
Precis antilope	Darker Commodore		1LC	1
Precis archesia archesia	Garden Commodore		1LC	2
Precis ceryne ceryne	Marsh Commodore		1LC	3

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
Precis octavia sesamus	Gaudy Commodore		1LC	3
Stygionympha wichgrafi williami	Wichgraf's Hillside Brown		1LC End	2
Telchinia burni	Pale-yellow Acraea		1LC	1
Telchinia encedon encedon	White-barred Acraea		1LC	1
Telchinia rahira rahira	Marsh Acraea		1LC	2
Telchinia serena	Dancing Acraea		1LC	1
Vanessa cardui	Painted Lady		1LC	1
Ypthima asterope asterope	African Ringlet		1LC	1
Ypthima granulosa	Granular Ringlet		1LC	1
Ypthima impura paupera	Impure Ringlet		1LC	1
PAPILIONIDAE	**Swallowtails, swordtails & relatives**			
Graphium antheus	Large Striped Swordtail		1LC	1
Graphium morania	White Lady		1LC	1
Papilio constantinus constantinus	Constantine's Swallowtail		1LC	1
Papilio demodocus demodocus	Citrus Swallowtail		1LC	1
Papilio nireus lyaeus	Green-banded Swallowtail		1LC	1
PIERIDAE	**Tips, whites & relatives**			
Belenois aurota	Brown-veined White		1LC	1
Belenois creona severina	African Common White		1LC	1
Belenois gidica abyssinica	African Veined White		1LC	3
Belenois zochalia zochalia	Forest White		1LC	3
Catopsilia florella	African Migrant		1LC	1
Colias electo electo	African Clouded Yellow		1LC	1
Colotis annae annae	Scarlet Tip		1LC	1
Colotis antevippe gavisa	Red Tip		1LC	1
Colotis euippe omphale	Smoky Orange Tip		1LC	1
Colotis evagore antigone	Small Orange Tip		1LC	1
Colotis evenina evenina	Orange Tip		1LC	1
Colotis ione	Bushveld Purple Tip		1LC	1
Colotis pallene	Bushveld Orange Tip		1LC	1
Colotis regina	Queen Purple Tip		1LC	1
Colotis vesta argillaceus	Veined Tip		1LC	1
Eurema brigitta brigitta	Broad-bordered Grass Yellow		1LC	1
Eurema hecabe solifera	Lowveld / Common Grass Yellow		1LC	1

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO QDS
Mylothris agathina agathina	Common Dotted Border		1LC	1
Mylothris rueppellii haemus	Twin Dotted Border		1LC	1
Pinacopteryx eriphia eriphia	Zebra White		1LC	1
Pontia helice helice	Common Meadow White		1LC	1
Teracolus agoye agoye	Speckled Sulphur Tip		1LC	1
Teracolus agoye bowkeri	Speckled Sulphur Tip		1LC	3
Teracolus eris eris	Banded Gold Tip		1LC	1
Teracolus subfasciatus	Lemon Traveller		1LC	1

Status: 1 = Global; 2 = Regional; End = Endemic; LC = Least Concern

Likelihood of Occurrence (LoO): 1 = Present; 2 = High; 3 = Moderate.

Sources: Mecenero *et al.* (2013); LepiMAP (2016)

13.7. Odonata list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	BIOTIC INDEX SCORE	LoO QDS
AESHNIDAE	**Hawkers**		
Anax ephippiger	Vagrant Emperor	2	2
Anax imperator	Blue Emperor	1	3
CHLOROCYPHIDAE	**Jewels**		
Platycypha caligata	Dancing Jewel	2	3
COENAGRIONIDAE	**Pond damsels**		
Africallagma glaucum	Swamp Bluet	1	2
Africallagma sapphirinum	Sapphire Bluet	4	3
Azuragrion nigridorsum	Sailing Bluet	3	2
Ceriagrion glabrum	Common Citril	0	3
Ischnura senegalensis	Tropical / Marsh Bluetail	0	2
Pseudagrion citricola	Yellow-faced Sprite	3	3
Pseudagrion hageni	Painted Sprite	2 or 5	3
Pseudagrion hamoni	Swarthy / Drab Sprite	2	3
Pseudagrion kersteni	Powder-faced / Kersten's Sprite	1	1
Pseudagrion massaicum	Masai Sprite	1	2
Pseudagrion salisburyense	Slate Sprite	1	1
Pseudagrion sublacteum	Cherry-eye Sprite	2	1
GOMPHIDAE	**Clubtails**		
Ceratogomphus pictus	Common Thorntail	2	2
Paragomphus cognatus	Rock / Boulder Hooktail	1	3
Paragomphus genei	Common / Green Hooktail	3	1
LESTIDAE	**Spreadwings**		
Lestes pallidus	Pallid / Pale Spreadwing	2	3
Lestes plagiatus	Highland Spreadwing	2	2
LIBELLULIDAE	**Skimmers**		
Acisoma panorpoides	Grizzled Pintail	2	3
Brachythemis leucosticta	Southern Banded Groundling	2	2
Crocothemis erythraea	Broad Scarlet	0	2
Crocothemis sanguinolenta	Little Scarlet	3	2
Diplacodes lefebvrii	Black Percher	3	3
Nesciothemis farinosa	Eastern Blacktail / Black-tailed Skimmer	1	2
Orthetrum caffrum	Two-striped Skimmer	3	1
Orthetrum chrysostigma	Epaulet Skimmer	2	1
Orthetrum icteromelas	Spectacled Skimmer	2	3
Orthetrum trinacria	Long Skimmer	1	3
Palpopleura deceptor	Deceptive Widow	4	1
Palpopleura jucunda	Yellow-veined Widow	2	2
Palpopleura lucia	Lucia Widow	2	2
Palpopleura portia	Portia Widow	2	3
Pantala flavescens	Wandering Glider / Pantala	0	2
Rhyothemis semihyalina	Phantom Flutterer	1	3
Sympetrum fonscolombii	Red-veined Darter / Nomad	0	2
Tholymis tillarga	Twister	3	3
Tramea basilaris	Keyhole Glider	0	1
Tramea limbata	Ferruginous / Voyaging Glider	0	2
Trithemis annulata	Violet Dropwing	1	1
Trithemis arteriosa	Red-veined Dropwing	0	1
Trithemis donaldsoni	Denim Dropwing	4	3
Trithemis dorsalis	Highland / Round-hook Dropwing	0	3

FAMILY & SCIENTIFIC NAME	COMMON NAME	BIOTIC INDEX SCORE	LoO QDS
Trithemis furva	Navy Dropwing	0	1
Trithemis kirbyi	Orange-winged / Kirby's Dropwing	0	2
Trithemis stictica	Jaunty Dropwing	1	2
Zygonyx natalensis	Blue / Scuffed Cascader	2	3
Zygonyx torridus	Ringed Cascader	2	1
MACROMIIDAE	**Cruisers**		
Phyllomacromia picta	Darting Cruiser	2	3
PLATYCNEMIDIDAE	**Featherlegs**		
Elattoneura glauca	Common Threadtail	1	2
SYNLESTIDAE	**Malachites**		
Chlorolestes fasciatus	Mountain Malachite	4	3

Likelihood of Occurrence (LoO): 1 = Present; 2 = High; 3 = Moderate.

Sources: Samways (2008); OdonataMAP (2016)

13.8. Scorpion list for the study area

FAMILY & SCIENTIFIC NAME	LoO QDS	LoO SITE
BUTHIDAE (Fat-tailed scorpions)		
Parabuthus mossambicensis	2	3
Parabuthus transvaalicus	2	4
Pseudolychas pegleri	3	3
Uroplectes carinatus	2	3
Uroplectes olivaceus	3	3
Uroplectes planimanus	3	4
Uroplectes triangulifer	2	3
Uroplectes vittatus	2	2
HORMURIDAE (Flat rock scorpions)		
Cheloctonus jonesii	3	4
SCORPIONIDAE (Burrowing scorpions)		
Opistophthalmus carinatus	3	3
Opistophthalmus glabrifrons	2	2
Opistophthalmus pugnax	3	4

Likelihood of Occurrence (LoO): 2 = High; 3 = Moderate; 4 = Low

Sources: Leeming (2003); ScorpionMAP (2016)

Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT

APPENDIX G.2:

Heritage Impact Assessment: Basic Assessment for the Proposed Development of a Piggery on Portion 15 of Farm Bultfontein 192, Nigel Magisterial District, Gauteng

HERITAGE IMPACT ASSESSMENT:
BASIC ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF A BROILER CHICKEN FACILITY ON PLOT 1109, REMAINDER OF FARM KLIPPAN 102 JR, GA-RANKUWA MAGISTERIAL DISTRICT, GAUTENG

Required under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999).

Report for:

CSIR – Environmental Management Services
P.O. Box 320, Stellenbosch, 7599
Tel: (021) 888 2408
Email: sngema@csir.co.za

On behalf of:

Nkunzi Agricultural Co-Operative

Dr Jayson Orton
ASHA Consulting (Pty) Ltd
40 Brassie Street, Lakeside, 7945
Tel: (021) 788 8425 | 083 272 3225
Email: jayson@asha-consulting.co.za

Jaco van der Walt
Heritage Contracts & Archaeological Consulting
37 Olienhout Street, Modimolle, 0510
Tel: 082 373 8491
Email: jaco.heritage@gmail.com

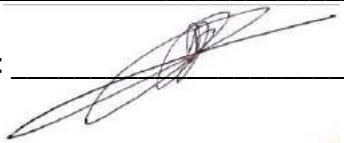
06 February 2017

Specialist declaration

I, Jayson Orton, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I 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 applicant;
- 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, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant 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; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I 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;
- I 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;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Name of Specialist: Jayson Orton

Signature of the specialist: 

Date: 6 March 2017

EXECUTIVE SUMMARY

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a broiler chicken facility on Plot 1109, remainder of the farm Klippan 102 JR, Ga-Rankuwa Magisterial District, Gauteng. The site lies at S25° 26' 15" E28° 02' 09" and is about 35 km northwest of Pretoria.

The site is flat, sandy land but was found to be covered in very dense grass and pioneer bush. Ground visibility was very poor, but the desktop study showed that few archaeological remains have ever been recorded in the general area.

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.

Glossary

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BAR: Basic Assessment Report

CSIR: Council for Scientific and Industrial Research

CRM: Cultural Resources Management

ECO: Environmental Control Officer

ESA: Early Stone Age

GDARD: Gauteng Department of Agriculture and Rural Development

GPS: global positioning system

HIA: Heritage Impact Assessment

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

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

PHRAG: Provincial Heritage Resources Authority Gauteng

PPP: Public Participation Process

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

Compliance with Appendix 6 of the 2014 EIA Regulations

	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.4 Appendix 1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 3
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 1.1.1
g) an identification of any areas to be avoided, including buffers;	n/a
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;	n/a
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.5
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;	Section 6
k) any mitigation measures for inclusion in the EMPr;	n/a
l) any conditions for inclusion in the environmental authorisation;	Section 12
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 9
n) a reasoned opinion- i. as to whether the proposed activity or portions thereof should be authorised; and 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;	Section 12
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a (see Section 3.6)
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
q) any other information requested by the competent authority.	n/a

Contents

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed development of a broiler chicken facility on Plot 1109, remainder of the farm Klippan 102 JR, Ga-Rankuwa Magisterial District, Gauteng. The site lies at S25° 26' 15" E28° 02' 09" and is about 35 km northwest of Pretoria (Figure 1).

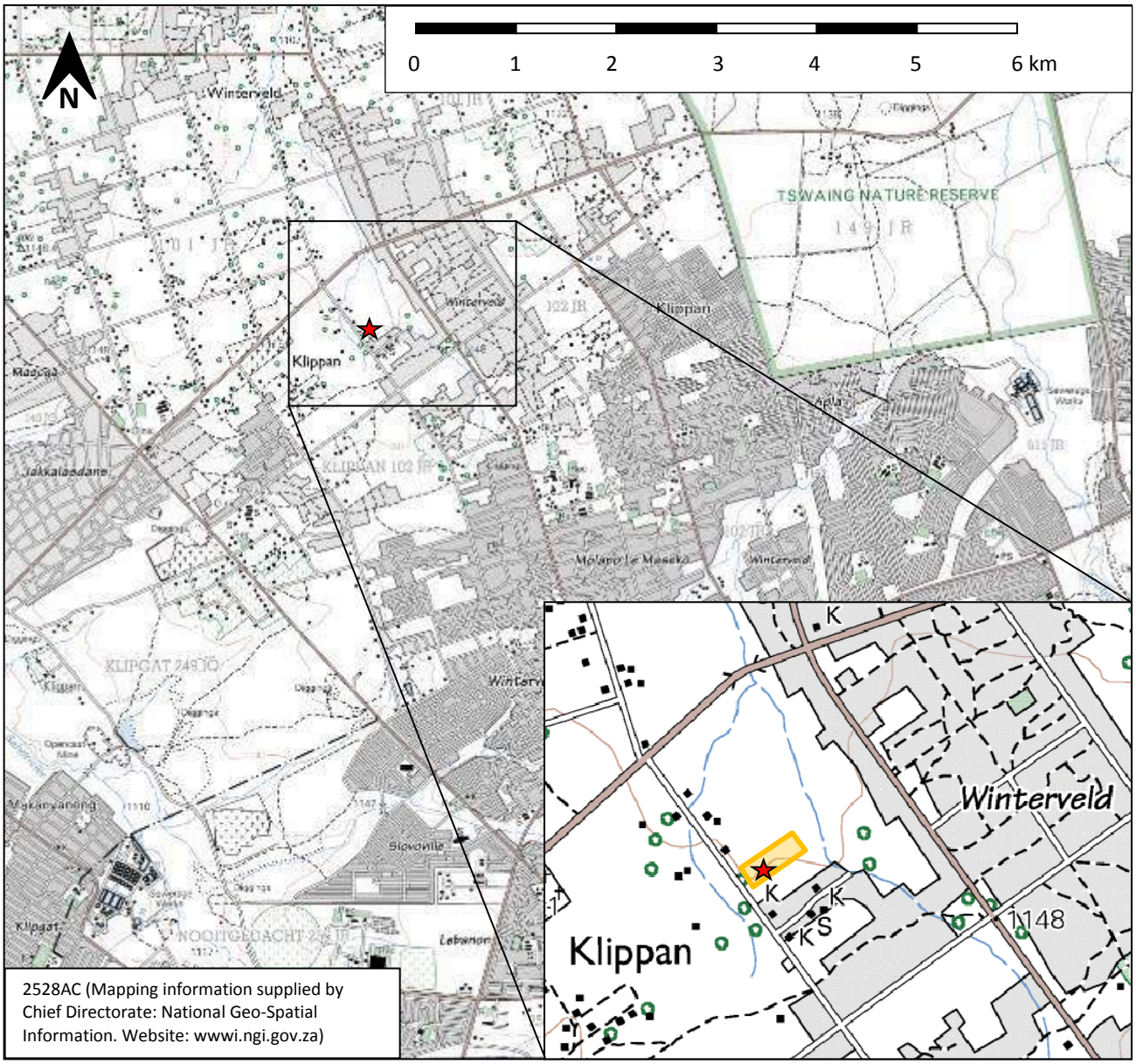


Figure 1: *Map showing the location of the site(red star) and Plot boundary (shaded orange polygon).*

1.1. Project description

Nkunzi Agricultural Co-Operative is proposing a small-scale broiler chicken raising of 4.2 hectares extent. The proposed project will include the following components:

- Office building with shower facilities;
- A bulk feed silo; and
- Two 1800 square meter chicken houses.

The operation will source its water from a borehole and electricity from a generator.

1.1.1. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant since excavations for foundations may impact on archaeological and/or palaeontological remains, while the above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting (Pty) Ltd was asked to:

- Determine what aspects of heritage were relevant to the proposed site and development;
- Conduct a site visit to locate any physical heritage resources that might be present; and
- Compile a Heritage Impact Assessment (HIA) that would assess all relevant heritage resources.

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued for consideration by the Gauteng Department of Agriculture and Rural Development (GDARD) who will review the Basic Assessment Report (BAR) and grant or withhold authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in the Western Cape and Northern Cape provinces of South Africa since 2004 (Please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

Jaco van der Walt conducted the fieldwork and necessary background research. He has an MA in Archaeology (Wits, 2012) and has worked in the heritage field since 2001 across much of southern

Africa (Please see curriculum vitae included in Appendix 1). He has carried out and published research on Iron Age sites and is an accredited heritage practitioner with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #159) as follows:

- Field Director: Iron Age, Shell Middens & Grave Relocation; and
- Field Supervisor: Colonial Period, Stone Age & Grave Relocation.

2. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: palaeontological, prehistoric and historical material (including ruins) more than 100 years old;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: "any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith";
- Palaeontological material: "any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace";
- Archaeological material: a) "material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures"; b) "rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation"; c) "wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation"; and d) "features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found";
- Grave: "means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place"; and
- Public monuments and memorials: "all monuments and memorials a) "erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government"; or b) "which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual."

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list

"historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value; some of these speak directly to cultural landscapes.

Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted. This report fulfils that requirement.

Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BAR. The Provincial Heritage Resources Authority Gauteng (PHRAG; for built environment and landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the GDARD

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. This literature included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:50 000 map and historical aerial images were sourced from the Chief Directorate: National Geo-Spatial Information.

3.2. Field survey

The site was subjected to a detailed foot survey on 28 February 2017. This was in late summer and the grass cover was dense meaning that visibility of any surface archaeological resources was very limited. During the survey the positions of finds were recorded on a hand-held GPS receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

3.3. Impact assessment

For consistency, the impact assessment was conducted through application of a scale supplied by the CSIR.

3.4. Grading

Section 7 of the NHRA provides for the grading of heritage resources into those of National (Grade 1), Provincial (Grade 2) and Local (Grade 3) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade 1 and 2 resources are intended to be managed by the national and provincial heritage resources authorities, while Grade 3 resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen.

SAHRA (2007) has formulated its own system[1] for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' and rated with an A (high/medium significance, requires mitigation), B (medium significance, requires recording) or C (low significance, requires no further action).

3.5. Assumptions and limitations

The study is carried out at the surface only and hence any completely buried archaeological sites will not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. The surface was densely covered in grass which hampered visibility of archaeological remains. Part of the site was also found to be waterlogged and could not be surveyed in detail.

3.6. Consultation processes undertaken

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP. The landowner was asked about heritage resources on site but was not aware of any within the proposed development footprint.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

Winterveld is a large, rural settlement with some commerce, largely in the form of general dealers, bottle stores and automotive spares and repair services. It is supported by a subsistence farming community producing mainly maize and having live-stock such as cattle, goats and sheep. These subsistence farming activities occur in the area surrounding the settlement. A gravel road passes by the south-western edge of the site, while telephone and electricity lines are present in the area. The property to the northwest is vacant, while to the southwest is a church, pre-school and some residences.

[1] The system is intended for use on archaeological and palaeontological sites only.

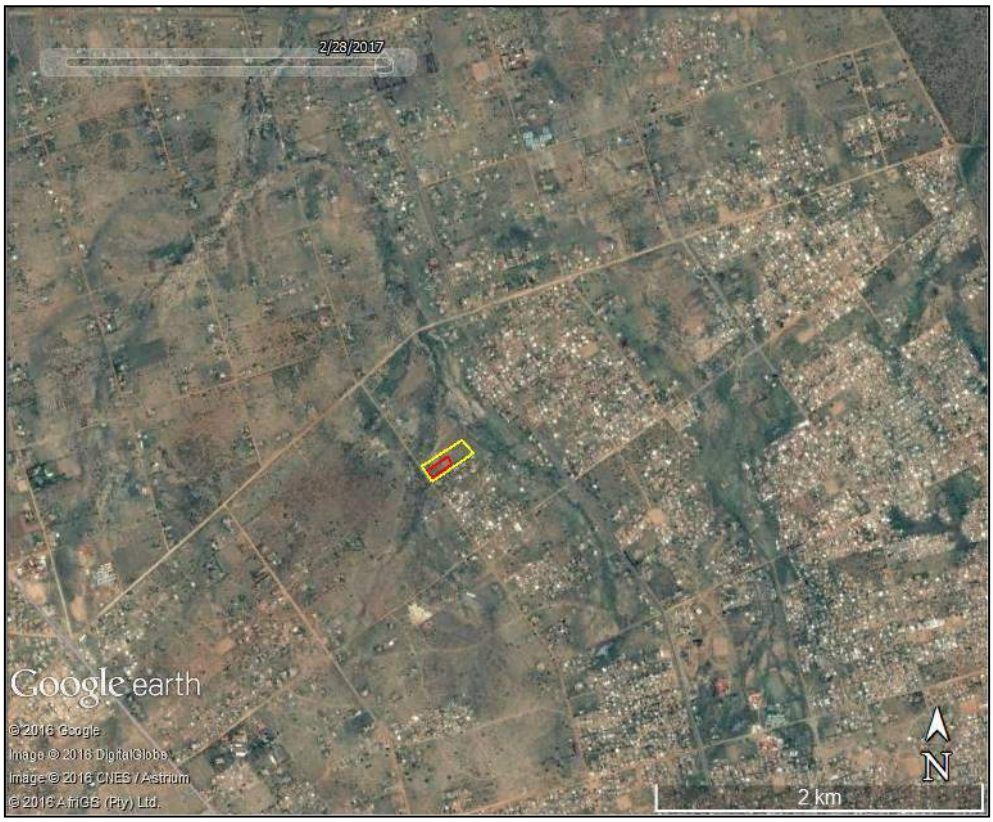


Figure 2: *Aerial view of the property (yellow polygon) and study area (red polygon) showing their broader context.*

4.2. Site description

The site is a level, sandy area with a good covering of grass. Rocky outcrops do not occur on the site but there are two buildings and a few trees and bushes. Drainage is presumably poor because some areas were water-logged. Figures 3 to 6 show some views of the site.

Figure 3: *View towards the south across the western end of the study area showing the house and long grass present.*

Figure 4: *View towards the east along the southern edge of the study area. The house is just visible on the left.*

Figure 5: *View of the water-logger ground in the eastern part of the property.*

Figure 6: *View towards the southwest along the length of the study area.*

5. HERITAGE CONTEXT

This section of the report contains the desktop study and establishes what is already known about heritage resources in the vicinity of the study area. What was found during the field survey as presented below may then be compared with what is already known in order to gain an improved understanding of the significance of the newly reported resources.

5.1. Archaeological aspects

The nearby Tswaing crater formed c. 220 000 years ago when a meteorite crashed into the earth. As there is no outlet for rain water, evaporation causes precipitation of the natural salts that have been leached out of the soil. The salt has been collected and used by humans ever since the Early Stone Age (ESA). A single ESA site – Wonderboompoort – is known from the area (Mason 1957), while several Later Iron Age Sites also occur (Bergh 1999: 4 & 7).

This part of South Africa tends to be dominated by Iron Age archaeology, although such material is generally far less common in areas where building stone was not available. Because this site is on a flat sandy plain there was no opportunity to build stone-walled structures and as such important Iron Age sites will not be present in the wider area. Very few archaeological surveys have been conducted in the area but Van der Walt (2012) and Van Schalkwyk (2013, 2015) did not find any archaeological sites during their surveys. Van Schalkwyk (2013, 2015) did, however, record some burial sites.

5.2. Historical aspects and the built environment

Winterveld became one of the first private black freehold areas in South Africa following the 1936 Native Trust and Land Act. It later became part of the Bophuthatswana administrative jurisdiction in 1977 (Coombes 2003). Historical aerial photography shows that the area was completely undeveloped in 1944.

6. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project. They are mapped in Figure 7.

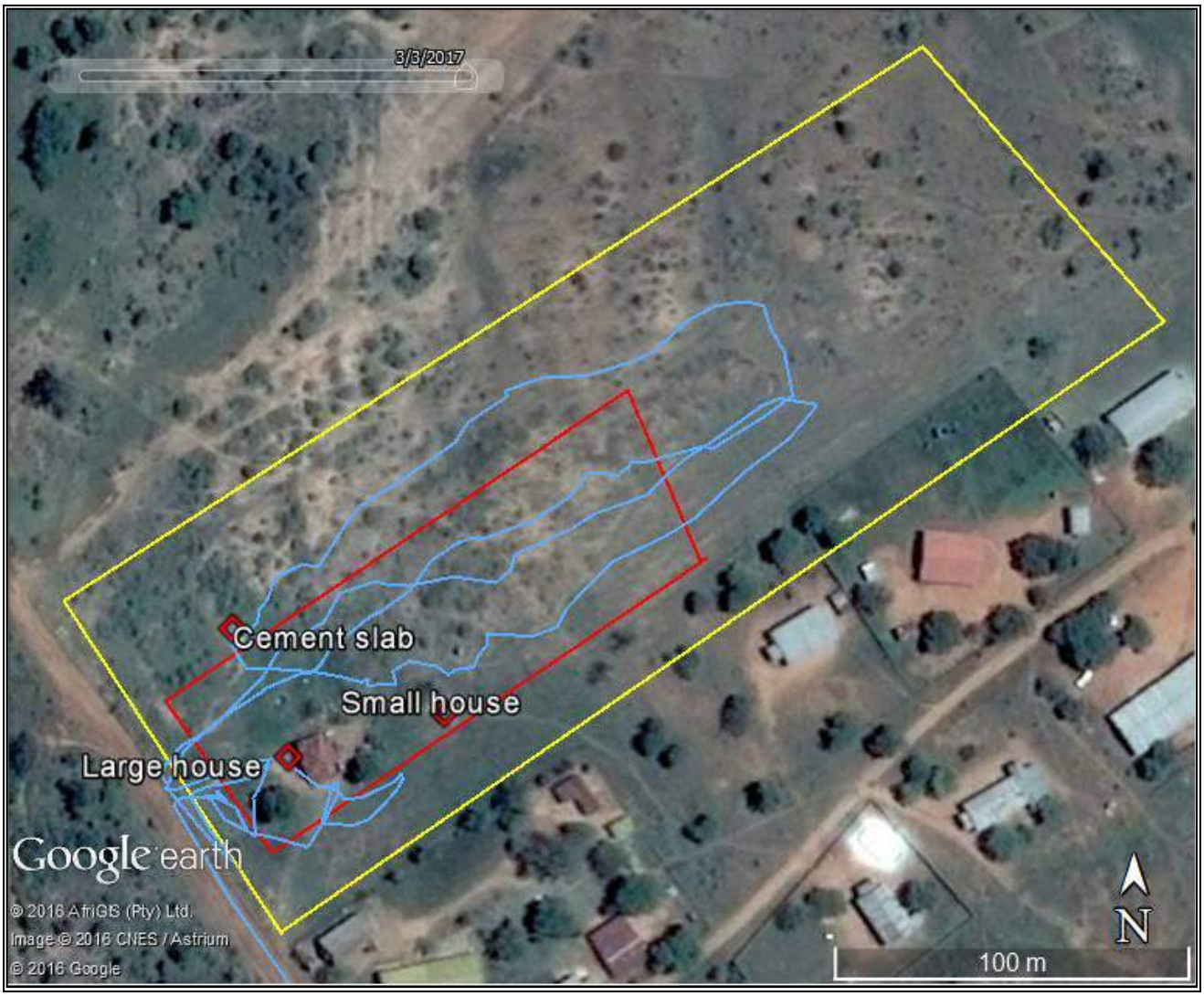


Figure 7: *Aerial view of the property (yellow polygon) and study area (red polygon) showing the finds recorded on site and the survey paths (blue lines).*

6.1. Archaeology

No archaeological resources were recorded in the study area.

6.2. Palaeontology

The SAHRIS Palaeosensitivity map indicates the entire area to be of zero palaeontological sensitivity (Figure 8). This is because it is underlain by granite which is unfossiliferous. Further assessment of this aspect is thus not required.

Figure 8: *Aerial view of the study area extracted from the SAHRIS Palaeosensitivity Map and indicating the site (red arrow) to be of zero sensitivity (grey shading).*

6.3. Graves

No graves were observed in the study area or its immediate surrounds.

6.4. Built environment

Three structures were present on the site. Aerial photography dating to 1944 shows the site to be entirely undeveloped which means that all structures are younger than 73 years. At least the main house appears to be present by 1968 though (Figure 9). This house (labelled 'large house' on Figure 7), although still occupied, is in a partially derelict state with broken windows and gutters (Figure 10). Its exact age is unknown but, although it might be older than 60 years of age. It lies at S25° 26' 15.25" E28° 02' 09.43". A second structure (labelled 'small house' on Figure 7) lies some 35 m to the east. It appears to be slightly more modern and has an outside toilet present to its north (Figures 11 & 12). It is at S25° 26' 14.47" E28° 02' 07.23". A cement slab was also noted to the north of these structures (S25° 26' 15.71" E28° 02' 07.67"). It presumably indicates the position of some sort of structure.

Figure 9: *1961 aerial photograph (Job 453, strip 009, photograph 06395) and modern view of the study area. Although the structures look like they are at a slightly different angle, it is generally not easy to be sure given the resolution of the imagery. The smaller structure towards the east is not visible.*

Figure 10: *View of the south face of the main house on the site.*

Figure 11: *The small house as seen from the west.* ***Figure 12:*** *The nearby outside toilet.*

6.5. Cultural landscape

The 1944 aerial imagery indicates that the general vicinity of the study area was entirely undeveloped (Figure 13). Just two tracks were present some distance to the north and east. By 1961 we see that the area has started being developed for agricultural practices (Figure 14). Development was obviously very rapid since a wider view from 1961 shows the small holdings to be extensive (Figure 15). This means that the present rural/agricultural cultural landscape is a relatively recent development. It nevertheless does have significance for the nature of the landuse which is what gives the area its pleasant rural character. It is interesting to note that the 1965 topographical map shows a 'hut' present on the site (Figure 16), while in 1984 no structures are marked (Figure 17). The map does, however, show that there had been a general increase in the number of buildings in the area.

Figure 13: *1944 (Job 14, strip 014, photograph 14130) and modern views of the vicinity of the study area.*

Figure 14: *1961 landscape (Job 453, strip 009, photograph 06395) and modern aerial views of the vicinity of the study area sowing the developing cultural landscape.*

Figure 15: *1961 landscape (Job 453, strip 009, photograph 06395) and modern aerial views of the vicinity of the study area sowing the newly developed cultural landscape to be extensive.*

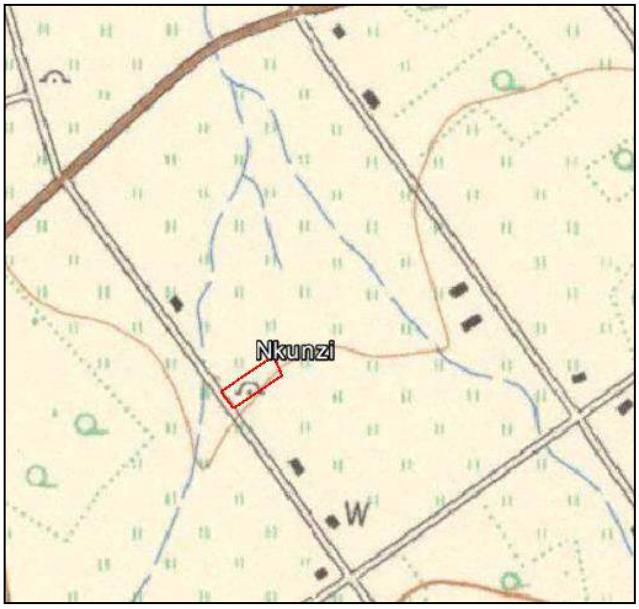


Figure 16: *1965 topographical map (1st edition) of the area showing a hut on the site. (Location determined through aerial overlay on Google Earth.*

Figure 17: *1984 topographical map of the area showing the number of structures in the vicinity to have increased markedly.*

6.6. Summary of heritage indicators

There is only one possible heritage resource in the study area. This is a house that is in very poor condition and may only just be older than 60 years.

6.7. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Although it is presently unknown whether the house on site is greater than 60 years of age or not, it is assumed following the precautionary principle that it is a heritage resource. It can be considered to have low heritage significance for its architectural and social values. PHRAG does not have grading guide and the SAHRA system applies only to archaeological and palaeontological resources.

7. IMPACT ASSESSMENT

The chances of impacting unknown archaeological sites in the study area is considered to be negligible. Any direct impacts that did occur would be during the construction phase only and would be of very low significance (Table 1).

It is unclear whether the house would be demolished or incorporated within the proposed development. However, the assessment presented here assumes total demolition. It has very low heritage significance which means that the extent of the impact can be regarded as site-specific. The impact significance is low but if the structure is retained and incorporated in the development then it would be very low. Indirect, contextual impacts to the surrounding structures would also occur, but because the project is essentially adding another agricultural building to an existing agricultural landscape, this is an impact that is in keeping with the agricultural land use and is thus given a neutral status. The significance of this impact is regarded as being very low (Table 1).

No significant cumulative impacts are expected because of the general lack of significant impacts to heritage resources that will result from this development and the general lack of significant resources known from the surroundings (Table 1).

8. LEGISLATIVE AND PERMIT REQUIREMENTS

Once a comment has been obtained from the relevant heritage authorities, the only further requirement would be that if the house is to be altered or demolished and is greater than 60 years of age then a permit will be required from the PHRAG.

9. ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

Due to the lack of heritage resources on the site, no heritage-related input to the environmental management programme is required.

Table 1: *Impact assessment summary table.*

Aspect/ Impact pathway	Nature of potential impact/risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of impact	Irreplaceability of receiving environment/resource	Potential mitigation measures	Significance of impact/risk = consequence x probability		Ranking of impact/risk	Confidence level
										Without mitigation /management	With mitigation /management (residual risk/impact)		
CONSTRUCTION PHASE: direct impacts to archaeological and built heritage resources													
Clearing of site and construction of facility	**Destruction of archaeological artefacts**	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible	High	None	Very Low	Very Low	5	High
	Destruction of structures	Negative	Site	Permanent	Moderate	Definite	Non-reversible	High	None	Low	Low	4	
CONSTRUCTION & OPERATION PHASES: indirect impacts to built heritage resources													
Construction and operation of facility	**Existence of new structure on the landscape**	Neutral	Site	Long term	Slight	Very likely	Reversible	High	None	Very Low	Very Low	5	High
CUMULATIVE IMPACTS: all heritage resources													
Clearing of site and construction and operation of facility	**Impacts to heritage resources**	Negative	Site	Permanent	Slight	Extremely unlikely	Non-reversible	High	None	Very Low	Very Low	5	High

10. EVALUATION OF IMPACTS RELATIVE TO SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

Section 38(3)(d) requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. In this instance there is a clear economic benefit to be derived from the proposed development and no significant heritage resources will be impacted.

11. CONCLUSIONS

Although there is a possibility that the existing house on site is older than 60 years and might be demolished, this is not regarded as a significant impact. No other heritage resources were recorded on the site.

12. RECOMMENDATIONS

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.

13. REFERENCES

Coombes. A.E. 2003. History after Apartheid: Visual Culture and Public Memory in a Democratic South Africa. Durham: Duke University Press.

Bergh, J. S. (ed.) 1999. *Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies*. Pretoria: J. L. van Schaik Uitgewers.

Mason, R.J. 1957. Preliminary note on an earlier Stone Age site at Wonderboom South, Pretoria. *South African Journal of Science* 53: 431 – 434.

SAHRA. 2007. Minimum Standards: archaeological and palaeontological components of impact assessment reports. Document produced by the South African Heritage Resources Agency, May 2007.

Van der Walt, J. 2012. Archaeological Impact Assessment Report for the proposed Soutpan Low Cost Housing Development close to Pretoria, Gauteng. Wierda Park: Heritage Contracts and Archaeological Consulting.

Van Schalkwyk, J. 2013. Heritage Impact Assessment for the Proposed Winterveld 132kv Power Line, Garankuwa Region, North West and Gauteng Provinces. Monument Park: J van Schalkwyk.

Van Schalkwyk, J. 2015. Basic Cultural Heritage Assessment for the Construction of a Number of proposed new Electricity Substations and Distribution Power Lines in the Moretele Local Municipality, North West Province. Monument Park: J van Schalkwyk.

APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address:	40 Brassie Street, Lakeside, 7945
Telephone:	(021) 788 8425
Cell Phone:	083 272 3225
Email:	jayson@asha-consulting.co.za

Birth date and place:	22 June 1976, Cape Town, South Africa
Citizenship:	South African
ID no:	760622 522 4085
Driver's License:	Code 08
Marital Status:	Married to Carol Orton
Languages spoken:	English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Memberships and affiliations:

South African Archaeological Society Council member	2004 –
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
ASAPA Cultural Resources Management Section member	2007 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –

Professional Accreditation:

ASAPA membership number: 233, CRM Section member

Principal Investigator:	Coastal shell middens (awarded 2007)
	Stone Age archaeology (awarded 2007)
	Grave relocation (awarded 2014)
Field Director:	Rock art (awarded 2007)
	Colonial period archaeology (awarded 2007)

Fieldwork and project experience:

Extensive fieldwork as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

<u>Phase 1 surveys and impact assessments:</u>

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
  - Archaeological specialist studies
  - Phase 1 test excavations in historical and prehistoric sites
  - Archaeological research projects
- Development types
  - Mining and borrow pits
  - Roads (new and upgrades)
  - Residential, commercial and industrial development
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

<u>Phase 2 mitigation and research excavations:</u>

- ESA open sites
  - Duinefontein, Gouda
- MSA rock shelters
  - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
  - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
  - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
  - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
  - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
  - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
  - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
  - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

CV Jaco van der Walt

PERSONAL PARTICULARS:

NAME:	Jaco van der Walt
MARITAL STATUS:	Married with two dependants
DATE OF BIRTH :	1977-11-04
Work Address	37 Olienhout Street, Modimolle, 0510
E-MAIL:	jaco.heritage@gmail.com
MOBILE:	+27 82 373 8491
FAX:	+27 86 691 6461

SYNOPSIS

Jaco has been actively involved as a professional archaeologist within the heritage management field in southern Africa for the past 15 years. Jaco acted as council member for the Association of Southern African Professional Archaeologist (ASAPA Member #159) in the Cultural Resource Management (CRM) portfolio for two years (2011 – 2012). Jaco was also a Research Associate with the University of Johannesburg from 2011 – 2013. He is well respected in his field and published in peer reviewed journals and presented his findings on various national and international conferences.

ACADEMIC QUALIFICATIONS:

Date of matriculation:		1995
Particulars of degrees/diplomas and/or other qualifications:		
Name of University or Institution:		University of Pretoria
Degree obtained	:	BA
Major subjects	:	Archaeology Cultural Heritage Tourism
Year of graduation	:	2001
Name of University or Institution:		University of the Witwatersrand
Degree obtained	:	BA [Honours]
Major subjects	:	Archaeology
Year of graduation	:	2002
Name of University or Institution	:	University of the Witwatersrand
Degree Obtained		**:**BA [Masters]
Major subject		**:**Archaeology
Year of Graduation		:2012

EMPLOYMENT HISTORY:

2011 – Present:	**Owner - Heritage Contracts and Archaeological Consulting CC.**
2007 – 2010 :	**CRM Archaeologist,** Managed the Heritage Contracts Unit at the University of the Witwatersrand.
2005 - 2007:	**CRM Archaeologist**, Director of Matakoma Heritage Consultants
2004:	**Technical Assistant**, Department of Anatomy University of Pretoria
2003:	**Archaeologist**, Mapungubwe World Heritage Site
2001 - 2002:	**CRM Archaeologists,** For R & R Cultural Resource Consultants, Polokwane
2000:	**Museum Assistant**, Fort Klapperkop.

Countries of work experience include:
Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

- Association of Southern African Professional Archaeologists. Member number 159
- Association of Southern African Professional Archaeologists Cultural Resource Management Section Accreditation: Field Director Iron Age Archaeology
  Field Supervisor – Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

REFERENCES:

1.	Prof Marlize Lombard	Senior Lecturer, University of Johannesburg, South Africa E-mail: mlombard@uj.ac.za
2.	Prof TN Huffman	Department of Archaeology Tel: (011) 717 6040 University of the Witwatersrand
3.	Alex Schoeman	University of the Witwatersrand E-mail: Alex.Schoeman@wits.ac.za

Basic Assessment for the proposed development of a Chicken Broiler facility on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

DRAFT BASIC ASSESSMENT REPORT

APPENDIX H: Environmental Management Programme (EMPr)

CONTENTS

1. INTRODUCTION

1.1 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 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 Nkunzi Agricultural Co-Operative's 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 Gauteng Department of Agriculture and Rural Development (GDARD) as part of the Application for Environmental Authorisation for Nkunzi Agricultural Co-Operative's proposed chicken broiler facility proposal on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng. 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.

1.2 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 326 as amended 07 April 2017, presented in Table 1 below.

Table 1: Compliance with Appendix 4 of Government Notice Regulation 326 as amended 07 April 2017 and Section 24N of the National Environmental Management Act 107 of 1998..

Requirements according to Appendix 4 of GNR 326 as amended 07 April 2017	Section
(1) An EMPr must comply with section 24N of the Act and include- a) details of - (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.3 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; and	Section 4
(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 – 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	Section 4

Requirements according to Appendix 4 of GNR 326 as amended 07 April 2017	Section
contemplated in paragraph (f);	
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- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (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

1.3 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**
Samukele Ngema	• MPhil: Urban and Regional Planning (Stellenbosch University) • One years' experience in Environmental Management and conducting Basic Assessments
Minnelise Levendal	• MSC Biological Science (Botany) (Stellenbosch University) • More than 17 years of experience in Environmental Management • 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 chicken broiler.

2. PROJECT BACKGROUND

2.1 Project Activities

The proposed site is located on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng. The project is within the 24th Ward of the City of Tshwane Metropolitan Municipality in Gauteng province. The property is located 1.5 kilometers of the major M39 road which leads out of Soshanguve and Mabopane towards the North West Province. The site is currently vacant apart from a housing structure, and zoned as agricultural use. The Nkunzi Agricultural Co-operative is an initiative of five members who are currently employed in other fields and unemployed. This application is for the commencement of a chicken broiler production. The proposed project seeks to introduce its sustainable production of local produce to the market with the inclusion of 80 000 chickens per 6 week cycle. The layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping. The current development footprint totals at 1 ha. This will be broken down into two chicken houses, an office with shower facilities, a feed bank and reservoir. The broiler 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 broiler 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.

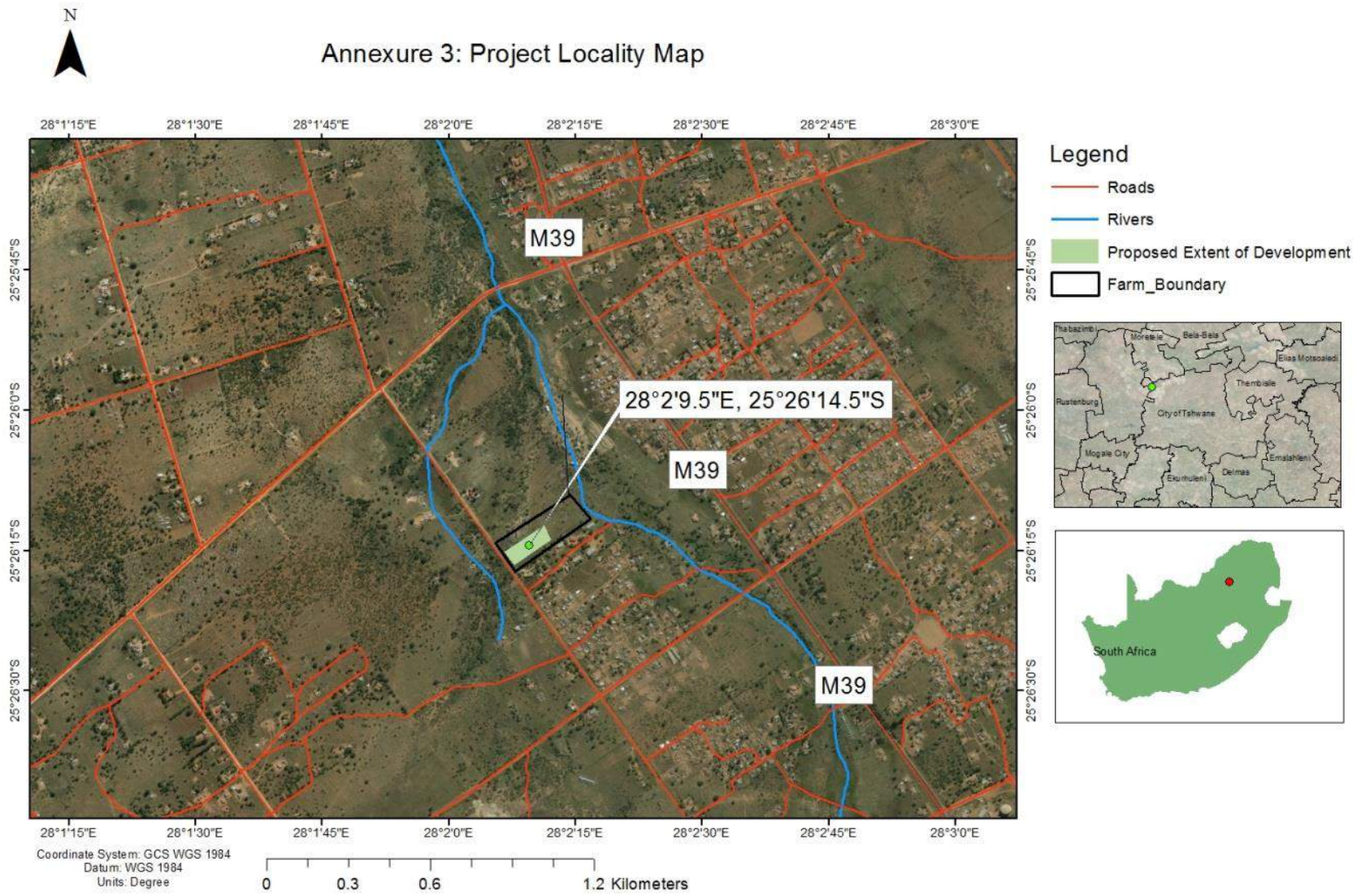


Figure 1: Location of the proposed development for a chicken broiler facility of Nkunzi Agricultural Co-Operative on Plot 1109, Remainder of Farm Klippan 102 JR, Winterveld, Gauteng.

2.2 Listed Activities

As part of the proposed chicken broiler development, 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) 326, as amended 7 April 2017. 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.

3. DESCRIPTION OF APPLICABLE LEGISLATION, POLICIES AND GUIDELINES.

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 Saouth 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

Description of compliance with the relevant legislation, policy or guideline:	
Legislation, policy of guideline	**Description of compliance**
	this act will be adhered to.
Environmental Impact Assessment Regulations, 2017	All the triggered activities as per National Environmental Management Act (Act No. 107 of 1998) have been listed below.
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: 1. Creating jobs and improving livelihoods; 2. Expanding infrastructure; 3. Transition to a low-carbon economy; 4. Transforming urban and rural spaces; 5. Improving education and training; 6. Providing quality health care; 7. Fighting corruption and enhancing accountability; 8. Transforming society and uniting the nation.
Tshwane Integrated Development Plan: 2011-2016 Tshwane Regional Spatial Development Framework: 2013	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. The proposed project falls within ward 24 of Region 1 of the Spatial Development Framework and is the north west quadrants of the CoT. 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 Regional IDP (Region 1) for CoT, 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.

4. ENVIRONMENTAL MANAGEMENT STRUCTURE

Nkunzi Agricultural Co-operative'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.

4.1 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:

4.1.1 Nkunzi Agricultural Co-Operative 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. Nkunzi Agricultural Co-Operative 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.

4.1.2 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 (GDARD) as required.

4.1.3 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 Nkunzi Agricultural Co-Operative.

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 GDARD), 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.

4.1.4 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.

5. 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 Nkunzi Agricultural Co-Operative chicken broiler development at the different phases.

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
CONSTRUCTION PHASE					
Loss or degradation of local wetland areas from increased vehicle traffic, construction activities, dust, erosion and possible sedimentation and spills.	Avoid disturbing in situ and neighbouring wetland areas and their buffers.	▪ Modify the layout of planned infrastructure to avoid wetland areas and their buffers.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Pre-construction	CSIR, Nkunzi Management
		▪ Demarcate or fence in the construction site.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Highlight all prohibited activities to workers through training and notices.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Commence (and preferably complete) construction activities during winter when the risk of erosion and wetland sedimentation should be least.		Prior to and during construction	Nkunzi Management, Construction Crew
	Establish measures on the access road to reduce dust, erosion and sedimentation.	▪ Design measures to effectively control vehicle access, vehicle speed, dust, stormwater run-off, erosion and sedimentation on the road.		Pre-construction	CSIR, Nkunzi Management
		▪ Implement the measures that were designed to control impacts on the road preferably during winter, when the risk of erosion		During construction	Nkunzi Management, Construction Crew

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		should be least.			
Loss of terrestrial vegetation and faunal habitat from clearing of vegetation, and increased vehicle and human activity.	Avoid unnecessary loss of existing indigenous vegetation and faunal habitats.	▪ Modify the layout of planned infrastructure to avoid important floral communities and large indigenous trees.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Pre-construction	CSIR, Nkunzi Management, with advice from a Botanist / Horticulturist
		▪ Identify and mark indigenous trees on the ground. Those that are small and cannot be avoided should be transplanted elsewhere on site.		Pre-construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
		▪ Demarcate or fence in the construction site.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Highlight all prohibited activities to workers through training and notices.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Commence (and preferably complete) construction activities during winter, when the risk of disturbing growing plants should be least.		Prior to and during construction	Nkunzi Management, Construction Crew
	Promote re-establishment of indigenous vegetation in disturbed areas.	▪ Briefly and effectively stockpile topsoil preferably 1-1.5m in height.		During construction	Nkunzi Management, Construction Crew
		▪ Use the topsoil to allow natural vegetation to establish in disturbed areas.		During construction	Nkunzi Management, Construction Crew, with advice from a Botanist /

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		If recovery is slow, then a seed mix for the area (using indigenous grass species listed within this report) should be sourced and planted.			Horticulturist
		▪ Do not undertake any landscaping with alien flora.		During construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
Loss of CI or medicinal flora from clearing of vegetation, and increased vehicle and human activity including harvesting.	Adhere to law and best practice guidelines regarding CI and medicinally important flora.	▪ Obtain permits to remove CI species (if detected –no CI species were detected during the site visit). Typical specie include geophytes such as Gladiolus, Boophone, Orchid species etc.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Pre-construction	CSIR, Nkunzi Management
		▪ Transplant CI and medicinally important floral specimens from the infrastructure footprint to suitable and safe locations elsewhere on site or nearby.		Pre-construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
		▪ Obtain guidance from a suitably qualified vegetation specialist or horticulturist regarding the collection, propagation/storage and		During construction	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		transplantation of plants.			
	Prohibit harvesting of CI and medicinally important flora	▪ Highlight all prohibited activities to workers through training and notices.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control (e.g. fencing).		During construction	Nkunzi Management
Loss of CI fauna from clearing of vegetation, earth-moving activities, and increased vehicle and human activity including harvesting.	Adhere to law and best practice guidelines regarding the displacement of CI faunal species.	▪ Appoint an appropriate specialist to relocate any detected CI fauna from water, termitaria, trees and soil that will be disturbed.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Pre-construction	Nkunzi Management with advice from a Zoologist / Ecologist
		▪ Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Check open trenches for trapped animals (e.g. reptiles, frogs and small terrestrial mammals), and relocate trapped animals with advice from an appropriate specialist.		Daily during construction	Nkunzi Management, Construction Crew, with advice from a Zoologist / Ecologist
	Prohibit disturbance and	▪ Educate workers about		Prior to and during	Nkunzi Management

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
	harvesting of CI and other indigenous fauna	dangerous animals (e.g. snakes, scorpions, bees) and highlight all prohibited activities to workers through training and notices.		construction	
		▪ Prohibit harvesting of CI and other indigenous fauna on site by community members through notices and site access control (e.g. fencing).		During construction	Nkunzi Management
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.	▪ Demarcate or fence in the construction site.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Carefully limit / regulate access by vehicles and materials to the construction site.		Prior to and during construction	Nkunzi Management, Construction Crew
		▪ Prohibit the introduction of domestic animals such as dogs and cats.		During construction	Nkunzi Management, Construction Crew
	Maintain a tidy construction site.	▪ Keep construction activities neat and tidy.		During construction	Nkunzi Management, Farm Management
		▪ When complete, remove all sand piles, and landscape all uneven ground while re-establishing a good topsoil layer.		During construction	Nkunzi Management, Construction Crew
		▪ Plant only locally indigenous flora if landscaping needs to be done.		During construction	Nkunzi Management, Construction Crew

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit.	▪ 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	Nkunzi Management, Construction Crew, with advice from a Botanist / Horticulturist
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.	ECO to ensure compliance and reporting thereof.	During construction	Nkunzi Management, Construction Crew
		▪ Commence (and preferably complete) construction during winter, when the risk of erosion should be least.		During construction	Nkunzi Management, Construction Crew
		▪ Revegetate denude areas with locally indigenous flora a.s.a.p.		During construction	Nkunzi Management, Construction Crew
		▪ Implement erosion protection measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.		During construction	Nkunzi Management, Construction Crew
		▪ Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.		During construction	Nkunzi Management, Construction Crew
Sensory disturbance	Time construction	▪ Commence (and preferably	ECO to ensure	Prior to and during	Nkunzi Management,

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
of fauna from increased vehicle and human activity, noise, dust and light.	activities to minimize sensory disturbance of fauna.	complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	compliance and reporting thereof.	construction	Construction Crew
	Minimize noise pollution.	▪ Minimize noise to limit its impact on calling and other sensitive fauna (e.g. frogs).		During construction	Nkunzi Management, Construction Crew
	Minimize light pollution.	▪ Limit construction activities to day time hours.		During construction	Nkunzi Management, Construction Crew
		▪ Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna.		During construction	Construction Crew
OPERATIONAL PHASE					
Loss or degradation of local wetland areas from increased vehicle traffic, dust, erosion and possible sedimentation and spills	Maintain measures on the access road to reduce dust, erosion and sedimentation.	▪ Monitor and maintain the road impact control measures to ensure that they remain effective.	ECO to ensure compliance to proposed mitigation measures and conduct regular inspection and provide reports thereof.	Throughout operation	Nkunzi Management, Farm Management
		▪ Ensure an approved Storm Water Management Plan is in place, that will highlight the separation of clean and dirty water and prevent contamination into the larger system.			CSIR, Nkunzi Management, planning from surface water experts

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		▪ Highlight all prohibited activities to workers through training and notices.		During operation	Nkunzi Management, Farm Management
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. - Regular site inspection to ensure that the proposed mitigation measures are being implemented. - Produce monthly reports to show compliance.	Pre-construction	
		▪ Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medications.		Throughout operation	CSIR, Nkunzi Management, with advise from agricultural experts
		▪ Adhere to best practice chicken husbandry and waste disposal norms.		Throughout operation	Nkunzi Management, Farm Management
		▪ All hazardous waste should be disposed of at an appropriate licensed facility for this.		Throughout operation	CSIR, Nkunzi Management, Farm Management, with advise from agricultural

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
					experts
		▪ Waste recycling should be incorporated into the facility's operations as far as possible.		Throughout operation	Nkunzi Management, Farm Management
		▪ Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices.		Throughout operation	Nkunzi Management, Farm Management
	Ensure that there are appropriate control measures in place for any contamination event.	▪ Establish appropriate emergency procedures for accidental contamination of the surroundings.		Pre-construction	Nkunzi Management, Farm Management
		▪ Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists.		A.s.a.p. following contamination	CSIR, Nkunzi Management
		▪ Educate workers about the facility's waste emergency procedures with training and notices.		At least annually during operation	Nkunzi Management, Farm Management, with advise from appropriate contamination and environmental specialists
Poor / Inappropriate control of animal	Control the access and proliferation of pests as far as possible.	▪ -Ensure that floors are sloped and slatted to facilitate drainage.	- ECO to develop a waste management	Pre-construction	CSIR, Nkunzi Management, Construction Crew

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
pests from poor waste management and hygiene, and insufficient, inappropriate and/or ineffectual pest control		▪ Ensure that there is effective storm water drainage around the facility.	plan and ensure implementation and adherence thereof. - Regular site inspection to ensure that the proposed mitigation measures are being implemented. - Produce monthly reports to show compliance.	All phases	CSIR, Nkunzi Management, Construction Crew
		▪ Screed concrete floors properly to seal all cracks and limit the pooling of effluent and water.		Construction and operation	Construction Crew, Farm Management
		▪ Effectively seal and maintain all pipes and reservoirs containing slurry, to prevent animals from accessing the effluent.		Construction and operation	Construction Crew, Farm Management
		▪ Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible.		Pre-construction, construction and operation	CSIR, Nkunzi Management, Farm Management
		▪ Check that fan louvers (if installed) work properly, and close fans completely when off.		Throughout operation	Farm Management and Team
		▪ Prevent and manage unwanted animal access to fodder.		Pre-construction, construction and operation	Nkunzi Management, Farm Management and Team
		▪ Clean floors regularly.		Throughout operation	Farm Management and Team
		▪ Clean up excess fodder regularly from under troughs and feed bins.		Throughout operation	Farm Management and Team
		▪ Keep areas surrounding the		Throughout operation	Farm Management and

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		facility free of spilled manure and litter.			Team
		▪ Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.		Throughout operation	Farm Management and Team
		▪ Keep weeds and grass mowed to 5cm or less immediately around the facilities, to reduce the prevalence of insects.		Throughout operation	Farm Management and Team
		▪ Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.		Throughout operation	Farm Management and Team
		▪ Control rodents through effective sanitation, rodent proofing and (as humane as possible) extermination.		During operation	Farm Management and Team
	Avoid affecting non-target animals.	▪ Ensure that measures to control pests are tightly restricted to areas where these are problematic.		During operation	Farm Management and Team
		▪ Pest control measures should be taxon-specific. If necessary, advice should be sought from an appropriate specialist.		During operation	Farm Management and Team

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		▪ 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.	As described above.	- ECO to develop a waste management plan and ensure implementation and adherence thereof. - Regular site inspection to ensure that the proposed mitigation measures are being implemented. - Produce monthly reports to show compliance.	As described above.	As described above.
	Ensure that there are appropriate control measures in place for any contamination event.	As described above.		As described above.	As described above.
	Control the access and proliferation of pests as far as possible.	As described above.		As described above.	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.	▪ Carefully limit / regulate access by vehicles and materials to the site.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Throughout operation	Nkunzi Management, Farm Management
		▪ Prohibit the introduction of domestic animals such as dogs and cats.		Throughout operation	Nkunzi Management, Farm Management
	Maintain a tidy production facility.	▪ Minimize the accumulation and dispersal of excess fodder on site.		Throughout operation	Farm Management and Team
		▪ Employ best practices regarding tilling of soil and		Throughout operation	Farm Management and Team

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		weed management.			
		▪ Plant only locally indigenous flora if landscaping needs to be done.		Throughout operation	Nkunzi Management, Farm Management, with advice from a Botanist / Horticulturist
	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site will require a permit.	▪ 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	Nkunzi Management, Farm Management, with advice from a Botanist / Horticulturist
Loss of CI or medicinal flora from clearing of vegetation, and increased vehicle and human activity including harvesting	Harvesting of indigenous flora for medicine, fire wood, building materials, and other purposes must be prohibited.	▪ Highlight all prohibited activities to workers through training and notices.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Prior to and during operation	Nkunzi Management, Farm Management
		▪ Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control (e.g. fencing).		Throughout operation	Nkunzi Management, Farm Management
Loss of CI fauna from clearing of vegetation, earth-moving activities, and increased vehicle and human activity including harvesting	Harvesting of indigenous fauna for food, sport, medicine, and other purposes must be prohibited.	▪ Educate workers about dangerous animals (e.g. snakes, scorpions, bees) and highlight all prohibited activities to workers through training and notices.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Prior to and during operation	Nkunzi Management, Farm Management
		▪ Prohibit harvesting of CI and other indigenous fauna on site by community members		Throughout operation	Nkunzi Management, Farm Management

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		through notices and site access control (e.g. fencing).			
Sensory disturbance of fauna from increased vehicle and human activity, noise, dust and light	Minimize essential lighting	▪ Install motion-sensitive lights.	Nkunzi Management to ensure proposed development adheres to the proposed mitigation measures of this EMPr	Construction and operation	Nkunzi Management, Farm Management
		▪ Ensure that all outdoor lights are angled downwards and/or fitted with hoods.		Construction and operation	Nkunzi Management, Farm Management
		▪ Use bulbs that emit warm, long wavelength (yellow-red) light, or use UV filters or glass housings on lamps to filter out UV.		Throughout operation	Farm Management and Team
		▪ Avoid using metal halide, mercury or other bulbs that emit high UV (blue-white) light that is highly and usually fatally attractive to insects.		Throughout operation	Farm Management and Team
	Minimize unavoidable noise	▪ Conduct regular maintenance of machinery, fans and other noisy equipment.		Throughout operation	Farm Management and Team
	Prevent unnecessary light and noise pollution	▪ Encourage workers to minimize light and noise pollution through training and notices.		Throughout operation	Nkunzi Management, Farm Management

6. ENVIRONMENTAL AWARENESS AND TRAINING PLAN

Nkunzi Agricultural Co-Operative 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.

BASIC ASSESSMENT REPORT

APPENDIX I: DETAILS OF EAP AND EXPERTISE

CONTENTS

Appendix I: DETAILS OF EAP AND EXPERTISE

Minnelise Levendal (Project Leader)

CSIR
Jan Cilliers Street
PO Box 320 Stellenbosch 7600
South Africa

Phone: +27 21 888 2400
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:

- 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*	EIA for a proposed wind farm near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd

Completion Date	Project description	Role	Client
in September 2011)			
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 (complete)	Basic Assessment for the erection of two wind monitoring masts near Jeffrey's Bay in the Eastern Cape	Project Manager	Windcurrent (Pty Ltd
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

August 2017

Samukele ('Sam') Manqoba Ngema (Project Manager)

CSIR
Jan Cilliers Street
PO Box 320 Stellenbosch 7600
South Africa

Phone: +27 21 888 2400
Fax: +27 21 888 2693
Email: *SNgema@csir.co.za*

CURRICULUM VITAE OF Samukele ('Sam') Manqoba Ngema – PROJECT MANAGER

Name:	Samukele ('Sam') Manqoba Ngema
I.D. Number:	9203125501081
Nationality:	South African
Languages:	English (Excellent), Isizulu (Good), IsiXhosa (Average) Afrikaans (Average)
Current Employer:	Council for Scientific and Industrial Research (CSIR)
Position:	Junior Environmental Assessment Practitioner
Residence:	Stellenbosch, Western Cape
Email:	sngema@csir.co.za, ngemasam@gmail.com
Contact:	021 888 2408, 072 901 9534
Gender:	Male
Race:	Black
Age:	25

BIOGRAPHICAL SKETCH:

Sam has been employed at the CSIR since May 2016. He has a year's worth of experience working in the environmental management sector. He has a Master of Philosophy Degree in Urban and Regional Planning from Stellenbosch University, South Africa. This research focused on exploring the comparison in land uses which are found between Durban and Cape Town Metropolitan Municipalities. His employment as a junior Environmental Assessment Practitioner (EAP) at CSIR's Environmental Management Services (EMS) group has so far has primarily focused on conducting and assisting in Basic Assessment Reports, assisting in various Strategic Environmental Assessments and Environmental Impact Assessments and Conducting a Environmental Sensitivity Screening.

TERTIARY EDUCATION:

Undergraduate
Bachelor: Development and Environment
Department of Social Sciences
Stellenbosch University, 2011 - 2013
Honours
BComm (Hons): Public and Development Management

Department of Economic Management Science
Stellenbosch University, 2014
Masters
Master of Philosophy (M.Phil) Urban and Regional Planning
Department of Geography
Stellenbosch University, 2015

WORK EXPERIENCE:

1.) Organisation — Department of Social Development
Position — *Internship*
Period — *June 2014 - January 2015*
2.) Organisation — Council for Scientific and Industrial Research
Position — *Junior Environmental Assessment Practitioner*
Period — *May 2016 – present*

Professional Affiliations

- Applicant for South African Council for Planners (SACPLAN) Candidate Planner
- International Association for Impact Assessment South Africa (Membership Number: 5242)

RELEVANT COURSES:

- Project Management 1 — CSIR Innovation Leadership & Learning Academy (*CiLLA*) (5-7 July, 2016)
- CSIR Media & Science Communication Training (CSIR, Stellenbosch) (2016)

CO-ORDINATED PROJECTS AND REPORTS

Project Description	Role	Date	Client
Environmental Screening Study for Non-Woven filter fabric facility	Project Manager	2016	CSIR Enterprise Creation Development (ECD)
Basic Assessment Report- Nkunzi Agricultural Co-Operative	Project Manager	Ongoing 2016	Nkunzi Agricultural Co-Operative
Basic Assessment Report- Mojaletema Farming Co-Operative	Project Manager	Ongoing 2016	Mojaletema Farming Co-Operative
Strategic Environmental Assessment- Square Kilometer Array	Project Assistant	2016	National Department of Environmental Affairs
Environmental Impact Assessment for the proposed Platberg and Teekloof Projects	Project Assistant	2016	Mainstream Renewable Power