DRAFT BASIC ASSESSMENT REPORT

Basic Assessment for the Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

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CSIR Report Number:
CSIR/IU/EMS/ER/2016/0003/A

November 2017

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November 2017

Prepared for:
Mojaletema Primary Co-Operative (Pty) Ltd

Prepared by:
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Samukele Ngema

Reviewer:
Minnelise Levendal

report details

Title:	Basic Assessment for the proposed development of a pig production facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.
Purpose of this report:	The purpose of this BA Report is to: • Present the proposed project and the need for the proposed 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 proposed project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the 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.
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Prepared by:	CSIR P O Box 320, Stellenbosch, 7599 Tel: +27 21 888 2408 Fax: +27 21 888 2493
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opportunity for review

Opportunity for Review:

This Draft Basic Assessment Report and Draft Environmental Management Programme (EMPr) are hereby 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

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Appendix A	Site plan(s) – (must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)
Appendix B	Photographs
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

tables

figures

executive summary

INTRODUCTION AND BACKGROUND

The Mojaletema Primary Co-Operative is a small scale commercial farming enterprise that was established in 2012. This Co-Operative comprises of five members who are proposing the establishment of a commercial pig production facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng. The farm currently is operating as a cattle, sheep and goat herding facility with maize also being cultivated. There is a slurry dam next to the proposed site which is currently not being used. There are ruins from a dairy production plant which have no historical significance. The proposed development footprint is 1.8 hectare and will consist of pig production facilities (production house, farrowing house, living quarters, silo and office). The proposed facility will house 248 pigs with an estimated throughput of 4800 pigs per annual cycle.

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) of 07 April 2017 promulgated under the National Environmental Management Act (Act no 107 of 1998) (NEMA). The proposed development also triggers listed activities in terms of the National Environmental Management: Waste Act (Act no 59 of 2008) (NEMWA). In terms of these Regulations, a BA needs to be undertaken and must include an application for a Waste Management Licence.

In terms of the NEMA EIA Regulations published in GNR 324, 325 and 327 (as amended) of 07 April 2017 in 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	4	The development and related operation of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceeds- (ii) 8 square meters per small stock unit and; (a) More than 1 000 units per facility excluding pigs where (b) more than 250 pigs per facility excluding piglets that are not yet weaned.
	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- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
GNR 921, 29 November 2013	Category A1	Storage of waste- The storage of general waste in lagoons
	Category A2.	Construction, expansion or decommissioning of facilities and associated structures and infrastructure. The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).

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 Portion 15 of Farm Bultfontein 192 IR in Nigel,within Ward 88 of the Ekurhuleni Metropolitan Municipality in Gauteng. The property is located 1.5 km off the major R51 which links Nigel to Springs. The site is currently zoned for agriculture. The Mojaletema Primary Co-operative comprises five family members who are currently farming with maize, sheep, goats and cattle. The livestock is sold to the local market.

This application is to obtain Environmental Authorisation to commence with a piggery production facility. The proposed project will increase the company's supply to the local market by adding 248 pigs (240 sows and 8 boars) with an annual through put of roughly 4 800 pigs of mixed ages.

The layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping undertaken as part of this assessment. The proposed development footprint totals 1.2 ha. This will consist of the following:

- a Slurry Dam (119 m^3)
- 3 pig houses,
- Sales office,
- living quarters
- feeding silo.

The pig facilities will have a mixture of both slated and concrete floors. The pig waste will fall through the slated flooring and will be stored there temporarily before being washed via a closed gutter to the slurry dam. The slurry dam will have water covering the solid waste that will settle at the bottom for odour control. The water that will overflow will be disinfected and reused to clean the piggery. After the slurry digestion process; where the pig waste is broken down and integrated with the water to form a slurry, the waste will be pumped out of the dam and used as fertilizer on the maize crops.

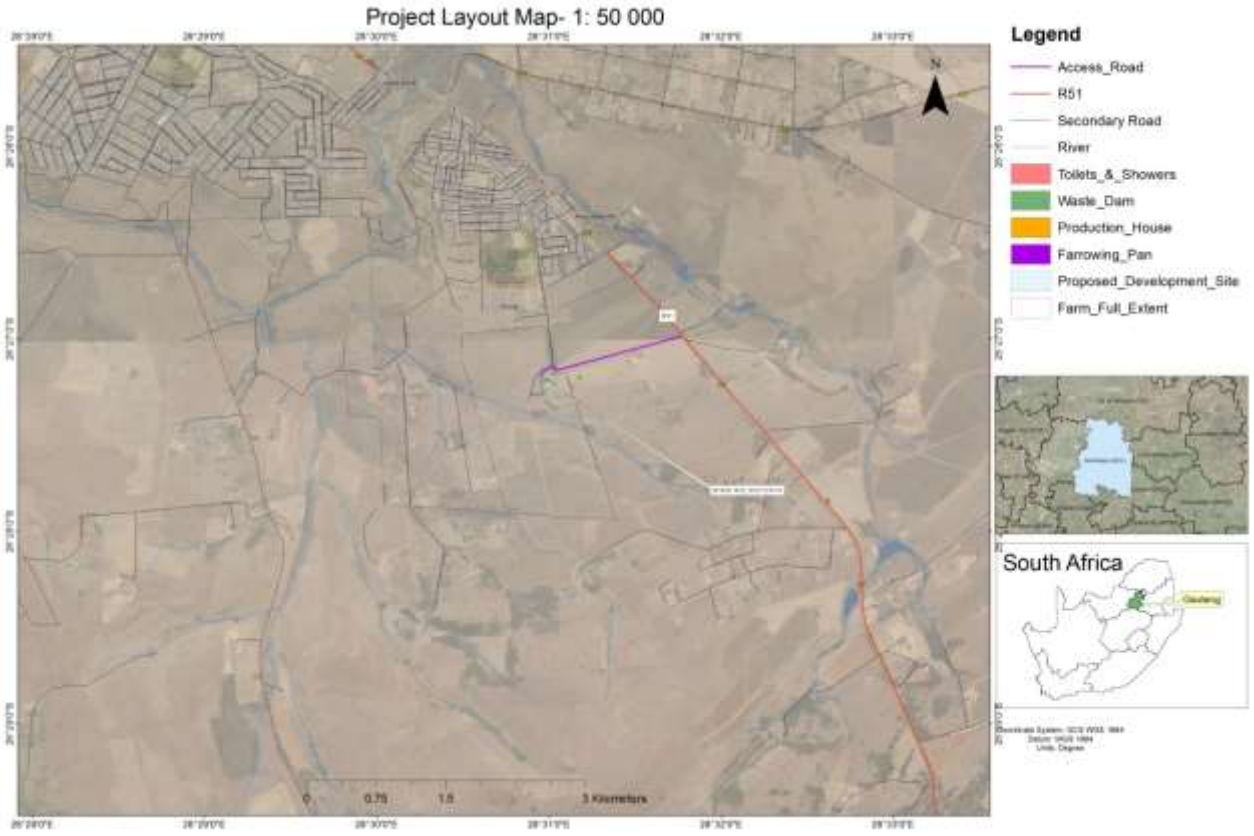


Figure 1: Location of the proposed pig production facility of Mojaletema Primary Co-operative on Portion 15 of Farm Bultfontein 192, Nigel, Johannesburg.

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	Moderate	Low
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	Moderate	Low
Increased dust and erosion	Moderate	Low
Sensory disturbance of fauna	Low	Low
Operational Phase		
Loss or degradation of local wetland areas	Moderate	Low
Environmental contamination (including odours)	High	Low
Poor / Inappropriate control of vertebrate pests	Moderate	Low
Disease transmission	Moderate	Low
Introduction and proliferation of alien species	Moderate	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	Moderate	Low
Introduction and proliferation of alien species	Moderate	Low
Increased dust and erosion	Moderate	Low
Sensory disturbance of fauna	Low	Low
Potential Heritage Impacts	**Significance Rating Without Mitigation**	**Significance Rating With Mitigation**
Construction Phase		
Destruction of archaeological artefacts	Very Low	Very Low
Operational Phase		
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 Ekurhuleni 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 piggery

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 324, 325 and 327, as amended 07 April 2017) 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 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	√	Section C Appendix E
(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

APPENDIX 1 OF THE REGULATIONS	YES / NO	SECTION IN BAR
(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 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;	√	Section E Appendix G
(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	√	Section E Appendix H

APPENDIX 1 OF THE REGULATIONS	YES / NO	SECTION IN BAR
issue and risk could be avoided or addressed by the adoption of mitigation measures;		
(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- (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;	√	Section E2
(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

APPENDIX 1 OF THE REGULATIONS	YES / NO	SECTION IN BAR
(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 l&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 decommissioning management of negative environmental impacts;	**N/A**	N/A
(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 Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

BASIC ASSESSMENT REPORT

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 piggery which will exist for the foreseeable future, therefore there are no intentions to close the piggery.

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 Portion 15 of Farm Bultfontein 192 IR in Nigel,within Ward 88 of the Ekurhuleni Metropolitan Municipality in Gauteng. The property is located 1.5 km off the major R51 which links Nigel to Springs. The site falls within an area currently zoned for agriculture. The Mojaletema Primary Co-operative comprises of five family members who are currently farming with maize,sheep, goats and cattle. The livestock is sold to the local market.

This application is to obtain Environmental Authorisation to commence with a piggery production facility. The proposed project will increase the company's supply to the local market by adding 248 pigs (240 sows and 8 boars) with an annual through put of roughly 4 800 pigs of mixed ages.

The layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping undertaken as part of this assessment. The proposed development footprint totals 1.2 ha. This will consist of the following:

- a Slurry Dam (119 m^3)
- 3 pig houses,
- Sales office,
- living quarters
- feeding silo.

The pig facilities will have a mixture of both slated and concrete floors. The pig waste will fall through the slated flooring and will be stored there temporarily before being washed via a closed gutter to the slurry dam. The slurry dam will be covered with water and the solid waste will settle at the bottom for odour control. The water that will overflow will be disinfected and reused to clean the piggery. After the slurry digestion process; where the pig waste is broken down and integrated with the water to form a slurry, the waste will be pumped out of the dam and used as fertilizer on the maize crops on site.

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 proposed expansion of agricultural production in the form of the commencement of a piggery housing 248 pigs with a throughput of roughly 4800 pigs per annum cycle.

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 [redacted]

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

National Environmental Management Waste Act GNR. 921 of 29 November 2013, and the Competent Authority is the Gauteng Department of Agriculture and Rural Development (GDARD).

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)?
If yes, have you received approval(s)? (attach in appropriate appendix)

YES [redacted]
[redacted] 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, 2017 (as amended)	National & Provincial	7 April 2017
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
Ekurhuleni Integrated Development Plan: 2016-2021	Provincial & Local	10 March 2016
Ekurhuleni Spatial Development Framework	Provincial & Local	29 November 2015

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 identification and assessment of the fauna and flora prevailing in the proposed project area and the handling thereof in terms of NEMBA.
National Environmental Management Waste Act, 2009 (Act No. 59 of 2008)	An application for a Waste Management Licence will be submitted in terms of NEM:WA as the proposed activity pertains to the following activities of the Act: Category A (1): The storage of general waste in lagoons. Category A (12): The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).
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

Legislation, policy of guideline	Description of compliance
	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.
Ekurhuleni Integrated Development Plan: 2016-2021 Ekurhuleni Spatial Development Framework:	The Spatial Development Framework (SDF) is the legislated component of the municipality's IDP that prescribes development strategies and policy guidelines to restructure and re-engineer the urban and rural form. The SDF is the municipality's long-term vision of what it wishes to achieve spatially, and within the programmes and projects identified in the IDP. 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 88 of Region EMM of the SDF and is located on the South Eastern boundary of the Ekurhuleni Municipality. The farm portion holds large undeveloped areas, which could accommodate future growth. Description of compliance with the relevant legislation, policy or guideline: According to the Regional IDP (Region EMM) for Ekurhuleni, the proposed project is in a rural area which is marked for creating employment providing food and work opportunities.

In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 324, 325 and 327 on the 4 December 2014 as Amended 07 April 2017 Government Gazette Number 40772 a Basic Assessment (BA) process is required as the proposed project triggers the following listed activities (detailed in Table 1 below).

Table 1: Listed Activities relating to the proposed project

Relevant Notice:	Activity No (s) (relevant notice):	Describe each listed activity as per the Government notices:
GN. R 327 (as amended) 7 April 2017	4.	The development and related operation of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceed-

Relevant Notice:	Activity No (s) (relevant notice):	Describe each listed activity as per the Government notices:
		(ii) 8 square meters per small stock unit and; b. more than 250 pigs per facility excluding piglets that are not yet weaned.
	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.
GNR 921, 29 November	Category A	1.Storage of waste- The storage of general waste in lagoons.
	Category A	12. Construction, expansion or decommissioning of facilities and associated structures and infrastructure- The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).

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**	**<u>Site Location and Layout:</u>** The proposed project which is the development of a piggery production facility is proposed on a site located on portion 15 of Farm Bultfontein 192, Blue Valley Agricultural Holdings in Nigel. The site falls within Ward 88 of the Ekurhuleni Metropolitan in Gauteng. The property is located 1.5 kilometres off the major R51 which links Nigel to Springs. The site is currently zoned and operating as agricultural use. The proposed project seeks to increase its sustainable production of local produce to the market with the inclusion of 248 pigs (240 sows & 8 boars) to their current crop and animal output. The layout plan of the proposed development site has been developed based on the outcome of the specialist studies and sensitivity mapping undertaken as part of this assessment process. The current development footprint totals 1.2 ha. This will be broken down into a slurry dam, 3 pig houses, and sales office, living quarters and a feed silo. The pig housing will have a mixture of both slated and concrete floors. The pig waste will fall through the slatted flooring and stored there temporarily before being washed via a closed gutter to the slurry dam. The slurry dam will be covered with water with the solid waste settling at the bottom to eliminate the odours. The overflowing water will be disinfected and reused to clean the piggery again. After the digestion period, the waste will be pumped out of the dam and used as fertilizer on the maize crops. The site is currently serviced by the Municipality with electricity services being available from Eskom. However, electricity to the piggery will be applied for once the funding for the project has been approved. The sewage for the offices and living quarters will be connected to those of the current sewage system of the farm and may be installed to the Municipality's standard at the projects expense. There is a total of four boreholes, only one is currently operating and another to be certified for the proposed project once funding has been approved. There are already access roads to and on the site.
2	**Property Alternative**	There have been no alternative properties or locations identified for the proposed project due to the applicants'

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	Description
		lack of funding and that the applicant is already leasing the proposed portion of land from the Land Bank. Therefore this is the only piece of land the applicant has available and it would not be economically feasible for the business to find or purchase a new property. Therefore, no alternate properties have been investigated in the Basic Assessment.
3	**Activity Alternative**	The applicant already undertakes other farming activities on the plot of land, however at a smaller scale, this being the only industry which can be scaled up to commercial scale due to climate, weather and land topography.
	Design or Layout Alternative	The proposed design and layout of the proposed development is done in a way to minimise the the potential impacts on the environment. The layout of the pig houses is focused on the biosecurity measures, which allows for more effective management of piggery production as it lessens the risk of the pigs catching diseases if the activity were to be in an open environment. Therefore no alternative layouts have been proposed as the current and preferred layout are on transformed land with relatively low impact significance and allow for the most efficient compliance to pig welfare legislation, maximising pig production outputs.
	Technology to be used	The technology to be used is in line with piggery farming standards, it further leads to pig welfare as well as complying with best practices in piggery production. No other technologies have been investigated as the current proposed technologies will be in line with SAPPOs guidelines in terms of best practice associated with piggery production.

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

Motivation
<u>Site layout and Location: Alternatives</u> The Council for Scientific and Industrial Research (CSIR) has been appointed by the Department of Environmental Affairs (DEA) to manage 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 **Mojaletema Farming Co-Operative** and is assisting them by managing the BA on their behalf to obtain an Environmental Decision from the Competent Authority. **Mojaletema Farming Co-Operative** is a 100% black owned entity being supported by the Land Bank which offers support to previously disadvantaged individuals who do not have the start-up capital to launch their own enterprise. **Mojaletema Farming Co-Operative** is leasing the land from the Land Bank on a 30 year

lease. There is therefore no scope for identifying an alternative property as this is the only property they could acquire. The proposed layout is in line with the biosecurity measures and has been informed by the Ecological Impact Assessment (Appendix G) to avoid impacts in areas with high conservation priority.

Activity Alternative

In their process of due diligence and market feasibility **Mojaletema Farming Co-Operative** preferred to undertake a business that could function at a small to medium scale enterprise focusing on producing high quality produce but with the ability and intension to grow in the future. This resulted in their decision to start with a piggery. With the current growth in this industry, roughly 5% on an annual basis, it also gives opportunities of employment and is a solution to the lack of rural development in the area.

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. The best principles for piggeries will be adopted by **Mojaletema Farming Co-Operative**. The structure of the pig houses will be made of slates and concrete floors, the pig sties will be cleaned frequently as to avoid diseases developing and spreading. The pig houses will have ventilation which is manually controlled in order to control the air and light entering the pig houses.

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 **Mojaletema Farming 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 ***(Total environmental (landscaping, parking, etc.) and the building footprint)***	1.2 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	435 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	m

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, February 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 theproposed activities on site has been included as 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 (complete only when appropriate) **N/A** times

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.)

Portion 15 of Farm Bultfontein 192 IR, Nigel, 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):**
	28.515652	26.454474

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	7	7	4	6	5	/	2	0	1	4									
Alt. 1																				
Alt. 2																				
etc.																				

**** Note from CSIR: there is no SG code available for the site, please refer to the coordinates ABOVE**

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

	1:50 – 1:20	1:20 – 1:15

4. LOCATION IN LANDSCAPE

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

	Side slope of hill/ridge	Undulating plain/low hills

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

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

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

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

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

Latitude (S):	**Longitude (E):**
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 identified and included in the Ecological Specialist Report (NSS, February 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 % =19	Natural veld with heavy alien infestation % =30	Veld dominated by alien species % = 11	Landscaped (vegetation) % =
Sport field % =	Cultivated land % = 32	Paved surface (hard landscaping) % =	Building or other structure % = 3	Bare soil % = 5

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 YES / NO

If YES, specify and explain:

Inputs from the Ecological Specialist Report- Appendix G(NSS, 2017)

Although there were no Red Listed Species that were recorded being present on the site, in addition to the declining *Gunnera* species were recorded, a number of *Gladiolus* individuals were located within the Rocky Grassland vegetation. These are considered Protected species under Schedule 11 Protected Plants (Section 86 (1) (a)) of the Gauteng Nature Conservation Ordinance, 12 of 1983 (Gauteng General Law Amendment Act No. 4 of 2005) (Figure 2). Protected Species may not be cut, disturbed, damaged, destroyed without obtaining a permit from Gauteng Province or a delegated authority. Based on the infrastructural layout for the proposed project, it is not expected that these Protected and the Declining Gunnera species will be affected by the development. There is also little to no information available on water quality of wetland systems and the effects it has on species such as *Gunnera perpensa*.

Gunnera perpensa – leaves

Gunnera perpensa – flower

Figure 2: Photographs of Conservation Important plant species in the surrounds of the survey area

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.	YES	NO

If YES, specify and explain:

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

If YES, specify and explain:

The proposed development site is situated within the **Moist Grasslands Priority Area (Figure 3)**, which supports a high diversity of birds and other native biodiversity, but which is subject to intensive livestock agriculture involving annual burning and over-grazing. Recently the area has also become target for water storage schemes and renewable electricity energy projects (Maphisa et al. 2016).

The proposed development site is situated within the **Blesbokspruit Highveld Grassland Threatened Ecosystem** (Figure 3). Key biodiversity features of this Ecosystem include the Blesbokspruit, Klein-Blesbokspruit, Verdrietlaagte, and various other wetlands and pans, as well as the Andesite Mountain Bushveld, Eastern Highveld Grassland, Eastern Temperate Freshwater Wetlands, Gold Reef Mountain Bushveld, Rand Highveld Grassland, Soweto Highveld Grassland and Tsakane Clay Grassland vegetation types. Red or Orange Listed plant and animal species in the Ecosystem include e.g. *Delosperma leendertziae* and *Khadia beswicki*; Spotted-necked Otter and Brown Hyena; African Grass-owl, the Greater and Lesser Flamingos, African Marsh-harrier, Secretarybird, Yellow-billed Stork, Caspian Tern, Melodious Lark, Lesser Kestrel, White-bellied Korhaan, and Corncrake; the Giant Bullfrog; Heidelberg Copper (Opal) Butterfly, and the Golden Starburst Baboon Spider (SANBI & DEAT 2009).

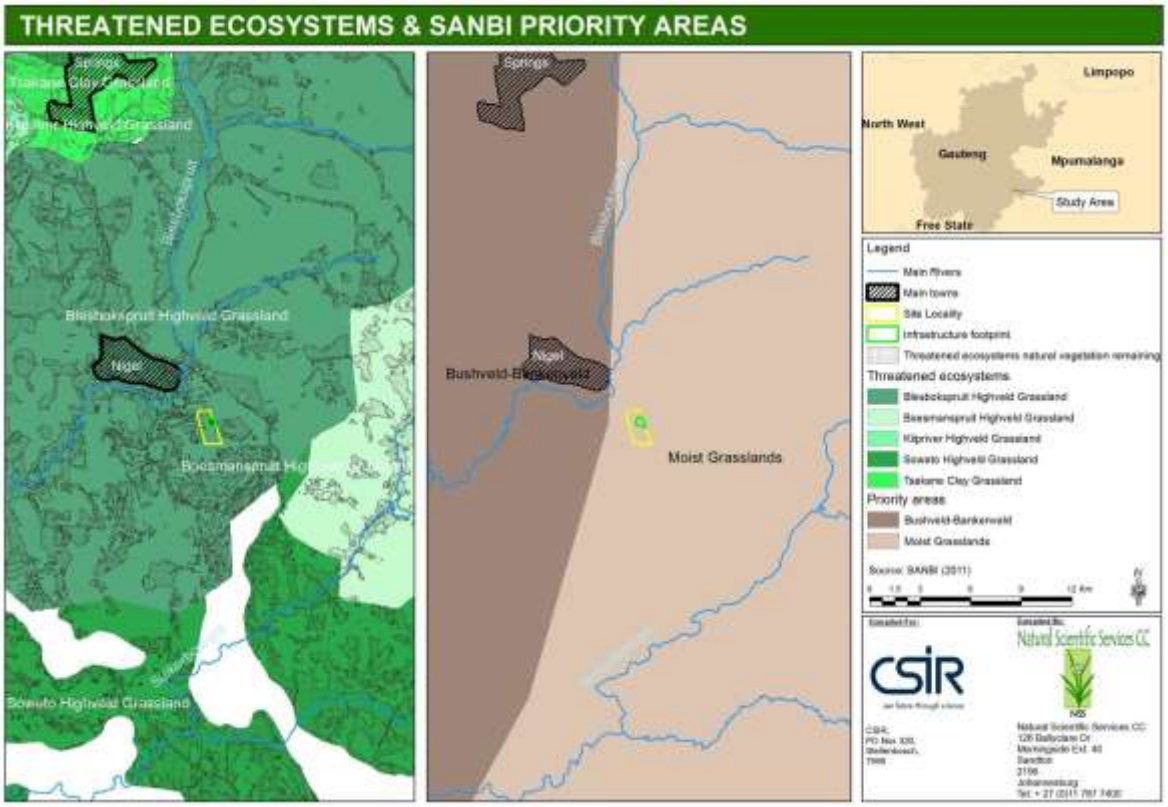


Figure 3: Location of the site relative to regional terrestrial Priority Areas and Threatened Ecosystems

Was a specialist consulted to assist with completing this section	YES	NO
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	10	10	7	7
1	1	1	7	7
2	1		1	1
1	2	2	1	1
1	1	7	2	2

WEST **EAST**

SOUTH

Note from CSIR: **The proposed development is surrounded by few small holdings with some agricultural practices and the dwellings are fairly spaced apart. There are alsoa few small seasonal wetlands 600m South East of the proposed site. Please see locality and aerial maps for an indication of the seeps/wetlands and small holdings (Page 30, 33 & 56 of the Ecological Report, Appendix G).**

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 Mojaletema Primary Co-Operative for the proposed Pig Production Facility Portion 15 of Farm Bulfontein 192, , Nigel, 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

The full consideration of all the anticipated impacts that may occur in a project, be they social as well as environmental help fully understand the scope of the proposed project and should be taken into consideration. These said impacts are very often broad, not concentrated or limited to the site of the proposed project. The social and environmental impacts of a project often filter their 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 on the Ekurhuleni Metropolitan Municipality and the Nigel area specifically. The project falls within Ward 88 of Nigel. Households and communities within Ward 88 should therefore be provided preference when implementing socio-economic policies and mitigation measures.

This Southern section with Duduza being the closest town and the biggest close hub being Springs to the North. According to the latest population report (Statistics South Africa, 2011), the total population for the Nigel area is 38 318 people. It has an average household size of 3.2 people per household at a density of 276 persons per square kilometer. The majority of the Nigel population falls within the youth category, with the highest population specifically falling into the 20-29 year olds. The over 70 year old population group is least represented. This large percentage of youth in the area means additional pressure on job creation in future. It also implies a high dependency ratio, which in this case is 44.9% as more people reach the economically activity stage. The racial make up of the area is shown in Table 2 below and Table 3 indicates the gender distribution.

Table 2: Racial Demographics of Nigel Municipality

Racial make up	
Group	**Percentage**
Black African	44.9%
Coloured	16.7%
Indian/ Asian	3.9%
White	33.4%
Other	1.1%

Table 3: Gender Demographics of the Nigel Municipality

Gender Classification	
Group	**Percentage**
Male	50.2%
Female	49.8 %

The language most spoken at home within the Nigel area is Afrikaans 43.5%, followed by IsiZulu 23.3% and English 16.1%. In terms of education, 4.4% of adults have no schooling whatsoever and 35.3% of adults are schooled up to Grade 12. In general, the level of education in the region is moderate which gives limited access to employment and economic growth. According to Statistics South Africa (2011), a majority of the households (90.6%) have access to a flush toilet (connected to sewage system) whilst 2.9% have no access to toilet facilities. 69.9 % of households in Nigel have access to electricity for cooking, heating and lighting. In terms of tenure status, 6.7% of the population occupied rent free, 73.3% fully own their dwellings and rented dwellings account for 20%. The main sources of water for households in the area are 97.5% Regional/Local water scheme, only 0.6% water tanker and the remainder a combination of water vendors, rain boreholes, springs and dams.

9.2 Baseline economic information

Unemployment is a challenging factor at a national scale, this includes Nigel, where, according to StatsSa 2011, approximately 15.7% of the Nigel population has no income. However, this is lower than the national average of 25.2% as shown in Figure 4 below.

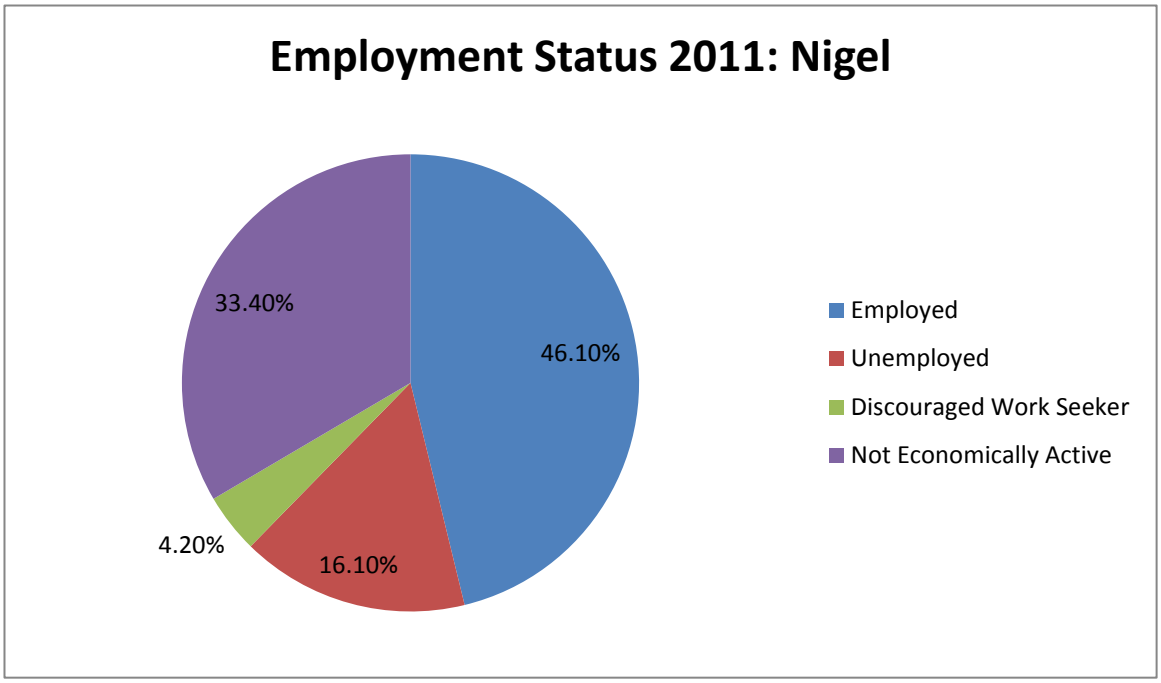


Figure 4: Employment Distribution of the Nigel Municipality

The economy of the Ekurhuleni is driven by both agricultural and industrial development, these which are the largest economic contributor of this metropolitan and dispersed all over the area. The area of Nigel is seen as a rural area which has an agricultural focus and most employment to be created in this area would be in this industry for the population of the area. The incomes of those who tend to find work in the Nigel area tend to be on the middle of the scale as shown in Table 4 below. Mojaletema Farming Co-Operative has thus identified an opportunity in Nigel that through the proposed Piggery 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 4: Economic Distribution of the Nigel Municipality

Income Distribution of Nigel	
Income	**Percentage**
No income	23,1%
R1 - R4,800	2,4%
R4,801 - R9,600	3,6%
R9,601 - R19,600	10%
R19,601 - R38,200	12,9%
R38,201 - R76,400	12%
R76,401 - R153,800	14,4%
R153,801 - R307,600	15,5%
R307,601 - R614,400	9,8%
R614,001 - R1,228,800	2,5%
R1,228,801 - R2,457,600	0,6%
R2,457,601+	0,5%

Anticipated CAPEX value of the project on completion	Pig Structure: R 8 680 000.00 Capital Total: R 1 865 150.00
What is the expected annual income to be generated by or as a result of the project?	R 4 320 000.00
New skilled employment opportunities created in the construction phase of the project	Bricklayers, Welding, Carpentry, Landscaping and Power tools operations. Depending on the contractor, a foreman or site supervisor will be used. Resulting in 4-6 jobs being created.
New skilled employment opportunities created in the operational phase of the project	An on-call handy man for electrical and mechanical works. A farm manager (Applicant)
New un-skilled employment opportunities created in the construction phase of the project	This may be at the discretion of the contractor, estimated 6-10 labourers.
New un-skilled employment opportunities created in the operational phase of the project	Dependent on the period of the piggery production cycle: cleaners and labourers for the waste management process. The process of moving the pigs from house to house for mating season, weaning stages etc. The moving of pigs when being sold (5- 7 labourers)
What is the expected value of the employment opportunities during the operational and construction phase?	R 350 000 for Construction (Once –off) R 360 000 per annum for Operational
What percentage of this value that will accrue to previously disadvantaged individuals?	70 % During Construction 100 % During Operational
The expected current value of the employment opportunities during the first 10 years	Estimated R 5 Million R 360 000.00 per annum at 6% increase per year
What percentage of this value that will accrue to previously disadvantaged individuals?	85%

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? If YES, explain:	YES	NO

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 Mojaletema Farming Co-Operative (Pty) Ltd on Portion 15 of Farm Bultfontein 192, Nigel, Gauteng.

A Heritage Impact Assessment was undertaken by ASHA Consulting (see Appendix G)

Based on the study, no heritage resources were found within the study area. However, in close proximity there is a farmhouse and outbuildings that are older than 60 years. They are probably early-mid-20th century and of relatively low significance. Historical aerial photography shows that historical tree lines were present in the area. These, however, have largely been destroyed in recent years.

No significant impacts to heritage resources are expected and no cumulative impacts were identified. As such, it is recommended that the proposed piggery be authorised but subject to the following condition being 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? Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)? If yes, please attached the comments from SAHRA in the appropriate Appendix	YES YES	NO NO

Note from CSIR: **A heritage screening report was submitted to South African Heritage Resources Agency (SAHRA) via the SAHRIS portal (Case ID 10179). The project was required to perform a Heritage Impact Assessment (HIA), including to explore Archaeological and Paleontological Assessment. 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 following the release of the Background Information Document:: Comment: "Department of Agriculture Forestry and Fisheries (DAFF), Directorate of Land Use and Soil Management acknowledged receipt of proposed project application documents on 24 October 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 – N/A

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 – N/A at this point

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 (complete only when appropriate)	**0**	times

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
If yes, what estimated quantity will be produced per month?	25m^3

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

The expected construction waste produced will be in the form of building rubble, packaging material and general waste produced by the construction staff. It will be collected and stored temporarily in a waste container and disposed at the nearest licensed waste site.

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

Waste will be disposed of at the nearest appropriate licensed landfill site which allows the disposing of building rubble.

Will the activity produce solid waste during its operational phase?	YES
If yes, what estimated quantity will be produced per month?	Pig Waste119`m^3 Other waste= 2m^3

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

All solid waste which is the outcome of the operational phase will be temporarily stored in containers to be sent to the nearest licensed landfill site. All medical waste from vaccinations etc. will be sent to existing medical waste management companies in the area to be dealt with appropriately. Pig waste will be stored in a slurry dam and used as fertilizer in the agricultural activities on site.

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 pig waste, will always be disposed of at a registered landfill 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?	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?	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 solid waste produced by the pigs will be gathered and stored in a slurry dam to allow the aerobic process to occur. Thereafter there will be the separation where the solids are stored on a flat concrete pan for composting, the liquids will be used for cleaning and watering of crops on the farm. The recyclable waste such as plastic, glass, paper etc will be taken to the nearest recycling warehouse.

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?	NO
If yes, what estimated quantity will be produced per month?	
If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?	NO

Will the activity produce any effluent that will be treated and/or disposed of on site?	Yes
If yes, what estimated quantity will be produced per month?	119 m^3

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

As the pig waste falls through the slatted floors it will remain there till it is flushed through a covered gutter to the concrete slurry dam. The slurry dam, filled with water, will allow the solids to sink to the bottom.. As more and more solids are pumped into the slurry dam, the overflowing water will be funneled into a watering tank which will be disinfected and pumped back into the pig houses for cleaning. The remaining water will be used for irrigating the maize crops fields. These water savings methods are in line with recommendations of Section 21 (e) of the National Water Act: The use of waste water for agricultural purposes is in accordance with the Department of Water Affairs' recognition of waste water as a valuable resource for use as a fertilizer.

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?	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:

The water used to clean the pig facility will be a mixture of fresh water as well as water which has been disinfected from the overflow of the slurry dam. The remaining water from the slurry dam will be used to irrigate the maize crop fields

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?	YES / NO
If yes, what estimated quantity will be produced per month?	N/A
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 piggery development will be in the form of construction emissions, dust from trucks on gravel roads. This dust generated 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 dust generated temporarily.

Operational emissions will be in the form of odour from the piggery waste, these are a result of the anaerobic metabolic process occuring in the slurry dam. A constant water level will be kept in the slurry dam to cover the solid waste in order to suppress the odor.

Odors from the piggeries will be managed to ensure that it does not have a negative impact on the quality of life.

2. WATER USE

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

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 2000 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 proposed project will require a Water Use License due to the amount of water that will be required on a daily basis (75 kilolitres per day) which will be pumped from a borehole. The site already uses water pumped from an underground source for domestic use, there will be an increase in the amount due to the need to be used for the proposed piggery activity. A water use licence is required for the facility as it triggers Section 21(a), (b) and (e) of the National Water Act 36 of 1998 (NWA): ''general authorisation which replaces the need for a water user to apply for a licence in terms of the Act, provided that the water use is within the limits and conditions as set out in this general authorization.'' The recycling of water, used in the pig cleaning process and the use of waste water to irrigate maize crop filed is in line with best practices where its use is part of a general authorization regarded as a Controlled Water Use Activity, provided that the activity complies with the conditions specified in Government Notice No. 665 of 6 September 2013 (National Water Act, Act 36 of 1998).

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

The facility would rely on renewable energy (solar panels) and possibly Eskom via 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 piggery 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:

Solar panels will be used to generate electricity The Applicant has not indicated such a plan

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) will be updated following the release of the Draft Basic Assessment Report will form part of the Final BAR..

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 specialists 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).

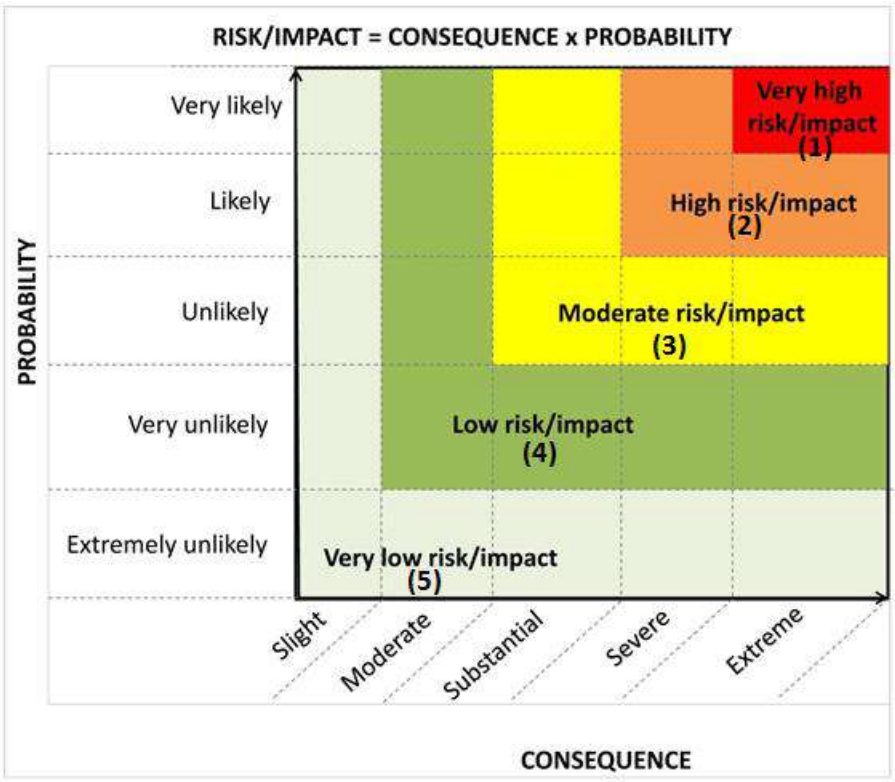


Figure 5: Guide to assessing risk/impact significance as a result of consequence and probability.

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 was 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 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
Construction Phase												
Loss or degradation of local wetland areas from construction activities, increased vehicle traffic, dust, erosion, sedimentation and possible spills	Local	Permanent	Low	Highly Probable	Low	Moderate	Moderate Negative	High	No	Yes	▪ 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 and 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.	Low
Loss of terrestrial vegetation and faunal habitat from clearing of vegetation, increased vehicle activity, altered burning and proliferation of alien flora	Local	Permanent	Medium	Probable	High	High	Moderate Negative	High	No	Yes	▪ Modify the layout of planned infrastructure to avoid important floral communities (rocky grassland around the entrance area) and large indigenous trees. ▪ Identify and mark any indigenous trees (these are limited on site) 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, proliferation of alien flora, altered burning, and harvesting by people	Local	Permanent	High	Probable	Low	High	Moderate Negative	High	No	Yes	▪ Obtain permits to remove CI species. ▪ 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,	Low

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
											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 (e.g. fencing).	
Loss of CI fauna from clearing of vegetation, earth-moving activities, wetland disturbance, and increased vehicle, human, livestock and pet activity	Local	Permanent	Moderate	Probable	Low	High	Moderate 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. ▪ 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	Moderate	Highly Probable	Low	High	Moderate 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	Moderate	Definate	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.	Low

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
											▪ Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.	
Sensory disturbance of fauna from noise, dust and light associated with construction activities	Local	Long Term	Moderate-Low	Probable	Moderate	High	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.	Low
Potential Heritage Impacts from Construction												
Destruction of archaeological artefacts	Site	Permanent	Low	Improbable	Non-Reversable	High	Very Low Negative	High	No	No	None	Very Low
Existence of new structure on the landscape	Site	Long Term	Low	Highly probable	Moderate	High	Very Low Neutral	High	No	No	None	Very Low
Existence of new structure on the landscape	Site	Permanent	Low	Improbable	Non-Reversable	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 upliftment in the area	Regional	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												
Loss or degradation of local wetland areas from operational activities, vehicle traffic, dust, erosion, sedimentation and possible	Local	Permanent	Moderate	Probable	Low	Moderate	Moderate Negative	High	No	Yes	▪ Monitor and maintain the road impact control measures to ensure that they remain effective. ▪ Highlight all prohibited activities to workers through training and notices.	Low

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
spills												
Environmental contamination from pig excrement, bedding, feed, carcasses and other operational waste	Regional	Long Term	Very-High	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. ▪ 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 pig 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 facility's 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.	Low
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	Low

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
											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.	
Disease transmission from poor waste management and hygiene, and insufficient, inappropriate and/or ineffectual pest control	Local	Long Term	Moderate	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 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. ▪ heck 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	Low

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
											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	Medium	Highly Probable	Moderate	Moderate	Moderate 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 proliferation of alien flora, altered burning, harvesting by people and increased livestock activity	Local	Permanent	High	Probable	Low	High	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 operational activities, wetland disturbance, and increased vehicle, human, livestock and pet activity	Local	Permanent	Moderate	Probable	Low	High	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 noise, dust and light associated with operational activities	Local	Long Term	Moderate-Low	Probable	Moderate	High	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	Low

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
											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.	
Potential Heritage Impacts from Operations												
Existence of new structure on the landscape	Site	Long Term	Low	Highly probable	Moderate	High	Very Low Neutral	High	No	No	None	Very Low
Impacts to heritage resources	Site	Permanent	Low	Improbable	Non-Reversable	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 pork 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(Negative)- Current activities on the farm (cattle and goat herding) may harm water quality**
Potential for groundwater impact:	**Moderate(Negative)- Current activities may be affected due to the use of a borehole.**
Air Quality impact:	**Low(Negative)- The current farm activities will continue and they produce little odor or dust from the herding of animals and maize crop farming.**
Waste generation:	**Low(Negative)- The farm operations will continue and the current activities produce a small amount of waste.**
Indirect Impacts - There won't be any contribution to the pork industry output. - There will be improving of food security in the district municipality - There won't be any employment increases on the farm.	

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 Mojaletema Primary Co-Operative for the proposed Pig Production Facility on Portion 15 of Farm Bultfontein 192, Nigel, Gauteng Province. (Appendix G)

Heritage Impact Assessment: Basic Assessment for the proposed development of a Piggery on Portion 15 of Farm Bultfontein 192, Nigel, Gauteng (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 piggery. Should there be plans to close down the piggery; 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	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	Permanent	Moderate	Highly Probable	Low	Moderate	Moderate 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	Moderate	Highly Probable	Moderate	Moderate	Moderate 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	Moderate	Definate	Moderate	Moderate	Moderate Negative	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	High irreplaceability	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 Mojaletema Primary Co-Operative for the propsed Pig Production Facility on Farm Portion 5, Blue Valley Agricultural Holdings, Uitkyk, Nigel, Gauteng Province. (Appendix G)

Heritage Impact Assessment: Basic Assessment for the proposed development of a Piggery on Portion 15 of Farm Bultfontein 192, Nigel, Gauteng (Appendix G)

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 pigs to the markets. However, both of these would be temporary in both instances. 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. Due to the need of more water, the project may look into a second borehole to meet water demand for the piggery facility activities. A water saving scheme will be established which recycles water by using disinfected water to clean the pig facilities and 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 pork 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 piggery facility is on land which has previously been transformed for a dairy farm, with the remaining land being used for cattle, sheep and goat rearing as well as maize crop growing. 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 piggery facilities and supporting infrastructure

is unavoidable. This may result in the exposing of soil leading to potential erosion and dust from the wind. The occurrence of erosion may result in loss of fertile land and sedimentation in watercourses (loss of wetland). This impact will be a temporary one and the impact 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 development site has been transformed, resulting in a low possibility of vegetation loss. With the appropriate mitigation there is very little probability of this occurring.

Waste
There will be waste generated in both stages of the project, construction and operational, and 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 pork to be sold in the local 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 piggery facility 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 piggery and pig 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 are no fatal flaws 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 piggery 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 farm operations. There will be no ability to develop increased profit and increase pork production to supply the pork industry. This opportunity to improve the local socio-economic situation and to use best practice pig farming methods, including improved pig welfare, will not be lost. There wont be increased and complicated waste to be managed on site where, odour and pest control problems associated with piggeries 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 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 on wetland habitat
- Potential for pollution of water sources
- Waste generation
- Impact of pests and disease transmission
- Impact of traffic
- Employment opportunities created

For alternative:

N/A

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 piggery facility and associated infrastructure. These developments will be according to the SAPPO best guidelines when it comes to pig farming within the environmental legislation and ensuring minimal environmental impacts.

It is not feasible for the relocating of the proposed piggery site as firstly, this is the only available land to the applicant; secondly the chosen sight has the smallest impact on the environment. The site further ensure minimal biosecurity threats to the piggery 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 pigs. Lastly, as the land has previously been transformed, there will be further minimal environmental damage done to the site.

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 MSDF is a visual representation of the 'development vision' and 'interventions' required to achieve the development objectives of the Growth and Development Strategy (GDS) and Integrated Development Plan (IDP) of the Ekurhuleni Metropolitan Municipality. Further to providing the objectives reflecting the desired urban form of Ekurhuleni, the Spatial Development Framework also puts forward policies and strategies for achieving these objectives. It is of utmost importance that Ekurhuleni pursues an approach to development and build a city around a development area that takes cognisance of the four disadvantaged township areas on the peripheries of the metro. Ekurhuleni Metropolitan Spatial Development Framework: 2015 Ekurhuleni MSDF: 2015 44 Final activities in order to address the huge social agenda of the state and the Millennium Development Goals (MDGs). The proposed project falls within Region E- Ward 88 in the Ukurhuleni Metropolitan Municipality, (Figure below).

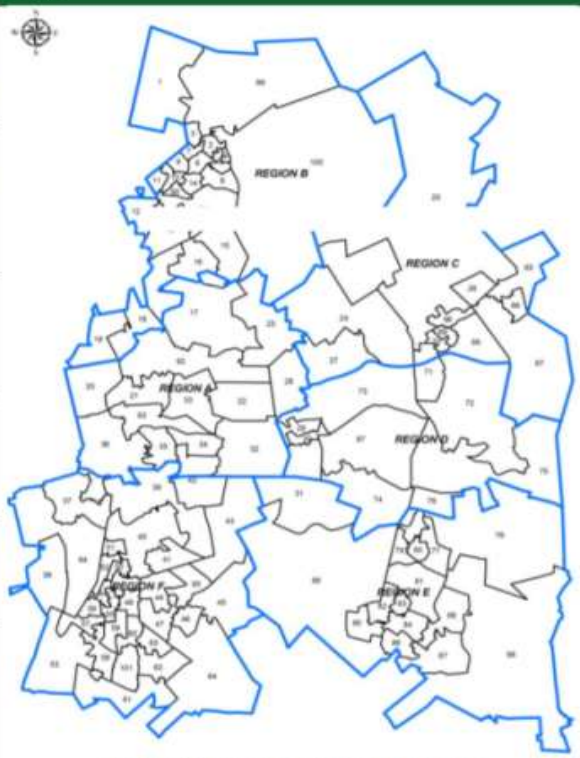
REGION	WARDS	PLAN
A	Portion of 15, Wards 17, 20 – 23, 28, 32 -36, a portion of 42 and wards 92 and 93	
B	Wards 1-15, portions of 16 and 17, 18-19, 89-91 and a portion of 100	
C	Wards 24-27, 65-70 a portion of 71, 96 and portion of 100	
D	Wards 29, 30, a portion of 31, 71-75, a portion of 78 and 97	
E	Portion of 31, 76, 77, a portion of 78, 79-88 and 99	
F	Portion of 36, 37-41, a portion of 42, 43-64, 94-95 and 101	

Figure 36: Wards in relation to planning

Figure 6: Ekurhuleni Metropolitan Municipality Spatial Development Framework 2015-2020 (Project area, Bottom Right of map) Region E- Ward 88

The proposed project falls within the rural category of land use where there is a high potential for agricultural practices. These areas have been earmarked by the regional authorities as vital in contributing to the region's economy and food security. This project will also be in the way forward in growing vibrant and sustainable rural communities. The proposed development has ticked these points and its development would have a multiplier effect by way of creating jobs and raising the money to be spent in the broader regional economy.

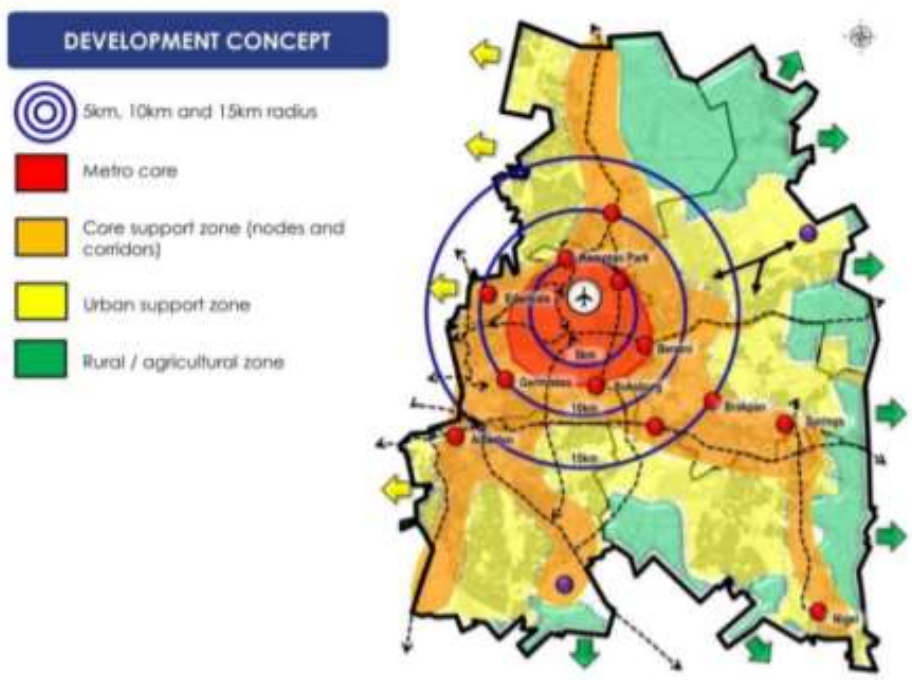


Figure 7: Regional Development Overview (Source: Ekurhuleni Metropolitan Spatial Development Framework: 2015-2020

The regional overview of Ekurhuleni and its economic trends and tendencies indicates that the area is characterised by growing unemployment and increasing job losses especially in manufacturing – the primary activity in the area. This gives opportunity to the agricultural sector to take up this slack as said by the intensions of the proposed project.

The apparent weaknesses identified at the time were as follows:

- Ageing infrastructure and service interruptions;
- Decaying CBDs;
- Poor tourist promotion of assets; and
- Business costs of crime and violence.

The threats which were also apparent could be identified as being:

- Not realising the potential of the Metropolitan;
- Increased unemployment;
- Development constraints due to dolomite and undermining; and
- Inability to provide municipal services.

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):

N/A

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 specialists must be implemented.
- The applicant to ensure 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 Waste Management Licence must be obtained for the storage of pig waste in the lagoon.
- A Water Use Licence/ Borehole license must be obtained for the water usage associated with the piggery operations as well as the re-use of waste water for fertilisation.

It is the opinion of the EAP that the proposed development will comply with current relevant legislation, and that with the implementation of the mitigation measures suggested in this Report, there are no environmental impacts identified as highly detrimental to the environment or resulting as fatal flaws to the proposed project.

9. THE NEEDS AND DESIREBILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

PART I: 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 project land use (Agricultural) is aligned with the Ekurhuleni Metropolitan Municipality 2015-2020 where this has been identified as a means for rural development.
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. This is the optimal use of the land and aligns with the Ekurhuleni Metropolitan Municipality 2015-2020 with intended plans of developing economically vibrant and sustainable rural areas through agricultural developments.
3	Does the community/area need the activity and	Yes. The local context is one of a low income area

	the associated land use concerned? This refers to the strategic as well as local level.	with declining employment from dropping manufacturing plants. The increase of agricultural activities would result in employment opportunities and raising the socio-economic level through the pork industry on a local and regional level
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. There are adequate services available in the area, electricity is already on site, it would need a new connection application to the piggery facility. Water use will be from a borehole for which a water use license would be required.
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 and No. The project is already catered for in terms of electricity provision, however there would need to be an application for a new connectivity point for the piggery facility. For water there is a plan to provide water for domestic use as stated in the Ekurhuleni Metropolitan Municipality 2015-2020, as the area is water scarce the project may not have municipal water provided to it for commercial use. However the project would use borehole water therefore no impacts would be felt in this regard and the project wont impact the infrastructure planning of the Municipality.
6	Is the project part of a national programme to address an issue of national concern or importance?	The project does not fall into any specific national project, it does however address a specific national goal of improving food security as well as aiding in decreasing unemployment in the country through job creation.
PART II: DESIRABILITY		
1	Is the development the best practicable environmental option for this land/site?	Yes. As it is a small track of land, not enough for crop raising on that particular plot. A structure of a piggery facility best suits the size and the chosen industry (pork) yields the best results economically. Further, this results in the minimal impact on the environment.
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 approval of this project would be in line with the relevant authorities attempt to make rural areas more economically vibrant and sustainable as stated in the Ekurhuleni Metropolitan Municipality Spatial Development Framework 2015-2020.
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. This area according to the Ekurhuleni Metropolitan Municipality Spatial Development Framework has been targeted as one of the areas agricultural areas. This project is aligning with that development goal whilst not causing any harm to the surrounding environment as supported in the Specialist Study on the Ecology of the area (Appendix G).
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 is within the intended agricultural zones of the municipality as well as the greater Gauteng spatial development plans. Further, proximity to a major road makes it more suited for distribution means to market both locally and provincially.
5	How will the activity of the land use associated	The proposed project does not need a land use

	with the activity being applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	change as is already marked as agricultural. The impacts of the proposed project as outlined in both the Ecological and Heritage studies conducted (Appendix G). Further, within these studies it states the proposed project as having a low impact on the environment and none on heritage of the site with the proposed mitigation measures being implemented.
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.)?	The proposed project will have a positive impact on peoples health and well-being in the form of providing them with better food security and nutrition at affordable prices. The only effects in terms of noise would mostly be during the construction phase, thereafter the noise levels would be negligible. Odour will be present from the anaerobic process of dealing with the slurry produced during the operational stages of the project, however this will be minimal due to the methods used to mask the smell. The proposed project will occur in an already functioning farm so there will be minimal impact visualy and the sense of place.
7	Will the proposed activity or the land use associated with the activity being applied for, result in unacceptable opportunity costs?	No. The proposed industry (pork) is the second fastest growing industry in South Africa, due to the limited amount of land available, this is the best option for economic development on this farm. Further the turnaround time of the industry make its more viable. Further, the industry presents the opportunity to export to the SADC region in future.
8	Will the proposed land use result in unacceptable cumulative impacts?	No. The proposed projects cumulative impacts have been labeled as having a low impact expect those resulting in job creation therefore raising the socio-economic status of the area. The other impacts have mitigation measures proposed which would lessen their impact, these outlined in the EMPr.

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 Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

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 Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

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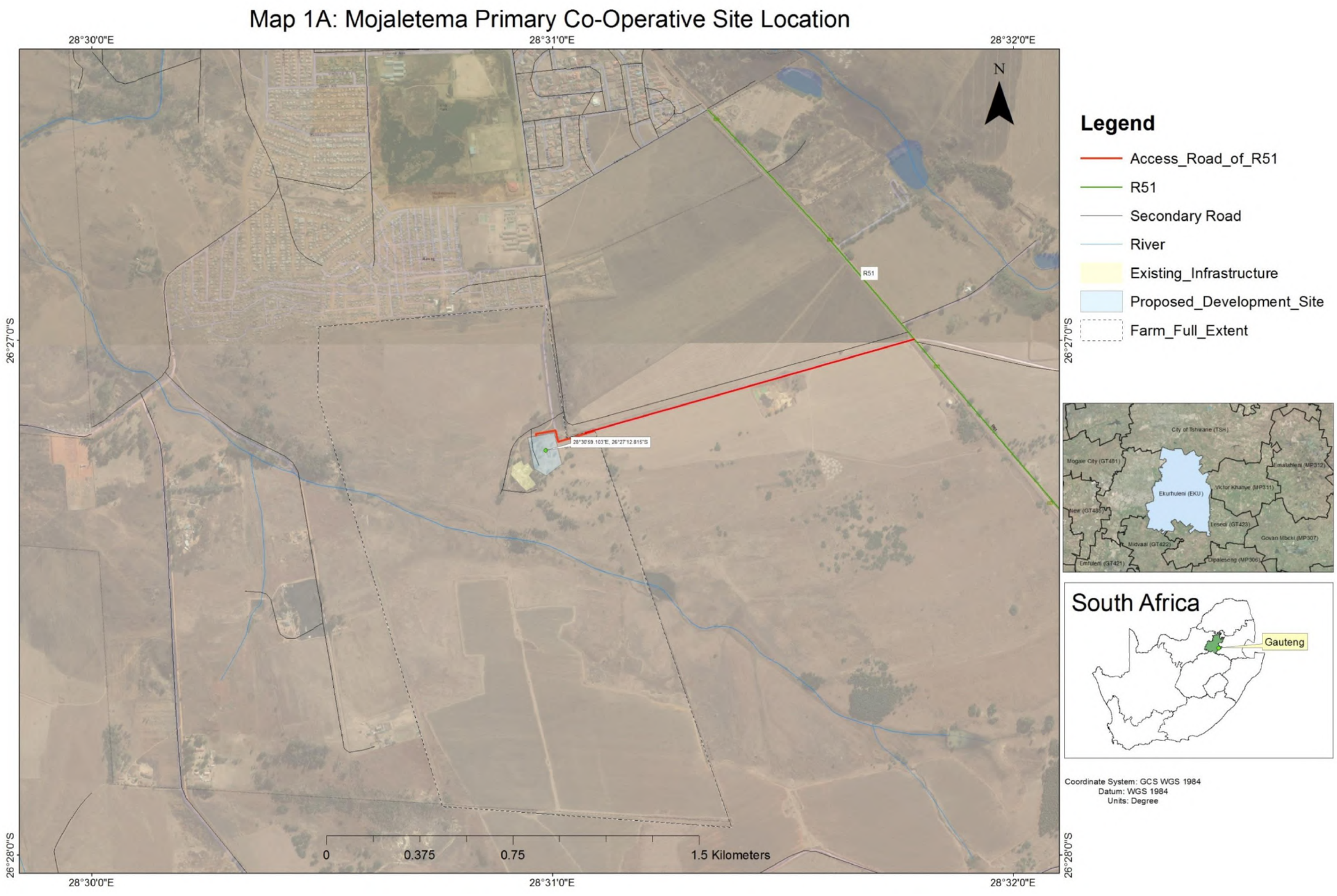
BASIC ASSESSMENT REPORT

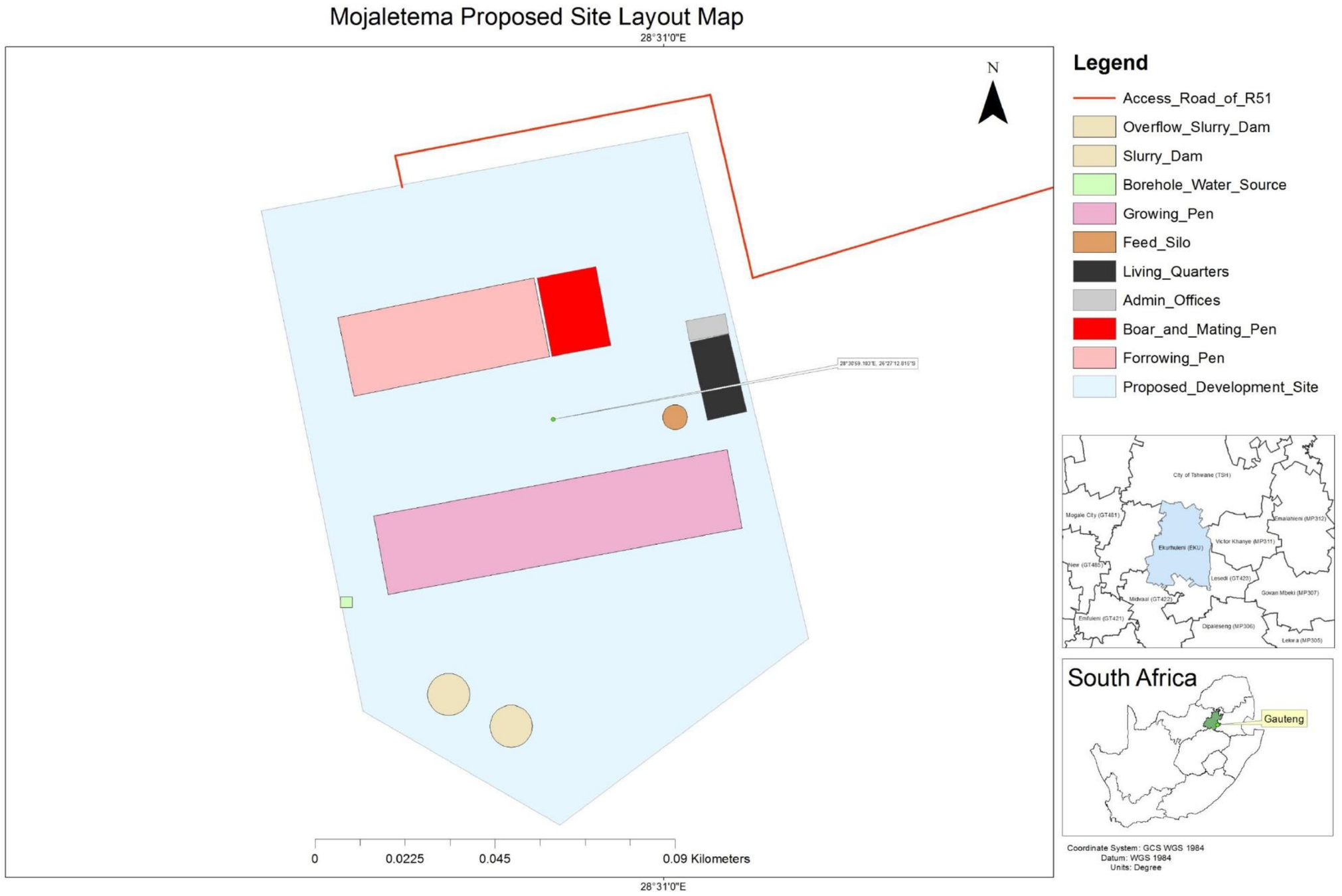
APPENDIX A: SITE LAYOUT PLANS

contents

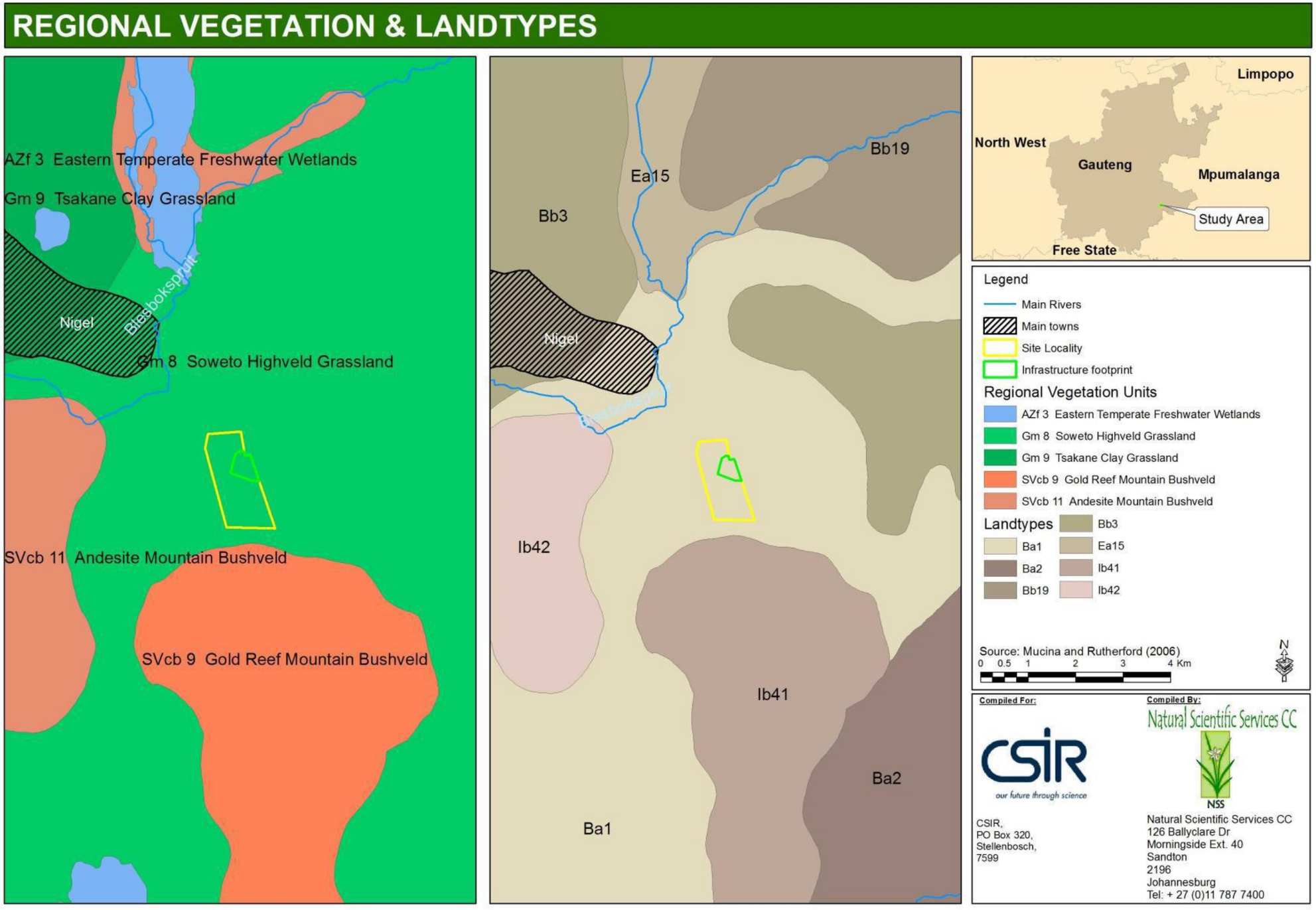
Appendix 1.A: Location of proposed project site of Mojaletema Primary Co-Operative on Portion 15 of Farm Bultfontein in Nigel, Gauteng.



Appendix 1.B: Proposed site layout of Mojaletema Primary Co-Operative



Appendix 1.C: Layout of vegetation found on the Mojaletema Primary Co-Operative site

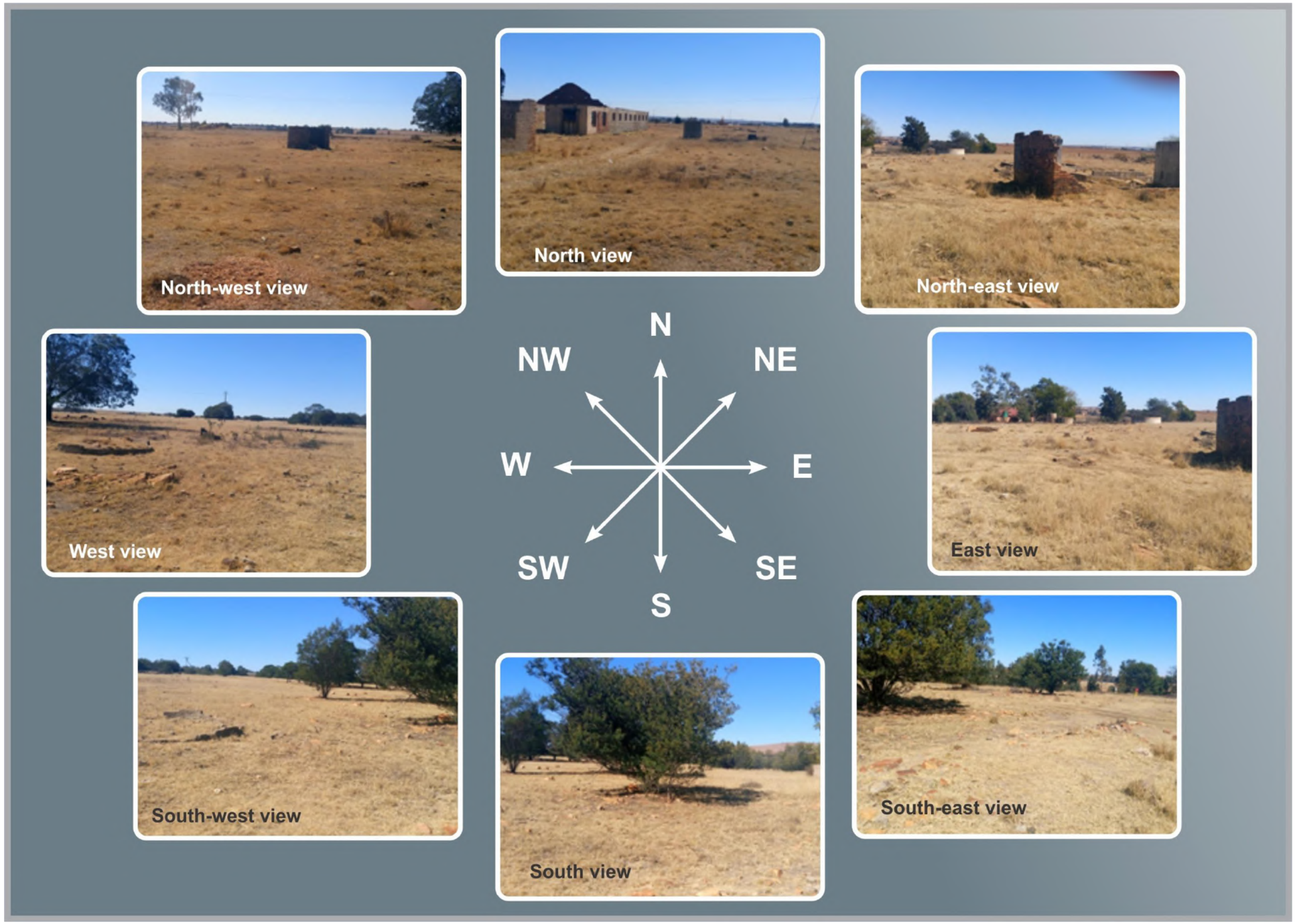


BASIC ASSESSMENT REPORT

APPENDIX B: PHOTOGRAPHS

contents

Appendix B: Site photographs taken in the eight major compass directions for the proposed piggery development of Mojaletema Primary Co-Operative

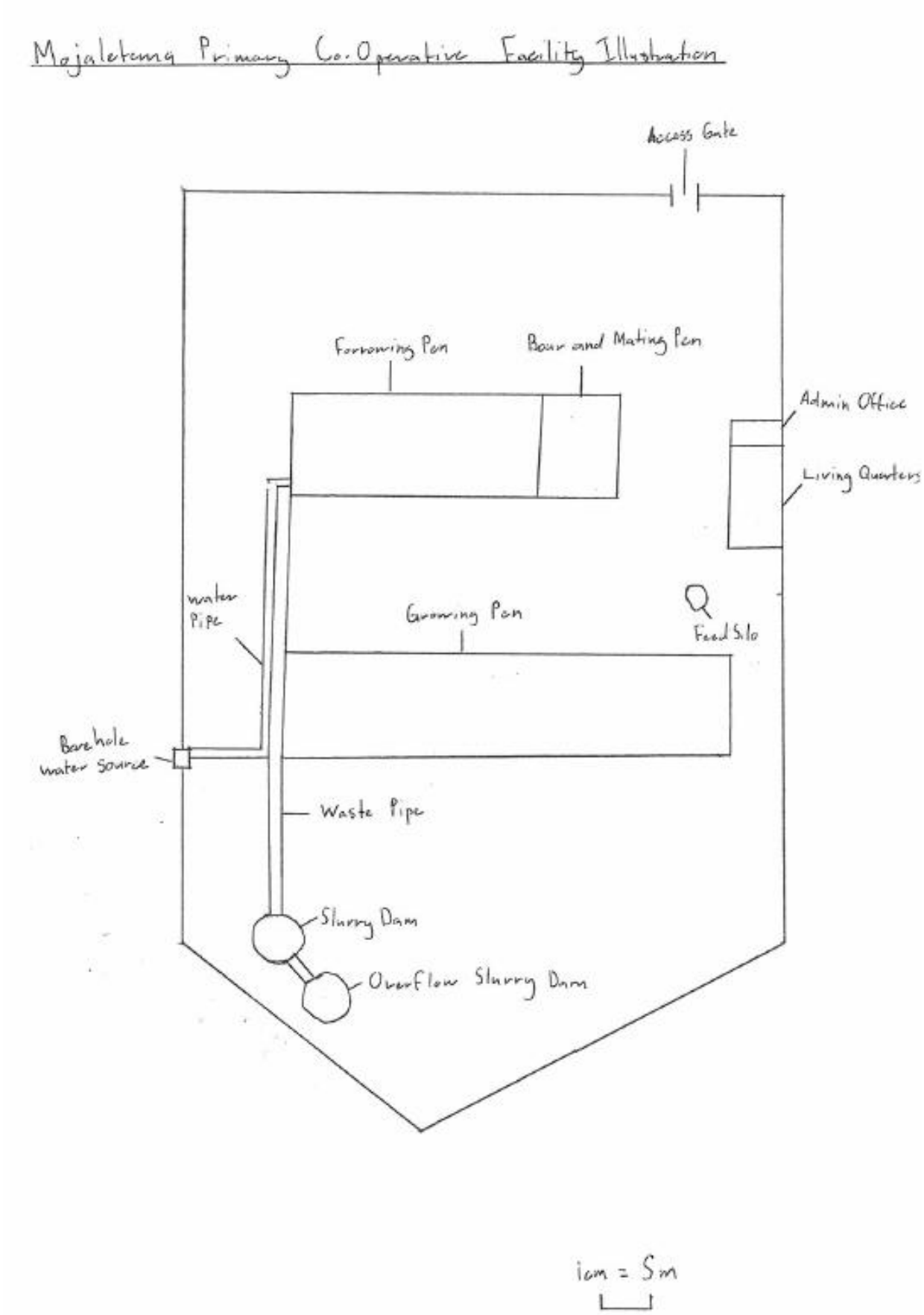


BASIC ASSESSMENT REPORT

APPENDIX C: FACILITY ILLUSTRATION

contents

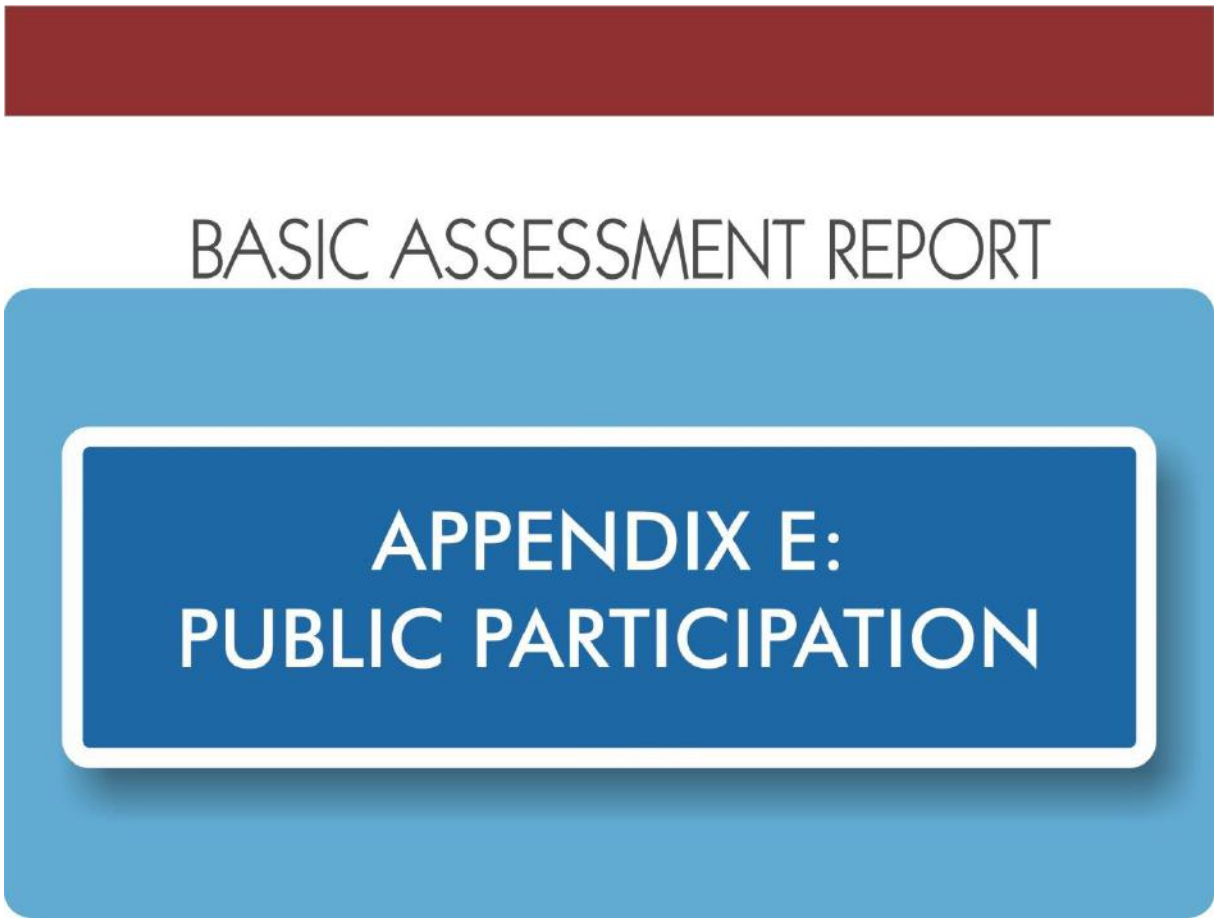
Appendix C: Hand drawing of the site facility



BASIC ASSESSMENT REPORT

APPENDIX D: Route position information

N/A



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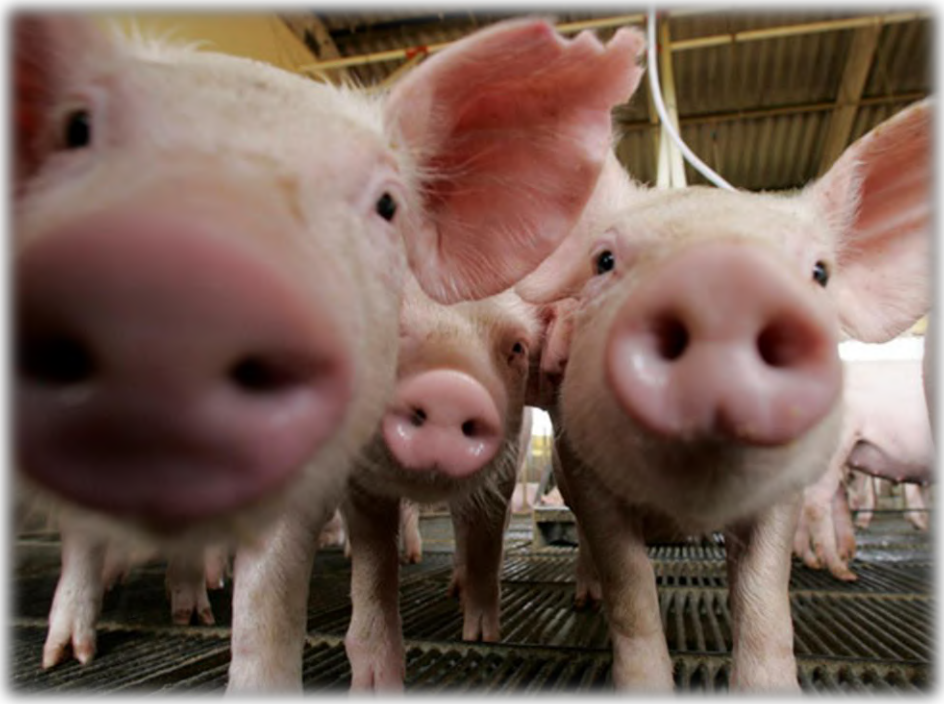


Appendix E1: Proof of site notices

Contents of the site notices (English) placed at the gate to the proposed site (GPS co-ordinates)

Mojaletema Co-Operative (Pty) Ltd Pig Production Facility on farm portion 5 Uitkyk, Nigel, Gauteng

Reference number: CSIR/IU/EMS/ER/2016/0003/A

NOTICE OF A BASIC ASSESSMENT (BA) PROCESS

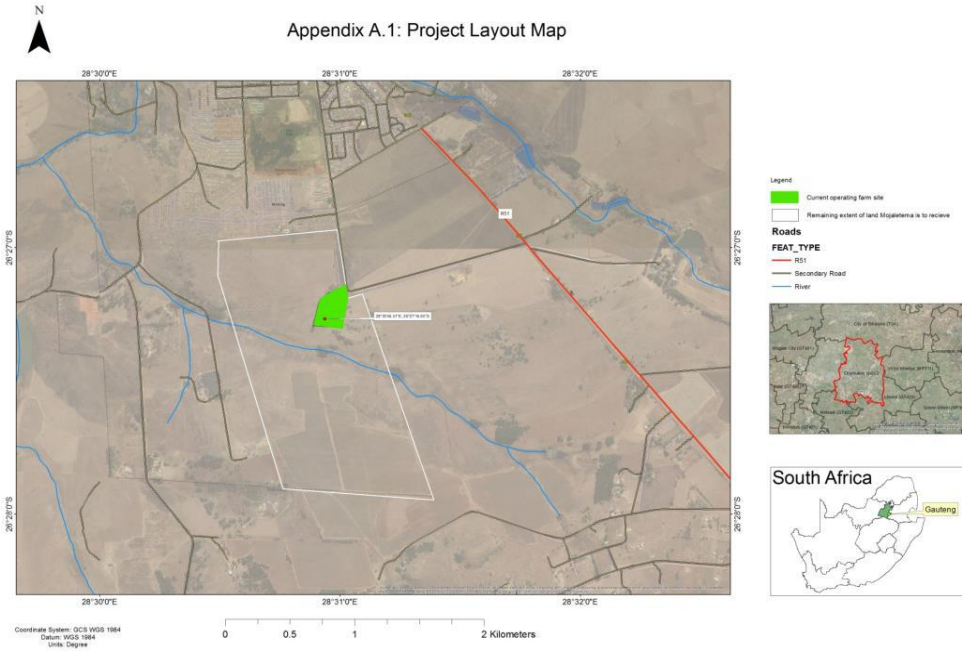
Notice is hereby given, in terms of the Environmental Impact Assessment (EIA) Regulations, under sub-regulation 41(1) and sub-regulation 41(4), published in Government Gazette No 38282 of 8 December 2014, of the National Environmental Management Act, 1998 (Act No 107 of 1998), that **Mojaletema Co-Operative (Pty) Ltd**, proposes a small-scale pig production facility on 1.8 hectares of the farm portion 5 Uitkyk, located in the Nigel area of Ekurhuleni, 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	4
GNR 983, 8 December 2014	27
GNR 921, 29 November 2013	Category A: 1 & 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

Mojaletema Co-Operative (Pty) Ltd Pig Production Facility on farm portion 5 Uitkyk, Nigel, Gauteng

Inombolo ye-Nkomba: CSIR/IU/EMS/ER/2016/0003/A

ISAZISO NGOQHUBO LOKUHLOLA SISEKELO

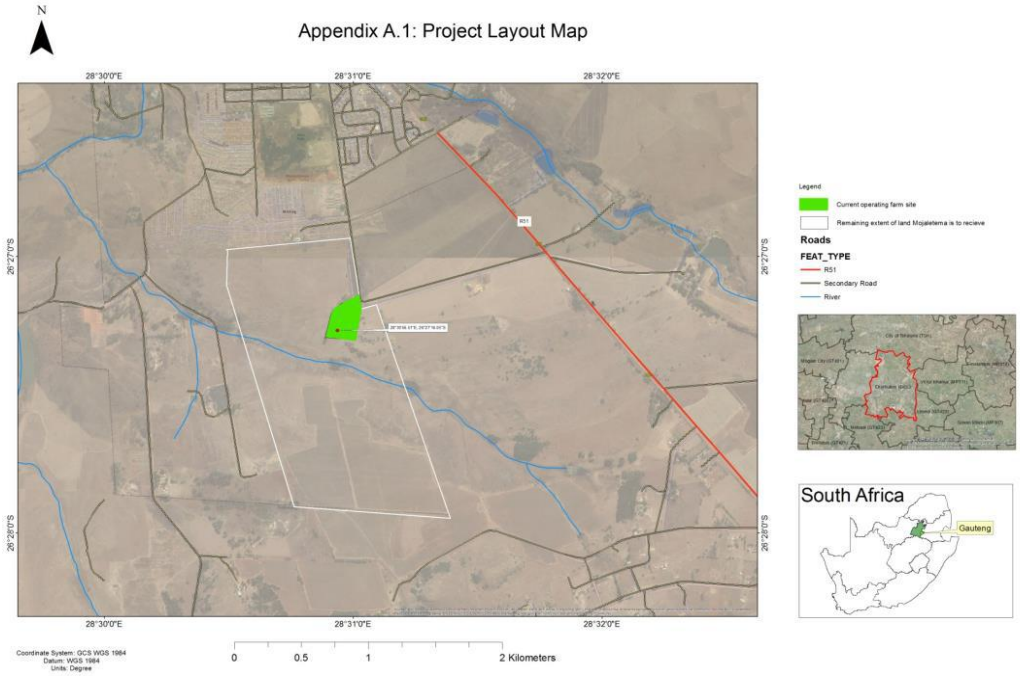
ISaziso sikhishwa ngokweMithethonqubo yokuHlola Umthelela kwezeMvelo (Environmental Impact Assessment (EIA),kwisigatshana somthethonqubo 41 (2) (a), enyatheliswe kwi Gazette Ka Hulumeni nombolo 38282 ka 4 December 2014, kumthetho i-National Environmental Management Act 1998 (Act No. 107 of 1998), ukuba i**Mojaletema Co-Operative (Pty) Ltd** ihlongoza ukwakha ibhizinisi lokukhulisa izingulube endaweni engamahektha awu 1.8 kwingxenye 5 yePulazi Uitkyk, esendaweni yase Nigel, Ekurhuleni, eGoli.

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

ISaziso sika Hulumeni	Inombolo yomsebenzi Obaliwe
GNR 983, 8 December 2014	4
GNR 983, 8 December 2014	12
GNR 921, 29 November 2013	Category A: 1 & 12

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

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



Isithombe 1: Indawo lapho i-Mojaletema Co-Operative ihlongoza ukwakha ibhizinisi lokukhulisa izingulube kwingxenye 5 yePulazi Uitkyk, esendaweni yase Nigel, Ekurhuleni, eGoli.

Appendix E2: Letter to Interested and Affected Parties to notify them of the proposed piggery project

Background Information Document and Postal List: Project Announcement (including letter 1, comment form and BID)- 30 September 2016

Background Information Document

Basic Assessment for the proposed Mojaletema Co-Operative (Pty) Ltd Pig Production facility on farm portion 5 Uitkyk, Nigel, Gauteng

Prepared by CSIR on behalf of Mojaletema Co-Operative (Pty) Ltd

Babalwa Mqokeli

bmqokeli@csir.co.za

Tel: (021) 888 2432

CSIR our future through science

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

You are invited to participate in the following process:

INTRODUCTION TO THE PROPOSED PROJECT

Mojaletema Co-Operative (Pty) Ltd is proposing a small-scale pig production endeavour on 1.8 hectares of the farm portion 5 Uitkyk, located in the Nigel, Gauteng Province. This area falls under the Ekurhuleni Municipality, and is approximately 65 km South East of Johannesburg (Figure 1). The proposed project will include the following components:

- Build a pig house for 80 sow and 5 boars
- Build a processing and packaging room
- Already existing municipal infrastructure (roads and electricity connection).

South African pork industry is relatively large in terms of overall South African agricultural sector. It contributes around 2.15% to the primary agricultural sector. The Mojaletema Co-Operative will seek to boost local economic development in the area and provide opportunities to decrease poverty and unemployment. Mojaletem Co-Operative (Pty) Ltd 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 the application for Environmental Authorisation 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 of 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 and a **Waste Management License** 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, 4 December 2014	4	The development and related operation of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceed- (i) 20 square metres per large stock unit and more than 500 units per facility; (ii) 8 square metres per small stock unit and; a. More than 1000 units per facility excluding pigs where (b) applies; b. More than 250 pigs per facility excluding piglets that are not yet weaned.
GN. R 983, 4 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.
GN. R 985, 4 December 2014	12.	The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.(ii) Within the critical biodiversity areas identified in bioregional plans.
GN. R 985, 4 December 2014	14.	The development of-(iv) dams, where the dam, including infrastructure and water surface areas exceeds 10 square meters in size Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional

Relevant notice:	Activity No (s) (in terms of the relevant notice) :	Description of each listed activity as per the Government Notice:
		plans
GN. R 921, 29 November 2013	Category A - 1	The storage of general waste in lagoons.
GN. R 921, 29 November 2013	Category A - 12	The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).

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)

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 GDARD 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 the Comment/Registration Form that has been included with this BID and kindly send to **Ms. Babalwa Mqokeli** on or before 30 September 2016**:**

Ms. Babalwa Mqokeli

Email: *bmqokeli@csir.co.za*

Tel: 021-888-2432

Fax: 021-888-2693

Address: CSIR, PO Box 320, Stellenbosch, 7599

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

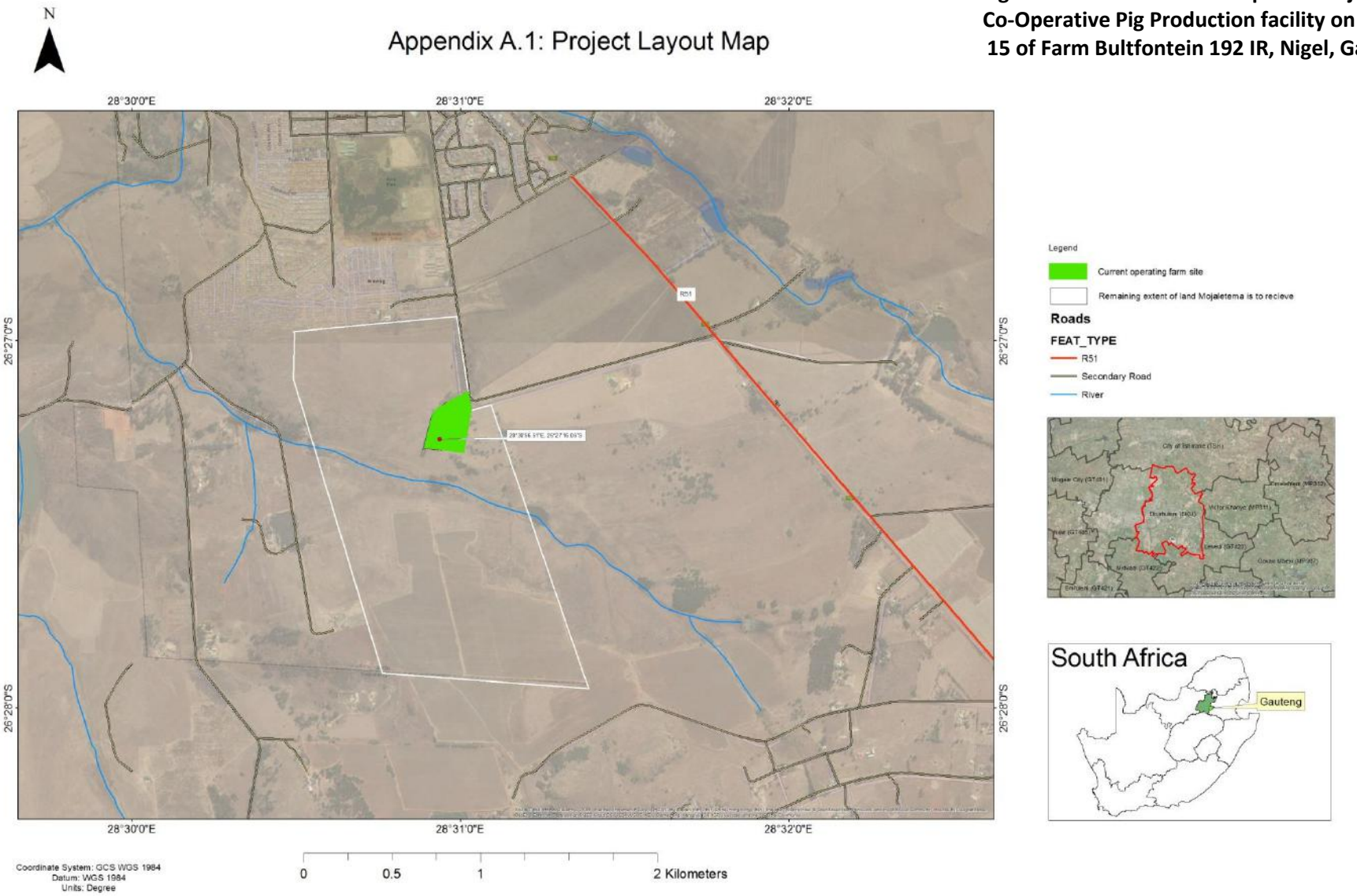


Figure 1: Location of the Proposed Mojaletema Co-Operative Pig Production facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

CSIR Implementation Unit

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

30 September 2016

Dear Interested and/or Affected Party,

PROJECT ANNOUNCEMENT

BASIC ASSESSMENT FOR THE PROPOSED MOJALETEMA CO-OPERATIVE (PTY) LTD PIG PRODUCTION FACILITY ON PORTION 5 OF FARM UITKYK, NIGEL, GAUTENG

REFERENCE NUMBER: CSIR/IU/EMS/ER/2016/0003/A

The National Department of Environmental Affairs (DEA) 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. The Council for Scientific and Industrial Research (CSIR) was appointed by DEA to manage the project on their behalf. **Mojaletema Co-Operative (Pty) Ltd** has been identified as an eligible client for this service and is proposing to develop a small-scale pig production on Portion 5 of Farm Uitkyk, located in Nigel, in the Ekurhuleni municipality area, Gauteng.

In terms of Government Notice Regulations (GNR) 983, 984 and 985 of 4 December 2014 of the National Environmental Management Act (Act 107 of 1998) published in Government Gazette 38282 on 8 December 2014, Environmental Authorisation from the Competent Authority, in this case the Gauteng Department of Agriculture and Rural Development (GDARD), is required prior to the undertaking of any activity triggered within GNR 983, 984 and/or 985. The CSIR 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 30 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 by supplying 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. Babalwa Mqokeli (Project Manager)

Postal address: PO Box 320, Stellenbosch, 7599, South Africa
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: bmqokeli@csir.co.za
Website: *http://www.csir.co.za/ems/specialneeds/*

Name & Signature of person responsible for post: JOHN:

19 items – NORMAL post (Mojaletema – Sent on 30 Aug 2016)

NMS0076 / RU N / 02100 / 021SE

Dept of Environmental Affairs – National Mmatlala Rabothata Fedsure Building Private Bag X 447 Pretoria 0001	Dept of Rural Development & Land Reform Bonginkosi Zulu Fedsure Building Private Bag X 447 Pretoria 0001	Dept of Agriculture, Forestry & Fisheries Mashudu Marubini Private Bag X 138 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 X 120 Pretoria 0001
Dept of Agriculture and Rural Development Mr Lebogang Malle PO Box 8769 Johannesburg 2000	Dept of Community Safety Ms Sizakele Nkosi-Malobane PO Box 62440 Marshalltown 2107	Lerato Senakhomo Project Applicant PO Box 860 Nigel 1490
Matshidiso Care of Lerato Senakhomo Project Applicant PO Box 860 Nigel 1490	Sonia Care of Lerato Senakhomo Project Applicant PO Box 860 Nigel 1490	Gladys Care ofLerato Senakhomo Project Applicant PO Box 860 Nigel 1490
Dept of Cooperative Governance and Traditional Affairs Mr Paul Mashatile Private Bag X 86 Marshalltown 2107	Dept of Water and Sanitation Mr Philemon Mashoko Private Bag X 1069 Germiston 1400	Dept of Enterprise Programme Management Mr Andile Mahlalutye Private Bag X 1069 Germiston 1400
Dept of Waste Management Qaphile Gcwensa Private Bag X 1069 Germiston 1400	Dept of Environmental Resource Management and Development Hezekiel Nkosi Private Bag X 1069 Germiston 1400	Dept of Economic Development Calphus Chauke Private Bag X 1069 Germiston 1400

Dept of City Planning and Development Mr Aubrey Motubatse Private Bag X 1069 Germiston 1400		

Email 1 to I&Aps: Project Announcement (30 September 2016)

From: Samukele Ngema

To: Samukele Ngema; Babalwa Mqokeli; Minnelise Levendal

BC mrabothata@environment.gov.za; SHlela@environment.gov.za; tnemarude@environment.gov.za; ncamisile.nkabinde@drdlr.gov.za; mashuduma@daff.gov.za; kgauta.mokoena@dmr.gov.za; MohapiN@dwa.gov.za; MuthraparsadN@dwa.gov.za; khayalethu.matrose@dmr.gov.za; MMolefane@thedti.gov.za; thokob@daff.gov.za; Thandeka.Mbasa@gauteng.gov.za; Thabo.Ntuli@gauteng.gov.za; Ntlakanipho.Nkontwana@gauteng.gov.za; Thokozile.Makgato@gauteng.gov.za; Phindile.Mbanjwa@gauteng.gov.za; Agnes.Vumazonke@gauteng.gov.za; Edward.Mosuwe@gauteng.gov.za; Khanyisa.Nkuna@gauteng.gov.za; phumeza.langa@gauteng.gov.za; Tebogo.Photo@gauteng.gov.za; Daphney.Ngoasheng@gauteng.gov.za; Jane.Hlongwane@gauteng.gov.za; tumelo.maimane@gauteng.gov.za; Sofia.Yusuf@gauteng.gov.za; Ronald.Swartz@gauteng.gov.za; phumza.ndlede@gauteng.gov.za; Shoki.tshabalala@gauteng.gov.za; Vivian.Moloi@gauteng.gov.za; Namhla.Siqaza@gauteng.gov.za; Mamokwe.makoloka@gauteng.gov.za; Goodwill.nkosi@gauteng.gov.za; mknight@upe.ac.za; dsibayi@sahra.org.za; anneliza@nda.agric.za; tumi.lehabe@wessa.co.za; stephaniea@ewt.org.za; adamp@ewt.org.za; ewt@ewt.org.za; maphata.ramphele@gauteng.gov.za; advocacy@birdlife.org.za; motsisl@eskom.co.za; gertrude.mshumpela@ekurhuleni.gov.za; hencil.b@ekurhuleni.gov.za

Date: 30/08/2016 13:42

Subject: Notification of Release of BID for Basic Assessment for the Proposed Development of a Pig Production Enterprise, and Associated Infrastructure, Nigel, Ekurhuleni.

Attachments: Comments & Reg Form.docx; Letter to I&APs_BID_Mojaletema Co-Operative.pdf; Mojaletema Co-Operative (Pty) Ltd BID March 2016.pdf

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 pig production enterprise on Farm Portion 5 Uitkyk, Nigel, Ekurhuleni. 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 30 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/interested. 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 via: Ms. Babalwa Mqokeli

Email: bmqokeli@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 (30 September 2016)

adamp@ewt.org.za Transferred
Transferred 30/08/2016 13:43
BC: adamp@ewt.org.za

advocacy@birdlife.org.za Transferred
Transferred 30/08/2016 13:44
BC: advocacy@birdlife.org.za

Agnes.Vumazonke@gauteng.gov.za Transfer Delayed
Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Agnes.Vumazonke@gauteng.gov.za

anneliza@nda.agric.za Transferred
Transferred 30/08/2016 13:43
BC: anneliza@nda.agric.za

Babalwa Mqokeli Read
Delivered 30/08/2016 13:42
Read 30/08/2016 14:09
To: BMqokeli@csir.co.za

Daphney.Ngoasheng@gauteng.gov.za Transfer Delayed
Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Daphney.Ngoasheng@gauteng.gov.za

dsibayi@sahra.org.za Transferred
Transferred 30/08/2016 13:43
BC: dsibayi@sahra.org.za

Edward.Mosuwe@gauteng.gov.za Transfer Delayed
Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Edward.Mosuwe@gauteng.gov.za

ewt@ewt.org.za Transferred
Transferred 30/08/2016 13:43
BC: ewt@ewt.org.za

gertrude.mshumpela@ekurhuleni.gov.za Transfer Delayed
Transfer Delayed 30/08/2016 13:42
Transferred 30/08/2016 14:03
BC: gertrude.mshumpela@ekurhuleni.gov.za

Goodwill.nkosi@gauteng.gov.za Transfer Delayed
Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Goodwill.nkosi@gauteng.gov.za

hencil.b@ekurhuleni.gov.za Transfer Delayed
Transfer Delayed 30/08/2016 13:42
Transferred 30/08/2016 14:03
BC: hencil.b@ekurhuleni.gov.za

Jane.Hlongwane@gauteng.gov.za Transfer Delayed
Transfer Failed
30/08/2016 13:44

Jane.Hlongwane@gauteng.gov.za Transfer Delayed

Transfer Delayed 30/08/2016 13:44

BC: Jane.Hlongwane@gauteng.gov.za

kgauta.mokoena@dmr.gov.za Transferred

Transferred 30/08/2016 13:45

BC: kgauta.mokoena@dmr.gov.za

Khanyisa.Nkuna@gauteng.gov.za Transfer Delayed

Transfer Failed

30/08/2016 13:44

Transfer Delayed 30/08/2016 13:44

BC: Khanyisa.Nkuna@gauteng.gov.za

khayalethu.matrose@dmr.gov.za Transferred

Mamokwe.makoloka@gauteng.gov.za Undelivered

maphata.ramphele@gauteng.gov.za Transfer Delayed

Transfer Failed

30/08/2016 13:44

Transfer Delayed 30/08/2016 13:44

BC: maphata.ramphele@gauteng.gov.za

mashuduma@daff.gov.za Transferred

Transferred 30/08/2016 13:42

BC: mashuduma@daff.gov.za

Minnelise Levendal Emptied

Delivered 30/08/2016 13:42

Read 30/08/2016 13:55

Deleted 30/10/2016 01:13

Emptied 07/11/2016 01:02

To: MLevendal@csir.co.za

mknight@upe.ac.za Transferred

Transferred 30/08/2016 13:42

BC: mknight@upe.ac.za

MMolefane@thedti.gov.za Transferred

Transferred 30/08/2016 13:42

BC: MMolefane@thedti.gov.za

MohapiN@dwa.gov.za Transferred

Transferred 30/08/2016 13:43

BC: MohapiN@dwa.gov.za

motsisl@eskom.co.za Transferred

Transferred 30/08/2016 13:42

BC: motsisl@eskom.co.za

mrabothata@environment.gov.za Transferred

Transferred 30/08/2016 13:42

BC: mrabothata@environment.gov.za

MuthraparsadN@dwa.gov.za Transferred

Transferred 30/08/2016 13:43

BC: MuthraparsadN@dwa.gov.za

Namhla.Siqaza@gauteng.gov.za Transfer Delayed

Transfer Failed

30/08/2016 13:44

Transfer Delayed 30/08/2016 13:44

BC: Namhla.Siqaza@gauteng.gov.za

ncamisile.nkabinde@drdlr.gov.za Transferred

Ntlakanipho.Nkontwana@gauteng.gov.za Undelivered

phumza.ndlede@gauteng.gov.za Undelivered

Ronald.Swartz@gauteng.gov.za Transfer Delayed

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30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Ronald.Swartz@gauteng.gov.za

Samukele Ngema Forwarded

Delivered 30/08/2016 13:42
Read 30/08/2016 13:42
Forwarded 30/08/2016 14:08
To: SNgema@csir.co.za

SHlela@environment.gov.za Transferred

Transferred 30/08/2016 13:42
BC: SHlela@environment.gov.za

Shoki.tshabalala@gauteng.gov.za Transfer Delayed

Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Shoki.tshabalala@gauteng.gov.za

Sofia.Yusuf@gauteng.gov.za Transfer Delayed

Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Sofia.Yusuf@gauteng.gov.za

stephaniea@ewt.org.za Transferred

Transferred 30/08/2016 13:43
BC: stephaniea@ewt.org.za

Tebogo.Photo@gauteng.gov.za Transfer Delayed

Thabo.Ntuli@gauteng.gov.za Undelivered

Thandeka.Mbasa@gauteng.gov.za Undelivered

thokob@daff.gov.za Transferred

Transferred 30/08/2016 13:42
BC: thokob@daff.gov.za

Thokozile.Makgato@gauteng.gov.za Transfer Delayed

Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: Thokozile.Makgato@gauteng.gov.za

tnemarude@environment.gov.za Transferred

Transferred 30/08/2016 13:42
BC: tnemarude@environment.gov.za

tumelo.maimane@gauteng.gov.za Transfer Delayed

Transfer Failed
30/08/2016 13:44
Transfer Delayed 30/08/2016 13:44
BC: tumelo.maimane@gauteng.gov.za

tumi.lehabe@wessa.co.za Transferred

tumi.lehabe@wessa.co.za	Transferred
Transferred	30/08/2016 13:44
BC: tumi.lehabe@wessa.co.za	
Vivian.Moloi@gauteng.gov.za	Transfer Delayed

Appendix E3: Proof of newspaper advertisements

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

24 AUGUSTUS 2016 HEIDELBERG/NIGEL HERAUT *Got a story in the Nigel area? Phone 011 814 1020/40* BLADSY 3

Chamber members receive pointers on how to improve profit

HEIDELBERG - Werner Froneman (marketing consultant) gave members of Heidelberg Chamber of Business some pointers on how to improve their businesses at the meeting on August 16.

Werner told them to make a list of the things that their businesses need more of to improve profitability and growth. They also had to make a list of those things that the business don't need and that is not worth the effort or take up a lot of the business owner's time.

A good principle to live by is the concept of 'under-promise' and 'over-deliver'. "Stick to your promise and if you can not deliver, tell your client and make a plan. Rather under-promise than to promise something that you can not deliver on. Quality service at a value for money price is essential," Werner said.

Werner ended with pearls of wisdom when he told members that it is important to be in a business that they are passionate about. Do something that is worth your effort, but it is not just about money. It is more important to do something that you love."

Heidelberg Business Chamber's next meeting is on September 13 at 19:00. For more information phone Suzaan on 072 523 9657.

Werner Froneman (marketing consultant) gave members of Heidelberg Chamber of Business some pointers on how to improve their businesses. Heidelberg Business Chamber's next meeting is on September 13 at 19:00

New kids on the block show their nails at first council meeting

Lydia Rice
news1.heraut@lantic.net

HEIDELBERG - The three new EFF councillors of Lesedi Local Municipality stood out in their red attire at the first council meeting after the local elections. Mgidi Isaac Khithika promised on August 17 that LLM will never be the same again and said the EFF will be the voice of the voiceless.

26 Councillors were sworn in by Mr Kiewiet de Bruyn (chief magistrate of Heidelberg). Mululeki Nelson Ronald Nkosi was elected as the new speaker. Thabiso Simon Moremi who was the previous speaker was elected as one of the five MMCs (members of the mayoral committee) and will be in charge of corporate services. Lerato Francina Maloka has unanimously been re-elected as the executive mayor. The 26 seats have been assigned between the ANC (16), DA (6), EFF (3) and VF Plus (1).

Mr Nkosi congratulated all the parties and new members and said he hoped that they will all work together in taking the council forward. He referred to the three EFF members as the "new kids on the block" and mentioned that the EFF in their red attire brigs colour to the council. "I thank you for showing confidence in me as speaker and together we will strive to bring quality service to the community," Nkosi said.

The other ANC councillors are: Themba Motsepe (MMC: Development and Planning), Mamoswane Katty Rakitla (MMC: Community Service), Thembekile Ellen Ramothibe (MMC: Finance), Mapule Vionah Motsepe (MMC: Service Delivery), Lulama Shirley-Anne Gamede, Mziwake Philemon Mtshonyane, Phetheni Rose Mchunu, Modiyehi Emily Mapori, Themba Joseph Gama, Nozabiseng Tressa Mofokeng, Zanele Silvia Twala, Simon Japi Mnyakeni and Mashele Sebonikhalion Lukhele.

The DA councillors are: Thulani Paulos Nyembe, Bontle Veronica Mongi, Remofilwe Simphiwe Hlatshwayo, Mirna-Ann Mulder, Gerhard (Gerry) Charles Holtzhausen and Sieghard (Sieg) Heindrich Adolph Carl Paul.

The other two EFF councillors are Aweena Zinhle Abdullah and Molebogeng Malefela. Mari Boshoff represents the VF Plus as councillor.

Gamede from the ANC and Mulder from the DA will be LLM's representatives in the Sedibeng District Municipality.

Mululeki Nelson Nkosi was elected as the new speaker of Lesedi Local Municipal Council.

The new EFF councillors provided a bit of colour to the chamber. They are Zinhle Abdullah, Isaac Khithika and Molebogeng Malefela.

In Liefdevolle herinnering aan

William Hendry Cooks

wat in die ouderdom van 75 oorlede is.

☆ 30 Augustus 1940
✝ 12 Augustus 2016

Elke afskeid is die geboorte van 'n herinnering. In ons harte sal jy altyd voortleef Paps.

William, Patricia, Annelize & families

Notice of Basic Assessment (BA) Process

Reference number: CSIR/LIVEHS/ER/2016/0003/A

Basic Assessment for the proposed Hojalelatsna Co-Operative (Pty) Ltd Pig Production facility on Farm Portion 5 Uitkyk, Nigel, Gauteng.

Notice is hereby given, in terms of the Environmental Impact Assessment (EIA) Regulations, under subregulation 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 **Hojalelatsna Co-Operative (Pty) Ltd** proposes a small-scale **pig production** on 1.8 hectares of the farm portion 5 Uitkyk, located in the Nigel area of Ekurhuleni, 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 a Waste Management License is required as the project triggers the following listed activities:

GNR 983 4, 12 and 27
GNR 985 12 and 14
GNR 921 1 and 12

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. Bebahwa Mqokeli, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2473 or Email: bmqokeli@csir.co.za.** You have until or before **30th September 2016** to do so (30 days from the date of this publication - including weekends, but excluding public holidays).

CSIR

Newspaper Advertisement (Tswana) placed in Heidelberg/Nigel Rekord on 30 August 2016

Meisieskoor aan die brand!

Hoërskool John Vorster se meisieskoor onder leiding van Sanet Bekker het tydens 'n fondsinsamelingsprojek die minderbevoorregte leerlinge van Laerskool Hannes Visagie vermaak met hul pragsangitems. Hulle het op uitnodiging saam met die opkomende sanger Michael Lindt van George opgetree. Hulle het op 27 Augustus by die NG Gemeente Nigel-Oos se vrouediens, tydens hul modeparade fondsinsamelingsprojek opgetree. Hulle gaan later vanjaar by Heidelberg Mall tydens 'n koorfees optree.

AUCTION / VEILING

KITSISO YA TSHEKATSHEKO YA TIKOLOGO

Reference number: CSIR/IU/EHS/ER/2016/0005/A

Kitsiso ya Tlhatlhobo ya Tikologo (Basic Assessment, BA) e tlwa molemong wa Mojalelema Co-Operative (Pty) Ltd (mokwadisi wa Projekte), ba ba batlang go **simolola kgwebo ya go rua ditlhobe, fa tshimong ya 5 Uitkyk, Nigel, Ekurhuleni, Gauteng.**

Lekgotla la Dipatlisiso tsa Saense le Indasteri (Council for Scientific and Industrial Research, CSIR) e tla laola tsamaiso ya Tshekatsheko ya Tikologo ya Projekte. Go ya ka melao ya Tshekatsheko ya Tikologo (NEMA BA Regulations) e e gatisitsweng ka fa tlase ga Kitsiso ya Molao wa Mmuso (GNR) 983 le 985 ya 4 Sedimonthole 2014, Gazeteng ya Mmuso 38282, le Molao ya Tshekatsheko ya Matlakala (NEM:WA), e e gatisitsweng ka fa tlase ga Kitsiso ya Molao wa Mmuso (GNR) 921 ya 29 Ngwanatsele 2013 GG No. 37083, e laola gore Tlhatlhobo ya Tikologo (BA) e ya tlhokagala ka ntlha ya ditiro tse di latelang:

GNR 983 Ditiro 4, 12 &27
GNR 985 Ditiro 12 & 14
GNR 921 Ditiro 1

Go fana ka go tlhagisa maikutlo ka tsamaisong ya Tshekatsheko ya Tikologo, le laletswa go ikwadisa jaaka mokgatlhegi/mosamegi wa projekte. Fa le tlhoka dintlha tsa projekte le/kgotsa go ikwadisa jaaka mokgatlhegi/mosamegi, fana ka leina le sefane la botlalo, aterese ya poso, nomoro ya fono, aterese ya imeile, le go fa lebaka la kgatlhego kgotsa la kamego go: **Ms. Babalwa Mqokeli, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2693 or Email: bmqokeli@csir.co.za.** Ka kopo, ikopanye le rona ya pele ga **30th September 2016** go simolola ka la tsatsi se.

CSIR

NOTICE / KENNISGEWINGS

PUBLIC PARTICIPATION NOTICE FOR A PROSPECTING RIGHT APPLICATION

NOTICE OF PROSPECTING RIGHT APPLICATION AND ASSOCIATED ENVIRONMENTAL AUTHORISATION WITHOUT BULK SAMPLING IN RESPECT OF PORTIONS 1, 11 AND 14 OF THE FARM WINTERHOEK 314 IR, IN THE MAGISTERIAL DISTRICT OF NIGEL, GAUTENG PROVINCE OF SOUTH AFRICA.

Notice is hereby given in terms of the Minerals and Petroleum Resources Act (Act No.28 of 2002) Hereafter as Amended Section by 12(d) of The Minerals and Development Resources Development Amendment Act, 2008 (Act 49 Of 2008) together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended), that Voctolux Collieries (Pty) Ltd has applied for a Prospecting Right. Referenced GP 30/5/1/1/2 (10445) PR and would like to engage the local property owners, interested and affected parties on Portions 1, 11 and 14 on the farm Winterhoek 314 IR, Nigel, Gauteng Province, South Africa.

PROJECT TITLE: Voctolux Collieries (Pty) Ltd Coal Prospecting Right Application – Winterhoek 314 IR

PROJECT PROPOSAL:

The applicant proposes to prospect for coal on the abovementioned farm. The prospecting activity triggers a Basic Assessment (BA) in terms of the NEMA regulations which will be undertaken as part of the Environmental Authorisation Application Process.

A Basic Assessment Report (BAR) will be available for review for 30 days from the 01st of September 2016 to the 30th of September 2016, reports will be emailed upon request and made available at the Nigel library – Alra Park Library.

LOCATION: Portions 1, 11 and 14 on the farm Winterhoek 314 IR, Nigel, Gauteng Province, South Africa.

DATE OF PUBLICATION OF THIS NOTICE: 30 August 2016

DEPARTMENT MINERALS RESOURCES REFERENCE NUMBER: GP 30/5/1/1/2 (10445) PR

Queries regarding this matter should be referred to: Environmental Assessment Practitioners: Eco Elementum (Pty) Ltd

Mr. Vernon Siemelink
Office: 012 807 0383 / 012 348 5214
Mobile: 072 196 9928
Fax: 086 714 5399
Email: info@ecoelementum.co.za
Project Ref: Voctolux – Winterhoek 314 IR

eco elementum
ENVIRONMENTAL & PROJECT MANAGEMENT PROFESSIONALS

OPPORTUNITY TO PARTICIPATE: Interested and affected parties (I&APs) are invited to register and provide written comments. I&APs should refer to the relevant reference number(s), and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below within **30 days** from the date of this notice

PUBLIC PARTICIPATION NOTICE FOR A PROSPECTING RIGHT APPLICATION

NOTICE OF PROSPECTING RIGHT APPLICATION AND ASSOCIATED ENVIRONMENTAL AUTHORISATION WITHOUT BULK SAMPLING IN RESPECT OF PORTIONS 2, 3, AND 9 OF THE FARM HONINGFONTEIN 339 IR, PORTIONS 4, 6, 17, 31, AND 32 OF THE FARM PALMIETFONTEIN 337 IR, PORTIONS 4, 6 AND 14 OF THE FARM PALMIETKUIL 322 IR, PORTIONS 4 AND 7 OF THE FARM WOLVENBANK 338 IR IN THE MAGISTERIAL DISTRICT OF NIGEL, GAUTENG PROVINCE OF SOUTH AFRICA.

Notice is hereby given in terms of the Minerals and Petroleum Resources Act (Act No.28 of 2002) Hereafter as Amended Section by 12(d) of The Minerals and Development Resources Development Amendment Act, 2008 (Act 49 Of 2008) together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended), that Mafatiki Amalgamated Commodities (Pty) Ltd has applied for a Prospecting Right. Referenced GP 30/5/1/1/2 (10436) PR and would like to engage the local property owners, Interested and Affected Parties on Portions 2, 3, And 9 of the Farm Honingfontein 339 IR, Portions 4, 6, 17, 31, and 32 of the Farm Palmietfontein 337 IR, Portions 4, 6 and 14 of the Farm Palmietkuil 322 IR, Portions 4 and 7 of the Farm Wolvenbank 338 IR, Nigel, Gauteng Province of South Africa.

PROJECT TITLE: Mafatiki Amalgamated Commodities (Pty) Ltd Coal Prospecting Right Application

PROJECT PROPOSAL:

The applicant proposes to prospect for coal on the abovementioned farms. The prospecting activity triggers a Basic Assessment (BA) in terms of the NEMA regulations which will be undertaken as part of the Environmental Authorisation Application Process.

A Basic Assessment Report (BAR) will be available for review for 30 days from the 01st of September 2016 to the 30th of September 2016, reports will be emailed upon request and made available at the Nigel library – Alra Park Library.

LOCATION: Portions 2, 3, And 9 of the Farm Honingfontein 339 IR, Portions 4, 6, 17, 31, and 32 of the Farm Palmietfontein 337 IR, Portions 4, 6 and 14 of the Farm Palmietkuil 322 IR, Portions 4 and 7 of the Farm Wolvenbank 338 IR, Nigel, Gauteng Province of South Africa.

DATE OF PUBLICATION OF THIS NOTICE: 30 August 2016

DEPARTMENT MINERALS RESOURCES REFERENCE NUMBER: GP 30/5/1/1/2 (10436) PR

Queries regarding this matter should be referred to: Environmental Assessment Practitioners: Eco Elementum (Pty) Ltd

Mr. Vernon Siemelink
Office: 012 807 0383 / 012 348 5214
Mobile: 072 196 9928
Fax: 086 714 5399
Email: info@ecoelementum.co.za
Project Ref: Mafatiki – Palmietfontein 337IR

eco elementum
ENVIRONMENTAL & PROJECT MANAGEMENT PROFESSIONALS

OPPORTUNITY TO PARTICIPATE: Interested and affected parties (I&APs) are invited to register and provide written comments. I&APs should refer to the relevant reference number(s), and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below within **30 days** from the date of this notice

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

Notice of Basic Assessment (BA) Process

Reference number: CSIR/IU/EMS/ER/2016/0003/A

Basic Assessment for the proposed Mojaletema Co-Operative (Pty) Ltd Pig Production facility on farm Portion 5 Uitkyk, Nigel, 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 **Mojaletema Co-Operative (Pty) Ltd** proposes a small-scale **pig production** on 1.8 hectares of the farm portion 5 Uitkyk, located in the Nigel area of Ekurhuleni, 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 a Waste Management License is required as the project triggers the following listed activities:

GNR 983 4, 12 and 27
GNR 985 12 and 14
GNR 921 1 and 12

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. Babalwa Mqokeli, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2473 or Email: bmqokeli@csir.co.za.** You have until or before **30th September 2016** to do so (30 days from the date of this publication - including weekends, but excluding public holidays).

CSIR

Contents of the Newspaper Advertisement (Tswana) placed in Heidelberg/ Nigel Rekord on 30 August 2016

KITSISO YA TSHEKATSHEKO YA TIKOLOGO

Reference number: CSIR/IU/EMS/ER/2016/0003/A

Kitsiso ya Tlhatlhobo ya Tikologo (Basic Assessment, BA) e fiwa molemong wa Mojaletema Co-Operative (Pty) Ltd (makwadisi wa Projekte), ba ba batlang go **simolola kgwebo ya go rua dikolobe, fa tshimong ya 5 Uitkyk, Nigel, Ekurhuleni, Gauteng**.

Lekgotla la Dipatlisiso tsa Saense le Indasteri (Council for Scientific and Industrial Research, CSIR) e tlo laola tsamaiso ya Tshekatsheko ya Tikologo ya Projekte. Go ya ka melao ya Tshekatsheko ya Tikologo (NEMA EIA Regulations) e e gatisitsweng ka fa tlase ga Kitsiso ya Molao wa Mmuso (GNR) 983 le 985 ya 4 Sedimonthole 2014, Gazeteng ya Mmuso 38282, le Molao ya Tshelatshenko ya Matlakala (NEM:WA), e e gatisitsweng ka fa tlase ga Kitsiso ya Molao wa Mmuso (GNR) 921 ya 29 Ngwanatsele 2013 GG No. 37083, e laola gore Tlhatlhobo ya Tikologo (BA) e ya tlhokagala ka ntlha ya ditiro tse di latelang:

GNR 983 Ditiro 4, 12 &27
GNR 985 Ditiro 12 & 14
GNR 921 Ditiro 1

Go fana ka go tlhagisa maikutlo ka tsamaisong ya Tshekatsheko ya Tikologo, le lalediwa go ikwadisa jaaka mokgatlhegi/moamegi wa projekte. Fa le tlhoka dintlha tsa projekte le/kgotsa go ikwadisa jaaka mokgatlegi/moamegi, fana ka leina le sefane ka botlalo, aterese ya poso, nomoro ya fono, aterese ya imeile, le go fa lebaka la kgatlhego kgotsa la kamego go: **Ms. Babalwa Mqokeli, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2693 or Email: bmqokeli@csir.co.za.** Ka kopo, ikopanye le motho yo pele ga **30th September 2016** go simolola ka la tsebiso ena.

CSIR

Appendix E4: –Communications to and from interested and affected parties

Basic Assessment for Mojaletema Farming Co-Operative (Pty) Ltd's proposed development of a Pig Production Enterprise on Farm Portion 5 Uitkyk, Nigel, Ekurhuleni.

24 August 2016

CSIR Refference number: CSIR/IU/EMS/ER/2016/0003/A

COMMENT AND REGISTRATION FORM

Name: KAMOGELO RAMOGALE	
ID no: 920721 0533 081	**Telephone:** 011 999 3296
Organisation: EKURHULENI MUNICIPALITY : ENVIRONMENTAL RESOURCE MANAGEMENT	**Fax:**
Position: INTERN	**Email:** kamogelo.ramogale@ekurhuleni.gov.za
Physical address: CORNER VAN RIEBEEK AVE & HENDRIK POTGIETER STR P.O. BOX 25 EDENVALE 1610	**Postal address:** SAME AS PHYSICAL ADDRESS

Please indicate if you would like to register as an Interested and Affected Party (I&AP). Registration is required in order to receive further correspondence during the Basic Assessment Process. Please tick the appropriate box.	
YES	X ✓
NO	
Please indicate if you have any interest (business, financial, personal or other) in the application for Environmental Authorisation:	

Please describe any issues or concerns you may have regarding the proposed project, which you think should be considered during the Basic Assessment Process.

Please provide details of any other individuals or organisations that should be registered as I&APs:

Please complete this Comment and Registration Form and submit it to:

Ms. Babalwa Mqokeli
P O Box 320,
Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: bmqokeli@csir.co.za

our future through science

Basic Assessment for Mojaletema Farming Co-Operative (Pty) Ltd's proposed development of a Pig Production Enterprise on Farm Portion 5 Uitkyk, Nigel, Ekurhuleni.

24 August 2016

CSIR Refference number: CSIR/IU/EMS/ER/2016/0003/A

COMMENT AND REGISTRATION FORM

Name: SONJA NAPPIE	
ID no: 8606010141089	**Telephone:** 073 25 60 858
Organisation:	**Fax:**
Position: Neighbour	**Email:** SONJANAPPIE173@gmail.com
Physical address: Same as postal	**Postal address:** 59 BOSBOK STREET ALRA PARK NIGEL, 1491

Please indicate if you would like to register as an Interested and Affected Party (I&AP). Registration is required in order to receive further correspondence during the Basic Assessment Process. Please tick the appropriate box.	
YES	X Interested
NO	

Please indicate if you have any interest (business, financial, personal or other) in the application for Environmental Authorisation:

Please describe any issues or concerns you may have regarding the proposed project, which you think should be considered during the Basic Assessment Process.

Please provide details of any other individuals or organisations that should be registered as I&APs:

Please complete this Comment and Registration Form and submit it to:

Ms. Babalwa Mqokeli
P O Box 320,
Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: bmqokeli@csir.co.za

Basic Assessment for Mojaletema Farming Co-Operative (Pty) Ltd's proposed development of a Pig Production Enterprise on Farm Portion 5 Uitkyk, Nigel, Ekurhuleni.

24 August 2016

CSIR Refference number: CSIR/IU/EMS/ER/2016/0003/A

COMMENT AND REGISTRATION FORM

Name: Moipone Gladys Maesotsenng	
ID no: 6212210490087.	**Telephone:** 078 254 4186
Organisation:	**Fax:**
Position: Farm owner.	**Email:**
Physical address: Farm portion 6 Bultontein Nigel.	**Postal address:**

Please indicate if you would like to register as an Interested and Affected Party (I&AP). Registration is required in order to receive further correspondence during the Basic Assessment Process. Please tick the appropriate box.		
YES	X	Interested
NO		
Please indicate if you have any interest (business, financial, personal or other) in the application for Environmental Authorisation:		

Please describe any issues or concerns you may have regarding the proposed project, which you think should be considered during the Basic Assessment Process.

Please provide details of any other individuals or organisations that should be registered as I&APs:

Please complete this Comment and Registration Form and submit it to:

Ms. Babalwa Mqokeli
P O Box 320,
Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: bmqokeli@csir.co.za

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Basic Assessment for Mojaletema Farming Co-Operative (Pty) Ltd's proposed development of a Pig Production Enterprise on Farm Portion 5 Uitkyk, Nigel, Ekurhuleni.

24 August 2016

CSIR Refference number: CSIR/IU/EMS/ER/2016/0003/A

COMMENT AND REGISTRATION FORM

Name: Seopolo Cracbuise Godfrey	
ID no: 800619 5638088.	**Telephone:** 078 912 4629
Organisation:	**Fax:**
Position: Herd - MAN.	**Email:** N/A
Physical address: 256 Ext 3 Monguni str Clra-park Nigel	**Postal address:** 256 Ext 3 Monguni str Clra-park Nigel

Please indicate if you would like to register as an Interested and Affected Party (I&AP). Registration is required in order to receive further correspondence during the Basic Assessment Process. Please tick the appropriate box.	
YES	X Interested.
NO	

Please indicate if you have any interest (business, financial, personal or other) in the application for Environmental Authorisation:

Please describe any issues or concerns you may have regarding the proposed project, which you think should be considered during the Basic Assessment Process.

Please provide details of any other individuals or organisations that should be registered as I&AIPs:

Please complete this Comment and Registration Form and submit it to:

Ms. Babalwa Mqokeli
P O Box 320,
Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: bmqokeli@csir.co.za

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Basic Assessment for Mojaletema Farming Co-Operative (Pty) Ltd's proposed development of a Pig Production Enterprise on Farm Portion 5 Uitkyk, Nigel, Ekurhuleni.

24 August 2016

CSIR Refference number: CSIR/IU/EMS/ER/2016/0003/A

COMMENT AND REGISTRATION FORM

Name: Lerato SeNakhoMO	
ID no: 9108070419082	**Telephone:** 083 741 2792
Organisation: Mojaletema	**Fax:**
Position: Director	**Email:** mojaletemalerato1@gmail.com
Physical address: farm portion 5 Uitkyk Nigel.	**Postal address:** P.O Box 860 Nigel 1490

Please indicate if you would like to register as an Interested and Affected Party (I&AP). Registration is required in order to receive further correspondence during the Basic Assessment Process. Please tick the appropriate box.

YES ✓	Intercsted
NO	

Please indicate if you have any interest (business, financial, personal or other) in the application for Environmental Authorisation:

Intrest I think this project will open a lot of doors for community Members.

Please describe any issues or concerns you may have regarding the proposed project, which you think should be considered during the Basic Assessment Process.

Please provide details of any other individuals or organisations that should be registered as I&APs:

Please complete this Comment and Registration Form and submit it to:

Ms. Babalwa Mqokeli
P O Box 320,
Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: bmqokeli@csir.co.za

From: Babalwa Mqokeli

To: Samukele Ngema

Date: 21/10/2016 13:27

Subject: Fwd: BA for proposed development of a Pig Production Enterprise on Farm Portion 5 Uitkyk Nigel

Attachments: CSIR notification.pdf

>>> Kamogelo Ramogale <Kamogelo.Ramogale@ekurhuleni.gov.za> 21/10/2016 13:12 >>>

Good day,

The above matter refers.

The Environmental Resource Management department received the notice and thus would like to be registered as an interested party and would like a hard copy of the report to be sent to our offices:

Att: Cecilia Rakgoale

Corner Van Riebeek Ave and Hendrik Potgieter Street

P. O. Box 25

Edenvale

1610

Warm Regards,

Kamogelo

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

21 October 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: Piggery Mojaletema Farming
Your reference:
Property Description: ***Uitkyk327-IR, ptn 5 & Bultfontein 192-IR, ptn 15***
Dated: ***17 October 2016***

Please use the following reference number in all enquiries:

AgriLand reference number: 2016_10_0158

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 E5: Minutes of any public and/or stakeholder meetings- Not Applicable

Appendix E6: Comments and Responses Report (*To be received after draft Basic Report)*

Appendix E7: Comments from I&APs on Basic Assessment (BA) Report- (*To be received after draft Basic Report).*

Appendix E8: Comments from I&Aps on amendments to the BA Report- *N/A at this stage of the BA process*

Appendix E9: Copy of the register of I&APs.

National	
Department of Environmental Affairs- National	Mmatlala Rabothata
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: Gauteng	
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 Treasury	Ms Barbara Creecy
	Ms Nomfundo Tshabalala

Local Municipality: Ekurhuleni	
Office of the Executive Mayor	Mondli Gungubele
Municipal Manager	Mr Khaya Ngema
Ward Councillors (Ward 88)	Wally Labuschagne
Neighbours	Matshidiso
	Sonia Nappie
	Gladys Moipane
	Godfrey Segolo Gaobuse
Water and Sanitation	Philemon Mashoko
Enterprise Programme Management	Andile Mahlalutye
Waste Management	Qaphile Gcwensa
Environmental Resource Management and Development	Kamogelo Ramogale/ Cecilia Rakgoale
	Hezekiel Nkosi
Economic Development	Caiphus Chauke
City Planning and Development	Aubrey Motubatse

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

BASIC ASSESSMENT REPORT

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

contents

Letter from Provincial Heritage Resources Authority Gauteng

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

Our Ref : H133/16
Enquiries : Tebogo Molokomme
Date : 10 February 2017

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

Dear Sir/Madam

Background Information Document: Basic Assessment for the proposed Mojaletema Co-Operative (Pty) Ltd Pig Production facility on Farm Portion 5 Uitkyk, Nigel, 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)

Basic Assessment for the Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

APPENDIX G.1: Ecological Opinion/Scan for the proposed Pig Production Facility on Portion 15 of Farm Bultfontein 192, Nigel, Gauteng.

ECOLOGICAL OPINION/SCAN

PIG PRODUCTION FACILITY ON PORTION 15 OF FARM BULTFONTEIN 192, NIGEL, 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: 2294
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

PIG PRODUCTION FACILITY ON PORTION 15 OF FARM BULTFONTEIN 192, NIGEL, 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

64A Coleraine Drive
River Club Extension 7
Sandton, Johannesburg
Tel: (011) 787-7400
Fax: (011) 784-7599

Ref No: 2294
Date: February 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 pig production facility on Portion 15 of the Farm Bultfontein 192 near Nigel in Gauteng Province.

Desktop research and findings from our site visit in December 2016 indicated that the proposed development site comprises mostly built infrastructure, pasture and alien bush clumps. In contrast, a significant portion of the remainder of Portion 15 comprises healthy grassland and wetland, which likely support a number of conservation important (CI) plant and animal species. The nearby drainage line (an unnamed tributary of the **Critically Endangered** Blesbokspruit), and patches of rocky grassland (which are representative of the **Threatened Blesbokspruit** Highveld Grassland (Soweto Highveld Grassland vegetation type), are considered to represent the most CI local biodiversity features.

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 are considered to be environmental contamination of the wetland downstream from poor waste management during operation. Other impacts include:

- Loss or degradation of the nearby drainage line during all phases of the project.
- Loss of adjoining natural terrestrial vegetation and faunal habitat during construction.
- Further introduction and proliferation of alien flora during all phases of the project.
- Loss of various potentially occurring CI fauna during construction and operation.
- Increased dust and erosion during construction and decommissioning, which could impact the nearby drainage line.

Table Summary of impact significance, without and with mitigation

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

POTENTIAL IMPACTS	SIGNIFICANCE	
Loss of CI or medicinal flora	Moderate	Low
Loss of CI fauna	Moderate	Low
Sensory disturbance of fauna	Low	Low
DECOMMISSIONING		
Loss or degradation of local wetland areas	Moderate	Low
Introduction and proliferation of alien species	Moderate	Low
Increased dust and erosion	Moderate	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)

February 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
ARC	Agricultural Research Council
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
CSIR	Council for Scientific and Industrial Research
D	Declining population trend
DACE	Department of Agriculture, Conservation and Environment
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
DREAD	Department of Rural, Environment and Agricultural Development
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)
EN	Endangered
End	Endemic
ES	Ecological Sensitivity
ESA	Ecological Support Area
EWT	Endangered Wildlife Trust
FEPA	Freshwater Ecosystem Priority Area
GG	Government Gazette
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
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
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMA	National Environmental Management Act (Act 107 of 1998)
NEPAD	New Partnership for Africa's Development

ACRONYM	DESCRIPTION
NFEPA	National Freshwater Ecosystem Priority Areas project
NSS	Natural Scientific Services CC
NT	Near Threatened
NWA	National Water Act (Act 36 of 1998)
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
SANBI	South African National Biodiversity Institute
SACNASP	South African Council for Natural Scientific Professions
ToPS	Threatened or Protected Species
TSP	Threatened Species Programme -– a programme managed by SANBI to assess the Red Data status of South African plants
U	Unknown population trend
UJ	University of Johannesburg
UP	University of Pretoria
VU	Vulnerable
WA	Wild Animal
WITS	University of the Witwatersrand

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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 pig production facility near the south-eastern boundary 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 - excluding wetland assessment work) 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 and condition;
- Discussion about observed and potentially occurring 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 team member is acknowledged by the Department of Water and Sanitation (DWS) as a competent wetland delineator.

Table 3-1 NSS project team

ROLE	NAME	QUALIFICATIONS
Flora / Wetlands	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.
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 (NEM:BA; 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

Mojaletema Co-Operative (Pty) Ltd (Mojaletema) proposes to develop a small-scale pig production endeavour comprising/involving:

- A pig house for 240 sow and 8 boars.
- A processing and packaging room.
- Existing municipal infrastructure (roads and an electricity connection).

6. Study Region

6.1. Locality & Land-use

The approximately 1.8ha development site is situated on Portion 15 of the Farm Bultfontein 192 in Blue Valley Agricultural Holdings near Nigel in south-eastern Gauteng Province (**Figure 3 1**). The Portion falls under the Sedibeng Metropolitan Municipality, where it is situated immediately south of the Cerutiville settlement, and north of Bothasgeluk Agricultural Holdings. Available satellite imagery indicates, and our field observations confirmed that approximately 49% of the proposed survey area comprises built infrastructure, alien bushclumps, pasture, and other transformed areas. The remainder of Portion 15 comprises cultivated fields, natural rocky grassland and wetland habitat.

Pasture and alien trees on site

Rocky area on site

Farm house and associated infrastructure on site

Building ruins on site

Rocky ridge north-west of the site

Grassland west of the site

Drainage line south-west of the site

Drainage line south of the site

Figure 6-1 Photographs of the site and surrounds

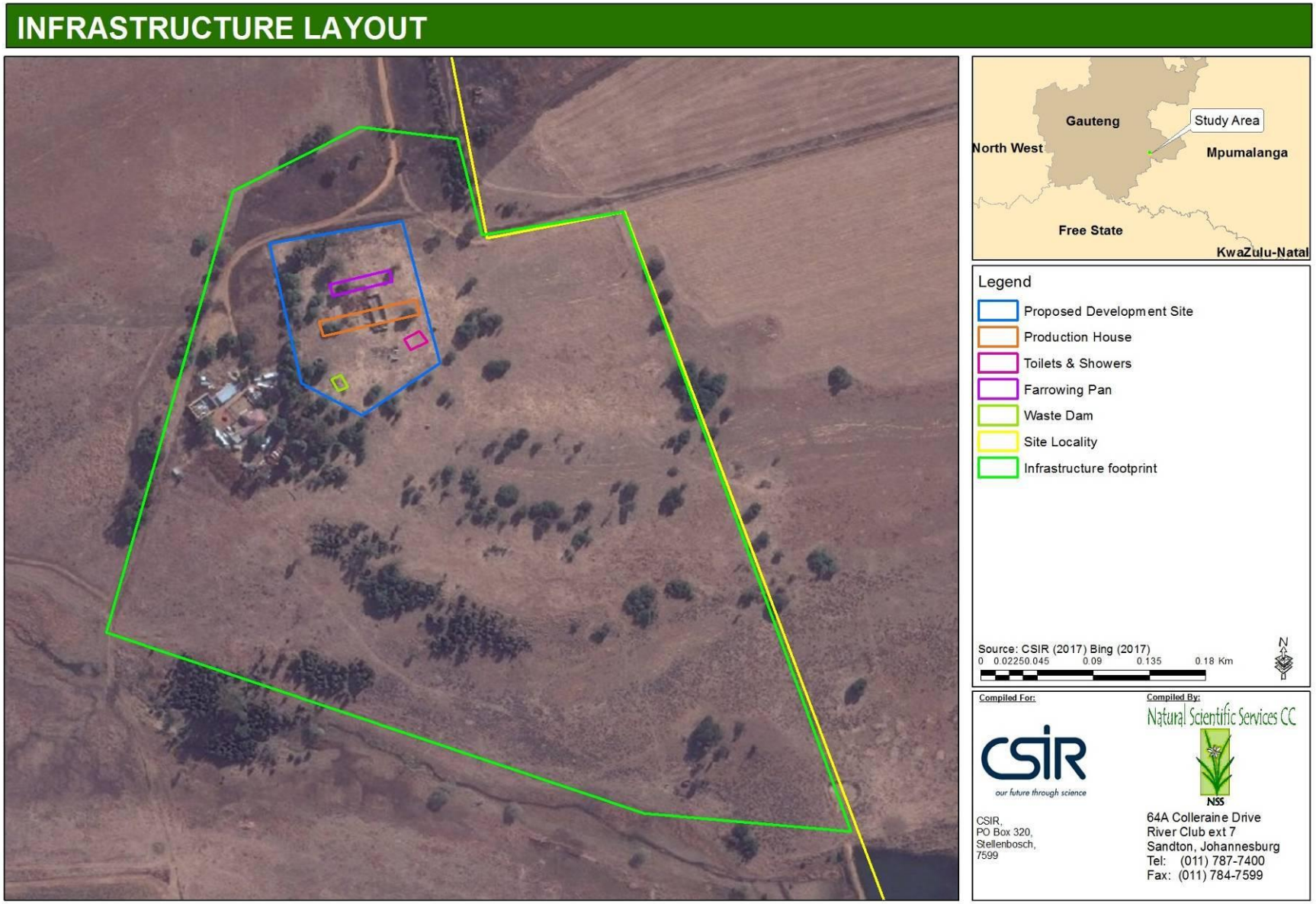


Figure 6-2 Location of Portion 15 and the proposed infrastructure footprint therein

6.2. Climate

The site falls within a summer rainfall and cool-temperate region with thermic continentality (i.e. high extremes between maximum summer and minimum winter temperatures). There are also large thermic diurnal differences (especially in autumn and spring). Winters are very dry with frequent frost. Average annual precipitation for the regional vegetation type is 662mm, with the most rainfall usually falling in January (~110mm) and no rain during July, August and September (Mucina & Rutherford 2006). Overall mean annual temperature is 14.8°C with the coldest months (0°C) in June and July, and the hottest months (27°C) in December and January (Mucina & Rutherdford 2006).

Shown in **Figure 6-3** is the monthly rainfall and maximum, mean and minimum atmospheric temperatures measured during the past two years in Springs (www.weathersa.co.za) or at O.R. Tambo International Airport in Kempton Park (accuweather.co.za). Prior to our site visit on 1 December 2016, the region had received a slightly above-average amount of (756mm) rainfall between November 2015 and 2016. Preceding our site visit the region had received more than 200mm rainfall since the (1 October) start of the 2016/2017 summer season, and temperatures had been mild to warm, not hot. The weather was similarly favourable for biodiversity on the day when the site visit was performed.

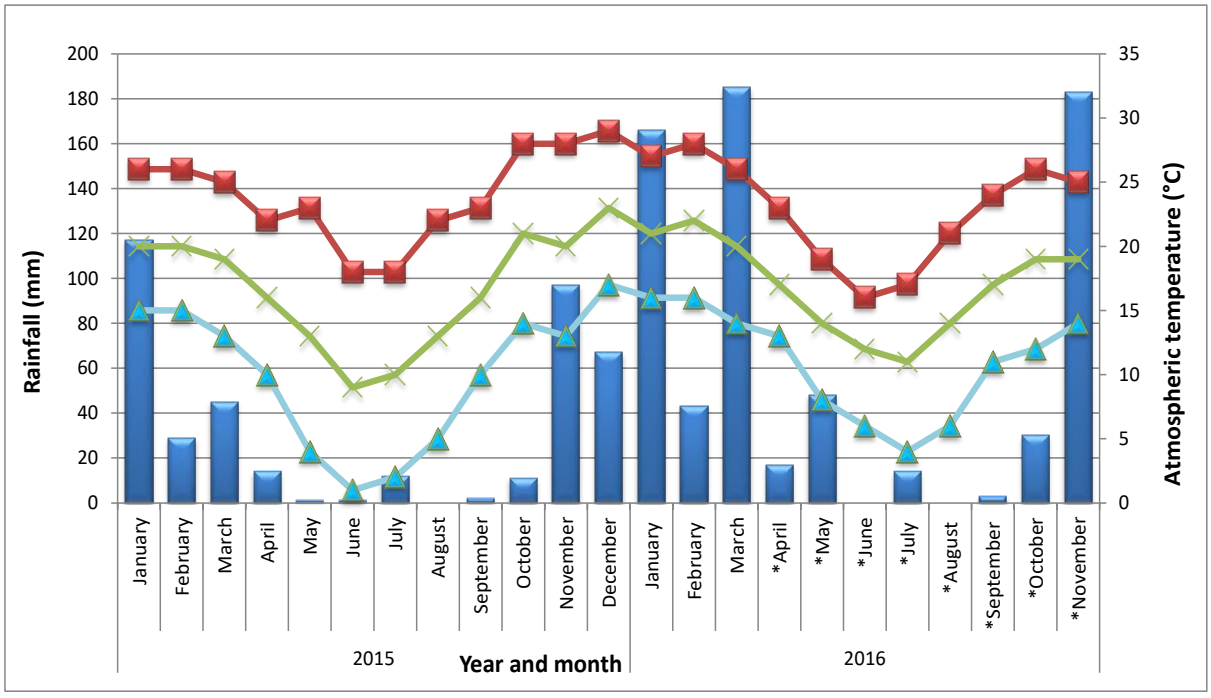


Figure 6-3 Monthly rainfall and temperature measured in Springs (WeatherSA 2016) or *O.R. Tambo International Airport in Kempton Park (AccuWeather 2016)

6.3. Geology and soils

"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, the study site is situated in land type Ba1. Historically this land type featured a gently to moderately undulating landscape. Elevation across Portion 15 ranges from approximately 1 604m a.s.l. in the north and 1 629m a.s.l. in the south to 1 587m at its lowest point where the drainage line exists the western boundary of the Portion. The infrastructure footprint slopes from 1 614m a.s.l. in the north-east to 1 598m a.s.l. in the south-west. Land type Ba1 includes three different geological types, namely the Vryheid, Dwyka and Malmani subgroups. The principle rock types for each group are listed in **Table 6-1**, and the soils are described in **Table 6-2**.

Table 6-1 Lithostratigraphic units and principal rock types in land type Ba1

LITHOSTRATIGRAPHIC UNITS	PRINCIPAL ROCK TYPES
Dwyka	Tillite with subordinate sandstone, mudstone, shale; intruded by dolerite dykes and sheets
Malmani Subgroup, Assen and Black Reef Formations:	Dolomite, chert, subordinate quartzite, conglomerate, shale; diabase and syenite dykes and sills
Vryheid	Arenite, shale and coal

Table 6-2 Description of regional soil types (adapted from GAPA 2002)

GENERAL DESCRIPTION OF SOIL GROUP	SOIL-SLOPE UNIT	DOMINANT SLOPE CLASS (%)	BRIEF DESCRIPTION OF DOMINANT SOILS
Moderately well-drained, yellow-brown, apedal on soft plinthite soils of the Avalon (Av) form usually overlying hydromorphic, weathering rock or unconsolidated materials (Soils are wet in the deep subsoil for short periods during the year.)	sAv9	0-5	Shallow (300 - 500 mm), dystrophic to mesotrophic loam in association with similar soils of the Glencoe form and other shallow, brown, coarse sand on weathering rock of the Glenrosa form
Well-drained, red, apedal soils of the Hutton form (Hu) overlying weathering and hard rock and various other unconsolidated materials	mHu6	0-5	Moderately deep (500 - 1000 mm), dystrophic to mesotrophic loam

6.4. Vegetation

The study site falls within South Africa's Grassland Biome as classified by Rutherford & Westfall (1986), and the Gm8 Soweto Highveld Grassland vegetation type (**Figure 6-5**) as described by Mucina & Rutherford (2006). Soweto Highveld Grassland represents short to medium-high, dense tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. In places not disturbed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover. **Although the disturbed infrastructure footprint is not representative of Soweto Highveld Grassland, remaining natural areas on Portion 15 are.**

Soweto Highveld Grassland is listed as an **Endangered** vegetation type (Mucina & Rutherford 2006). The national target is to protect 24% of the unit, but currently only a handful of patches are statutorily conserved (in the Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, and Rolfe's Pan Nature Reserves) and privately conserved (in the Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves, and the Heidelberg Natural Heritage Site). Almost half of the vegetation unit has been transformed by cultivation, urban sprawl, mining and building of road infrastructure. Some areas have been flooded by dams (such as the Grootdraai, Leeuwkuil, Trichardtsfontein, Vaal, and Willem Brummer). Erosion is generally very low (Mucina & Rutherford 2006).

Table 6-3 Dominant plant species in the Soweto Highveld Grassland vegetation type

GROWTH FORM	DOMINANT SPECIES
Low Shrubs:	*Anthospermum hispidulum, Anthospermum rigidum* subsp. *pumilum, Berkheya annectens, Felicia muricata, Ziziphus zeyheriana*
Herbaceous Climber:	*Rhynchosia totta.*
Graminoids:	*Andropogon appendiculatus, Brachiaria serrata, Cymbopogon pospischilii, Cynodon dactylon, Elionurus muticus, Eragrostis capensis, Eragrostis chloromelas, Eragrostis curvula, Eragrostis plana, Eragrostis planiculmis, Eragrostis racemosa, Heteropogon contortus, Hyparrhenia hirta, Setaria nigrirostis, Setaria sphacelata, Themeda triandra, Tristachya leucothrix*
Herbs:	*Hermannia depressa, Acalypha angustata, Berkheya setifera, Dicoma anomala, Euryops gilfillanii, Geigeria aspera* var. *aspera, Graderia subintegra, Haplocarpha scaposa, Helichrysum micronifolium, Helichrysum nudifolium* var. *nudifolium, Helichrysum rugulosum, Hibiscus pusillus, Justicia anagalloides, Lippia scaberrima, Rhynchosia effusa, Schistostephium crataegifolium, Selago densiflora, Senecio coronatus, Hillardia oligocephala, Wahlenbergia undulata*
Geophytic Herbs:	*Haemanthus humilis* subsp. *hirsutus, Haemanthus montanus*

6.5. Hydrology

The proposed development site is situated in the Level 1 (Highveld) Ecoregion 11 and quaternary catchment C21E (**Figure 6-4)**, approximately 1.7km south-east of an unnamed tributary of the **Critically Endangered Blesbokspruit** in the Upper Vaal Water Management Area (WMA) 8. The Blesbokspruit drains into the Suikerbosrand River, which enters the Vaal River at the Vaal River Barrage roughly 90km south-west of the site. The Blesbokspruit catchment falls within the jurisdiction of Randwater which manages the water quality of the Vaal River Barrage Reservoir. **The Blesbokspruit wetland in the Suikerbosrand catchment has been identified as a wetland of international importance as defined in the Ramsar Convention.** However, large quantities of urban and industrial effluent, together with urban wash-off and mine pumpage from Boksburg and Benoni, have a major impact on the water quality in some tributary rivers in the north-western part of the water management area e.g. Waterval, Blesbokspruit, Natalspruit and Klip River.

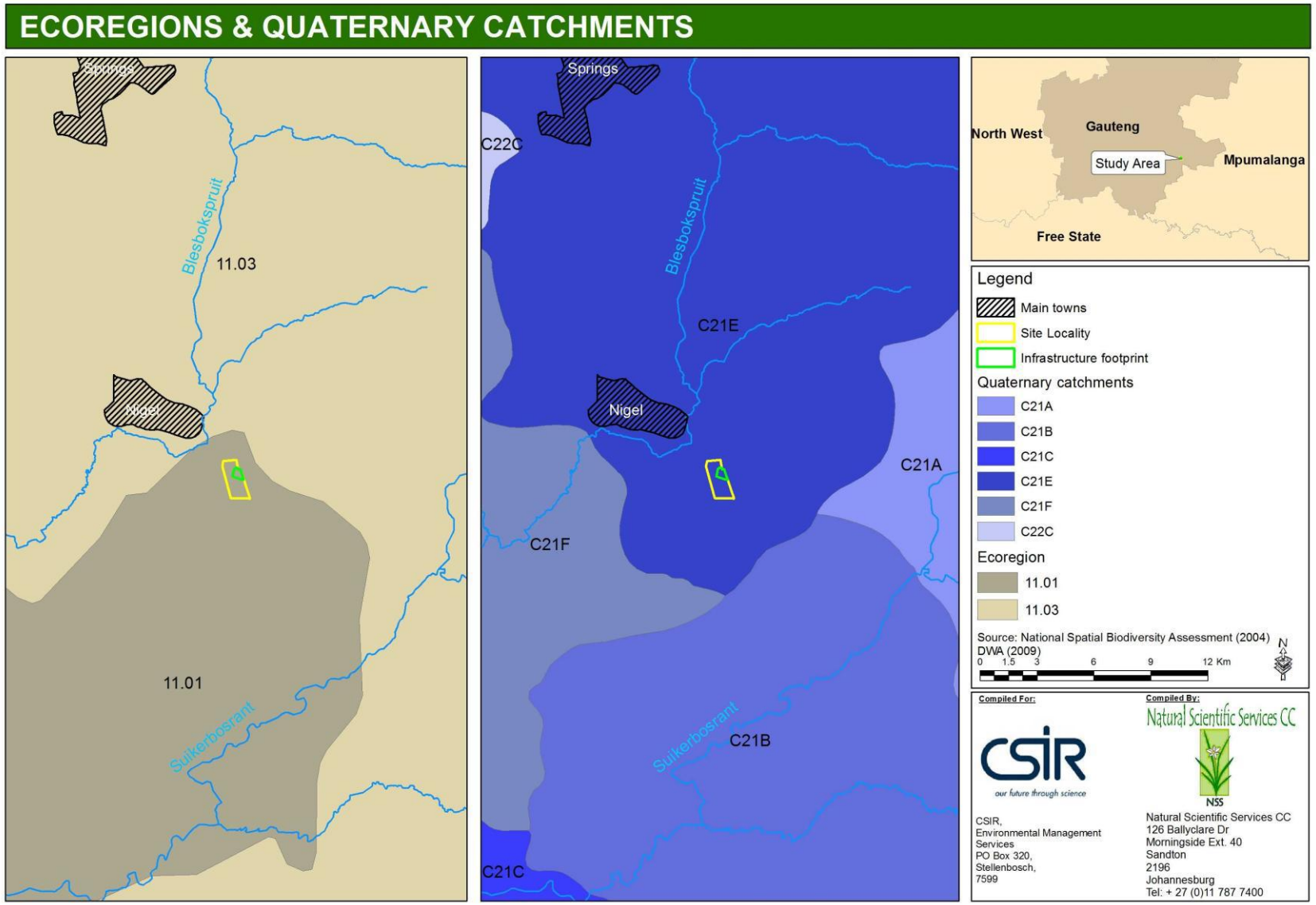


Figure 6-4 Ecoregion and quaternary catchment wherein the development site is situated

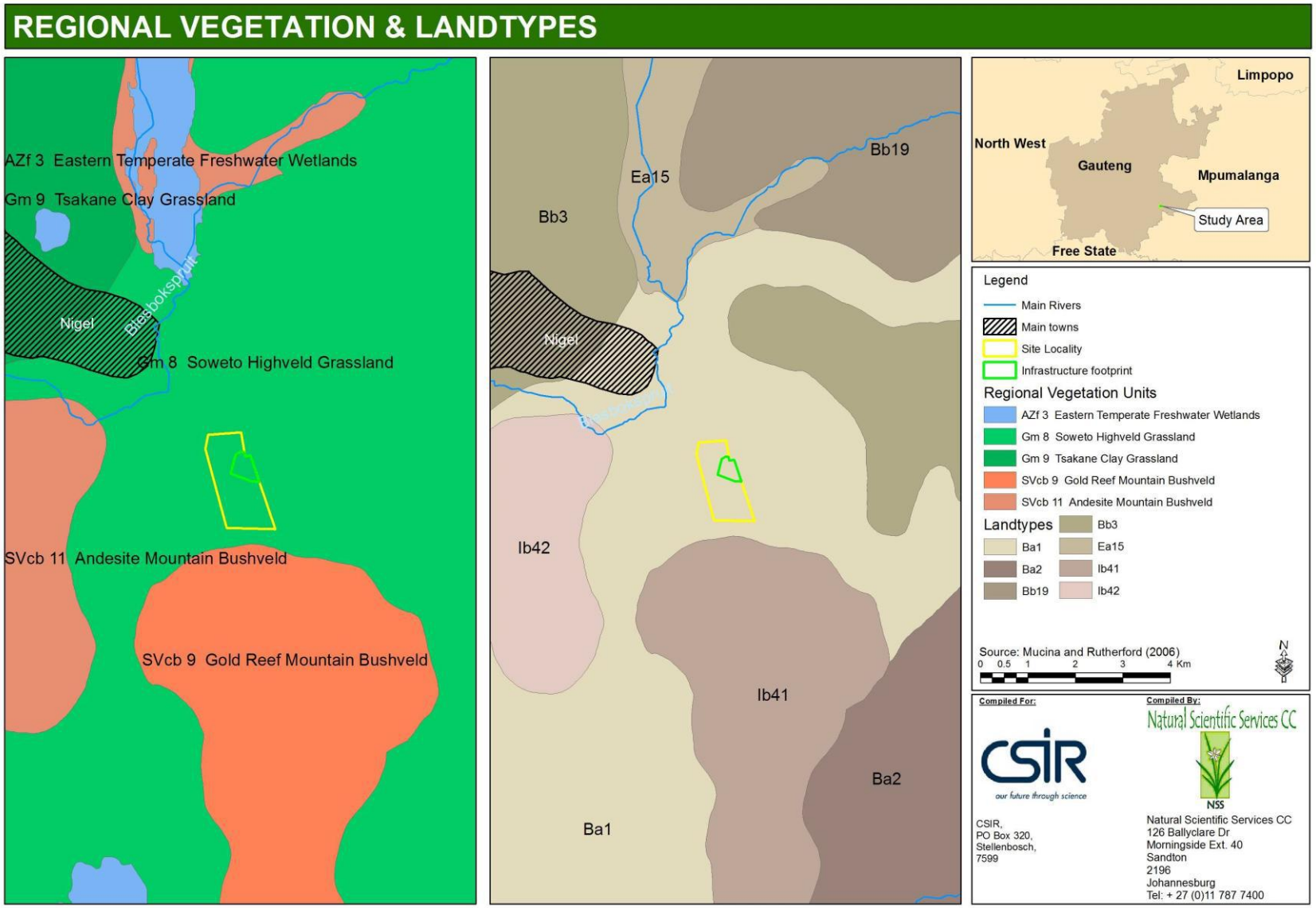


Figure 6-5 Regional vegetation and land type wherein the development site is situated

7. Methodology

7.1. Vegetation & Floral Communities

Due to the small extent of the site 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) 2628BC QDS
  - Mucina & Rutherford's (2006) vegetation map of southern Africa.
  - The current GDARD C-Plan 3.3.
  - 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, December 2016).
  - 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

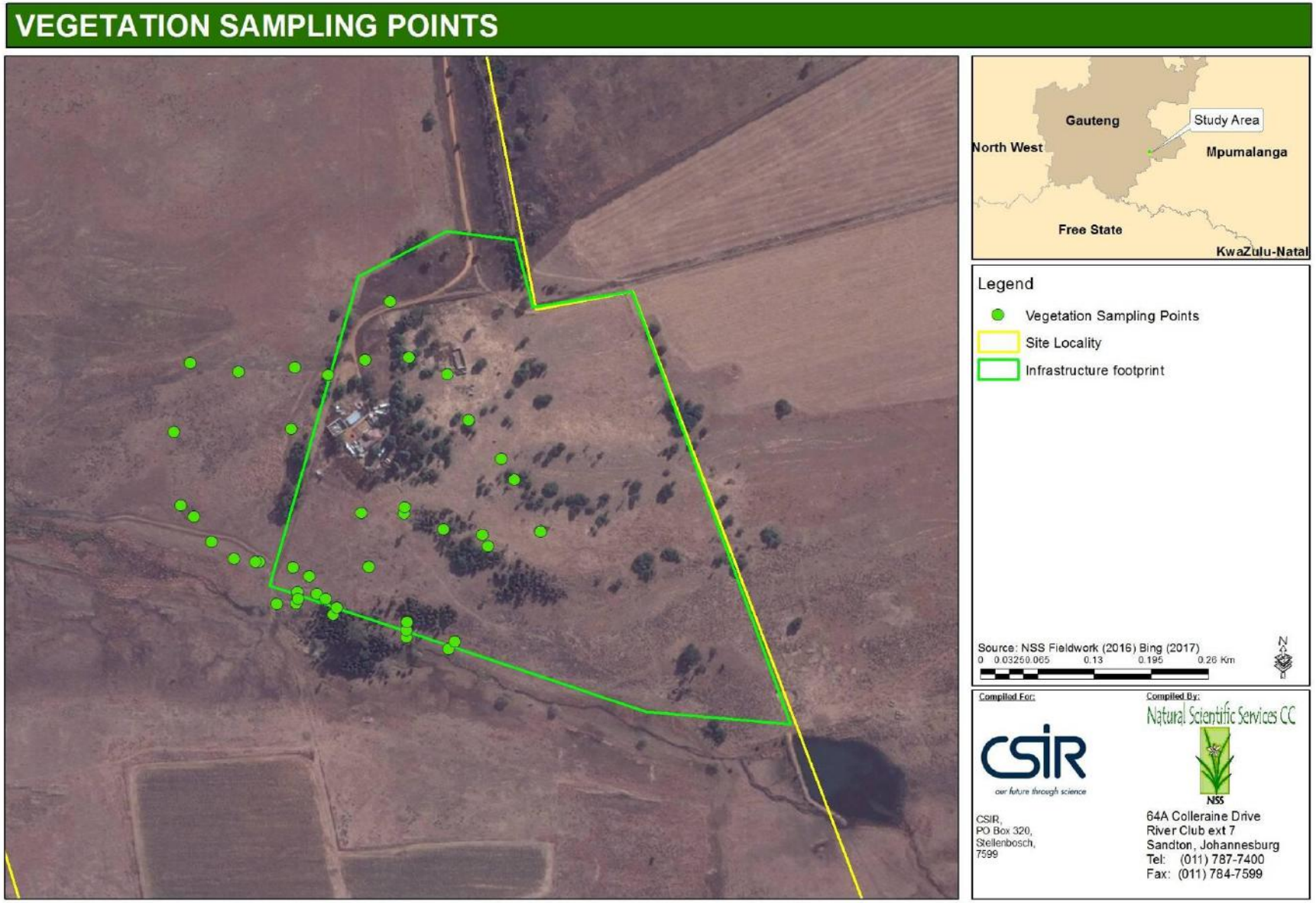


Figure 7-1 Main vegetation sampling points

Limitations

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.

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 (2017) for quarter degree square (QDS) 2628BC.
- Birds, using the list of bird species for QDS 2628BC from the Roberts VII (2013) mobile phone app., and the latest online list of bird species for pentad 2625_2830 from the second Southern African Bird Atlas Project (SABAP 2 2017), which included records of bird species that were observed in QDS 2628BC 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 (2017) for the relevant QDS.
- Frogs, using the published species distribution maps in Minter *et al*. (2004), and online species distribution data from FrogMAP (2017) for the relevant QDS.
- Butterflies, using the published species distribution maps in Mecenero *et al.* (2013), and online species distribution data from LepiMAP (2017) for the relevant QDS.
- Odonata, using the published distribution maps in Samways (2008), and online species distribution data from OdonataMAP (2017) for the relevant QDS.
- Scorpions, using the published species distribution maps in Leeming (2003). ScorpionMAP (2017) did not have any species records for QDS 2628BC.

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 (NEM:BA 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 NEM:BA, 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.

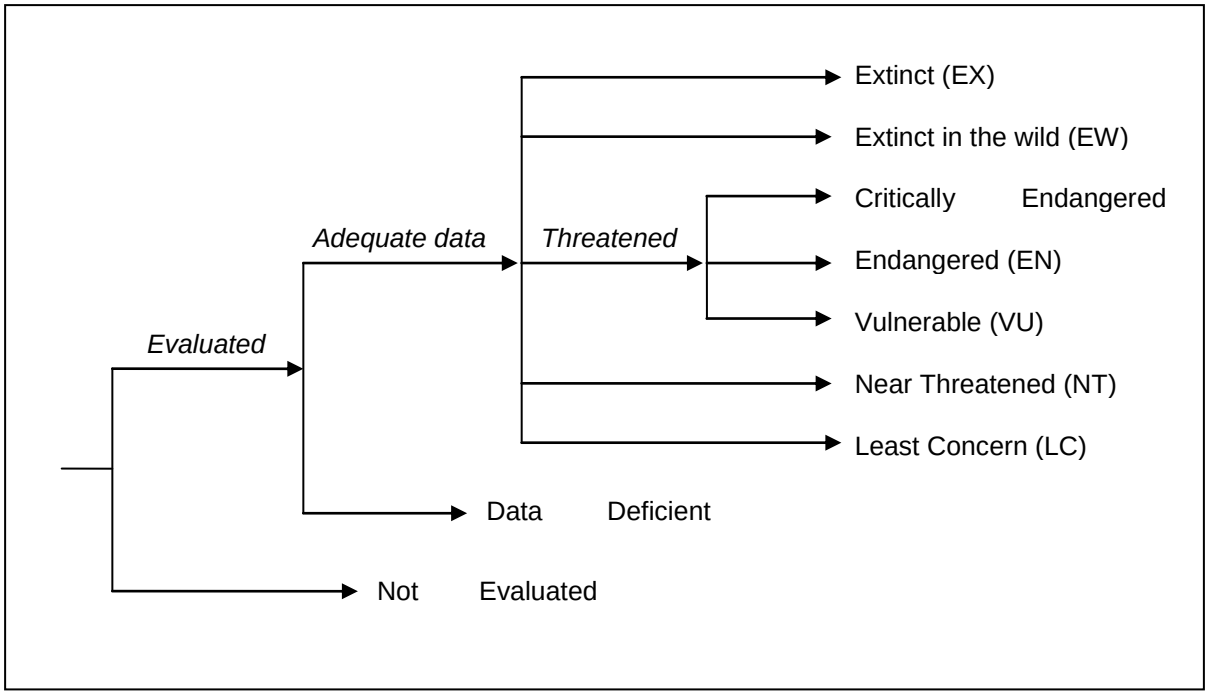


Figure 7-2 IUCN Red List categories

7.2.4. Limitations

- The site visit was limited to a few day time hours and, therefore, not all potentially occurring (especially 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. 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 7-1**);
- Impact duration (**Table 7-2**);
- Potential impact intensity (**Table 7-3**);
- Impact reversibility (high, moderate, low or irreversible);
- Irreplaceability of the impacted resource (high, moderate, low or replaceable);
- Impact probability (**Table 7-4**);
- Our confidence in the ratings (high, moderate or low);

Overall impact significance (**Table 7-5**) is calculated as:

Impact significance = Impact magnitude x Impact probability

where

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

Table 7-1 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 7-2 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 7-3 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[2] (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[3], 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.	Medium	4

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

[3]*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.*

NEGATIVE POTENTIAL INTENSITY DESCRIPTION	RATING	SCORE
Improved individual livelihoods		
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 7-4 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 7-5 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.

8. Survey Results

8.1. Vegetation and Floral Communities

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 Site falls within 2628BC. This QDG yielded only 11 species and has not been surveyed enough to obtain a representative of the area. The adjacent grid (2628AD) yielded 536 species within 92 families. The dominant families being ASTERACEAE, POACEAE ad FABACEAE (**Table 8-1**), with the Herbs representing 45%, Graminoids representing 11%, and Geophytes representing just over 10% of the total species listed for the area (**Table 8-1**). As expected within grassland habitat, wooded species in total constitute approximately 16% of the species within the larger study region. In

terms of the site, structural representation was following the trend presented within the larger region, with Herbs, Graminoids and Geophytes being the most dominant. Wooded vegetation constituted over 2 0%. **(Table 8-1**).

Table 8-1 Top 12 dominant families and most dominant growth forms obtained from the POSA website for the QDS 2628BC & 2628AD and on site

IMPORTANT FAMILIES	No. OF SPP	GROWTH FORMS	% TOTAL SPP	ON SITE
ASTERACEAE	77	Herb	45.45	36.03
POACEAE	60	Graminoid	11.36	22.79
FABACEAE	40	Geophyte	10.61	7.35
APOCYNACEAE	30	Dwarf shrub	10.23	8.09
RUBIACEAE	18	Shrub, tree	5.3	2.21
CYPERACEAE	17	Shrub	5.11	7.35
MALVACEAE	14	Cyperoid	3.22	6.62
HYACINTHACEAE	12	Climber	2.84	0.74
SCROPHULARIACEAE	12	Succulent	1.52	2.21
CRASSULACEAE	10	Helophyte	1.52	2.21
LAMIACEAE	10	Bryophyte	1.14	-
SOLANACEAE	9	Tree	0.57	3.68

8.1.2. On Site - Vegetation Communities

The proposed infrastructure is positioned within the alien vegetation (bushclumps) and disturbed grassland. There is no naturally structured communities remaining within the infrastructural footprint. Within the remainder of the study area and surrounds, natural to semi natural habitats include Rocky Grassland, *Seriphium* Dominated Grassland and the *Typha- Juncus – Eleocharis* Wetland (**Figure 8-1** and **Figure 8-4**). The wetland system is approximately 230m south of the proposed footprint and disturbance area. These areas only constituted less than 37% of the area surveyed (refer to **Table 8-2**). Analysis of Google Earth aerial imagery dated from 2004 to 2016 indicates that there has been an increase / spread in wooded alien vegetation on site.

Table 8-2 Broad Habitat/Vegetation communities

Vegetation Community	Conservation Significance	Area -%
Natural – Semi Natural Grasslands		
Themeda Rocky Grassland (with outcrops)	Moderate-High	5.88
Seriphium Dominated Grassland	Moderate	30.09
Disturbed Grassland	Moderate-Low	13.11
Wetlands and Watercourses		
Typha- Juncus – Eleocharis Wetland	**High**	1.42
Alien Bushclumps		
Acacia mearnsii Bushclumps	Moderate-Low	10.61

Vegetation Community	Conservation Significance	Area -%
Eucalyptus Stumps	Moderate-Low	0.3
Eucalyptus Dominated Bushclumps	Moderate-Low	1.81
Mixed Alien Bushclumps	Moderate-Low	9.7
Agriculture		
Eragrostis pastures	Low	17.23
Transformed		
Pennisetum (Kikuyu) Dominated	Low	5.71
Transformed - Build Up	Low	4.12

Themeda Rocky Grassland

Typha- Juncus – Eleocharis Wetland

Themeda Rocky Grassland (within outcrops)

Figure 8-1 Photographs of the different habitats within and surrounding the site (not immediately within the footprint of the site)

Alien Bushclumps (Typha- Juncus – Eleocharis wetland in the foreground)

Pennisetum (Kikuyu) Dominated

Disturbed Eragrostis Grassland

Built Structures and dumping

Figure 8-2 Photographs of the different transformed habitats within and surrounding the site (including the infrastructural footprint.

A limited description can be provided for such a transformed habitat. However, a brief overview of the semi to natural communities are described below.

Themeda Rocky Grassland (with outcrops)

This community was mainly found to the west of the survey area, although some remnants of outcrops was located in the central section of the survey area, south east of the infrastructure footprint. These smaller remnants are now dominated by alien species such as *Acacia mearnsii* and *Eucalyptus* species and have limited herbaceous cover. Species (**Figure 8-4**) within the broader community include:

- *Cyanotis speciosa (L.f.) Hassk.*
- *Eragrostis spp*
- *Brachiaria serrata (Thunb.) Stapf*
- *Cyperus obtusiflorus Vahl var. obtusiflorus*
- *Ocimum obovatum E.Mey. ex Benth. subsp. obovatum var. obovatum*
- *Polygala amatymbica Eckl. & Zeyh.*
- *Polygala hottentotta C.Presl*
- *Scabiosa columbaria L.*

- *Eragrostis lehmanniana Nees var. lehmanniana*
- *Eragrostis racemosa (Thunb.) Steud.*
- *Felicia muricata (Thunb.) Nees subsp. muricata*
- *Gazania krebsiana Less.*
- *Helichrysum nudifolium (L.) Less. var. nudifolium*
- *Hilliardiella (Vernonia) aristata (natalensis) (DC.) H.Rob.*
- *Hypoxis acuminata Baker*
- *Ledebouria ovatifolia (Baker) Jessop*
- *Microchloa caffra Nees*
- *Loudetia simplex (Nees) C.E.Hubb.*
- *Senecio coronatus (Thunb.) Harv.*
- *Seriphium plumosum L.*
- *Themeda triandra Forssk.*
- *Tribulus terrestris L.**
- *Lantana camara L.**
- *Richardia brasiliensis Gomes**
- *Cynodon dactylon (L.) Pers.*
- *Diospyros lycioides Desf. subsp. lycioides*
- *Elephantorrhiza elephantina (Burch.) Skeels*
- *Melinis repens (Willd.) Zizka subsp. repens*
- *Leonotis microphylla Scan*
- *Lopholaena coriifolia (Sond.) E.Phillips & C.A.Sm.*

Seriphium Dominated Grassland

Within the survey area, a transformed habitat through excessive grazing pressure has allowed for species such as *Seriphium* to become dominant. This area is found both to the west and south of the infrastructural footprint and includes species such as:

- *Ajuga ophrydis Burch. ex Benth.*
- *Aloe greatheadii Schönland*
- *Aristida congesta Roem. & Schult. subsp. congesta*
- *Brachiaria serrata (Thunb.) Stapf*
- *Chaetacanthus costatus (Pers) Lindl.*
- *Cleome rubella Burch.*
- *Commelina africana L. var. krebsiana (Kunth) C.B.Clarke*
- *Conyza podocephala DC.*
- *Cynodon dactylon (L.) Pers.*
- *Eragrostis lehmanniana Nees var. lehmanniana*
- *Eragrostis racemosa (Thunb.) Steud.*
- *Felicia muricata (Thunb.) Nees subsp. muricata*
- *Gazania krebsiana Less. subsp. serrulata (DC.) Roessler*
- *Gomphrena celosioides Mart.*
- *Hermannia depressa N.E.Br.*
- *Heteropogon contortus (L.) Roem. & Schult.*
- *Hyparrhenia hirta (L.) Stapf*
- *Ledebouria ovatifolia (Baker) Jessop*
- *Melinis repens (Willd.) Zizka subsp. repens*
- *Monsonia angustifolia E.Mey. ex A.Rich.*
- *Scabiosa columbaria L.*
- *Seriphium plumosum L.*

Typha- Juncus – Eleocharis Wetland

This habitat is found approximately 230m to the south of the Infrastructural footprint and

borders the survey area.

The wetlands system is releively intact containing a diverse array of indigenous species. However, downstream (border of survey area), the stream enters a alien bushclump and therefore contains less herbaceous cover. Species within this system include:

- *Andropogon appendiculatus Nees*
- *Centella asiatica (L.) Urb.*
- *Cleome rubella Burch.*
- *Cyperus cf. leptocladus Kunth*
- *Cyperus compressus L.*
- *Eleocharis dregeana Steud.*
- *Gunnera perpensa L.*
- *Imperata cylindrica (L.) Raeusch.*
- *Juncus dregeanus Kunth subsp. dregeanus*
- *Juncus effusus*
- *Kyllinga erecta Nees*
- *Leersia hexandra Sw.*
- *Phragmites australis (Cav.) Steud.*
- *Plantago longissima Decne.*
- *Ranunculus multifidus Forssk.*
- *Salix babylonica L. var. babylonica**
- *Scirpoides burkei (C.B.Clarke) Goetgh., Muasya & D.A.Simpson*
- *Setaria sphacelata (Schumach.) Stapf & C.E.Hubb.*
- *Typha capensis (Rohrb.) N.E.Br.*
- *Verbena bonariensis L.**
- *Verbena brasiliensis Vell.**

Polygala amatymbica

Cyperus obtusiflorus

Cyanotis speciosa

Pygmaeothamnus chamaedendrum

Figure 8-3 Examples of species found on site

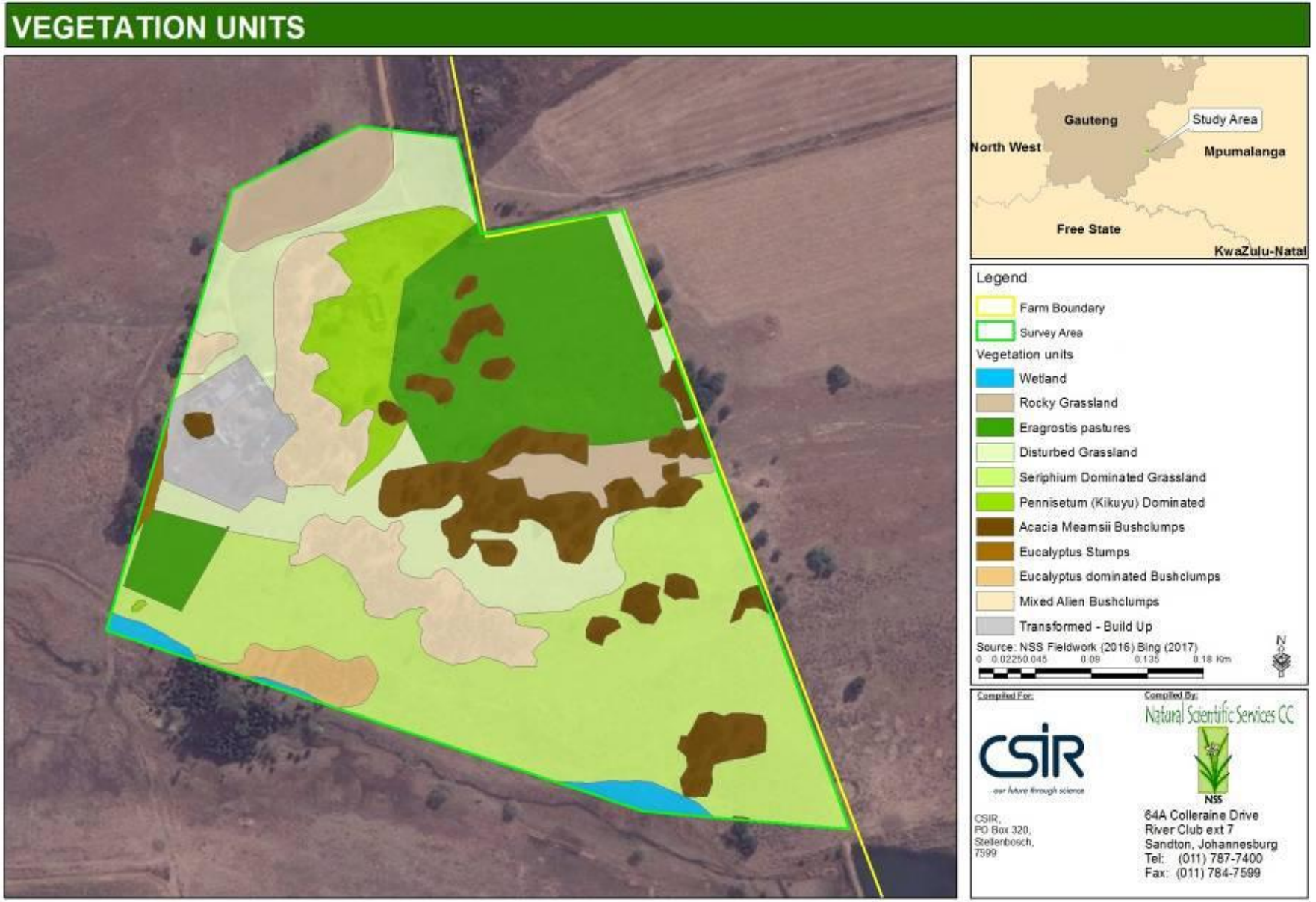


Figure 8-4 Vegetation communities within the study area

8.1.3. Conservation Important Species

Heterogeneous landscapes, diverse geology and a range of environmental conditions, provide a diverse number of habitats for plant species (well documented through articles from 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 infrastructural footprint is almost 100% transformed through past agricultural activities, building and planting and spreading of alien trees. The larger survey area is more heterogeneous with elements of exposed rock, southern slopes, and soil wetness. Although these areas have some transformation from past activities, they could still provide habitat for CI species. 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 January 2017), there are 77 Red Data listed species (including Data Deficient and Rare species) (**Table 8-3**) out of a possible 2762 species within Gauteng Province of which 1 species is Extinct, 1 species is Critically Endangered (CR), 410 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 North West (date accessed: January 2017)

Threat Status	South Africa	GAUTENG	2628AD / BC
EX (Extinct)	28	1	0
EW (Extinct in the wild)	7	0	0
CR PE (Critically Endangered, Possibly Extinct)	57	0	0
CR (Critically Endangered)	332	1	0
EN (Endangered)	716	10	0
VU (Vulnerable)	1217	13	3
NT (Near Threatened)	402	19	2
Critically Rare (known to occur only at a single site)	153	0	0
Rare (Limited population but not exposed to any direct or potential threat)	1212	4	0
Declining (not threatened but processes are causing a continuing decline in the population)	47	9	2
LC (Least Concern)	13 856	1997	455
DDD (Data Deficient - Insufficient Information)	348	1	0
DDT (Data Deficient - Taxonomically Problematic)	904	19	5

Threat Status	South Africa	GAUTENG	2628AD / BC
Total spp (including those not evaluated)	**23 399**	**2762**	**525**

**Date accessed – January 2017

From the POSA website (2628AD & BC QDS) 12 listed CI species have been recorded in the greater region (**Table 8-4**). Of these 7 species have a possibility of occurring in the surrounding natural to semi-natural vegetation communities around the site and *Hypoxis hemerocallidea* is highly likely to occur. *Gunnera perpensa* was located within the wetland to the south west of the infrastructural footprint. This species is listed as Declining in the Red List. According to Williams *et al* (2008) large volumes of this species is traded in traditional medicine markets and declines in availability and local extirpations have been noted. It is, however, widespread, somewhat resilient to harvesting and tends to grow back after the roots have been removed. However, given the high volumes traded, successive harvesting will have an impact on the population in conjunction with the degradation and decline of its habitat.

Table 8-4 Potential CI species based on information obtained from 2628AD & BC QDS

Family	Species	Status	Flowering Times	Habitat	LoO
EUPHORBIACEAE	*Acalypha caperonioides Baill. var. caperonioides*	DDT	Spring - Summer	In grassland, *Brachystegia* woodland and at margins of vleis, typically after grass fires	Possible
CRASSULACEAE	*Adromischus umbraticola C.A.Sm. subsp. umbraticola*	NT	September - January	Rock crevices on rocky ridges, usually south-facing, or in shallow gravel on top of rocks, but often in shade of other vegetation.	Possible
APIACEAE	*Alepidea peduncularis A.Rich.*	DDT	Summer	Montane grassland	Unlikely
ASTERACEAE	*Cineraria longipes S.Moore*	VU	March - May	Koppies to the south of Johannesburg, amongst rocks and along seep lines in association with Pteridium.	Possible
HYACINTHACEAE	*Drimia elata Jacq.*	DDT	September - January	Grassland and bushveld	Possible
ORCHIDACEAE	*Eulophia coddii A.V.Hall*	VU	Early December	Steep hillsides on soil derived from sandstone, grassland or mixed bush.	Unlikely
HYPOXIDACEAE	*Hypoxis hemerocallidea Fisch., C.A.Mey. & Avé-Lall.*	DEC	Summer	Occurs in a wide range of habitats, from sandy hills on the margins of dune forests to open rocky grassland; also grows on dry, stony, grassy slopes, mountain slopes and plateaux; appears to be drought and fire tolerant.	Highly Likely
AQUIFOLIACEAE	*Ilex mitis (L.) Radlk. var. mitis*	DEC	October - December	Along rivers and streams in forest and thickets, sometimes in the open. Found from sea level to inland mountain slopes.	Unlikely

Family	Species	Status	Flowering Times	Habitat	LoO
MESEMBRYANTHEMACEAE	*Khadia beswickii (L.Bolus) N.E.Br.*	VU	October - March	Open areas on shallow surfaces above rocks in grassland.	Possible
MESEMBRYANTHEMACEAE	*Lithops lesliei (N.E.Br.) N.E.Br. subsp. lesliei*	NT	March, April and May	Grassland with dark pinkish-red ferruginous shaly siltstone.	Possible
MYROTHAMNACEAE	*Myrothamnus flabellifolius Welw.*	DDT	September - November	In shallow soil over sheets of rock	Possible
SANTALACEAE	*Thesium boissierianum A.DC.*	DDT	Summer	Not known at time of report compilation	?

* Vulnerable – VU; Data Deficient Taxonomically – DDT; Near Threatened – NT; Declining - DEC

In addition to the Declining *Gunnera* species were recorded, a number of *Gladiolus* individuals were located within the Rocky Grassland vegetation. These are considered Protected species under Schedule 11 Protected Plants (Section 86 (1) (a)) of the Gauteng Nature Conservation Ordinance, 12 of 1983 (Gauteng General Law Amendment Act No. 4 of 2005) (**Figure 8-5)**. Protected Species may not be cut, disturbed, damaged, and destroyed without obtaining a permit from Gauteng Province or a delegated authority. Based on the infrastructural layout for the proposed project, it is not expected that these Protected and the Declining *Gunnera* species will be affected by the development. There is also little to no information available on water quality of wetland systems and the effects it has on species such as *Gunnera perpensa.*

Gunnera perpensa - leaves

Gunnera perpensa - flower

Figure 8-5 Photographs of Conservation Important plant species in the surrounds of the survey area

Alien and Invasives Species

Alien, especially invasive[4] plant species are a major threat to the ecological functioning of

[4] 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

natural systems and to the productive use of land. The trend within areas with such high past disturbances and transformation, is considered to be infested with a number of alien species. This is typical to what has been found on site. The large stands of alien bushclumps and *Pennisetum* patches dominate the area. Over 19% of the species found on site were alien. Of these, over 38% were NEMBA Category 1b and 7% were Category 2 (**Table 8.5** and **Figure 8-6**).

Table 8-5 Alien and Invasive Species detected during the survey

Family	Species	Growth forms	NEMBA
FABACEAE	*Acacia dealbata Link*	Shrub, tree	2
FABACEAE	*Acacia mearnsii De Wild.*	Shrub, tree	2
AMARANTHACEAE	*Amaranthus hybridus L. subsp. hybridus var. hybridus*	Herb	Not listed
PAPAVERACEAE	*Argemone ochroleuca*	Herb	1b
ASTERACEAE	*Bidens pilosa L.*	Herb	Not listed
PINACEAE	*Cedrus deodara*	Tree	Not listed
CHENOPODIACEAE	*Chenopodium album L.*	Herb	Not listed
SOLANACEAE	*Datura stramonium L.*	Herb, shrub	1b
POACEAE	*Eragrostis tef (Zuccagni) Trotter*	Graminoid	Not listed
MYRTACEAE	*Eucalyptus camaldulensis Dehnh.*	Tree	1b in Grassland Biome
AMARANTHACEAE	*Gomphrena celosioides Mart.*	Herb	Not listed
VERBENACEAE	*Lantana camara L.*	Shrub	1b
OXALIDACEAE	*Oxalis corniculata L.*	Herb	Not listed
POACEAE	*Paspalum dilatatum Poir.*	Graminoid	Not listed
POACEAE	*Pennisetum clandestinum Hochst. ex Chiov.*	Graminoid	1b in wetlands
RANUNCULACEAE	*Ranunculus multifidus Forssk.*	Herb	Not listed
RUBIACEAE	*Richardia brasiliensis Gomes*	Herb	Not listed
SALICACEAE	*Salix babylonica L. var. babylonica*	Tree	Not listed
LAMIACEAE	*Salvia runcinata L.f.*	Herb	Not listed
SOLANACEAE	*Solanum mauritianum Scop.*	Tree	1b
SOLANACEAE	*Solanum sisymbriifolium Lam.*	Herb, shrub	1b
ASTERACEAE	*Tagetes minuta L.*	Herb	Not listed
VERBENACEAE	*Verbena aristigera S.Moore*	Herb	Not listed
VERBENACEAE	*Verbena bonariensis L.*	Herb	1b
VERBENACEAE	*Verbena brasiliensis Vell.*	Herb	1b
ASTERACEAE	*Xanthium strumarium L.*	Shrublet	1b

- National Environmental Management: Biodiversity Act (NEM:BA; Act 10 of 2004):

Solanum sisymbriifolium

Argemone ochroleuca

Figure 8-6 The Category 1 Listed *Opuntia* species

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

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

Approximately 44 mammal species are considered highly likely or likely to occur at least occasionally in the study area (**Appendix 13.2**). Of these, the Southern African / Common Mole-rat was detected during the brief site visit along with domestic dogs, cattle and sheep (**Figure 8-7**). Rocky patches in the study area likely provide habitat for Eastern Rock Elephant Shrew and Namaqua Rock Mouse. The nearby unnamed tributary of the Blesbokspruit potentially provides habitat for the Southern African Vlei Rat, Marsh Mongoose, Swamp Musk Shrew, and African Clawless Otter. Most other mammal species, which have been listed for the study area, are wide-ranging and/or habitat generalists such as the Black-backed Jackal, Bush Duiker, Cape Porcupine, Cape Serotine and Egyptian Free-tailed bats, Common Genet, Four-striped Grass Mouse, Highveld Gerbil, Slender and Yellow Mongoose, and Southern African Mastomys.

Southern African Mole-rat (*Cryptomys hottentotus*) mounds

Dog

Cattle

Sheep

Figure 8-7 Evidence of local mammal species

Up to 10 threatened or Protected mammal species were rated with a high or moderate Likelihood of Occurrence (LoO) in the study area (**Table 8-6**).

- The globally Endangered (EN) and nationally Vulnerable (VU) African White-tailed Rat is known to occur *inter alia* in undisturbed grassland areas in southern Gauteng. The species is poorly understood and difficult to detect due to its nocturnal and fossorial (burrowing) habits (Stuart & Stuart 2007). Considering that any local population would likely be threatened by crop cultivation, livestock grazing and increasing human settlement, this species was rated with a moderate LoO in the study area.
- The globally and nationally VU Black-footed Cat, which is also listed as a national Protected Species, inhabits moist and arid grassland where it utilizes burrows made by other animals, and termite mounds (Stuart & Stuart 2007). As with the afore-mentioned species, Black-footed Cats are difficult to detect due to their secretive nocturnal and fossorial habits. Considering on the one hand that there is natural grassland and termitaria for this species, and on the other hand that there is increasing human settlement and pet activity in the area, the Black-footed Cat was rated with a moderate LoO.
- The globally and nationally Near Threatened (NT) Brown Hyena, which is also listed as a national Protected Species and a provincial Protected Game species, is known to scavenge opportunistically from human settlements. Given that there are at least two records of this species from QDS 2628BC (MammalMAP 2017), and that the study area is situated on the periphery of a human settlement area, the Brown Hyena was rated with a high LoO.
- The globally and nationally NT Highveld Golden Mole occurs in high-altitude grassland where it is restricted to friable soil at the edges of marshes in valleys, and in meadows on mountainsides. The species is also common in well-irrigated farmyards, gardens, golf courses, and exotic plantations. Habitat loss from coal-mining is the main threat to this species (IUCN 2017). As the distribution range of the Highveld Golden Mole is marginal to the study area, and there are no records for this species from QDS 2628BC (MammalMAP 2017), it was rated with a moderate LoO at best.
- The African Clawless Otter has recently been listed as globally and nationally NT (SANBI & EWT 2016). Although it is widely distributed in sub-Saharan Africa, populations are restricted to areas of permanent fresh water where there is good shoreline cover and an abundant prey base. In addition to wetland habitat loss and pollution, otters are also predicted to be impacted by global climate change and increasing human/otter conflict for increasingly scarce resources such as water, land and fish (IUCN 2017). Although no otter scat was found during the site visit, there are 17 records of African Clawless Otter from QDS 2628BC (MammalMAP 2017), and, therefore, this species was rated with a high LoO.
- The nationally NT and Protected Serval typically frequents dense, grassy habitat near water. The South African population is small (<10,000 individuals) and highly fragmented

due to wetland and grassland transformation (Friedmann & Daly 2004). NSS has noticed, however, that Serval can tolerate extensive crop cultivation and even mining activities in some areas, where they may seek refuge in e.g. alien bushclumps. Given this, and that there is also a record for Serval from QDS 2628BC (MammalMAP 2017), this species was rated with a high LoO in the study area.

- The nationally NT Southern African Hedgehog inhabits the temperate eastern interior of South Africa where it requires good ground cover for nesting. It is threatened by habitat transformation, road traffic, and the wildlife trade (Friedmann & Daly 2004) and is listed as a Protected Game species in Gauteng. Individuals tend to avoid wet ground and require thick, dry cover for nesting and resting by day during summer, and while in torpor during winter. The drier, higher-lying parts of the study area are considered suitable for hedgehogs, and given that there is at least one Hedgehog record from QDS 2628BC (MammalMAP 2017), this species was rated with a high LoO in the study area.
- The national status of the African Striped Weasel has recently been up-listed from Least Concern to NT (SANBI & EWT 2016). Although the Striped Weasel is widely distributed in South Africa, it is poorly understood due to its secretive nocturnal habits, and appears to be rare. Given this, and that there is no record for this species from QDS 2628BC (MammalMAP 2017), it was rated with a moderate LoO in the study area.
- The nationally NT Swamp Musk Shrew typically inhabits dense, matted vegetation near wetlands (Stuart & Stuart 2000). As with the afore-mentioned species, due to its inconspicuous behaviour, little is known about Swamp Musk Shrews. NSS has found, however, that where undisturbed wetland habitat exists, this species is almost inevitably present. Given that downstream wetland conditions seem relatively healthy, and that there are as many as 97 Swamp Musk Shrew records from QDS 2628BC (MammalMAP 2017), this species was rated with a high LoO.
- The Cape Fox is common across much of its range in southern Africa, although problem animal control activities (hunting and poisoning) have resulted in population reductions in some areas. For this reason it is listed as a national Protected Species. The species typically occupies open country including grassland, grassland with scattered thickets, and lightly wooded areas, and is generally most abundant in areas receiving <500mm annual rainfall (IUCN 2017). Given this, and that there is no record for Cape Fox from QDS 2628BC (MammalMAP 2017), this species was rated with a moderate LoO.
- The Aardwolf is listed as a provincial Protected Game species as it is has also been subject to persecution for problem animal control. Although relatively widely distributed in Africa, the Aardwolf is not common within its range. In prime habitat (open grassland and scrub regions), densities may reach one adult/km² on farms with good populations of termites and no persecution by farmers (IUCN 2017). Although there is no record for this species from QDS 2628BC (MammalMAP 2017), termitaria are common in the study area and, therefore, the Aardwolf was rated with a moderate LoO.
- The Steenbok is also listed as a provincial Protected Game species. Due to the proximity of human settlement and the observed presence of hunting dogs, this species was rated with a moderate LoO in the study area.

Table 8-6 Potentially occurring Conservation Important mammal species

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS (NEM:BA ToPS 2015)	GAUTENG LEGAL STATUS (Transvaal Nature Conservation Ordinance 1983)	GLOBAL RED LIST STATUS (IUCN 2016-3)	RSA RED LIST STATUS (SANBI & EWT 2016)	LoO IN QDS (Friedmann & Daly 2004; MammalMAP 2017)	LoO IN PORTION 15
Raphicerus campestris	Steenbok		PG Schedule 2 Section 15(1)(a)	LC (S)	LC	3	3
Vulpes chama	Cape Fox	PS		LC (S)	LC	2	2
Amblysomus septentrionalis	Highveld Golden Mole			NT (D)	NT	2	3
Atelerix frontalis (frontalis)	Southern African Hedgehog		PG Schedule 2 Section 15(1)(a)	LC (S)	NT	1	2
Felis nigripes	Black-footed Cat	PS		VU (D)	VU	1	3
Leptailurus serval	Serval	PS		LC (S)	NT	1	2
Hyaena brunnea	Brown Hyena	PS	PG Schedule 2 Section 15(1)(a)	NT (S)	NT	1	2
Proteles cristata	Aardwolf		PG Schedule 2 Section 15(1)(a)	LC (S)	LC	2	3
Aonyx capensis	African Clawless Otter			NT (D)	NT	1	2
Poecilogale albinucha	African Striped Weasel			LC (U)	NT	3	3
Mystromys albicaudatus	African White-tailed Rat			EN (D)	VU	3	3
Crocidura mariquensis	Swamp Musk Shrew			LC (U)	NT	1	2

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

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

Sources: Transvaal Nature Conservation Ordinance (1983); Friedmann & Daly (2004); NEM:BA ToPS (2015); SANBI & EWT (2016); IUCN (2016-3); MammalMAP (2017)

Table 8-7 Potentially occurring Conservation Important bird species

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS (NEM:BA ToPS 2015)	GAUTENG LEGAL STATUS (Transvaal Nature Conservation Ordinance 1983)	GLOBAL RED LIST STATUS (Taylor *et al.* 2015)	REGIONAL RED LIST STATUS (Taylor *et al.* 2015)	LoO IN QDS (Roberts VII 2013)	LoO IN PENTAD (SABAP2 2017)	LoO IN PORTION 15
Anthropoides paradiseus	Crane, Blue	PS	PG Schedule 2 Section 15(1)(a)	VU	NT	1	1	3
Falco biarmicus	Falcon, Lanner		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	3
Circus ranivorus	Harrier, African Marsh		PG Schedule 2 Section 15(1)(a)	LC	EN	1	1	3
Circus macrourus	Harrier, Pallid		PG Schedule 2 Section 15(1)(a)	NT	NT	1		3
Eupodotis caerulescens	Korhaan, Blue		PG Schedule 2 Section 15(1)(a)	NT	LC	1	1	2
Eupodotis senegalensis	Korhaan, White-bellied		PG Schedule 2 Section 15(1)(a)	LC	VU	1		3
Mirafra cheniana	Lark, Melodious		PG Schedule 2 Section 15(1)(a)	NT	LC	1		3
Tyto capensis	Owl, African Grass		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	2
Ciconia abdimii	Stork, Abdim's		PG Schedule 2 Section 15(1)(a)	LC	NT	1		3

Status: EN = Endangered; LC = Least Concern; NT = Near Threatened; PG = Protected Game; PS = Protected Species; VU = Vulnerable

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

Sources: Transvaal Nature Conservation Ordinance (1983); Roberts VII (2013); NEM:BA ToPS (2015); Taylor *et al.* (2015); SABAP 2 (2017)

8.2.2. Birds

Approximately 355 bird species are listed for QDS 2628BC (Roberts VII 2013), of which 216 were rated with a high or moderate LoO in the study area. Approximately 236 bird species have been recorded in pentad 2625_2830 (SABAP 2 2017), and 34 bird species were detected during the brief site visit (**Appendix 13.3**). Regionally-occurring montane bird species (e.g. Jackal Buzzard, Rock Kestrel and Verreaux's Eagle) , as well as open water and wading bird species (e.g. grebes, flamingos, sandpipers, stints, etc.) are considered unlikely to occur due to the absence of appropriate habitats for these birds in the study area. The bird species that were recorded during the site visit (**Figure 8-8**) represent common, widespread bird taxa (e.g. bishops, cisticolas, doves, larks, prinias, shrikes, swallows and swifts), which are more or less tolerant of crop cultivation, human settlement, livestock grazing, and dog activity. The Alien Common Myna was also recorded on site.

Southern Red Bishop
(*Euplectes orix*)

Pin-tailed Whydah
(*Vidua macroura*)

Crowned Lapwing
(*Vanellus coronatus*)

Figure 8-8 Evidence of local bird species

Under the 1983 Transvaal Nature Conservation Ordinance (refer to **Appendix 13.3**), most bird species that are listed for the study area represent provincial Protected Game. A few species (i.e. the Egyptian and Spur-winged geese, Orange River and Red-winged francolins, Yellow-billed Duck and Red-billed Teal) represent provincial "Other Game." Certain common indigenous bird taxa (e.g. bulbuls, cormorants, crows, doves, mousebirds, Red-billed Quelea and weavers) represent provincial "Wild Animals." Nine threatened or nationally Protected bird species were rated with a high or moderate LoO in the study area (**Table 8-7**).

- The regionally EN African Marsh Harrier is limited to large wetland systems in eastern and southern Africa. Populations are declining due to wetland transformation caused by drainage, damming, over-grazing and pesticides (BirdLife International 2013). Fires during the breeding season are also problematic for these birds (Roberts VII 2013). Given the small size of the nearby unnamed tributary of the Blesbokspruit, and that this species has

not yet been recorded in pentad 2625_2830 by SABAP 2 observers (SABAP 2 2017), it was rated with a moderate LoO.

- The globally VU and regionally NT Blue Crane is listed also as a national Protected Species. Although Blue Cranes forage in a diversity of habitats including cultivated fields, they breed preferentially at high elevations in secluded natural grass- and sedge-dominated habitats where the vegetation is thick and short (BirdLife International 2013). Although much of Portion 15 might support Blue Crane foraging, local breeding by these birds is unlikely given the proximity of human settlement and the prevalence of people, livestock and pets. Given this, and that the Blue Crane has not yet been recorded in pentad 2625_2830 by SABAP 2 observers (SABAP 2 2017), this species was rated with a moderate LoO at best.
- The regionally VU Lanner Falcon favours open grassland or woodland in the vicinity of cliff or electricity pylon breeding sites (Roberts VII 2013). Cliffs and large pylons appear to be limited in the study area, and since Lanner Falcons have not yet been recorded in pentad 2625_2830 (SABAP 2 2017), this species was rated with a moderate LoO.
- The regionally VU White-bellied Korhaan inhabits open grassland and lightly wooded savanna where it prefers taller grass than most other korhaans (BirdLife International 2013). There is currently no record of this species in pentad 2625_2830 (SABAP 2 2017), and since the observed height of local grassland and pasture was mostly moderate or short, this species was rated with a conservative moderate LoO.
- The regionally VU African Grass-owl is a habitat specialist requiring tall (at least knee-high), dense grasses and sedges in which to construct nests and roost tunnels. Suitable habitat is typically found along drainage systems, around pans, and within slope seepage zones and the occurrence of these owls in an area is dependent on the retention of such areas. Nesting has been recorded even in small (≤4m²) patches of suitable habitat within generally unsuitable *Hyparrhenia hirta* grassland (Geoff Lockwood pers. comm.). Grass-owls hunt over a mixture of wetland, grassland, cropland and fallow fields, and have been shown through radio telemetry to forage up to 4km away from their roosts and nests (Geoff Lockwood pers. comm.). During foraging, grass-owls are able to fly over extensive areas of unsuitable habitat to reach favoured hunting areas, and it is this behaviour combined with the species' nesting adaptability, which could enable this species to occur in the study area. Considering that there is sufficient vegetation along the wetland system – specifically to the west, the African Grass-owl was rated with a High LoO in the larger area.
- The globally and regionally NT Pallid Harrier is a migratory, non-breeding visitor to South Africa. It occupies grasslands associated with flood plains and pans, and also croplands, where it preys predominantly on insects and birds. Populations are mainly threatened by poisoning from pesticides and transformation of grassland by fire and overgrazing (BirdLife International 2013). Although there seems to be some suitable habitat for Pallid Harriers on Portion 15, there is currently no SABAP record for this species from either pentad 2625_2830 or QDS 2628BC (SABAP 2 2017), and, therefore, this species was rated with a moderate LoO.

- The globally NT Blue Korhaan is endemic to the grassland biome in South Africa and Lesotho where increasing habitat transformation is the main threat to the species (BirdLife International 2013). Compared to White-bellied Korhaans, Blue Korhaans typically feed and nest in areas with shorter grass, and seem capable of persisting in areas where there is crop cultivation, livestock grazing, and a low density of human settlement (NSS pers. obs.). Given this, and that the observed height of local grassland and pasture was mostly moderate or short, Blue Korhaans were rated with a high LoO.
- The globally NT Melodious Lark preferentially inhabits areas where the grass is short, and there are open spaces between the grass tussocks. Wetter low-lying areas are avoided, and the species is sensitive to grazing by livestock (BirdLife International 2013). Although the higher-lying parts of Portion 15 might be suitable for this species, grazing by cattle and sheep could be problematic. There is also no SABAP record of Melodious Lark from either pentad 2625_2830 or QDS 2628BC (SABAP 2 2017). This species was, therefore, rated with a conservative moderate LoO.
- The regionally NT Abdim's Stork inhabits grassland, savanna woodland and cultivated fields where it preys on mainly insects (especially orthoptera), army worms, and small vertebrates. Although Abdim's Stork does not breed in South Africa, these birds require large trees or cliffs for roosting at night (Roberts VII 2013). Although local grassland and alien bushclumps might provide suitable foraging and roosting habitat for Abdim's Storks, levels of disturbance from people, traffic and pets may be problematic. There is also no SABAP record of Abdim's Stork from either pentad 2625_2830 or QDS 2628BC (SABAP 2 2017). This species was, therefore, rated with a moderate LoO at best.

8.2.3. Reptiles

Approximately 45 reptile species are considered highly likely or likely to occur at least occasionally in the study area (**Appendix 13.413.4**). During the site visit, Speckled Rock Skink was recorded on site, and the Southern Rock Agama was encountered on the rocky ridge in the north-western section of Portion 15 (**Figure 8-9**).

Termitaria | Southern Rock Agama | Rocky ridge

Figure 8-9 Photographic evidence of local reptile habitat and species

In Gauteng, the Water Monitor and all snake species represent provincial Wild Animals. Other reptile taxa in the study area, such as agamas, chameleons, geckos, lizards, skinks and terrapins) represent provincial Protected Game (refer to **Appendix 13.4**). Three reptile species of conservation concern potentially occur in the study area (**Table 8-8**).

- The globally NT Coppery Grass Lizard has a patchy distribution along South Africa's eastern escarpment, where populations inhabit grassy mountain slopes and plateaus (Branch 1990). The species is adapted to moving like a snake through grass, and is compromised where grassland has been destroyed or degraded, and the ground is exposed and hardened (Alexander 2009). As the rocky ridge and adjoining grassland to the west of the development site is considered to represent suitable habitat for this species, it was rated with a high LoO within these habitats.
- The Striped Harlequin Snake is endemic to South Africa, and due to grassland loss and degradation is listed as globally NT. It lives mainly underground and inside moribund termite mounds where it feeds exclusively on thread snakes (Branch 1990). The species has a patchy occurrence and is rare. Therefore, although grassland and termitaria are present in the study area, this species was rated with a moderate LoO.
- Although widely distributed and listed as Least Concern, the uncommon Aurora Snake is reportedly experiencing rapid population declines in Gauteng and elsewhere. Threats to this species include habitat loss, harvesting for the pet trade, and their mortality caused by road traffic (Alexander & Marais 2008). There is at least one record of this species from QDS 2628BC (ReptileMAP 2017), and considering that there is suitable grassland habitat for this species on Portion 15, it was rated with a high LoO.

8.2.4. Frogs

Approximately 15 frog species are considered highly likely or likely to occur in the study area (**Appendix 13.5**). The Common Platanna is likely to be prevalent throughout much of the nearby Blesbokspruit tributary. Flowing sections of the spruit provide habitat that appears to be suitable for the Cape River Frog, Delalande's River Frog, Raucous Toad and even the Striped Stream Frog. A small permanently-inundated dam adjoining the eastern boundary of Portion 15 approximately mid-way, likely provides breeding habitat for Guttural and Red toads. Only one Conservation Important frog species is likely to occur in the study area.

- The Giant Bullfrog is listed as regionally NT by Minter *et al.* (2004), and is also listed as provincial Protected Game. 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). There is at least one record of the Giant Bullfrog from QDS 2628BC (FrogMAP 2017), but suitable breeding habitat for bullfrogs seems to be limited on Portion 15. This species was, therefore, rated with a moderate LoO.

Table 8-8 Potentially occurring Conservation Important reptile species

SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS (Transvaal Nature Conservation Ordinance 1983)	RED LIST STATUS (Bates *et al*. 2014)	LoO IN QDS (ReptileMAP 2017)	LoO IN PORTION 15
Chamaesaura aenea	Coppery Grass Lizard	**PG Schedule 2 Section 15(1)(a)**	**1NT End**	2	2
Homoroselaps dorsalis	Striped Harlequin Snake	**WA Schedule 5 Section 43**	**1NT End**	3	3
Lamprophis aurora	Aurora House Snake	**WA Schedule 5 Section 43**	1LC	1	2

Status: 1 = Global; 2 = Regional; End = Endemic; LC = Least Concern; NT = Near Threatened; PG = Protected Game; WA = Wild Animal

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

Sources: Transvaal Nature Conservation Ordinance (1983); Bates *et al.* (2014); NEM:BA ToPS (2015); ReptileMAP (2017)

Table 8-9 Potentially occurring Conservation Important frog species

SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS (Transvaal Nature Conservation Ordinance 1983)	GLOBAL RED LIST STATUS (IUCN)	RSA, LSO & SWZ RED LIST STATUS (Minter *et al*. 2004)	LoO IN QDS (FrogMAP 2017)	LoO IN PORTION 15
Pyxicephalus adspersus	Giant Bullfrog	**PG Schedule 2 Section 15(1)(a)**	LC (D)	**NT**	1	3

Status: D = Declining; LC = Least Concern; NT = Near Threatened; PG = Protected Game

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

Sources: Transvaal Nature Conservation Ordinance (1983); Minter *et al.* (2004); NEM:BA ToPS (2015); FrogMAP (2017)

Table 8-10 Potentially occurring Conservation Important butterfly species

SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS (Transvaal Nature Conservation Ordinance 1983)	RED LIST STATUS (Mecenero *et al*. 2013)	LoO IN QDS (LepiMAP 2017)	LoO IN PORTION 15
Aloeides dentatis dentatis	Roodepoort Copper	**Schedule 7 Section 45**	**1EN End**	3	3
Chrysoritis aureus	Heidelberg Opal	**Schedule 7 Section 45**	**1EN End**	3	4
Orachrysops mijburghi	Mijburgh's Blue		**1EN End**	3	3
Metisella meninx	Marsh Sylph		**1LC Rare Habitat Specialist**	2	2

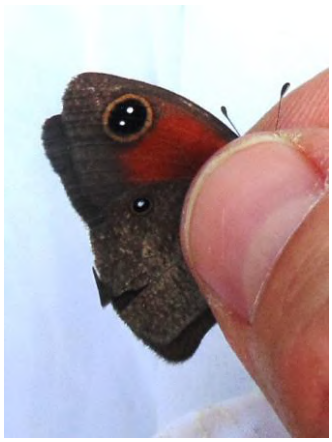
Status: 1 = Global; EN = Endangered; End = Endemic; LC = Least Concern

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

Sources: Transvaal Nature Conservation Ordinance (1983); Mecenero *et al.* (2013); NEM:BA ToPS (2015); LepiMAP (2017)

8.2.5. Butterflies

Based on the published butterfly distribution maps in Mecenero *et al.* (2013), approximately 44 butterfly species are considered highly likely to occur in QDS 2628BC, and 32 were rated with a moderate LoO. LepiMAP (2017) holds records for 20 butterfly species from QDS 2628BC (**Appendix 13.6**), most of which are likely to occur on, or at least pass through the site. Ten butterfly species were encountered during the site visit (**Figure 8-10**), all of which have previously been recorded in QDS2628BC except for Wichgraf's Hillside Brown, which we caught on the rocky ridge to the north-west of the site.



Wichgraf's Brown
(*Stygionympha wichgrafi*)

Broad-bordered Grass Yellow
(*Eurema brigitta brigitta*)

Citrus Swallowtail
(*Papilio demodocus demodocus*)

Brown-veined White
(*Belenois aurota*)

African Monarch
(*Danaus chrysippus orientis*)

Meadow White
(*Pontia helice helice*)

Figure 8-10 Evidence of local butterfly species

All the observed butterfly species and most of the potentially occurring butterfly species are common and widespread. However, as many as four conservation important butterfly species are known to occur in the region.

- The globally EN Roodepoort Copper subspecies *Aloeides dentatis dentatis,* is known from five locations in southern Gauteng where it inhabits fairly flat, rocky grassland (including Soweto Highveld Grassland), along or below ridges above 1 500m a.s.l.. Larval host plants of this butterfly species include *Hermannia depressa* and *Lotononis eriantha* (Mecenero *et al.* 2013). Although this species is rare, habitat

conditions seem suitable to the west of the site. The Roodepoort Copper subspecies *A. d. dentatis* was rated with a Moderate LoO.

- The globally EN Heidelberg Opal is limited to south-eastern Gauteng and south-western Mpumalanga where it inhabits steep, south-facing boulder-strewn patches of Gold Reef and Andesite mountain bushveld at an altitude of 1 600m – 1 800m a.s.l.. The vegetation must support a diversity of forbs, its host plant *Clutia pulchella,* and associated ant species *Crematogaster liengmei* (Mecenero *et al.* 2013). As this important set of habitat requirements is not met in the study area, this species was rated with a low LoO.
- The globally EN Mijburgh's Blue is known from five localities in southern Gauteng and the north-eastern Free State, where populations inhabit moist grassland (including Soweto Highveld Grassland), fringing ephemeral streams in undulating flatlands (Mecenero *et al*. 2013). Although native grassland on Portion 15 is representative of Soweto Highveld Grassland, the unnamed Blesbokspruit tributary is seasonal, not ephemeral. Based on observed habitat conditions where NSS recently encountered Mijburgh's Blue at a site near Heilbron, the presence of this species in the Blue Valley study area was not ruled out and was therefore given a LoO of Moderate.
- The rare Marsh Sylph is limited to grassland wetlands where contiguous patches of its larval food plant occur. Larval food plants include the rushes *Juncus oxycarpus* and *Juncus exsertus exsertus*, the sedge *Schoenoplectus decipiens* and the grasses *Diplachne fusca* and *Leersia hexandra*, in particular. Adults can be seen flying in suitable habitat patches between December and March. During the site visit sufficient patches of *Leersia hexandra* was present along the system and therefore, this species was rated with a High LoO.

8.2.6. Odonata

Based on the published odonatan distribution maps in Samways (2006), at least 13 dragonfly and damselfly species are considered highly likely to occur in QDS 2628BC, and 10 were rated with a moderate LoO in the QDS (**Appendix 13.6**). During our visit the terrestrial-wandering Pantala and the Two-striped Skimmer were observed in the development footprint. The former species has a Biotic Index Score of 0, while the latter has a score of 3. Samways' (2008) Biotic Index is "based on three criteria: geographical distribution, conservation status and sensitivity to change in habitat. It ranges from a minimum of 0 to a maximum of 9. A very common, widespread species which is highly tolerant of human disturbance scores 0. In contrast, a range-restricted, threatened and sensitive endemic species scores 9." The observed presence of the moderate-scoring Two-striped Skimmer suggests that the unnamed Blesbokspruit tributary is in a fair condition.

Female Pantala
(*Pantala flavescens*)

Female Two-striped Skimmer
(*Orthetrum caffrum*)

Figure 8-11 Evidence of local dragonfly species

Of the 23 odonatan species that are listed for the study area, at least five have been recorded in QDS 2628BC, including the common and widespread Blue Emperor, Broad Scarlet, Marsh Bluetail and Swamp Bluet, as well as the endemic Sapphire Bluet (OdonataMAP 2017). The Sapphire Bluet, which has a Biotic Index score of 4, can be found at pools and dams with fringing tall grasses and sedges (Samways 2008), and was rated with a moderate LoO in the study area. The Mountain Malachite, which is the only other potentially occurring high-scoring odonatan species (with a Biotic Index score of 4), inhabits streams with pools and an abundance of tall grass, reeds and small bushes over the water (Samways 2008), and was also rated with a moderate LoO. No potentially occurring odonatan species has a threatened or Protected status.

8.2.7. Scorpions

Approximately five scorpion species are considered highly likely or likely to occur in the study area (**Appendix 13.8**). Scorpion species, which were rated with the highest LoO based on their distributions and observed habitat conditions (esp. substrates and shelter) include: *Uroplectes triangulifer,* which is common in grassland areas where it makes a shallow scrape under rocks and may also enter houses; *Cheloctonus jonesii,* which burrows in peaty soils, avoiding areas that become waterlogged; and *Opistophthalmus pugnax* which constructs burrows under rocks on ridges and outcrops in Gauteng (Leeming 2003). None of the potentially occurring scorpion species has a threatened or Protected status.

9. Areas of Significance

The site significance assessment, which includes a significance map for terrestrial biodiversity in the study area, 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.* The Blesbokspruit Ramsar Site is, however, situated roughly 7km north of the proposed development site, and the unnamed stream, which flows in a north-westerly direction along the southern boundary of the site, joins the Blesbokspruit approximately 2.2km north-west of the site (see **Figure 9-4**).
- *World Heritage Site.*
- *Important Bird Area (IBA)* – see **Figure 9-1**. The site is, however, situated approximately 7km south of the Blesbokspruit IBA, and approximately 7km west of the Devon Grasslands IBA. These distances are well within the flight capability of many of the conservation important bird species, which occur within these IBAs (e.g. cranes, harriers and the Secretarybird).

9.2. National and Regional Areas of Conservation Significance

A number of biodiversity features with recognised national or provincial conservation importance, require consideration.

9.2.1. Protected Areas

The proposed development site is situated approximately 7km south of the **Marievale Bird Sanctuary and Provincial Nature Reserve** (**Figure 9-1**). Habitats in this reserve include shallow open water, reedbeds and grassland, which collectively support more than 240 bird species. These include rare, threatened and Protected bird species such as the African Grass-owl, Red-chested Flufftail, Curlew Sandpiper, Sand Martin, Caspian Tern, Baillon's Crake, Black-winged Pratincole, Black-tailed Godwit, Slaty Egret, Yellow Wagtail, as well as Baird's, Pectoral and Buff-breasted sandpipers (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 **Moist Grasslands Priority Area** (**Figure 9-2**), which supports a high diversity of birds and other native biodiversity, but which is subject to intensive livestock agriculture involving annual burning and over-grazing. Recently the area has also become target for water storage schemes and renewable electricity energy projects (Maphisa *et al.* 2016).

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 situated within the **Blesbokspruit Highveld Grassland Threatened Ecosystem** (**Figure 9-2**). Key biodiversity features of this Ecosystem include the Blesbokspruit, Klein-Blesbokspruit, Verdrietlaagte, and various other wetlands and pans, as well as the Andesite Mountain Bushveld, Eastern Highveld Grassland, Eastern Temperate Freshwater Wetlands, Gold Reef Mountain Bushveld, Rand Highveld Grassland, Soweto Highveld Grassland and Tsakane Clay Grassland vegetation types. Red or Orange Listed plant and animal species in the Ecosystem include e.g. *Delosperma leendertziae* and *Khadia beswicki*; Spotted-necked Otter and Brown Hyena; African Grass-owl, the Greater and Lesser Flamingos, African Marsh-harrier, Secretarybird, Yellow-billed Stork, Caspian Tern, Melodious Lark, Lesser Kestrel, White-bellied Korhaan, and Corncrake; the Giant Bullfrog; Heidelberg Copper (Opal) Butterfly, and the Golden Starburst Baboon Spider (SANBI & DEAT 2009).

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 nearby unnamed tributary of the Blesbokspruit has not yet been classified. The **Blesbokspruit** proper (~1.7km north-west of the site), and the **Suikerbosrantspruit** (~11.5km south of the site) are, however, classified as Wetland FEPAs.

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, the area wherein the main farm house and associated infrastructure are situated, is classified as an **Ecological Support Area (ESA).** Remaining parts of the site have been classified as an **Important Critical Biodiversity Area (CBAs)**.

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, 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).

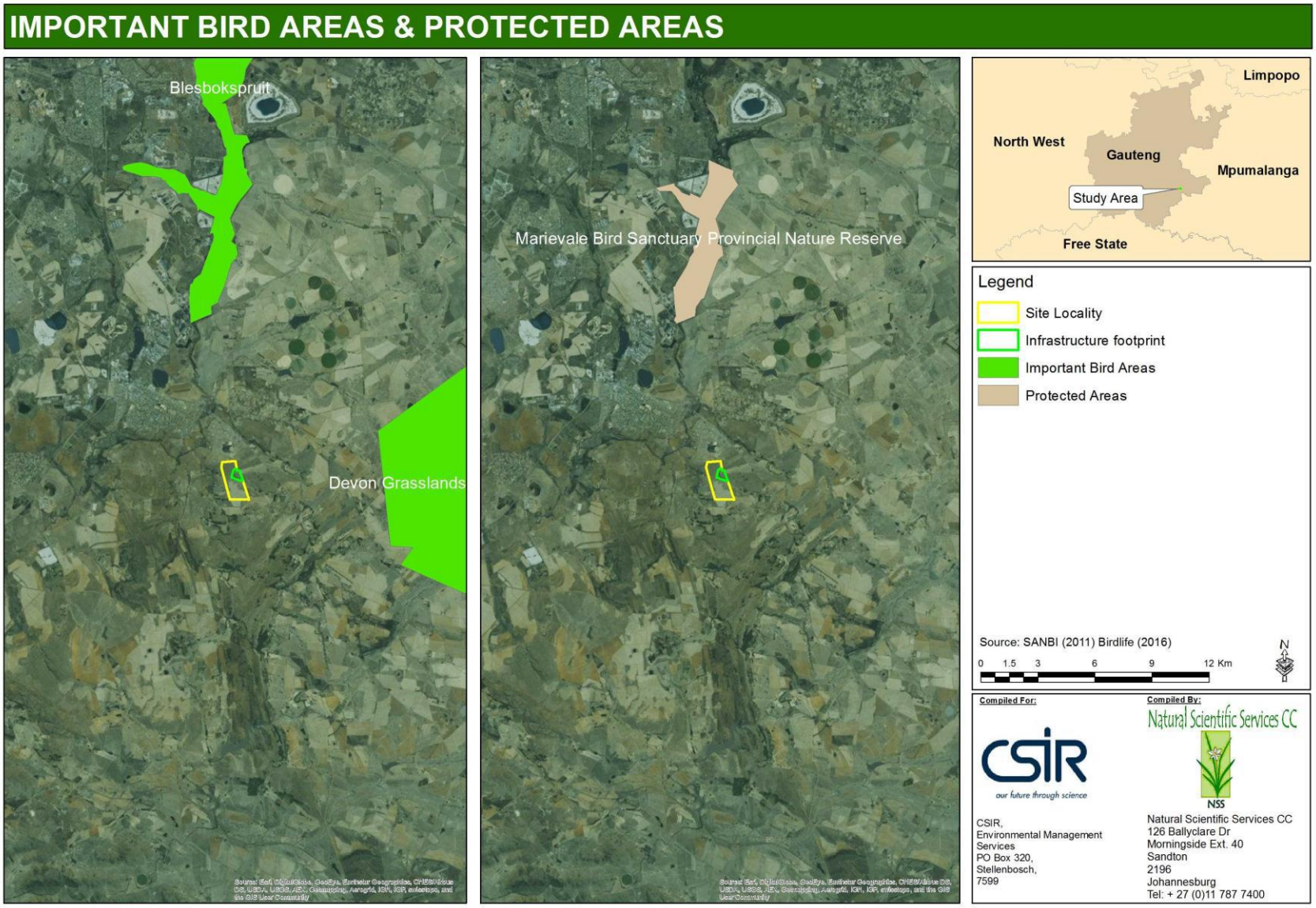


Figure 9-1 Location of the site in relation to Important Bird Areas, and Protected Areas

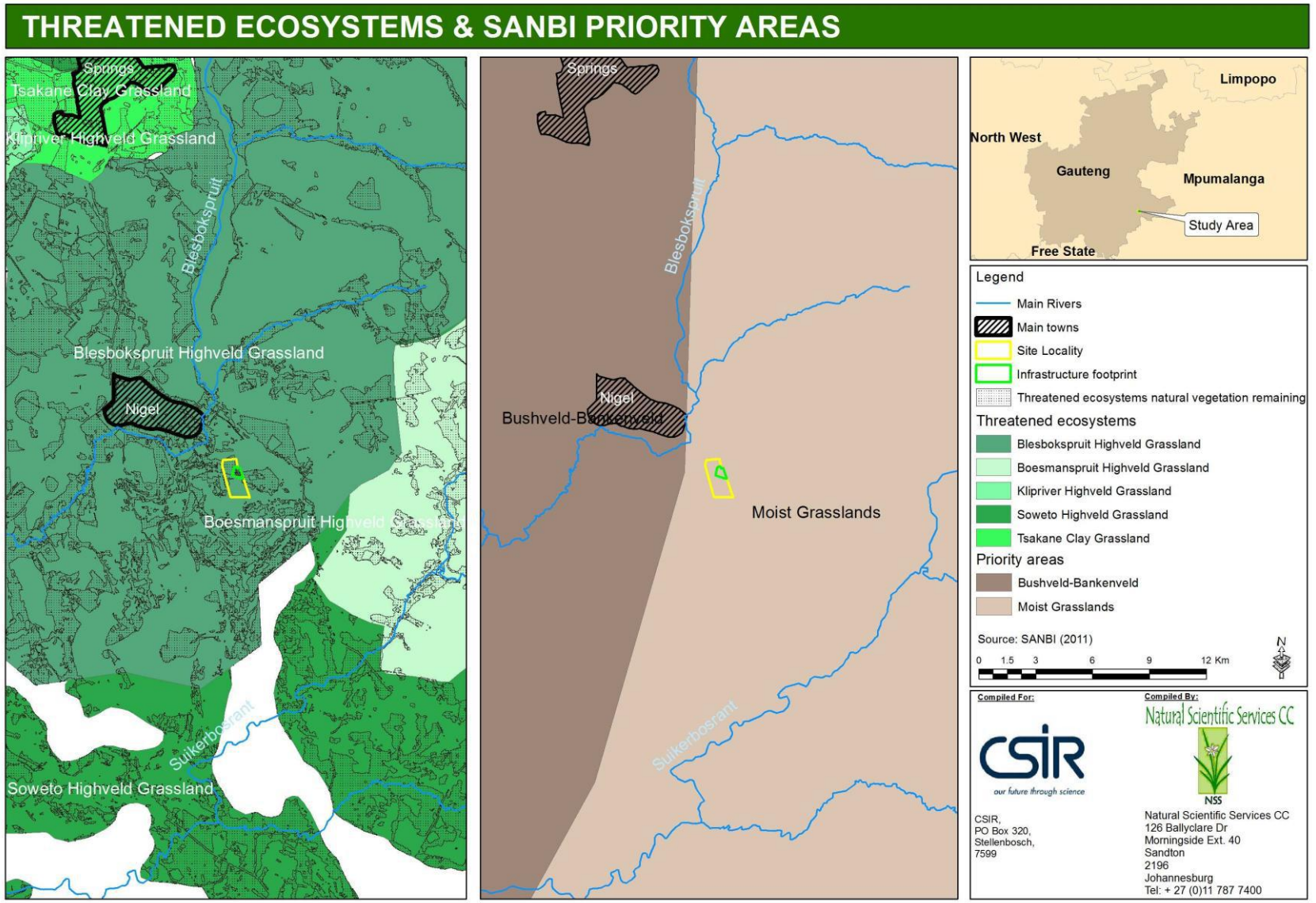


Figure 9-2 Location of the site relative to regional terrestrial Priority Areas and Threatened Ecosystems

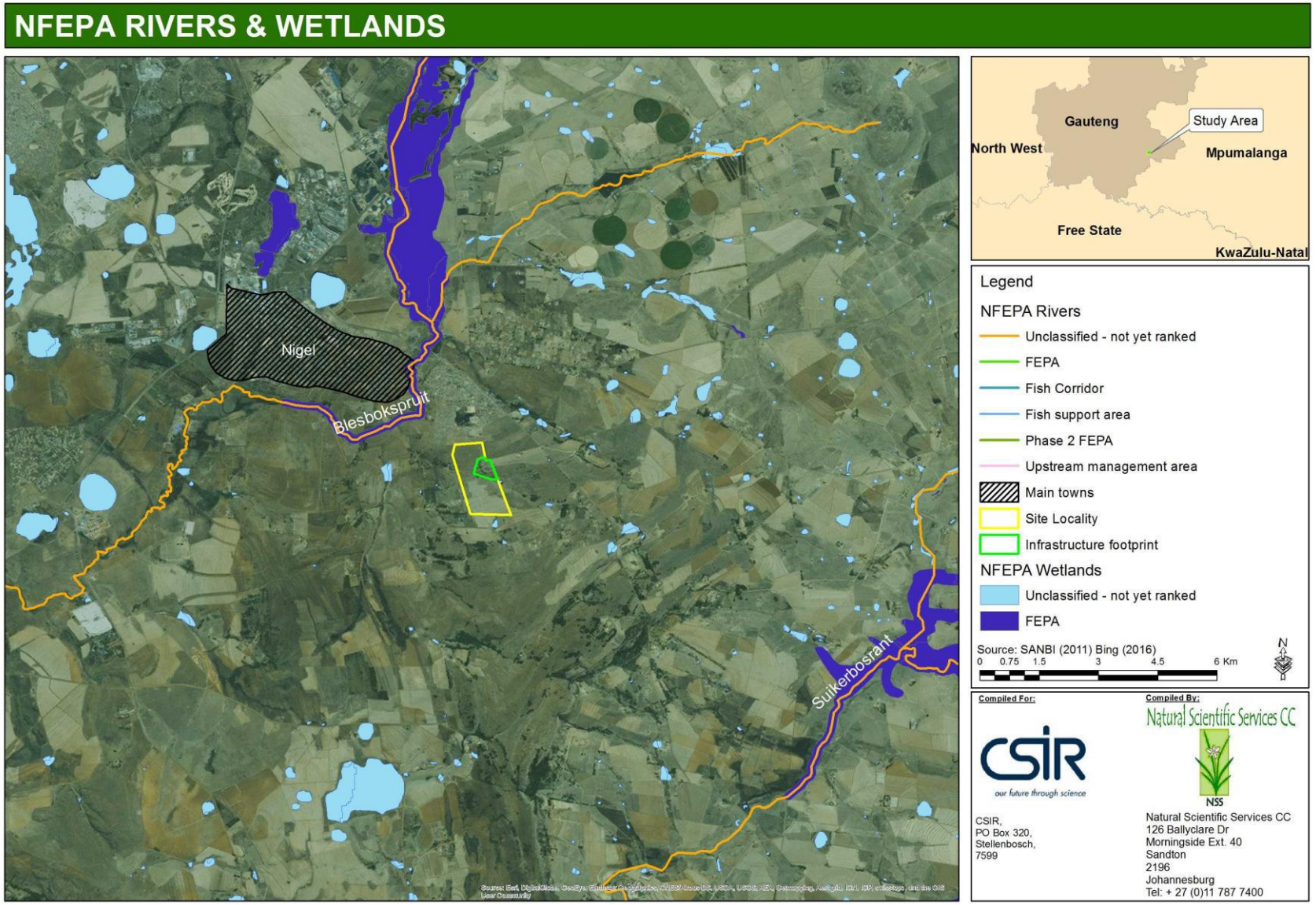


Figure 9-3 Location of the site in relation to regional Freshwater Ecosystem Priority Areas

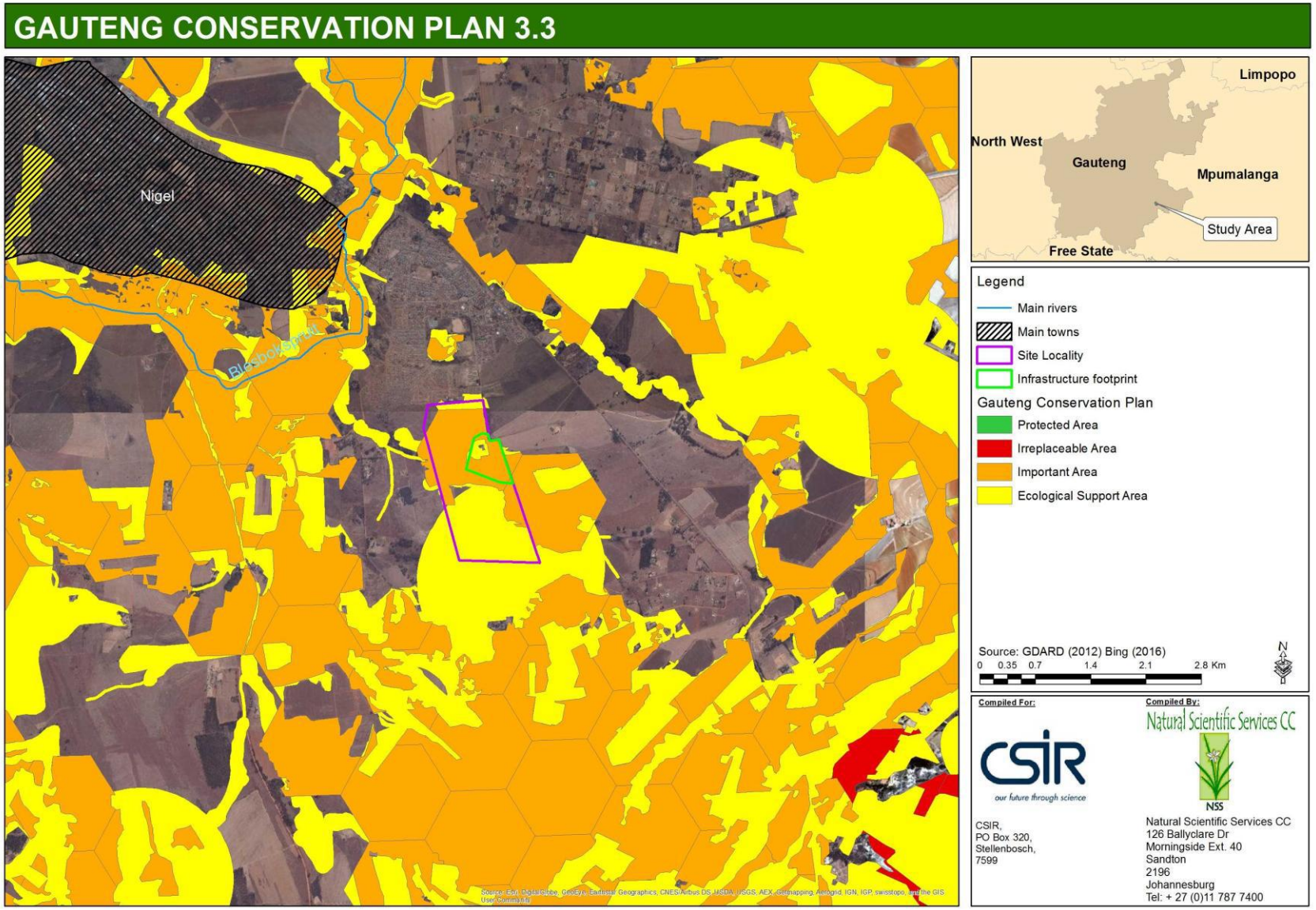


Figure 9-4 Location of the site in relation to Gauteng CBAs and ESAs

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).

Areas within the study area were ranked with ***High***, ***Medium-high***, ***Medium, Medium-low*** or ***Low*** biodiversity conservation significance based on the scoring system shown in **Table 8-1.** The scoring system was based on available information for the area, and our site assessment and professional experience. A map showing the relative conservation significance of areas within the study site is presented in **Figure 9-5**.

Table 8-1 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

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). Moreover, the unnamed tributary of the Blesbokspruit has been classified as a provincial Ecological Support Area (GDARD 2012), which drains within roughly 2km into the **Critically Endangered** Blesbokspruit.
- **Moderate-High** rated areas include:
  - Remaining patches of native grassland, which are representative of the **Endangered** Soweto Highveld Grassland regional vegetation type and the Gazetted Threatened Blesbokspruit Highveld Grassland. These are found mainly to the west of the survey area and a small patch to the north.
  - A minimum 50m buffer around all local wetland areas.
- **Moderate** rated areas include:
  - The *Seriphium* dominated grasslands. These areas, although overgrazed, are remnants of the Soweto Highveld Grassland and could, with the correct management, become more complex grassland systems.
- **Moderate-Low** rated areas include:
  - The Disturbed *Eragrostis* dominated areas (past pastures); and

  - The Alien Bushclumps (refuge for small mammals and raptor species)
- **Low** rated areas include:
  - Infrastructure.
  - Areas denude of vegetation.
  - *Eragrostis* Pastures

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.

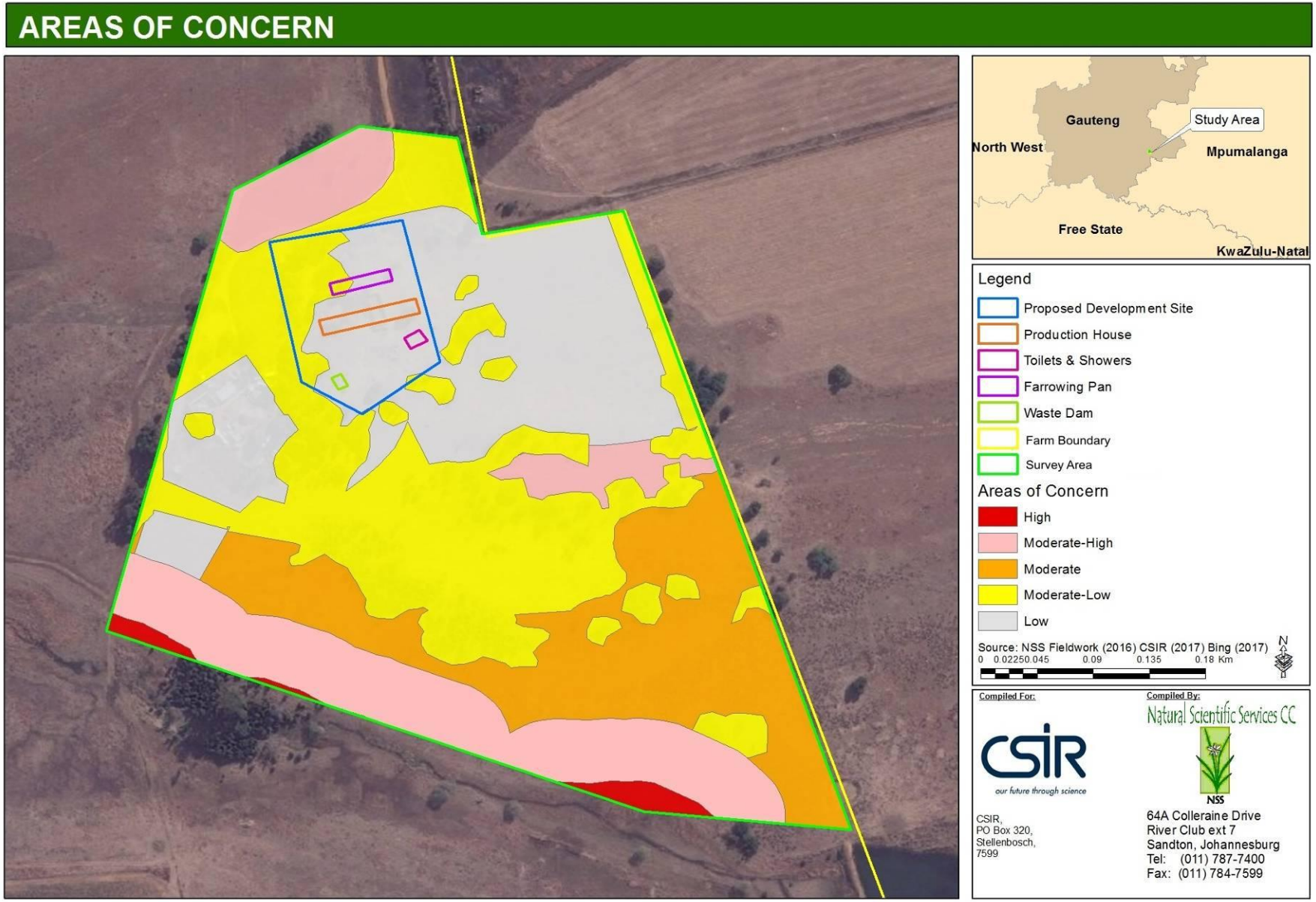


Figure 9-5 Areas of biodiversity conservation significance

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. Loss or degradation of local wetland areas

The unnamed Blesbokspruit tributary is situated along the southern boundary of the survey area but 230m south of the infrastructural footprint. It is unlikely that construction activities could cause further destruction or degradation of this system, which feeds into the Critically Endangered Blesbokspruit approximately 2.2km north-west of the site. However, during all phases of the project, continued vehicle and livestock activity, and proliferation of alien flora could cause degradation of local wetland areas through increased erosion and sedimentation. Given the fair to good condition of the local drainage system (as revealed by the diversity of species, presence of protected species - *Gunnera* and sensitive species such as the Two-striped Skimmer), this potential impact was rated with **Moderate** significance.

10.1.2. Loss of terrestrial vegetation and faunal habitat

Although the development site mainly comprises built infrastructure, pasture and alien bushclumps, potential loss or degradation of remaining native terrestrial vegetation and faunal habitat on adjoining parts of Portion 15 is a concern. This potential impact from construction, operational and decommissioning activities, vehicle and livestock activity, and proliferation of alien flora, was rated with **Moderate** significance considering that a significant portion of Portion 15 is representative of the Gazetted Threatened Blesbokspruit Highveld Grassland vegetation type.

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 conservation important (CI) or medicinal plant species may be lost during clearing vegetation within the construction footprint. A greater concern is the potential loss of CI or medicinal flora in adjoining areas during all phases of the project due to proliferation of alien flora, livestock activity and human harvesting. This potential impact was rated with **Moderate** significance.

10.1.4. Loss of CI fauna

Earth-moving activities during construction present a threat to small, slow-moving fossorial and terrestrial fauna including CI species such as the potentially occurring NT Giant Bullfrog, Striped Harlequin Snake and Southern African Hedgehog. Increased human, livestock and pet activity during operation present a risk to ground-nesting CI bird species such as the

potentially occurring VU African Grass-owl, and NT Blue Korhaan and Melodious Lark. Inappropriate pest control during operation could impact hunting and scavenging CI species such as the NT Brown Hyena and Serval. Destruction or degradation of local wetland areas could impact potentially occurring CI wetland fauna such as the NT African Clawless Otter and Swamp Musk Shrew. The potential loss of CI fauna during construction and operation was rated with **Moderate** significance given the number of CI animal species that potentially occurs in the study area.

10.1.5. Introduction and proliferation of alien plant species

The proposed project will increase the 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. This potential impact was rated with **Moderate** significance in the absence of effective control measures.

10.1.6. Increased dust and erosion

Construction and decommissioning activities are likely to increase bare ground, dust and the land's susceptibility to erosion. Furthermore, because the unnamed Blesbokspruit tributary is situated where elevation across the site is lowest, there is a good chance that significant erosion and sedimentation could adversely affect this system. Given the current fair to good condition of the system, this potential impact was rated with **Moderate** significance.

10.1.7. Sensory disturbance of fauna

Sensory disturbance of fauna from increased dust, noise and light pollution will likely cause certain fauna to vacate the area, at least temporarily during construction and decommissioning. Considering, however, that fauna in the study area 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 pig 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 and more importantly, downstream wetland areas. Given the fair to good condition of the nearby unnamed Blesbokspruit tributary, 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 pig 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 vulnerable CI species such as the NT Brown Hyena might occur in the study area, this potential impact was rated with **Moderate** significance.

10.1.10. Disease transmission

Diseases could be transmitted either directly from pigs 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 current prevalence of dogs, and the probable presence of scavenging wild fauna such as Black-backed Jackal, the potential impact of a possible disease outbreak was rated with **Moderate** significance.

10.2. Management and Mitigation Recommendations

Recommended management and mitigation measures are detailed in **Table 11-1**. With successful implementation of the recommended measures, the significance of impacts 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	Moderate	Low
Loss of terrestrial vegetation and faunal habitat	Moderate	Low
Loss of CI or medicinal flora	Moderate	Low
Loss of CI fauna	Moderate	Low
Introduction and proliferation of alien species	Moderate	Low
Increased dust and erosion	Moderate	Low
Sensory disturbance of fauna	Low	Low
OPERATION		
Loss or degradation of local wetland areas	Moderate	Low
Environmental contamination	High	Low
Poor / Inappropriate control of animal pests	Moderate	Low
Disease transmission	Moderate	Low
Introduction and proliferation of alien species	Moderate	Low
Loss of CI or medicinal flora	Moderate	Low
Loss of CI fauna	Moderate	Low
Sensory disturbance of fauna	Low	Low
DECOMMISSIONING		
Loss or degradation of local wetland areas	Moderate	Low
Introduction and proliferation of alien species	Moderate	Low
Increased dust and erosion	Moderate	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 to **Low**. Based on our site visit and the information that was available to date, it is NSS's opinion that there are no fatal flaws to the project. If the recommended mitigation measures are implemented, NSS has no objection to the project going forward. *Most importantly, the nearby unnamed Blesbokspruit tributary and remaining patches of native grassland on Portion 15 must remain undisturbed by the project.*

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 construction activities, increased vehicle traffic, dust, erosion, sedimentation and possible spills	Without	Negative	Local (<2km from site)	2	Permanent	5	Low	1	Low reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0.75	**Medium**	**6.00**	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
Loss of terrestrial vegetation and faunal habitat																
from clearing of vegetation, increased vehicle activity, altered burning and proliferation of alien flora	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Irreversible	High irreplaceability	Probable (25-50% chance)	0.5	**Medium**	**5.50**	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Low	1	Moderate reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	**Low**	**1.50**	High	3
Loss of CI or medicinal flora																
from clearing of vegetation, proliferation of alien flora, altered burning, and harvesting by people	Without	Negative	Local (<2km from site)	2	Permanent	5	High	8	Low reversibility	High irreplaceability	Probable (25-50% chance)	0.5	**Medium**	**7.50**	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Low	1	Moderate reversibility	High irreplaceability	Low probability (10-25% chance)	0.25	**Low**	**1.50**	High	3
Loss of CI fauna																
from clearing of vegetation, earth-moving activities, wetland disturbance, and increased vehicle, human, livestock and pet activity	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Low reversibility	High irreplaceability	Probable (25-50% chance)	0.5	**Medium**	**5.50**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Medium	4	High reversibility	High irreplaceability	Low probability (10-25% chance)	0.25	**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	Medium	4	Low reversibility	High 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	High 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	Medium	4	Moderate reversibility	Moderate irreplaceability	Definite (>90% chance)	1	**Medium**	**9.00**	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Medium-low	2	High reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	**Low**	**1.00**	High	3
Sensory disturbance of fauna																
from noise, dust and light associated with construction activities	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	High 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	High irreplaceability	Probable (25-50% chance)	0.5	**Low**	**1.50**	High	3
OPERATION																
Loss or degradation of local wetland areas																
from operational activities, vehicle traffic, dust, erosion, sedimentation and possible spills	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
Environmental contamination																
from pig excrement, bedding, feed, carcasses and other operational waste	Without	Negative	Regional (within 30km of site)	3	Long term (>15 years)	4	Very high / Fatal flaw	16	Low reversibility	Moderate irreplaceability	Probable (25-50% chance)	0.5	**High**	**11.50**	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, inappropriate 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	Without	Negative	Local (<2km from	2	Long term (>15	4	Medium	4	Moderate	Moderate	Probable (25-50%	0.5	**Medium**	**5.00**	High	3

POTENTIAL IMPACTS	MITIGATION	STATUS	EXTENT		DURATION		INTENSITY		REVERSIBILITY	IRREPLACEABILITY	PROBABILITY		SIGNIFICANCE		CONFIDENCE	
and hygiene, and insufficient, inappropriate and/or ineffectual pest control			site)		years)				reversibility	irreplaceability	chance)					
	With	Negative	Local (<2km from site)	2	Temporary (<2 years)	1	Low	1	High reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0.25	Low	1.00	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	Medium	4	Moderate 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 or medicinal flora																
from proliferation of alien flora, altered burning, harvesting by people and increased livestock activity	Without	Negative	Local (<2km from site)	2	Permanent	5	High	8	Low reversibility	High irreplaceability	Probable (25-50% chance)	0.5	Medium	7.50	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Low	1	Moderate reversibility	High irreplaceability	Low probability (10-25% chance)	0.25	Low	1.50	High	3
Loss of CI fauna																
from operational activities, wetland disturbance, and increased vehicle, human, livestock and pet activity	Without	Negative	Local (<2km from site)	2	Permanent	5	Medium	4	Low reversibility	High irreplaceability	Probable (25-50% chance)	0.5	Medium	5.50	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Medium	4	High reversibility	High irreplaceability	Probable (25-50% chance)	0.5	Low	3.00	High	3
Sensory disturbance of fauna																
from noise, dust and light associated with operational activities	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	High 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	High irreplaceability	Probable (25-50% chance)	0.5	Low	1.50	High	3
DECOMMISSIONING																
Loss or degradation of local wetland areas																
from decommissioning activities, increased vehicle traffic, dust, erosion, sedimentation and possible spills	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
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	Medium	4	Moderate 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
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	Medium	4	Moderate reversibility	Moderate irreplaceability	Definite (>90% chance)	1	Medium	9.00	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Medium-low	2	High reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	Low	1.00	High	3
Sensory disturbance of fauna																
from noise, dust and light associated with decommissioning activities	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	High 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	High 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.	*Demarcate or fence in the construction site.	Prior to and during construction	Mojaletema Management, Construction Crew
		*Highlight all prohibited activities to workers through training and notices.	Prior to and during construction	Mojaletema 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	Mojaletema 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, Mojaletema 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	Mojaletema Management, Construction Crew
Loss of terrestrial vegetation and faunal habitat				
Minimize loss and degradation of terrestrial vegetation (esp. Soweto Highveld Grassland) and faunal habitat.	Avoid unnecessary loss of indigenous vegetation and faunal habitats.	*Modify the layout of planned infrastructure to avoid important floral communities (rocky grassland around the entrance area) and large indigenous trees.	Pre-construction	CSIR, Mojaletema Management, with advice from a Botanist / Horticulturist
		*Identify and mark any indigenous trees (these are limited on site) on the ground. Those that are small and cannot be avoided should be transplanted elsewhere on site.	Pre-construction	Mojaletema Management, Construction Crew, with advice from a Botanist / Horticulturist
		*Demarcate or fence in the construction site.	Prior to and during construction	Mojaletema Management, Construction Crew
		*Highlight all prohibited activities to workers through training and notices.	Prior to and during construction	Mojaletema 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	Mojaletema 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	Mojaletema 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	Mojaletema Management, Construction Crew, with advice from a Botanist / Horticulturist
		*Do not undertake any landscaping with alien flora.	During construction	Mojaletema 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.	Pre-construction	CSIR, Mojaletema Management
		*Transplant CI and medicinally important floral specimens from the infrastructure footprint to suitable and safe locations elsewhere on site or nearby.	Pre-construction	Mojaletema 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	Mojaletema 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	Mojaletema 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	Mojaletema Management
Loss of CI fauna				
Minimize mortality and displacement of fauna, especially CI species.	Adhere to law and best practice guidelines regarding the displacement of CI faunal species.	*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	Mojaletema 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	Mojaletema 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	Mojaletema 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	Mojaletema Management
Introduction and proliferation of alien species				
Minimize the introduction and proliferation of invasive alien species during construction.	Limit / Regulate access by potential vectors of alien flora.	*Demarcate or fence in the construction site.	Prior to and during construction	Mojaletema Management, Construction Crew
		*Carefully limit / regulate access by vehicles and materials to the construction site.	Prior to and during construction	Mojaletema Management, Construction Crew
		*Prohibit the introduction of domestic animals such as dogs and cats.	During construction	Mojaletema Management, Farm Management
	Maintain a tidy construction site.	*Keep construction activities neat and tidy.	During construction	Mojaletema Management, Construction Crew
		When complete, remove all sand piles, and landscape all uneven ground while re-establishing a good topsoil layer.	During construction	Mojaletema Management, Construction Crew

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
		*Plant only locally indigenous flora if landscaping needs to be done.	During construction	Mojaletema 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	Mojaletema 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	Mojaletema Management, Construction Crew
		*Commence (and preferably complete) construction during winter, when the risk of erosion should be least.	During construction	Mojaletema Management, Construction Crew
		*Revegetate denude areas with locally indigenous flora a.s.a.p.	During construction	Mojaletema 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	Mojaletema Management, Construction Crew
		*Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.	During construction	Mojaletema 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	Mojaletema Management, Construction Crew
	Minimize noise pollution.	*Minimize noise to limit its impact on calling and other sensitive fauna (e.g. frogs).	During construction	Mojaletema Management, Construction Crew
	Minimize light pollution.	*Limit construction activities to day time hours.	During construction	Mojaletema 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	Mojaletema Management, Farm Management
		*Highlight all prohibited activities to workers through training and notices.	During operation	Mojaletema 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, Mojaletema 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	Mojaletema Management, Farm Management
		*Adhere to best practice pig husbandry and waste disposal norms.	Throughout operation	CSIR, Mojaletema Management, Farm Management, with advise from agricultural experts
		*All hazardous waste should be disposed of at an appropriate licensed facility for this.	Throughout operation	Mojaletema Management, Farm Management
		*Waste recycling should be incorporated into the facility's operations as far as possible.	Throughout operation	Mojaletema Management, Farm Management
		*Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices.	Throughout operation	Mojaletema 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	CSIR, Mojaletema Management
		*Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists.	A.s.a.p. following contamination	Mojaletema 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	Mojaletema Management, Farm Management
Poor / Inappropriate control of animal pests				

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
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, Mojaletema Management, Construction Crew
		*Ensure that there is effective storm water drainage around the facility.	All phases	CSIR, Mojaletema 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, Mojaletema 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	Mojaletema 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	Mojaletema Management, Farm Management
		*Prohibit the introduction of domestic animals such as dogs and cats.	Throughout operation	Mojaletema 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 weed management.	Throughout operation	Farm Management and Team
		*Plant only locally indigenous flora if landscaping needs to be done.	Throughout operation	Mojaletema 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	Mojaletema Management, Farm Management and Team, with advice from a Botanist / Horticulturist

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
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	Mojaletema 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	Mojaletema 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	Mojaletema 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	Mojaletema Management, Farm Management
Sensory disturbance of fauna				
Minimize sensory disturbance of fauna.	Minimize essential lighting	*Install motion-sensitive lights.	Construction and operation	Mojaletema Management, Farm Management
		*Ensure that all outdoor lights are angled downwards and/or fitted with hoods.	Construction and operation	Mojaletema 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	Mojaletema 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 decommissioning site.	Prior to and during decommissioning	Mojaletema Management, Decommissioning Crew
		*Highlight all prohibited activities to workers through training and notices.	Prior to and during decommissioning	Mojaletema 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	Mojaletema 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, Mojaletema 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.	Mojaletema 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	Mojaletema Management, Decommissioning Crew
		*Commence (and preferably complete) decommissioning during winter, when the risk of erosion should be least.	During decommissioning	Mojaletema Management, Decommissioning Crew
		*Revegetate denude areas with locally indigenous flora a.s.a.p.	During decommissioning	Mojaletema 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	Mojaletema Management, Decommissioning Crew
		*Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.	During decommissioning	Mojaletema 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	Mojaletema Management, Decommissioning Crew

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	METHODOLOGY	FREQUENCY	RESPONSIBILITY
	Minimize noise pollution.	*Minimize noise to limit its impact on sensitive fauna.	During decommissioning	Mojaletema Management, Decommissioning Crew
	Minimize light pollution.	*Limit demolition activities to day time hours.	During decommissioning	Mojaletema 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 recorded on and near the survey area

Family		*Species*	Growth forms
ACANTHACEAE		*Chaetacanthus costatus (Pers) Lindl.*	Dwarf shrub
ACANTHACEAE		*Crabbea acaulis N.E.Br.*	Herb
AMARANTHACEAE	*	*Amaranthus hybridus L.*	Herb
AMARANTHACEAE	*	*Gomphrena celosioides Mart.*	Herb
ANACARDIACEAE		*Searsia magalismontana (Sond.) Moffett*	Dwarf shrub
ANTHERICACEAE		*Chlorophytum fasciculatum (Baker) Kativu*	Herb
APIACEAE		*Centella asiatica (L.) Urb.*	Climber
ASPHODELACEAE		*Aloe greatheadii Schönland*	Succulent
ASPHODELACEAE		*Bulbine spp*	Geophyte
ASTERACEAE		*Berkheya setifera DC.*	Herb
ASTERACEAE	*	*Bidens pilosa L.*	Herb
ASTERACEAE		*Conyza podocephala DC.*	Herb
ASTERACEAE		*Cotula coronopifolia L.*	Helophyte
ASTERACEAE		*Felicia muricata (Thunb.) Nees subsp. muricata*	Shrub
ASTERACEAE		*Gazania krebsiana Less.*	Herb
ASTERACEAE		*Helichrysum nudifolium (L.) Less. var. nudifolium*	Herb
ASTERACEAE		*Helichrysum rugulosum Less.*	Herb
ASTERACEAE		*Hilliardiella (Vernonia) aristata (natalensis) (DC.) H.Rob.*	Herb
ASTERACEAE		*Hilliardiella hirsuta (DC.) H.Rob.*	Herb
ASTERACEAE		*Hilliardiella oligocephala (DC.) H.Rob.*	Herb
ASTERACEAE		*Lopholaena coriifolia (Sond.) E.Phillips & C.A.Sm.*	Succulent
ASTERACEAE		*Nidorella hottentotica DC.*	Herb
ASTERACEAE		*Senecio coronatus (Thunb.) Harv.*	Herb
ASTERACEAE		*Seriphium plumosum L.*	Shrublet
ASTERACEAE	*	*Tagetes minuta L.*	Herb
ASTERACEAE		*Vernonia galpinii Klatt*	Herb
ASTERACEAE	*	*Xanthium strumarium L.*	Shrublet
CAMPANULACEAE		*Wahlenbergia undulata (L.f.) A.DC.*	Herb
CAPPARACEAE		*Cleome maculata (Sond.) Szyszyl.*	Herb
CAPPARACEAE		*Cleome rubella Burch.*	Herb
CAPPARACEAE		*Cleome spp*	Herb
CARYOPHYLLACEAE		*Silene spp*	Herb
CHENOPODIACEAE	*	*Chenopodium album L.*	Herb
COMMELINACEAE		*Commelina africana L.*	Herb
COMMELINACEAE		*Cyanotis speciosa (L.f.) Hassk.*	Succulent
CYPERACEAE		*Bulbostylis burchellii (Ficalho & Hiern) C.B.Clarke*	Cyperoid
CYPERACEAE		*Cyperus cf. leptocladus Kunth*	Cyperoid
CYPERACEAE		*Cyperus compressus L.*	Cyperoid
CYPERACEAE		*Cyperus esculentus L. var. esculentus*	Cyperoid
CYPERACEAE		*Cyperus obtusiflorus Vahl var. obtusiflorus*	Cyperoid
CYPERACEAE		*Cyperus rupestris Kunth*	Cyperoid

Family		Species	Growth forms
CYPERACEAE		*Eleocharis dregeana Steud.*	Cyperoid
CYPERACEAE		*Juncus effusus*	Helophyte
CYPERACEAE		*Kyllinga alba Nees*	Cyperoid
CYPERACEAE		*Scirpoides burkei (C.B.Clarke) Goetgh., Muasya & D.A.Simpson*	Cyperoid
DIPSACACEAE		*Scabiosa columbaria L.*	Herb
EBENACEAE		*Diospyros lycioides Desf. subsp. lycioides*	Shrub, tree
EUPHORBIACEAE		*Acalypha angustata Sond.*	Dwarf shrub
EUPHORBIACEAE		*Euphorbia striata Thunb. var. striata*	Dwarf shrub
FABACEAE	*	*Acacia dealbata Link*	Shrub, tree
FABACEAE	*	*Acacia mearnsii De Wild.*	Shrub, tree
FABACEAE		*Elephantorrhiza elephantina (Burch.) Skeels*	Dwarf shrub
FABACEAE		*Eriosema spp*	Herb
FABACEAE		*Indigofera sp*	Shrublet
FABACEAE		*Pearsonia cajanifolia (Harv.) Polhill subsp. cajanifolia*	Herb, shrub
FABACEAE		*Pearsonia sessilifolia (Harv.) Duemmer subsp. sessilifolia*	Herb
GERANIACEAE		*Monsonia angustifolia E.Mey. ex A.Rich.*	Herb
GERANIACEAE		*Pelargonium luridum (Andrews) Sweet*	Geophyte
GUNNERACEAE		*Gunnera perpensa L.*	Declining
HYACINTHACEAE		*Dipcadi cf marlothii Engl.*	Geophyte
HYACINTHACEAE		*Ledebouria cf. revoluta (L.f.) Jessop*	Geophyte
HYACINTHACEAE		*Ledebouria ovatifolia (Baker) Jessop*	Geophyte
HYPOXIDACEAE		*Hypoxis acuminata Baker*	Geophyte
HYPOXIDACEAE		*Hypoxis iridifolia Baker*	Geophyte
HYPOXIDACEAE		*Hypoxis rigidula Baker var. rigidula*	Geophyte
IRIDACEAE		*Gladiolus spp*	Geophyte
JUNCACEAE		*Juncus dregeanus Kunth*	Helophyte
LAMIACEAE		*Ajuga ophrydis Burch. ex Benth.*	Herb
LAMIACEAE		*Leonotis microphylla Scan*	Shrub
LAMIACEAE		*Ocimum obovatum E.Mey. ex Benth. subsp. obovatum var. obovatum*	Herb
LAMIACEAE	*	*Salvia runcinata L.f.*	Herb
MALVACEAE		*Hermannia depressa N.E.Br.*	Herb
MYRTACEAE	*	*Eucalyptus camaldulensis Dehnh.*	Tree
OXALIDACEAE	*	*Oxalis corniculata L.*	Herb
PAPAVERACEAE	*	*Argemone ochroleucra*	Herb
PINACEAE	*	*Cedrus deodara*	Tree
PLANTAGINACEAE		*Plantago longissima Decne.*	Herb
PLANTAGINACEAE		*Plantago virginica L.*	Herb
POACEAE		*Alloteropsis semialata (R.Br.) Hitchc. subsp. semialata*	Graminoid
POACEAE		*Andropogon appendiculatus Nees*	Graminoid
POACEAE		*Aristida congesta Roem. & Schult. subsp. congesta*	Graminoid
POACEAE		*Brachiaria serrata (Thunb.) Stapf*	Graminoid
POACEAE		*Cynodon dactylon (L.) Pers.*	Graminoid
POACEAE		*Digitaria eriantha Steud.*	Graminoid
POACEAE		*Elionurus muticus (Spreng.) Kunth*	Graminoid
POACEAE		*Eragrostis curvula (Schrad.) Nees*	Graminoid

Family		*Species*	Growth forms
POACEAE		*Eragrostis lehmanniana Nees var. lehmanniana*	Graminoid
POACEAE		*Eragrostis racemosa (Thunb.) Steud.*	Graminoid
POACEAE		*Eragrostis spp*	Graminoid
POACEAE		*Eragrostis superba Peyr.*	Graminoid
POACEAE	*	*Eragrostis tef (Zuccagni) Trotter*	Graminoid
POACEAE		*Harpochloa falx (L.f.) Kuntze*	Graminoid
POACEAE		*Heteropogon contortus (L.) Roem. & Schult.*	Graminoid
POACEAE		*Hyparrhenia hirta (L.) Stapf*	Graminoid
POACEAE		*Imperata cylindrica (L.) Raeusch.*	Graminoid
POACEAE		*Leersia hexandra Sw.*	Graminoid
POACEAE		*Loudetia simplex (Nees) C.E.Hubb.*	Graminoid
POACEAE		*Melinis repens (Willd.) Zizka subsp. repens*	Graminoid
POACEAE		*Microchloa caffra Nees*	Graminoid
POACEAE	*	*Paspalum dilatatum Poir.*	Graminoid
POACEAE	*	*Pennisetum clandestinum Hochst. ex Chiov.*	Graminoid
POACEAE		*Phragmites australis (Cav.) Steud.*	Graminoid
POACEAE		*Pogonarthria squarrosa (Roem. & Schult.) Pilg.*	Graminoid
POACEAE		*Setaria sphacelata (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss*	Graminoid
POACEAE		*Themeda triandra Forssk.*	Graminoid
POACEAE		*Tragus spp*	herb
POACEAE		*Tristachya biseriata Stapf*	Graminoid
POACEAE		*Tristachya leucothrix Trin. ex Nees*	Graminoid
POACEAE		*Tristachya rehmannii*	Graminoid
POLYGALACEAE		*Polygala amatymbica Eckl. & Zeyh.*	Herb
POLYGALACEAE		*Polygala hottentotta C.Presl*	Dwarf shrub
PORTULACACEAE		*Portulaca grandiflora Hook.*	Succulent
RANUNCULACEAE	*	*Ranunculus multifidus Forssk.*	Herb
ROSACEAE		*Cliffortia linearifolia Eckl. & Zeyh.*	Shrub
RUBIACEAE		*Galium capense Thunb. subsp. capense*	Herb
RUBIACEAE		*Oldenlandia herbacea (L.) Roxb*	Herb
RUBIACEAE		*Pentanisia angustifolia (Hochst.) Hochst.*	Herb
RUBIACEAE		*Pygmaeothamnus chamaedendrum*	Dwarf shrub
RUBIACEAE	*	*Richardia brasiliensis Gomes*	Herb
SALICACEAE	*	*Salix babylonica L. var. babylonica*	Tree
SANTALACEAE		*Thesium utile A.W.Hill*	Parasite
SCROPHULARIACEAE		*Nemesia fruticans (Thunb.) Benth.*	Dwarf
SCROPHULARIACEAE		*Selago densiflora Rolfe*	Herb
SINOPTERIDACEAE		*Cheilanthes viridis (Forssk.) Sw.*	Geophyte
SOLANACEAE	*	*Datura stramonium L.*	Shrub
SOLANACEAE		*Solanum campylacanthum Hochst. ex A.Rich. subsp. panduriforme (Drège ex Dunal) J.Samuels*	Herb
SOLANACEAE	*	*Solanum mauritianum Scop.*	Tree
SOLANACEAE	*	*Solanum sisymbriifolium Lam.*	Shrub
TYPHACEAE		*Typha capensis (Rohrb.) N.E.Br.*	
VERBENACEAE	*	*Lantana camara L.*	Shrub
VERBENACEAE	*	*Verbena aristigera S.Moore*	Herb

Family		*Species*	Growth forms
VERBENACEAE	*	*Verbena bonariensis L.*	Herb
VERBENACEAE	*	*Verbena brasiliensis Vell.*	Herb
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 IN QDS	LoO IN PORTION 15
BATHYERGIDAE	**Mole-rats**						
Cryptomys hottentotus	Southern African Mole-rat			LC (S)	LC	2	1
BOVIDAE	**Even-toed antelope**						
Raphicerus campestris	Steenbok		**PG Schedule 2 Section 15(1)(a)**	LC (S)	LC	3	3
Redunca arundinum	Southern Reedbuck		**PG Schedule 2 Section 15(1)(a)**	LC (S)	LC	1	4
Sylvicapra grimmia	Bush Duiker			LC (S)	LC	1	2
CANIDAE	**Dogs, foxes, jackals & relatives**						
Canis mesomelas	Black-backed Jackal			LC (S)	LC	1	2
Vulpes chama	Cape Fox	**PS**		LC (S)	LC	2	2
CERCOPITHECIDAE	**Baboon & monkeys**						
Papio ursinus	Chacma Baboon			LC (S)	LC	3	4
CHRYSOCHLORIDAE	**Golden moles**						
Amblysomus septentrionalis	Highveld Golden Mole			**NT (U)**	**NT**	2	3
ERINACEIDAE	**Hedgehog**						
Atelerix frontalis (frontalis)	Southern African Hedgehog		**PG Schedule 2 Section 15(1)(a)**	LC (S)	**NT**	1	2
FELIDAE	**Cats**						
Felis nigripes	Black-footed Cat	**PS**		**VU (D)**	**VU**	1	3
Leptailurus serval	Serval	**PS**		LC (S)	**NT**	1	2
GALAGIDAE	**Bushbabies**						
Galago moholi	Moholi Bushbaby			LC (S)	LC	3	4
GLIRIDAE	**Dormice**						
Graphiurus platyops	Flat-headed African Dormouse			LC (U)	LC	3	4
HERPESTIDAE	**Meerkat & mongooses**						
Atilax paludinosus	Marsh Mongoose			LC (D)	LC	1	2
Cynictis penicillata	Yellow Mongoose			LC (S)	LC	1	2
Herpestes pulverulentus	Cape Gray Mongoose			LC (S)	LC	1	
Herpestes sanguineus	Slender Mongoose			LC (S)	LC	1	2
Ichneumia albicauda	White-tailed Mongoose			LC (S)	LC	3	3
Suricata suricatta	Meerkat			LC (U)	LC	1	3
HYAENIDAE	**Aardwolf & hyenas**						
Hyaena brunnea	Brown Hyena	**PS**	**PG Schedule 2 Section 15(1)(a)**	**NT (D)**	**NT**	1	2
Proteles cristata	Aardwolf		**PG Schedule 2 Section 15(1)(a)**	LC (S)	LC	2	3
HYSTRICIDAE	**Porcupine**						

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
Hystrix africaeaustralis	Cape Porcupine			LC (S)	LC	1	2
LEPORIDAE	**Hares & rabbits**						
Lepus saxatilis	Scrub Hare			LC (D)	LC	2	2
Pronolagus randensis	Jameson's Red Rock Hare			LC (U)	LC	2	4
MACROSCELIDIDAE	**Elephant shrews**						
Elephantulus myurus	Eastern Rock Elephant Shrew			LC (S)	LC	1	2
MOLOSSIDAE	**Free-tailed & related bats**						
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	1	2
Gerbilliscus brantsii	Highveld Gerbil			LC (U)	LC	1	2
Mastomys coucha	Southern African Mastomys			LC (S)	LC	2	2
Otomys auratus / irroratus	Southern African Vlei Rat			LC (S)	LC	1	2
Rhabdomys pumilio	Xeric Four-striped Grass Rat			LC (S)	LC	1	2
MUSTELIDAE	**Badger, otters, polecat & weasel**						
Aonyx capensis	African Clawless Otter			LC (S)	**NT**	1	2
Hydrictis maculicollis	Spotted-necked Otter			LC (D)	**VU**	1	4
Ictonyx striatus	Striped Polecat			LC (S)	LC	1	2
Poecilogale albinucha	African Striped Weasel			LC (U)	**NT**	3	3
NESOMYIDAE	**Climbing & fat mice & relatives**						
Dendromus melanotis	Gray African Climbing Mouse			LC (S)	LC	3	3
Dendromus mystacalis	Chestnut African Climbing Mouse			LC (S)	LC	3	3
Mystromys albicaudatus	African White-tailed Rat			**EN (D)**	**VU**	3	3
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	3	3
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	2	4
PROCAVIIDAE	**Hyraxes**						
Procavia capensis	Rock Hyrax			LC (U)	LC	2	4
RHINOLOPHIDAE	**Horseshoe bats**						
Rhinolophus clivosus	Geoffroy's Horseshoe Bat			LC (U)	LC	3	3

FAMILY & SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
SCIURIDAE	**Squirrels**						
Xerus inauris	South African Ground Squirrel			LC (S)	LC	3	4
SORICIDAE	**Shrews**						
Crocidura cyanea	Reddish-gray Musk Shrew			LC (S)	LC	2	2
Crocidura mariquensis	Swamp Musk Shrew			LC (U)	**NT**	1	2
Myosorex cafer	Dark-footed Mouse Shrew			LC (U)	**VU**	2	4
Myosorex varius	Forest Shrew			LC (S)	LC	2	3
Suncus infinitesimus	Least Dwarf Shrew			LC (U)	LC	1	3
Suncus varilla	Lesser Dwarf Shrew			LC (U)	LC	3	3
SUIDAE	**Hogs & pigs**						
Potamochoerus larvatus	Bush-pig			LC (S)	LC	3	4
THRYONOMYIDAE	**Cane Rat**						
Thryonomys swinderianus	Greater Cane Rat			LC (U)	LC	3	4
VESPERTILIONIDAE	**House, pipistrelle, serotine & related bats**						
Miniopterus natalensis	Natal / Shreiber's Long-fingered Bat			LC (U)	LC	3	3
Neoromicia capensis	Cape Serotine			LC (S)	LC	2	2
VIVERRIDAE	**Civet & genets**						
Genetta genetta	Common Genet			LC (S)	LC	2	2

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); Friedmann & Daly (2004); NEM:BA ToPS (2015); IUCN (2016); SANBI & EWT (2016); MammalMAP (2017)

13.3. Bird list for the study area

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Diomedea amsterdamensis	Albatross, Amsterdam		PG Schedule 2 Section 15(1)(a)	CR	NA			
Thalassarche chlororhynchos	Albatross, Atlantic Yellow-nosed		PG Schedule 2 Section 15(1)(a)	EN	EN			
Thalassarche melanophrys	Albatross, Black-browed		PG Schedule 2 Section 15(1)(a)	EN	EN			
Thalassarche bulleri	Albatross, Buller's		PG Schedule 2 Section 15(1)(a)	NT	NA			
Thalassarche eremita	Albatross, Chatham		PG Schedule 2 Section 15(1)(a)	VU	NA			
Thalassarche chrysostoma	Albatross, Grey-headed		PG Schedule 2 Section 15(1)(a)	EN	EN			
Thalassarche carteri	Albatross, Indian Yellow-nosed		PG Schedule 2 Section 15(1)(a)	EN	EN			
Phoebastria immutabilis	Albatross, Laysan		PG Schedule 2 Section 15(1)(a)	NT	NA			
Phoebetria palpebrata	Albatross, Light-mantled		PG Schedule 2 Section 15(1)(a)	NT	NT			
Diomedea sanfordi	Albatross, Northern Royal		PG Schedule 2 Section 15(1)(a)	EN	EN			
Thalassarche salvini	Albatross, Salvin's		PG Schedule 2 Section 15(1)(a)	VU	NA			
Thalassarche cauta	Albatross, Shy		PG Schedule 2 Section 15(1)(a)	NT	NT			
Phoebetria fusca	Albatross, Sooty		PG Schedule 2 Section 15(1)(a)	EN	EN			
Diomedea epomophora	Albatross, Southern Royal		PG Schedule 2 Section 15(1)(a)	VU	VU			
Diomedea dabbenena	Albatross, Tristan		PG Schedule 2 Section 15(1)(a)	CR	CR			
Diomedea exulans	Albatross, Wandering		PG Schedule 2 Section 15(1)(a)	VU	VU			
Apalis thoracica	Apalis, Bar-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Apalis ruddi	Apalis, Rudd's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Apalis flavida	Apalis, Yellow-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			
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			
Tricholaema leucomelas	Barbet, Acacia Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Lybius torquatus	Barbet, Black-collared		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Trachyphonus vaillantii	Barbet, Crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Stactolaema olivacea	Barbet, Green		PG Schedule 2 Section 15(1)(a)	LC	EN			
Stactolaema leucotis	Barbet, White-eared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Terathopius ecaudatus	Bateleur	EN	PG Schedule 2 Section 15(1)(a)	NT	EN			
Batis capensis	Batis, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC			
Batis molitor	Batis, Chinspot		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Batis pririt	Batis, Pririt		PG Schedule 2 Section 15(1)(a)	LC	LC			
Batis fratrum	Batis, Woodwards'		PG Schedule 2 Section 15(1)(a)	LC	LC			
Merops persicus	Bee-eater, Blue-cheeked		PG Schedule 2 Section 15(1)(a)	LC	LC			

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Merops apiaster	Bee-eater, European		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Merops pusillus	Bee-eater, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Merops superciliosus	Bee-eater, Olive		PG Schedule 2 Section 15(1)(a)					
Merops nubicoides	Bee-eater, Southern Carmine		PG Schedule 2 Section 15(1)(a)	LC	LC			
Merops hirundineus	Bee-eater, Swallow-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Merops bullockoides	Bee-eater, White-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Merops albicollis	Bee-eater, White-throated		PG Schedule 2 Section 15(1)(a)					
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
Ixobrychus sturmii	Bittern, Dwarf		PG Schedule 2 Section 15(1)(a)	LC	LC			
Botaurus stellaris	Bittern, Eurasian		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Ixobrychus minutus	Bittern, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lioptilus nigricapillus	Blackcap, Bush		PG Schedule 2 Section 15(1)(a)	NT	VU			
Sylvia atricapilla	Blackcap, Eurasian		PG Schedule 2 Section 15(1)(a)					
Telophorus zeylonus	Bokmakierie		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sula leucogaster	Booby, Brown		PG Schedule 2 Section 15(1)(a)					
Sula sula	Booby, Red-footed		PG Schedule 2 Section 15(1)(a)					
Laniarius ferrugineus	Boubou, Southern		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Laniarius major	Boubou, Tropical		PG Schedule 2 Section 15(1)(a)	LC	LC			
Smithornis capensis	Broadbill, African		PG Schedule 2 Section 15(1)(a)	LC	VU			
Phyllastrephus terrestris	Brownbul, Terrestrial		PG Schedule 2 Section 15(1)(a)	LC	LC			
Nilaus afer	Brubru		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Pycnonotus nigricans	Bulbul, African Red-eyed		WA Schedule 5 Section 43	LC	LC	1	1	3
Pycnonotus capensis	Bulbul, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	3
Emberiza tahapisi	Bunting, Cinnamon-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Emberiza flaviventris	Bunting, Golden-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Emberiza impetuani	Bunting, Lark-like		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Chlorophoneus nigrifrons	Bush-shrike, Black-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chlorophoneus viridis	Bush-shrike, Gorgeous		PG Schedule 2 Section 15(1)(a)	LC	LC			
Malaconotus blanchoti	Bush-shrike, Grey-headed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chlorophoneus olivaceus	Bush-shrike, Olive		PG Schedule 2 Section 15(1)(a)	LC	LC			
Telophorus sulfureopectus	Bush-shrike, Orange-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Lissotis melanogaster	Bustard, Black-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC			
Neotis denhami	Bustard, Denham's	VU	PG Schedule 2 Section 15(1)(a)	NT	VU			
Ardeotis kori	Bustard, Kori	PS	PG Schedule 2 Section 15(1)(a)	NT	NT			
Neotis ludwigii	Bustard, Ludwig's	EN	PG Schedule 2 Section 15(1)(a)	EN	EN			
Turnix nanus	Buttonquail, Black-rumped		PG Schedule 2 Section 15(1)(a)	LC	VU			
Turnix sylvaticus	Buttonquail, Common (Kurrichane)		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Turnix hottentottus	Buttonquail, Hottentot		PG Schedule 2 Section 15(1)(a)	EN	EN			
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		3
Buteo trizonatus	Buzzard, Forest		PG Schedule 2 Section 15(1)(a)	LC	LC			
Buteo rufofuscus	Buzzard, Jackal		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Kaupifalco monogrammicus	Buzzard, Lizard		PG Schedule 2 Section 15(1)(a)	LC	LC			
Camaroptera brachyura	Camaroptera, Green-backed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Camaroptera brevicaudata	Camaroptera, Grey-backed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Serinus alario	Canary, Black-headed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Crithagra atrogularis	Canary, Black-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Crithagra sulphurata	Canary, Brimstone		PG Schedule 2 Section 15(1)(a)	LC	LC			
Serinus canicollis	Canary, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Crithagra scotops	Canary, Forest		PG Schedule 2 Section 15(1)(a)	LC	LC			
Crithagra citrinipectus	Canary, Lemon-breasted		PG Schedule 2 Section 15(1)(a)	LC	NT			
Crithagra albogularis	Canary, White-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
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
Fringilla coelebs	Chaffinch, Common		PG Schedule 2 Section 15(1)(a)					
Myrmecocichla formicivora	Chat, Ant-eating		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Pentholaea arnotti	Chat, Arnot's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pinarornis plumosus	Chat, Boulder		PG Schedule 2 Section 15(1)(a)					
Campicoloides bifasciata	Chat, Buff-streaked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cercomela familiaris	Chat, Familiar		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Cercomela schlegelii	Chat, Karoo		PG Schedule 2 Section 15(1)(a)	LC	LC			
Thamnolaea cinnamomeiventris	Chat, Mocking Cliff		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Cercomela sinuata	Chat, Sickle-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cercomela tractrac	Chat, Tractrac		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cisticola textrix	Cisticola, Cloud		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Cisticola natalensis	Cisticola, Croaking		PG Schedule 2 Section 15(1)(a)	LC	LC			

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Cisticola aridulus	Cisticola, Desert		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Cisticola subruficapilla	Cisticola, Grey-backed		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	1
Cisticola cinnamomeus	Cisticola, Pale-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cisticola chiniana	Cisticola, Rattling		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Cisticola erythrops	Cisticola, Red-faced		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cisticola galactotes	Cisticola, Rufous-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cisticola rufilatus	Cisticola, Tinkling		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cisticola lais	Cisticola, Wailing		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
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	1
Fulica cristata	Coot, Red-knobbed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Phalacrocorax neglectus	Cormorant, Bank		PG Schedule 2 Section 15(1)(a)	EN	EN			
Phalacrocorax capensis	Cormorant, Cape		PG Schedule 2 Section 15(1)(a)	EN	EN			
Phalacrocorax coronatus	Cormorant, Crowned		PG Schedule 2 Section 15(1)(a)	NT	NT			
Phalacrocorax africanus	Cormorant, Reed		WA Schedule 5 Section 43	LC	LC	1	1	3
Phalacrocorax carbo	Cormorant, White-breasted		WA Schedule 5 Section 43	LC	LC	1	1	3
Centropus grillii	Coucal, Black		PG Schedule 2 Section 15(1)(a)	LC	LC			
Centropus burchellii	Coucal, Burchell's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Centropus senegalensis	Coucal, Senegal		PG Schedule 2 Section 15(1)(a)	LC	LC			
Rhinoptilus chalcopterus	Courser, Bronze-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cursorius rufus	Courser, Burchell's		PG Schedule 2 Section 15(1)(a)	LC	VU			
Rhinoptilus africanus	Courser, Double-banded		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cursorius temminckii	Courser, Temminck's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Rhinoptilus cinctus	Courser, Three-banded		PG Schedule 2 Section 15(1)(a)	LC	LC			
Crecopsis egregia	Crake, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Porzana pusilla	Crake, Baillon's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Amaurornis flavirostris	Crake, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Crex crex	Crake, Corn		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Porzana parva	Crake, Little		PG Schedule 2 Section 15(1)(a)					
Porzana porzana	Crake, Spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Aenigmatolimnas marginalis	Crake, Striped		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anthropoides paradiseus	Crane, Blue	PS	PG Schedule 2 Section 15(1)(a)	VU	NT	1	1	3
Balearica regulorum	Crane, Grey Crowned	EN	PG Schedule 2 Section 15(1)(a)	EN	EN	1		4

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Bugeranus carunculatus	Crane, Wattled	CR	PG Schedule 2 Section 15(1)(a)	VU	CR	1		4
Sylvietta rufescens	Crombec, Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Corvus capensis	Crow, Cape		WA Schedule 5 Section 43	LC	LC	1		3
Corvus splendens	Crow, House		PG Schedule 2 Section 15(1)(a)					
Corvus albus	Crow, Pied		WA Schedule 5 Section 43	LC	LC	1	1	2
Cuculus gularis	Cuckoo, African		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chrysococcyx cupreus	Cuckoo, African Emerald		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cercococcyx montanus	Cuckoo, Barred Long-tailed		PG Schedule 2 Section 15(1)(a)					
Cuculus clamosus	Cuckoo, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Cuculus canorus	Cuckoo, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
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		4
Clamator jacobinus	Cuckoo, Jacobin		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Chrysococcyx klaas	Cuckoo, Klaas's		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Clamator levaillantii	Cuckoo, Levaillant's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cuculus rochii	Cuckoo, Madagascar		PG Schedule 2 Section 15(1)(a)					
Cuculus solitarius	Cuckoo, Red-chested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Pachycoccyx audeberti	Cuckoo, Thick-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Campephaga flava	Cuckooshrike, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Coracina caesia	Cuckooshrike, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC			
Coracina pectoralis	Cuckooshrike, White-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Numenius arquata	Curlew, Eurasian		PG Schedule 2 Section 15(1)(a)	NT	NT			
Anhinga rufa	Darter, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Streptopelia decipiens	Dove, African Mourning		PG Schedule 2 Section 15(1)(a)	LC	LC			
Turtur afer	Dove, Blue-spotted Wood		PG Schedule 2 Section 15(1)(a)	LC	LC			
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			
Streptopelia turtur	Dove, European Turtle		PG Schedule 2 Section 15(1)(a)	VU	NA			
Streptopelia senegalensis	Dove, Laughing		WA Schedule 5 Section 43	LC	LC	1	1	1
Columba larvata	Dove, Lemon		PG Schedule 2 Section 15(1)(a)	LC	LC			
Oena capensis	Dove, Namaqua		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Streptopelia semitorquata	Dove, Red-eyed		WA Schedule 5 Section 43	LC	LC	1	1	2
Columba livia	Dove, Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Turtur tympanistria	Dove, Tambourine		PG Schedule 2 Section 15(1)(a)	LC	LC			
Limnodromus semipalmatus	Dowitcher, Asiatic		PG Schedule 2 Section 15(1)(a)	NT	NA			

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Dicrurus adsimilis	Drongo, Fork-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Dicrurus ludwigii	Drongo, Square-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	3
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	1	4
Thalassornis leuconotus	Duck, White-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	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	1
Calidris alpina	Dunlin		PG Schedule 2 Section 15(1)(a)					
Haliaeetus vocifer	Eagle, African Fish		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Aquila spilogaster	Eagle, African Hawk		PG Schedule 2 Section 15(1)(a)	LC	LC			
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		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		4
Stephanoaetus coronatus	Eagle, Crowned		PG Schedule 2 Section 15(1)(a)	NT	VU			
Clanga pomarina	Eagle, Lesser Spotted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lophaetus occipitalis	Eagle, Long-crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Polemaetus bellicosus	Eagle, Martial	EN	PG Schedule 2 Section 15(1)(a)	VU	EN	1		4
Circaetus fasciolatus	Eagle, Southern Banded Snake		PG Schedule 2 Section 15(1)(a)	NT	CR			
Aquila nipalensis	Eagle, Steppe		PG Schedule 2 Section 15(1)(a)	EN	LC			
Aquila rapax	Eagle, Tawny	EN	PG Schedule 2 Section 15(1)(a)	LC	EN			
Aquila verreauxii	Eagle, Verreauxs'		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Aquila wahlbergi	Eagle, Wahlberg's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Egretta alba	Egret, Great		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Egretta garzetta	Egret, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Egretta vinaceigula	Egret, Slaty		PG Schedule 2 Section 15(1)(a)	VU	NA	1		4
Egretta thula	Egret, Snowy		PG Schedule 2 Section 15(1)(a)					
Bubulcus ibis	Egret, Western Cattle		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Egretta intermedia	Egret, Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Eremomela usticollis	Eremomela, Burnt-necked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Eremomela scotops	Eremomela, Green-capped		PG Schedule 2 Section 15(1)(a)	LC	LC			
Eremomela gregalis	Eremomela, Karoo		PG Schedule 2 Section 15(1)(a)	LC	LC			
Eremomela icteropygialis	Eremomela, Yellow-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Falco amurensis	Falcon, Amur		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Falco eleonorae	Falcon, Eleonora's		PG Schedule 2 Section 15(1)(a)					
Falco biarmicus	Falcon, Lanner		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	3
Falco peregrinus	Falcon, Peregrine		PG Schedule 2 Section 15(1)(a)	LC	LC			
Polihierax semitorquatus	Falcon, Pygmy		PG Schedule 2 Section 15(1)(a)	LC	LC			
Falco vespertinus	Falcon, Red-footed		PG Schedule 2 Section 15(1)(a)	NT	NT	1		4
Falco chicquera	Falcon, Red-necked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Falco concolor	Falcon, Sooty		PG Schedule 2 Section 15(1)(a)	NT	NA	1		4
Falco fasciinucha	Falcon, Taita	CR	PG Schedule 2 Section 15(1)(a)	VU	CR			
Anomalospiza imberbis	Finch, Cuckoo		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Amadina fasciata	Finch, Cut-throat		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
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			
Podica senegalensis	Finfoot, African		PG Schedule 2 Section 15(1)(a)	LC	VU			
Lagonosticta rubricata	Firefinch, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Lagonosticta rhodopareia	Firefinch, Jameson's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lagonosticta senegala	Firefinch, Red-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Lanius collaris	Fiscal, Southern (Common)		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Phoenicopterus ruber	Flamingo, Greater		PG Schedule 2 Section 15(1)(a)	LC	NT	1	1	4
Phoenicopterus minor	Flamingo, Lesser		PG Schedule 2 Section 15(1)(a)	NT	NT	1	1	4
Sarothrura elegans	Flufftail, Buff-spotted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Sarothrura rufa	Flufftail, Red-chested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sarothrura boehmi	Flufftail, Streaky-breasted		PG Schedule 2 Section 15(1)(a)					
Sarothrura affinis	Flufftail, Striped		PG Schedule 2 Section 15(1)(a)	LC	VU			
Sarothrura ayresi	Flufftail, White-winged		PG Schedule 2 Section 15(1)(a)	CR	CR			
Muscicapa adusta	Flycatcher, African Dusky		PG Schedule 2 Section 15(1)(a)	LC	LC			
Terpsiphone viridis	Flycatcher, African Paradise		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Muscicapa caerulescens	Flycatcher, Ashy		PG Schedule 2 Section 15(1)(a)	LC	LC			
Bias musicus	Flycatcher, Black-and-white (Vanga)		PG Schedule 2 Section 15(1)(a)					
Trochocercus cyanomelas	Flycatcher, Blue-mantled Crested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Bradornis infuscatus	Flycatcher, Chat		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ficedula albicollis	Flycatcher, Collared		PG Schedule 2 Section 15(1)(a)					
Stenostira scita	Flycatcher, Fairy		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Sigelus silens	Flycatcher, Fiscal		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2

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Myioparus plumbeus	Flycatcher, Grey Tit-		PG Schedule 2 Section 15(1)(a)	LC	LC			
Bradornis mariquensis	Flycatcher, Marico		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Bradornis pallidus	Flycatcher, Pale		PG Schedule 2 Section 15(1)(a)	LC	LC			
Melaenornis pammelaina	Flycatcher, Southern Black		PG Schedule 2 Section 15(1)(a)	LC	LC			
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		4
Dendroperdix sephaena	Francolin, Crested		OG Schedule 3 Section 15(1)(b)	LC	LC	1		4
Scleroptila afra	Francolin, Grey-winged		OG Schedule 3 Section 15(1)(b)	LC	LC	1		4
Scleroptila levaillantoides	Francolin, Orange River		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	1	2
Scleroptila shelleyi	Francolin, Shelley's		OG Schedule 3 Section 15(1)(b)	LC	LC			
Fregata minor	Frigatebird, Greater		PG Schedule 2 Section 15(1)(a)					
Fregata ariel	Frigatebird, Lesser		PG Schedule 2 Section 15(1)(a)					
Fulmarus glacialoides	Fulmar, Southern		PG Schedule 2 Section 15(1)(a)	LC	LC			
Porphyrio alleni	Gallinule, Allen's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Porphyrio martinicus	Gallinule, American (Purple)		PG Schedule 2 Section 15(1)(a)					
Morus serrator	Gannet, Australasian		PG Schedule 2 Section 15(1)(a)					
Morus capensis	Gannet, Cape		PG Schedule 2 Section 15(1)(a)	VU	VU			
Anas querquedula	Garganey		PG Schedule 2 Section 15(1)(a)			1		4
Corythaixoides concolor	Go-away-bird, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Limosa lapponica	Godwit, Bar-tailed		PG Schedule 2 Section 15(1)(a)	NT	LC			
Limosa limosa	Godwit, Black-tailed		PG Schedule 2 Section 15(1)(a)	NT	NA	1		4
Limosa haemastica	Godwit, Hudsonian		PG Schedule 2 Section 15(1)(a)					
Nettapus auritus	Goose, African Pygmy		PG Schedule 2 Section 15(1)(a)	LC	VU			
Alopochen aegyptiacus	Goose, Egyptian		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	2
Plectropterus gambensis	Goose, Spur-winged		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	2
Accipiter tachiro	Goshawk, African		PG Schedule 2 Section 15(1)(a)	LC	LC			
Melierax metabates	Goshawk, Dark Chanting		PG Schedule 2 Section 15(1)(a)	LC	LC			
Melierax gabar	Goshawk, Gabar		PG Schedule 2 Section 15(1)(a)	LC	LC			
Melierax canorus	Goshawk, Pale Chanting		PG Schedule 2 Section 15(1)(a)	LC	LC			
Sphenoeacus afer	Grassbird, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Podiceps nigricollis	Grebe, Black-necked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Podiceps cristatus	Grebe, Great Crested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Tachybaptus ruficollis	Grebe, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Andropadus importunus	Greenbul, Sombre		PG Schedule 2 Section 15(1)(a)	LC	LC			

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Chlorocichla flaviventris	Greenbul, Yellow-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC			
Phyllastrephus flavostriatus	Greenbul, Yellow-streaked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Tringa nebularia	Greenshank, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Guttera pucherani	Guineafowl, Crested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Numida meleagris	Guineafowl, Helmeted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Chroicocephalus ridibundus	Gull, Common Black-headed		PG Schedule 2 Section 15(1)(a)					
Leucophaeus pipixcan	Gull, Franklin's		PG Schedule 2 Section 15(1)(a)					
Larus cirrocephalus	Gull, Grey-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Chroicocephalus hartlaubii	Gull, Hartlaub's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Larus dominicanus	Gull, Kelp		PG Schedule 2 Section 15(1)(a)	LC	LC			
Larus fuscus	Gull, Lesser Black-backed		PG Schedule 2 Section 15(1)(a)			1		4
Xema sabini	Gull, Sabine's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chroicocephalus genei	Gull, Slender-billed		PG Schedule 2 Section 15(1)(a)					
Scopus umbretta	Hamerkop		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Circus ranivorus	Harrier, African Marsh		PG Schedule 2 Section 15(1)(a)	LC	EN	1	1	3
Circus maurus	Harrier, Black		PG Schedule 2 Section 15(1)(a)	VU	EN	1		4
Circus pygargus	Harrier, Montagu's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Circus macrourus	Harrier, Pallid		PG Schedule 2 Section 15(1)(a)	NT	NT	1		3
Circus aeruginosus	Harrier, Western Marsh		PG Schedule 2 Section 15(1)(a)			1	1	3
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
Macheiramphus alcinus	Hawk, Bat		PG Schedule 2 Section 15(1)(a)	LC	EN			
Prionops scopifrons	Helmet-shrike, Chestnut-fronted		PG Schedule 2 Section 15(1)(a)					
Prionops retzii	Helmet-shrike, Retz's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Prionops plumatus	Helmet-shrike, White-crested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Egretta ardesiaca	Heron, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Nycticorax nycticorax	Heron, Black-crowned Night		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Ardea melanocephala	Heron, Black-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Ardea goliath	Heron, Goliath		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Butorides striata	Heron, Green-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Ardea cinerea	Heron, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Egretta caerulea	Heron, Little Blue		PG Schedule 2 Section 15(1)(a)					
Ardea purpurea	Heron, Purple		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Ardeola rufiventris	Heron, Rufous-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ardeola ralloides	Heron, Squacco		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2

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Gorsachius leuconotus	Heron, White-backed Night		PG Schedule 2 Section 15(1)(a)	LC	VU			
Falco cuvierii	Hobby, African		PG Schedule 2 Section 15(1)(a)					
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		4
Indicator indicator	Honeyguide, Greater		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Indicator minor	Honeyguide, Lesser		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Indicator variegatus	Honeyguide, Scaly-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
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			
Tockus alboterminatus	Hornbill, Crowned		PG Schedule 2 Section 15(1)(a)	LC	LC			
Bucorvus leadbeateri	Hornbill, Southern Ground-	EN	PG Schedule 2 Section 15(1)(a)	VU	EN			
Tockus erythrorhynchus	Hornbill, Southern Red-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Tockus leucomelas	Hornbill, Southern Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Bycanistes bucinator	Hornbill, Trumpeter		PG Schedule 2 Section 15(1)(a)	LC	LC			
Hyliota australis	Hyliota, Southern		PG Schedule 2 Section 15(1)(a)					
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	1	2
Bostrychia hagedash	Ibis, Hadeda		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Geronticus calvus	Ibis, Southern Bald	VU	PG Schedule 2 Section 15(1)(a)	VU	VU			
Vidua funerea	Indigobird, Dusky		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Vidua purpurascens	Indigobird, Purple		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Vidua chalybeata	Indigobird, Village		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Actophilornis africanus	Jacana, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Microparra capensis	Jacana, Lesser		PG Schedule 2 Section 15(1)(a)	LC	VU			
Stercorarius longicaudus	Jaeger, Long-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Stercorarius parasiticus	Jaeger, Parasitic		PG Schedule 2 Section 15(1)(a)	LC	LC			
Falco dickinsoni	Kestrel, Dickinson's		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	1	2
Falco rupicolus	Kestrel, Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Ispidina picta	Kingfisher, African Pygmy		PG Schedule 2 Section 15(1)(a)	LC	LC			
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			
Alcedo semitorquata	Kingfisher, Half-collared		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4

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Alcedo cristata	Kingfisher, Malachite		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Halcyon senegaloides	Kingfisher, Mangrove		PG Schedule 2 Section 15(1)(a)	LC	EN			
Ceryle rudis	Kingfisher, Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Halcyon chelicuti	Kingfisher, Striped		PG Schedule 2 Section 15(1)(a)	LC	LC			
Halcyon senegalensis	Kingfisher, Woodland		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Milvus migrans	Kite, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
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	3
Rissa tridactyla	Kittiwake, Black-legged		PG Schedule 2 Section 15(1)(a)					
Calidris tenuirostris	Knot, Great		PG Schedule 2 Section 15(1)(a)	EN	NA			
Calidris canutus	Knot, Red		PG Schedule 2 Section 15(1)(a)	NT	LC			
Eupodotis caerulescens	Korhaan, Blue		PG Schedule 2 Section 15(1)(a)	NT	LC	1	1	2
Eupodotis vigorsii	Korhaan, Karoo		PG Schedule 2 Section 15(1)(a)	LC	NT			
Afrotis afraoides	Korhaan, Northern Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lophotis ruficrista	Korhaan, Red-crested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Afrotis afra	Korhaan, Southern Black		PG Schedule 2 Section 15(1)(a)	VU	VU			
Eupodotis senegalensis	Korhaan, White-bellied		PG Schedule 2 Section 15(1)(a)	LC	VU	1		3
Vanellus senegallus	Lapwing, African Wattled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Vanellus melanopterus	Lapwing, Black-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Vanellus armatus	Lapwing, Blacksmith		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Vanellus coronatus	Lapwing, Crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Vanellus crassirostris	Lapwing, Long-toed		PG Schedule 2 Section 15(1)(a)					
Vanellus lugubris	Lapwing, Senegal		PG Schedule 2 Section 15(1)(a)	LC	LC			
Vanellus albiceps	Lapwing, White-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC			
Certhilauda brevirostris	Lark, Agulhas Long-billed		PG Schedule 2 Section 15(1)(a)	NR	NT		1	
Calendulauda barlowi	Lark, Barlow's		PG Schedule 2 Section 15(1)(a)	LC	NT			
Eremopterix australis	Lark, Black-eared Sparrow-		PG Schedule 2 Section 15(1)(a)	LC	LC			
Spizocorys fringillaris	Lark, Botha's		PG Schedule 2 Section 15(1)(a)	EN	EN			
Mirafra apiata	Lark, Cape Clapper		PG Schedule 2 Section 15(1)(a)	LC	LC		1	
Certhilauda curvirostris	Lark, Cape Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC		1	
Eremopterix leucotis	Lark, Chestnut-backed Sparrow-		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Pinarocorys nigricans	Lark, Dusky		PG Schedule 2 Section 15(1)(a)	LC	LC			
Mirafra fasciolata	Lark, Eastern Clapper		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Certhilauda semitorquata	Lark, Eastern Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Calendulauda africanoides	Lark, Fawn-coloured		PG Schedule 2 Section 15(1)(a)	LC	LC			

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Mirafra rufocinnamomea	Lark, Flappet		PG Schedule 2 Section 15(1)(a)	LC	LC			
Eremopterix verticalis	Lark, Grey-backed Sparrow		PG Schedule 2 Section 15(1)(a)	LC	LC			
Calendulauda albescens	Lark, Karoo		PG Schedule 2 Section 15(1)(a)	LC	LC			
Certhilauda subcoronata	Lark, Karoo Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC		1	
Galerida magnirostris	Lark, Large-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Mirafra cheniana	Lark, Melodious		PG Schedule 2 Section 15(1)(a)	NT	LC	1		3
Mirafra passerina	Lark, Monotonous		PG Schedule 2 Section 15(1)(a)	LC	LC			
Spizocorys conirostris	Lark, Pink-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Calendulauda burra	Lark, Red		PG Schedule 2 Section 15(1)(a)	VU	VU			
Calandrella cinerea	Lark, Red-capped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Heteromirafra ruddi	Lark, Rudd's		PG Schedule 2 Section 15(1)(a)	VU	EN			
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		4
Spizocorys sclateri	Lark, Sclater's		PG Schedule 2 Section 15(1)(a)	NT	NT			
Certhilauda chuana	Lark, Short-clawed		PG Schedule 2 Section 15(1)(a)	LC	NT			
Chersomanes albofasciata	Lark, Spike-heeled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Spizocorys starki	Lark, Stark's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Macronyx capensis	Longclaw, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Macronyx ameliae	Longclaw, Rosy-throated		PG Schedule 2 Section 15(1)(a)	LC	NT			
Macronyx croceus	Longclaw, Yellow-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Agapornis roseicollis	Lovebird, Rosy-faced		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ceuthmochares australis	Malkoha, Green		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anas platyrhynchos	Mallard		PG Schedule 2 Section 15(1)(a)			1		4
Spermestes cucullatus	Mannikin, Bronze		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Lonchura fringilloides	Mannikin, Magpie		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lonchura nigriceps	Mannikin, Red-backed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Riparia cincta	Martin, Banded		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Riparia paludicola	Martin, Brown-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Delichon urbicum	Martin, Common House		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
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	1	3
Gallinula chloropus	Moorhen, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Gallinula angulata	Moorhen, Lesser		PG Schedule 2 Section 15(1)(a)	LC	LC			
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

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Colius colius	Mousebird, White-backed		WA Schedule 5 Section 43	LC	LC	1		4
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
Nicator gularis	Nicator, Eastern		PG Schedule 2 Section 15(1)(a)	LC	LC			
Luscinia luscinia	Nightingale, Thrush		PG Schedule 2 Section 15(1)(a)	LC	LC			
Caprimulgus europaeus	Nightjar, European		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Caprimulgus pectoralis	Nightjar, Fiery-necked		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Caprimulgus tristigma	Nightjar, Freckled		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Caprimulgus vexillarius	Nightjar, Pennant-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Caprimulgus rufigena	Nightjar, Rufous-cheeked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Caprimulgus fossii	Nightjar, Square-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Caprimulgus natalensis	Nightjar, Swamp		PG Schedule 2 Section 15(1)(a)	LC	VU			
Anous stolidus	Noddy, Brown		PG Schedule 2 Section 15(1)(a)					
Anous tenuirostris	Noddy, Lesser		PG Schedule 2 Section 15(1)(a)					
Anastomus lamelligerus	Openbill, African		PG Schedule 2 Section 15(1)(a)	LC	LC		1	
Oriolus auratus	Oriole, African Golden		PG Schedule 2 Section 15(1)(a)	LC	LC			
Oriolus larvatus	Oriole, Black-headed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Oriolus oriolus	Oriole, Eurasian Golden		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Pandion haliaetus	Osprey, Western		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Struthio camelus	Ostrich, Common			LC	LC	1	1	5
Tyto capensis	Owl, African Grass		PG Schedule 2 Section 15(1)(a)	LC	VU	1	1	?
Otus senegalensis	Owl, African Scops		PG Schedule 2 Section 15(1)(a)	LC	LC			
Strix woodfordii	Owl, African Wood		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	1	2
Scotopelia peli	Owl, Pel's Fishing		PG Schedule 2 Section 15(1)(a)	LC	EN			
Ptilopsis granti	Owl, Southern White-faced		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
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 capense	Owlet, African Barred		PG Schedule 2 Section 15(1)(a)	LC	LC			
Glaucidium perlatum	Owlet, Pearl-spotted		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Buphagus erythrorynchus	Oxpecker, Red-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Buphagus africanus	Oxpecker, Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Haematopus moquini	Oystercatcher, African Black		PG Schedule 2 Section 15(1)(a)	NT	NA			

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Haematopus ostralegus	Oystercatcher, Eurasian		PG Schedule 2 Section 15(1)(a)	NT	NA			
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)					
Poicephalus cryptoxanthus	Parrot, Brown-headed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Poicephalus robustus	Parrot, Cape	EN	PG Schedule 2 Section 15(1)(a)	NR	EN			
Poicephalus fuscicollis	Parrot, Grey-headed	PS	PG Schedule 2 Section 15(1)(a)	LC	LC			
Poicephalus meyeri	Parrot, Meyer's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Alectoris chukar	Partridge, Chukar		PG Schedule 2 Section 15(1)(a)					
Pavo cristatus	Peafowl, Indian		PG Schedule 2 Section 15(1)(a)					
Pelecanus onocrotalus	Pelican, Great White		PG Schedule 2 Section 15(1)(a)	LC	VU			
Pelecanus rufescens	Pelican, Pink-backed		PG Schedule 2 Section 15(1)(a)	LC	VU		1	
Anthoscopus minutus	Penduline-tit, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anthoscopus caroli	Penduline-tit, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC			
Spheniscus demersus	Penguin, African		PG Schedule 2 Section 15(1)(a)	EN	EN			
Aptenodytes patagonicus	Penguin, King		PG Schedule 2 Section 15(1)(a)		NT			
Eudyptes chrysolophus	Penguin, Macaroni		PG Schedule 2 Section 15(1)(a)	VU	VU			
Eudyptes moseleyi	Penguin, Northern Rockhopper		PG Schedule 2 Section 15(1)(a)	EN	NA			
Eudyptes chrysocome	Penguin, Southern Rockhopper		PG Schedule 2 Section 15(1)(a)	VU	EN			
Thalassoica antarctica	Petrel, Antarctic		PG Schedule 2 Section 15(1)(a)					
Pterodroma incerta	Petrel, Atlantic		PG Schedule 2 Section 15(1)(a)	EN	NA			
Pterodroma baraui	Petrel, Barau's		PG Schedule 2 Section 15(1)(a)	EN	NA			
Fregetta tropica	Petrel, Black-bellied Storm		PG Schedule 2 Section 15(1)(a)		NT			
Halobaena caerulea	Petrel, Blue		PG Schedule 2 Section 15(1)(a)		NT			
Hydrobates pelagicus	Petrel, European Storm		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pterodroma macroptera	Petrel, Great-winged		PG Schedule 2 Section 15(1)(a)	LC	NT			
Procellaria cinerea	Petrel, Grey		PG Schedule 2 Section 15(1)(a)	NT	VU			
Garrodia nereis	Petrel, Grey-backed Storm		PG Schedule 2 Section 15(1)(a)		NT			
Lugensa brevirostris	Petrel, Kerguelen		PG Schedule 2 Section 15(1)(a)		NT			
Oceanodroma leucorhoa	Petrel, Leach's Storm		PG Schedule 2 Section 15(1)(a)	LC	CR			
Oceanodroma matsudairae	Petrel, Matsudaira's Storm		PG Schedule 2 Section 15(1)(a)	VU	NA			
Macronectes halli	Petrel, Northern Giant		PG Schedule 2 Section 15(1)(a)	LC	NT			
Daption capense	Petrel, Pintado		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pterodroma mollis	Petrel, Soft-plumaged		PG Schedule 2 Section 15(1)(a)	LC	NT			
Macronectes giganteus	Petrel, Southern Giant		PG Schedule 2 Section 15(1)(a)	LC	NT			
Procellaria conspicillata	Petrel, Spectacled		PG Schedule 2 Section 15(1)(a)	VU	VU			

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Fregetta grallaria	Petrel, White-bellied Storm		PG Schedule 2 Section 15(1)(a)					
Procellaria aequinoctialis	Petrel, White-chinned		PG Schedule 2 Section 15(1)(a)	VU	VU			
Pelagodroma marina	Petrel, White-faced Storm		PG Schedule 2 Section 15(1)(a)					
Pterodroma lessonii	Petrel, White-headed		PG Schedule 2 Section 15(1)(a)					
Oceanites oceanicus	Petrel, Wilson's Storm		PG Schedule 2 Section 15(1)(a)	LC	LC			
Petronia superciliaris	Petronia, Yellow-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Phalaropus fulicarius	Phalarope, Red		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Phalaropus lobatus	Phalarope, Red-necked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Phalaropus tricolor	Phalarope, Wilson's		PG Schedule 2 Section 15(1)(a)					
Treron calvus	Pigeon, African Green		PG Schedule 2 Section 15(1)(a)	LC	LC			
Columba arquatrix	Pigeon, African Olive		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Columba delegorguei	Pigeon, Eastern Bronze-naped		PG Schedule 2 Section 15(1)(a)	LC	EN			
Columba guinea	Pigeon, Speckled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anas acuta	Pintail, Northern		PG Schedule 2 Section 15(1)(a)					
Anthus cinnamomeus	Pipit, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anthus crenatus	Pipit, African Rock		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4
Anthus vaalensis	Pipit, Buffy		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anthus caffer	Pipit, Bushveld		PG Schedule 2 Section 15(1)(a)	LC	LC			
Tmetothylacus tenellus	Pipit, Golden		PG Schedule 2 Section 15(1)(a)					
Anthus similis	Pipit, Long-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anthus hoeschi	Pipit, Mountain		PG Schedule 2 Section 15(1)(a)	LC	NT			
Anthus leucophrys	Pipit, Plain-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Anthus cervinus	Pipit, Red-throated		PG Schedule 2 Section 15(1)(a)					
Anthus brachyurus	Pipit, Short-tailed		PG Schedule 2 Section 15(1)(a)	LC	VU			
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			
Anthus chloris	Pipit, Yellow-breasted		PG Schedule 2 Section 15(1)(a)	VU	VU			
Pitta angolensis	Pitta, African		PG Schedule 2 Section 15(1)(a)					
Pluvialis dominica	Plover, American Golden		PG Schedule 2 Section 15(1)(a)					
Charadrius asiaticus	Plover, Caspian		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Charadrius pallidus	Plover, Chestnut-banded		PG Schedule 2 Section 15(1)(a)	NT	NT	1		4
Charadrius hiaticula	Plover, Common Ringed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Dromas ardeola	Plover, Crab-		PG Schedule 2 Section 15(1)(a)					
Charadrius leschenaultii	Plover, Greater Sand		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pluvialis squatarola	Plover, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC			

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Charadrius pecuarius	Plover, Kittlitz's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Charadrius mongolus	Plover, Lesser Sand		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pluvialis fulva	Plover, Pacific Golden		PG Schedule 2 Section 15(1)(a)			1		4
Charadrius tricollaris	Plover, Three-banded		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Charadrius marginatus	Plover, White-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Netta erythrophthalma	Pochard, Southern		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Glareola nordmanni	Pratincole, Black-winged		PG Schedule 2 Section 15(1)(a)	NT	NT	1	1	4
Glareola pratincola	Pratincole, Collared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Glareola nuchalis	Pratincole, Rock		PG Schedule 2 Section 15(1)(a)					
Prinia flavicans	Prinia, Black-chested		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Prinia hypoxantha	Prinia, Drakensberg		PG Schedule 2 Section 15(1)(a)	LC	LC			
Prinia maculosa	Prinia, Karoo		PG Schedule 2 Section 15(1)(a)	LC	LC			
Prinia subflava	Prinia, Tawny-flanked		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Pachyptila desolata	Prion, Antarctic		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pachyptila vittata	Prion, Broad-billed		PG Schedule 2 Section 15(1)(a)					
Pachyptila turtur	Prion, Fairy		PG Schedule 2 Section 15(1)(a)		NT			
Pachyptila salvini	Prion, Salvin's		PG Schedule 2 Section 15(1)(a)		NT			
Pachyptila belcheri	Prion, Slender-billed		PG Schedule 2 Section 15(1)(a)					
Dryoscopus cubla	Puffback, Black-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Pytilia melba	Pytilia, Green-winged		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Pytilia afra	Pytilia, Orange-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ortygospiza atricollis	Quail-finch, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Excalfactoria adansonii	Quail, Blue		PG Schedule 2 Section 15(1)(a)					
Coturnix coturnix	Quail, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Coturnix delegorguei	Quail, Harlequin		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Quelea quelea	Quelea, Red-billed		WA Schedule 5 Section 43	LC	LC	1	1	1
Quelea erythrops	Quelea, Red-headed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Rallus caerulescens	Rail, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Corvus albicollis	Raven, White-necked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Tringa totanus	Redshank, Common		PG Schedule 2 Section 15(1)(a)			1		4
Tringa erythropus	Redshank, Spotted		PG Schedule 2 Section 15(1)(a)			1		4
Phoenicurus phoenicurus	Redstart, Common		PG Schedule 2 Section 15(1)(a)					
Cossypha caffra	Robin-chat, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Cossypha dichroa	Robin-chat, Chorister		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cossypha natalensis	Robin-chat, Red-capped		PG Schedule 2 Section 15(1)(a)	LC	LC			

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Cossypha heuglini	Robin-chat, White-browed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cossypha humeralis	Robin-chat, White-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Erythropygia quadrivirgata	Robin, Bearded Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC			
Erythropygia signata	Robin, Brown Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cercotrichas paena	Robin, Kalahari Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC			
Erythropygia coryphoeus	Robin, Karoo Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cercotrichas leucophrys	Robin, White-browed Scrub		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pogonocichla stellata	Robin, White-starred		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chaetops frenatus	Rockjumper, Cape		PG Schedule 2 Section 15(1)(a)	LC	NT			
Chaetops aurantius	Rockjumper, Drakensberg		PG Schedule 2 Section 15(1)(a)	LC	LC			
Eurystomus glaucurus	Roller, Broad-billed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Coracias garrulus	Roller, European		PG Schedule 2 Section 15(1)(a)	LC	NT	1	1	4
Coracias caudatus	Roller, Lilac-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Coracias naevius	Roller, Purple		PG Schedule 2 Section 15(1)(a)	LC	LC			
Coracias spatulatus	Roller, Racket-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Philomachus pugnax	Ruff		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Calidris alba	Sanderling		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pterocles burchelli	Sandgrouse, Burchell's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pterocles bicinctus	Sandgrouse, Double-banded		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pterocles namaqua	Sandgrouse, Namaqua		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pterocles gutturalis	Sandgrouse, Yellow-throated		PG Schedule 2 Section 15(1)(a)	LC	NT			
Calidris bairdii	Sandpiper, Baird's		PG Schedule 2 Section 15(1)(a)			1		4
Limicola falcinellus	Sandpiper, Broad-billed		PG Schedule 2 Section 15(1)(a)					
Tryngites subruficollis	Sandpiper, Buff-breasted		PG Schedule 2 Section 15(1)(a)	NT	NA	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	1	4
Calidris melanotos	Sandpiper, Pectoral		PG Schedule 2 Section 15(1)(a)			1		4
Xenus cinereus	Sandpiper, Terek		PG Schedule 2 Section 15(1)(a)	LC	LC			
Calidris fuscicollis	Sandpiper, White-rumped		PG Schedule 2 Section 15(1)(a)			1		4
Tringa glareola	Sandpiper, Wood		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Psalidoprocne pristoptera	Saw-wing, Black		PG Schedule 2 Section 15(1)(a)	LC	LC			
Rhinopomastus cyanomelas	Scimitarbill, Common		PG Schedule 2 Section 15(1)(a)	LC	LC			
Sagittarius serpentarius	Secretarybird		PG Schedule 2 Section 15(1)(a)	VU	VU	1	1	4

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Crithagra leucoptera	Seedeater (Canary), Protea		PG Schedule 2 Section 15(1)(a)	LC	NT			
Crithagra gularis	Seedeater, Streaky-headed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Calonectris borealis	Shearwater, Cory's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Puffinus carneipes	Shearwater, Flesh-footed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Puffinus gravis	Shearwater, Great		PG Schedule 2 Section 15(1)(a)	LC	LC			
Puffinus assimilis	Shearwater, Little		PG Schedule 2 Section 15(1)(a)	LC	LC			
Puffinus puffinus	Shearwater, Manx		PG Schedule 2 Section 15(1)(a)	LC	LC			
Calonectris diomedea	Shearwater, Scopoli's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Puffinus griseus	Shearwater, Sooty		PG Schedule 2 Section 15(1)(a)	NT	NT			
Calonectris leucomelas	Shearwater, Streaked		PG Schedule 2 Section 15(1)(a)					
Puffinus bailloni	Shearwater, Tropical		PG Schedule 2 Section 15(1)(a)					
Puffinus pacificus	Shearwater, Wedge-tailed		PG Schedule 2 Section 15(1)(a)					
Chionis albus	Sheathbill, Greater		PG Schedule 2 Section 15(1)(a)					
Tadorna cana	Shelduck, South African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Accipiter badius	Shikra		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anas smithii	Shoveler, Cape		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		4
Lanius minor	Shrike, Lesser Grey		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Corvinella melanoleuca	Shrike, Magpie		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lanius collurio	Shrike, Red-backed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Eurocephalus anguitimens	Shrike, Southern White-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC			
Crithagra totta	Siskin, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC			
Crithagra symonsi	Siskin, Drakensberg		PG Schedule 2 Section 15(1)(a)	LC	LC			
Rynchops flavirostris	Skimmer, African		PG Schedule 2 Section 15(1)(a)	NT	NA			
Rynchops niger	Skimmer, Black		PG Schedule 2 Section 15(1)(a)					
Stercorarius pomarinus	Skua, Pomarine		PG Schedule 2 Section 15(1)(a)	LC	LC			
Stercorarius maccormicki	Skua, South Polar		PG Schedule 2 Section 15(1)(a)					
Stercorarius antarcticus	Skua, Subantarctic		PG Schedule 2 Section 15(1)(a)	LC	EN			
Gallinago nigripennis	Snipe, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Gallinago media	Snipe, Great		PG Schedule 2 Section 15(1)(a)	NT	NA	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	2
Passer motitensis	Sparrow, Great		PG Schedule 2 Section 15(1)(a)	LC	LC			
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

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Accipiter melanoleucus	Sparrowhawk, Black		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Accipiter minullus	Sparrowhawk, Little		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Accipiter ovampensis	Sparrowhawk, Ovambo		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Accipiter rufiventris	Sparrowhawk, Rufous-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Neafrapus boehmi	Spinetail, Böhm's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Telacanthura ussheri	Spinetail, Mottled		PG Schedule 2 Section 15(1)(a)	LC	LC			
Platalea alba	Spoonbill, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Pternistis capensis	Spurfowl, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pternistis natalensis	Spurfowl, Natal		OG Schedule 3 Section 15(1)(b)	LC	LC			
Pternistis adspersus	Spurfowl, Red-billed		OG Schedule 3 Section 15(1)(b)	LC	LC			
Pternistis afer	Spurfowl, Red-necked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pternistis swainsonii	Spurfowl, Swainson's		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Notopholia corrusca	Starling, Black-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lamprotornis australis	Starling, Burchell's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lamprotornis nitens	Starling, Cape Glossy		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Sturnus vulgaris	Starling, Common		PG Schedule 2 Section 15(1)(a)					
Lamprotornis chalybaeus	Starling, Greater Blue-eared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lamprotornis mevesii	Starling, Meves's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Lamprotornis elisabeth	Starling, Miombo Blue-eared		PG Schedule 2 Section 15(1)(a)					
Onychognathus nabouroup	Starling, Pale-winged		PG Schedule 2 Section 15(1)(a)	LC	LC			
Spreo bicolor	Starling, Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
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		3
Creatophora cinerea	Starling, Wattled		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
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
Calidris subminuta	Stint, Long-toed		PG Schedule 2 Section 15(1)(a)					
Calidris ruficollis	Stint, Red-necked		PG Schedule 2 Section 15(1)(a)					
Calidris temminckii	Stint, Temminck's		PG Schedule 2 Section 15(1)(a)					
Saxicola torquatus	Stonechat, African		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Ciconia abdimii	Stork, Abdim's		PG Schedule 2 Section 15(1)(a)	LC	NT	1		3
Ciconia nigra	Stork, Black		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Leptoptilos crumeniferus	Stork, Marabou		PG Schedule 2 Section 15(1)(a)	LC	NT	1		4
Ephippiorhynchus senegalensis	Stork, Saddle-billed		PG Schedule 2 Section 15(1)(a)	LC	EN			
Ciconia ciconia	Stork, White		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3

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Ciconia episcopus	Stork, Woolly-necked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Mycteria ibis	Stork, Yellow-billed		PG Schedule 2 Section 15(1)(a)	LC	EN	1	1	4
Promerops cafer	Sugarbird, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC			
Promerops gurneyi	Sugarbird, Gurney's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chalcomitra amethystina	Sunbird, Amethyst		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Anthodiaeta collaris	Sunbird, Collared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cinnyris fuscus	Sunbird, Dusky		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cinnyris afer	Sunbird, Greater Double-collared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cyanomitra veroxii	Sunbird, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC			
Nectarinia famosa	Sunbird, Malachite		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Cinnyris mariquensis	Sunbird, Marico		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
Cinnyris neergaardi	Sunbird, Neergaard's		PG Schedule 2 Section 15(1)(a)	NT	VU			
Cyanomitra olivacea	Sunbird, Olive		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anthobaphes violacea	Sunbird, Orange-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anthreptes reichenowi	Sunbird, Plain-backed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cinnyris bifasciatus	Sunbird, Purple-banded		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chalcomitra senegalensis	Sunbird, Scarlet-chested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cinnyris chalybeus	Sunbird, Southern Double-collared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cinnyris venustus	Sunbird, Variable		PG Schedule 2 Section 15(1)(a)					
Cinnyris talatala	Sunbird, White-bellied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Hirundo rustica	Swallow, Barn		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Hirundo atrocaerulea	Swallow, Blue		PG Schedule 2 Section 15(1)(a)	VU	CR			
Hirundo cucullata	Swallow, Greater Striped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Pseudhirundo griseopyga	Swallow, Grey-rumped		PG Schedule 2 Section 15(1)(a)	LC	LC			
Hirundo abyssinica	Swallow, Lesser Striped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Cecropis senegalensis	Swallow, Mosque		PG Schedule 2 Section 15(1)(a)	LC	LC			
Hirundo dimidiata	Swallow, Pearl-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1		3
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	2
Hirundo albigularis	Swallow, White-throated		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Hirundo smithii	Swallow, Wire-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Porphyrio madagascariensis	Swamphen, African (Purple)		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Cygnus olor	Swan, Mute		PG Schedule 2 Section 15(1)(a)					
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	4

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Tachymarptis melba	Swift, Alpine		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Apus bradfieldi	Swift, Bradfield's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Apus apus	Swift, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
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	2
Apus caffer	Swift, White-rumped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Tchagra senegalus	Tchagra, Black-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Tchagra australis	Tchagra, Brown-crowned		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Tchagra tchagra	Tchagra, Southern		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	1	4
Anas erythrorhyncha	Teal, Red-billed		OG Schedule 3 Section 15(1)(b)	LC	LC	1	1	3
Sterna vittata	Tern, Antarctic		PG Schedule 2 Section 15(1)(a)	LC	EN			
Sterna paradisaea	Tern, Arctic		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chlidonias niger	Tern, Black		PG Schedule 2 Section 15(1)(a)					
Sterna sumatrana	Tern, Black-naped		PG Schedule 2 Section 15(1)(a)					
Onychoprion anaethetus	Tern, Bridled		PG Schedule 2 Section 15(1)(a)					
Sterna caspia	Tern, Caspian		PG Schedule 2 Section 15(1)(a)	LC	VU	1		4
Sterna hirundo	Tern, Common		PG Schedule 2 Section 15(1)(a)	LC	LC			
Sterna balaenarum	Tern, Damara		PG Schedule 2 Section 15(1)(a)	NT	CR			
Sterna elegans	Tern, Elegant		PG Schedule 2 Section 15(1)(a)					
Gelochelidon nilotica	Tern, Gull-billed		PG Schedule 2 Section 15(1)(a)					
Thalasseus bengalensis	Tern, Lesser Crested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Sterna albifrons	Tern, Little		PG Schedule 2 Section 15(1)(a)	LC	LC			
Sterna dougallii	Tern, Roseate		PG Schedule 2 Section 15(1)(a)	LC	EN			
Thalasseus sandvicensis	Tern, Sandwich		PG Schedule 2 Section 15(1)(a)	LC	LC			
Onychoprion fuscatus	Tern, Sooty		PG Schedule 2 Section 15(1)(a)					
Thalasseus bergii	Tern, Swift		PG Schedule 2 Section 15(1)(a)	LC	LC			
Chlidonias hybrida	Tern, Whiskered		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Sterna repressa	Tern, White-cheeked		PG Schedule 2 Section 15(1)(a)					
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	2
Burhinus vermiculatus	Thick-knee, Water		PG Schedule 2 Section 15(1)(a)	LC	LC			
Monticola rupestris	Thrush, Cape Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Cichladusa arquata	Thrush, Collared Palm		PG Schedule 2 Section 15(1)(a)	LC	LC			

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Psophocichla litsipsirupa	Thrush, Groundscraper		PG Schedule 2 Section 15(1)(a)	LC	LC			
Turdus smithi	Thrush, Karoo		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Turdus libonyanus	Thrush, Kurrichane		PG Schedule 2 Section 15(1)(a)	LC	LC			
Turdus olivaceus	Thrush, Olive		PG Schedule 2 Section 15(1)(a)	LC	LC		1	
Geokichla gurneyi	Thrush, Orange Ground		PG Schedule 2 Section 15(1)(a)	LC	NT			
Monticola explorator	Thrush, Sentinel Rock		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Monticola brevipes	Thrush, Short-toed Rock		PG Schedule 2 Section 15(1)(a)	LC	LC			
Geokichla guttata	Thrush, Spotted Ground		PG Schedule 2 Section 15(1)(a)	EN	EN			
Pogoniulus pusillus	Tinkerbird, Red-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Pogoniulus chrysoconus	Tinkerbird, Yellow-fronted		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Pogoniulus bilineatus	Tinkerbird, Yellow-rumped		PG Schedule 2 Section 15(1)(a)	LC	LC			
Parisoma subcaeruleum	Tit-Babbler, Chestnut-vented		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Sylvia layardi	Tit-Babbler, Layard's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Parus cinerascens	Tit, Ashy		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Parus afer	Tit, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC			
Parus niger	Tit, Southern Black		PG Schedule 2 Section 15(1)(a)	LC	LC			
Apaloderma narina	Trogon, Narina		PG Schedule 2 Section 15(1)(a)	LC	LC			
Phaethon aethereus	Tropicbird, Red-billed		PG Schedule 2 Section 15(1)(a)					
Phaethon rubricauda	Tropicbird, Red-tailed		PG Schedule 2 Section 15(1)(a)					
Phaethon lepturus	Tropicbird, White-tailed		PG Schedule 2 Section 15(1)(a)					
Tauraco corythaix	Turaco, Knysna		PG Schedule 2 Section 15(1)(a)	LC	LC			
Tauraco livingstonii	Turaco, Livingstone's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Tauraco porphyreolophus	Turaco, Purple-crested		PG Schedule 2 Section 15(1)(a)	LC	LC			
Arenaria interpres	Turnstone, Ruddy		PG Schedule 2 Section 15(1)(a)	LC	LC			
Mandingoa nitidula	Twinspot, Green		PG Schedule 2 Section 15(1)(a)	LC	LC			
Hypargos margaritatus	Twinspot, Pink-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Hypargos niveoguttatus	Twinspot, Red-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Gypaetus barbatus	Vulture, Bearded	CR	PG Schedule 2 Section 15(1)(a)	NT	CR			
Gyps coprotheres	Vulture, Cape	EN	PG Schedule 2 Section 15(1)(a)	EN	EN	1		4
Neophron percnopterus	Vulture, Egyptian	CR	PG Schedule 2 Section 15(1)(a)	EN	NA			
Necrosyrtes monachus	Vulture, Hooded	EN	PG Schedule 2 Section 15(1)(a)	CR	CR			
Torgos tracheliotos	Vulture, Lappet-faced	EN	PG Schedule 2 Section 15(1)(a)	EN	EN			
Gypohierax angolensis	Vulture, Palm-nut		PG Schedule 2 Section 15(1)(a)	LC	LC			
Gyps rueppelli	Vulture, Rüppell's		PG Schedule 2 Section 15(1)(a)	CR	NA			
Gyps africanus	Vulture, White-backed	EN	PG Schedule 2 Section 15(1)(a)	CR	CR			

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Trigonoceps occipitalis	Vulture, White-headed	EN	PG Schedule 2 Section 15(1)(a)	CR	CR			
Motacilla aguimp	Wagtail, African Pied		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Motacilla capensis	Wagtail, Cape		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Motacilla citreola	Wagtail, Citrine		PG Schedule 2 Section 15(1)(a)					
Motacilla cinerea	Wagtail, Grey		PG Schedule 2 Section 15(1)(a)					
Motacilla clara	Wagtail, Mountain		PG Schedule 2 Section 15(1)(a)	LC	LC			
Motacilla flava	Wagtail, Western Yellow		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Acrocephalus baeticatus	Warbler, African Reed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Bradypterus barratti	Warbler, Barratt's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Calamonastes fasciolatus	Warbler, Barred Wren-		PG Schedule 2 Section 15(1)(a)	LC	LC			
Acrocephalus griseldis	Warbler, Basra Reed		PG Schedule 2 Section 15(1)(a)					
Schoenicola brevirostris	Warbler, Broad-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Euryptila subcinnamomea	Warbler, Cinnamon-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC			
Iduna natalensis	Warbler, Dark-capped Yellow		PG Schedule 2 Section 15(1)(a)	LC	LC			
Acrocephalus scirpaceus	Warbler, Eurasian Reed		PG Schedule 2 Section 15(1)(a)					
Sylvia borin	Warbler, Garden		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Acrocephalus arundinaceus	Warbler, Great Reed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Hippolais icterina	Warbler, Icterine		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Bradypterus sylvaticus	Warbler, Knysna		PG Schedule 2 Section 15(1)(a)	VU	VU			
Acrocephalus gracilirostris	Warbler, Lesser Swamp		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Bradypterus baboecala	Warbler, Little Rush		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Acrocephalus palustris	Warbler, Marsh		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Phragmacia substriata	Warbler, Namaqua		PG Schedule 2 Section 15(1)(a)	LC	LC			
Hippolais olivetorum	Warbler, Olive-tree		PG Schedule 2 Section 15(1)(a)	LC	LC			
Locustella fluviatilis	Warbler, River		PG Schedule 2 Section 15(1)(a)	LC	LC			
Malcorus pectoralis	Warbler, Rufous-eared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Acrocephalus schoenobaenus	Warbler, Sedge		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Calamonastes stierlingi	Warbler, Stierling's Wren-		PG Schedule 2 Section 15(1)(a)	LC	LC			
Cryptillas victorini	Warbler, Victorin's		PG Schedule 2 Section 15(1)(a)	LC	LC			
Phylloscopus trochilus	Warbler, Willow		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Phylloscopus ruficapilla	Warbler, Yellow-throated Woodland		PG Schedule 2 Section 15(1)(a)	LC	LC			
Platysteira peltata	Wattle-eye, Black-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Estrilda erythronotos	Waxbill, Black-faced		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	4
Uraeginthus angolensis	Waxbill, Blue		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Estrilda astrild	Waxbill, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1

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Estrilda perreini	Waxbill, Grey		PG Schedule 2 Section 15(1)(a)	LC	LC			
Amandava subflava	Waxbill, Orange-breasted		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2
Coccopygia melanotis	Waxbill, Swee		PG Schedule 2 Section 15(1)(a)	LC	LC			
Granatina granatina	Waxbill, Violet-eared		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ploceus xanthops	Weaver, African (Holub's) Golden		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ploceus capensis	Weaver, Cape		WA Schedule 5 Section 43	LC	LC	1	1	2
Ploceus rubiginosus	Weaver, Chestnut		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ploceus bicolor	Weaver, Dark-backed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ploceus intermedius	Weaver, Lesser Masked		PG Schedule 2 Section 15(1)(a)	LC	LC			
Bubalornis niger	Weaver, Red-billed Buffalo		PG Schedule 2 Section 15(1)(a)	LC	LC			
Anaplectes rubriceps	Weaver, Red-headed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Philetairus socius	Weaver, Sociable		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ploceus xanthopterus	Weaver, Southern Brown-throated		PG Schedule 2 Section 15(1)(a)	LC	LC			
Ploceus velatus	Weaver, Southern Masked		WA Schedule 5 Section 43	LC	LC	1	1	1
Ploceus ocularis	Weaver, Spectacled		PG Schedule 2 Section 15(1)(a)	LC	LC			
Amblyospiza albifrons	Weaver, Thick-billed		PG Schedule 2 Section 15(1)(a)	LC	LC	1		2
Ploceus cucullatus	Weaver, Village		WA Schedule 5 Section 43	LC	LC	1	1	3
Ploceus subaureus	Weaver, Yellow		PG Schedule 2 Section 15(1)(a)	LC	LC			
Oenanthe pileata	Wheatear, Capped		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Oenanthe monticola	Wheatear, Mountain		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	3
Oenanthe oenanthe	Wheatear, Northern		PG Schedule 2 Section 15(1)(a)					
Oenanthe pleschanka	Wheatear, Pied		PG Schedule 2 Section 15(1)(a)					
Numenius phaeopus	Whimbrel, Common		PG Schedule 2 Section 15(1)(a)	LC	LC			
Zosterops senegalensis	White-eye, African Yellow		PG Schedule 2 Section 15(1)(a)	LC	LC			
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	
Sylvia communis	Whitethroat, Common		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Vidua obtusa	Whydah, Broad-tailed Paradise		PG Schedule 2 Section 15(1)(a)					
Vidua paradisaea	Whydah, Long-tailed Paradise		PG Schedule 2 Section 15(1)(a)	LC	LC	1		4
Vidua macroura	Whydah, Pin-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Vidua regia	Whydah, Shaft-tailed		PG Schedule 2 Section 15(1)(a)	LC	LC			
Euplectes axillaris	Widowbird, Fan-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	1
Euplectes ardens	Widowbird, Red-collared		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	1
Euplectes albonotatus	Widowbird, White-winged		PG Schedule 2 Section 15(1)(a)	LC	LC	1	1	2

SCIENTIFIC NAME	COMMON NAME	RSA LEGAL STATUS	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	REGIONAL RED LIST STATUS	RECORDS IN QDS	RECORDS IN PENTAD	LoO IN PORTION 15
Phoeniculus purpureus	Wood-hoopoe, Green		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Dendropicos namaquus	Woodpecker, Bearded		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1		4
Campethera bennettii	Woodpecker, Bennett's		**PG Schedule 2 Section 15(1)(a)**	LC	LC			
Dendropicos fuscescens	Woodpecker, Cardinal		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	3
Campethera abingoni	Woodpecker, Golden-tailed		**PG Schedule 2 Section 15(1)(a)**	LC	LC			
Geocolaptes olivaceus	Woodpecker, Ground		**PG Schedule 2 Section 15(1)(a)**	LC	LC			
Campethera notata	Woodpecker, Knysna		**PG Schedule 2 Section 15(1)(a)**	**NT**	**NT**			
Dendropicos griseocephalus	Woodpecker, Olive		**PG Schedule 2 Section 15(1)(a)**	LC	LC			
Jynx ruficollis	Wryneck, Red-throated		**PG Schedule 2 Section 15(1)(a)**	LC	LC	1	1	2
Tringa flavipes	Yellowlegs, Lesser		**PG Schedule 2 Section 15(1)(a)**					

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); NEM:BA ToPS (2015); Taylor *et al.* (2015); SABAP 2 (2017)

13.4. Reptile list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
AGAMIDAE	**Agamas**				
Agama aculeata distanti	Distant's Ground Agama	**PG Schedule 2 Section 15(1)(a)**	1LC	1	2
Agama atra	Southern Rock Agama	**PG Schedule 2 Section 15(1)(a)**	1LC	1	1
CHAMAELEONIDAE	**Chameleons**				
Chamaeleo dilepis dilepis	Common Flap-neck Chameleon	**PG Schedule 2 Section 15(1)(a)**	2LC*	1	2
COLUBRIDAE	**Typical snakes**				
Crotaphopeltis hotamboeia	Red-lipped Snake	**WA Schedule 5 Section 43**	2LC	2	2
Dasypeltis scabra	Rhombic Egg-eater	**WA Schedule 5 Section 43**	2LC	2	2
CORDYLIDAE	**Crag, flat & girdled lizards**				
Chamaesaura aenea	Coppery Grass Lizard	**PG Schedule 2 Section 15(1)(a)**	**1NT End**	2	2
Cordylus vittifer	Common Girdled Lizard	**PG Schedule 2 Section 15(1)(a)**	1LC	1	2
Pseudocordylus melanotus melanotus	Common Crag Lizard	**PG Schedule 2 Section 15(1)(a)**	1LC End	3	3
ELAPIDAE	**Cobras, mambas & relatives**				
Elapsoidea sundevallii media	Highveld Garter Snake	**WA Schedule 5 Section 43**	1LC*	1	2
Hemachatus haemachatus	Rinkhals	**WA Schedule 5 Section 43**	1LC	1	2
GEKKONIDAE	**Geckos**				
Lygodactylus capensis capensis	Common Dwarf Gecko	**PG Schedule 2 Section 15(1)(a)**	1LC	1	3
Pachydactylus affinis	Transvaal Gecko	**PG Schedule 2 Section 15(1)(a)**	1LC	3	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**				
Nucras lalandii	Delalande's Sandveld Lizard	**PG Schedule 2 Section 15(1)(a)**	1LC	1	3
Pedioplanis burchelli	Burchell's Sand Lizard	**PG Schedule 2 Section 15(1)(a)**	1LC End	3	4
LAMPROPHIIDAE	**Lamprophid snakes**				
Aparallactus capensis	Black-headed Centipede-eater	**WA Schedule 5 Section 43**	2LC	2	2
Atractaspis bibronii	Bibron's Stiletto Snake	**WA Schedule 5 Section 43**	2LC	3	3
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
Homoroselaps dorsalis	Striped Harlequin Snake	**WA Schedule 5 Section 43**	**1NT End**	3	3
Homoroselaps lacteus	Spotted Harlequin Snake	**WA Schedule 5 Section 43**	1LC	2	3
Lamprophis aurora	Aurora House Snake	**WA Schedule 5 Section 43**	1LC	1	2
Lycodonomorphus inornatus	Olive House Snake	**WA Schedule 5 Section 43**	1LC	3	3
Lycodonomorphus rufulus	Brown Water Snake	**WA Schedule 5 Section 43**	1LC	1	2

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
Lycophidion capense capense	Cape Wolf Snake	**WA Schedule 5 Section 43**	2LC	3	3
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	2
Psammophis crucifer	Cross-marked Grass Snake	**WA Schedule 5 Section 43**	1LC	3	3
Psammophis trinasalis	Fork-marked Sand Snake	**WA Schedule 5 Section 43**	2LC	3	3
Psammophylax rhombeatus rhombeatus	Spotted Grass Snake	**WA Schedule 5 Section 43**	2LC	1	2
Psammophylax tritaeniatus	Striped Grass Snake	**WA Schedule 5 Section 43**	2LC	3	3
Pseudaspis cana	Mole Snake	**WA Schedule 5 Section 43**	2LC	1	2
LEPTOTYPHLOPIDAE	**Thread snakes**				
Leptotyphlops scutifrons conjunctus	Eastern Thread Snake	**WA Schedule 5 Section 43**	1LC*	1	2
Leptotyphlops scutifrons scutifrons	Peters' Thread Snake	**WA Schedule 5 Section 43**	1LC*	1	3
PELOMEDUSIDAE	**Terrapins**				
Pelomedusa galeata	South African Marsh Terrapin	**PG Schedule 2 Section 15(1)(a)**		2	2
SCINCIDAE	**Skinks**				
Acontias gracilicauda	Thin-tailed Legless Skink	**PG Schedule 2 Section 15(1)(a)**	1LC	2	2
Afroablepharus wahlbergii	Wahlberg's Snake-eyed Skink	**PG Schedule 2 Section 15(1)(a)**	2LC	3	3
Trachylepis capensis	Cape Skink	**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
Trachylepis punctatissima	Speckled Rock Skink	**PG Schedule 2 Section 15(1)(a)**	2LC	1	1
Trachylepis varia	Variable Skink	**PG Schedule 2 Section 15(1)(a)**	2LC	1	2
TYPHLOPIDAE	**Blind snakes**				
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	3	3
VARANIDAE	**Monitors**				
Varanus niloticus	Water Monitor	**WA Schedule 5 Section 43**	2LC	3	3
VIPERIDAE	**Adders**				
Bitis arietans arietans	Puff Adder	**WA Schedule 5 Section 43**	2LC	2	2
Causus rhombeatus	Rhombic Night Adder	**WA Schedule 5 Section 43**	2LC	3	3

Status: 1 = Global; 2 = Regional; End = Endemic; LC = Least Concern; NT = Near Threatened; PG = Protected Game; WA = Wild Animal; *Status assigned to species

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

Sources: Transvaal Nature Conservation Ordinance (1983); Bates *et al.* (2014); NEM:BA ToPS (2015); ReptileMap (2017)

13.5. Frog list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	GLOBAL RED LIST STATUS	RSA, LSO & SWZ RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
BUFONIDAE	**True toads**					
Schismaderma carens	Red Toad		LC (U)	LC	2	2
Sclerophrys capensis	Raucous Toad		LC (D)	LC	2	2
Sclerophrys garmani	Olive Toad		LC (U)	LC	3	3
Sclerophrys gutturalis	Guttural Toad		LC (I)	LC	1	2
HYPEROLIIDAE	**Leaf-folding & reed frogs**					
Kassina senegalensis	Bubbling Kassina		LC (U)	LC	1	2
Semnodactylus wealii	Rattling Frog		LC (U)	LC	1	2
PHRYNOBATRACHIDAE	**Puddle frogs**					
Phrynobatrachus natalensis	Snoring Puddle Frog		LC (S)	LC	2	3
PIPIDAE	**African clawed frogs**					
Xenopus laevis	Common Platanna		LC (I)	LC	1	2
PYXICEPHALIDAE	**Moss, river, sand & stream frogs**					
Amietia fuscigula	Cape River Frog		LC (S)	LC	1	2
Cacosternum boettgeri	Common Caco		LC (U)	LC	1	2
Pyxicephalus adspersus	Giant Bullfrog	**PG Schedule 2 Section 15(1)(a)**	LC (D)	**NT**	1	3
Strongylopus fasciatus	Striped Stream Frog		LC (U)	LC	2	3
Tomopterna cryptotis	Tremolo Sand Frog		LC (S)	LC	1	2
Tomopterna natalensis	Natal Sand Frog		LC (U)	LC	1	2
RHACOPHORIDAE	**Foam Nest Frog**					
Amietia delalandii	Delalande's River Frog			*LC	1	2

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

Sources: Transvaal Nature Conservation Ordinance (1983); Minter *et al.* (2004); IUCN (2013.1); NEM:BA ToPS (2015); FrogMap (2017)

13.6. Butterfly list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
HESPERIIDAE	**Sandmen, skippers, sylphs & relatives**				
Coeliades forestan forestan	Striped Policeman		1LC	3	3
Coeliades pisistratus	Two-pip Policeman		1LC	3	3
Eretis umbra umbra	Small Marbled Elf		1LC End	2	2
Gegenes niso niso	Common Hottentot		1LC	1	1
Kedestes barberae barberae	Barber's Ranger		1LC	3	3
Metisella malgacha malgacha	Grassveld Sylph		1LC End	3	3
Metisella meninx	Marsh Sylph		**1LC Rare Habitat Specialist**	2	?
Spialia asterodia	Star Sandman		1LC	1	1
Spialia diomus ferax	Common Sandman		1LC	3	3
Spialia mafa mafa	Mafa Sandman		1LC	1	1
Spialia spio	Mountain Sandman		1LC	3	3
Tsitana tsita	Dismal Sylph		1LC	3	3
LYCAENIDAE	**Blues, coppers, opals & relatives**				
Actizera lucida	Rayed Blue		1LC	2	2
Aloeides dentatis dentatis	Roodepoort Copper	**Schedule 7 Section 45**	**1EN End**	3	?
Aloeides henningi	Henning's Copper		1LC End	2	2
Aloeides molomo molomo	Molomo Copper		1LC End	2	3
Aloeides trimeni trimeni	Trimen's Copper		1LC	2	3
Anthene definita definita	Common Hairtail		1LC	3	4
Anthene livida livida	Pale Hairtail		1LC	3	4
Azanus jesous	Topaz Babul Blue		1LC	3	3
Azanus ubaldus	Velvet-spotted Babul Blue		1LC	2	2
Cacyreus marshalli	Common Geranium Bronze		1LC	3	3
Chilades trochylus	Grass Jewel		1LC	2	2
Chrysoritis aureus	Heidelberg Opal	**Schedule 7 Section 45**	**1EN End**	3	4
Cigaritis ella	Ella's Bar		1LC	3	4
Cigaritis natalensis	Natal Bar		1LC	3	3
Cupidopsis cissus cissus	Common Meadow Blue		1LC	2	2
Cupidopsis jobates jobates	Tailed Meadow Blue		1LC	3	3
Eicochrysops messapus mahallakoaena	Cupreous Blue		1LC	2	2
Lampides boeticus	Pea Blue		1LC	1	2
Lepidochrysops ignota	Zulu Blue		1LC End	3	3

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
Lepidochrysops ketsi ketsi	Ketsi Blue		1LC End	3	3
Lepidochrysops letsea	Free State Blue		1LC	3	3
Lepidochrysops ortygia	Koppie Blue		1LC End	3	4
Lepidochrysops patricia	Patricia Blue		1LC	2	2
Lepidochrysops plebeia plebeia	Twin-spot Blue		1LC	2	3
Leptomyrina henningi henningi	Henning's Black-eye		1LC	2	3
Leptotes pirithous pirithous	Common Zebra Blue		1LC	2	2
Lycaena clarki	Eastern Sorrel Copper		1LC End	1	2
Orachrysops lacrimosa	Restless Blue		1LC End	3	4
Orachrysops mijburghi	Mijburgh's Blue		**1EN End**	3	?
Oraidium barberae	Dwarf Blue		1LC	2	3
Tarucus sybaris sybaris	Dotted Blue		1LC	2	2
Tuxentius melaena melaena	Black Pie		1LC	3	4
Uranothauma nubifer nubifer	Black Heart		1LC	3	3?
Zintha hintza hintza	Hintza Pierrot		1LC	2	3
Zizeeria knysna knysna	African / Sooty Grass Blue		1LC	1	2
Zizina otis antanossa	Dark / Clover Grass Blue		1LC	3	3?
Zizula hylax	Tiny / Gaika Grass Blue		1LC	1	2
NYMPHALIDAE	**Acraeas, browns, charaxes & relatives**				
Acraea horta	Garden Acraea		1LC	2	3
Acraea neobule neobule	Wandering Donkey Acraea		1LC	1	2
Byblia ilithyia	Spotted Joker		1LC	2	2
Catacroptera cloanthe cloanthe	Pirate		1LC	2	2
Danaus chrysippus orientis	African Monarch, Plain Tiger		1LC	1	1
Hypolimnas misippus	Common Diadem		1LC	1	2
Junonia hierta cebrene	Yellow Pansy		1LC	1	2
Junonia oenone oenone	Blue Pansy		1LC	1	2
Junonia orithya madagascariensis	Eyed Pansy		1LC	1	1
Paternympha narycia	Spotted-eye Brown		1LC End	3	3
Phalanta phalantha aethiopica	African Leopard		1LC	3	4
Precis archesia archesia	Garden Commodore		1LC	2	2
Precis octavia sesamus	Gaudy Commodore		1LC	2	2
Stygionympha wichgrafi wichgrafi	Wichgraf's Hillside Brown		1LC End	2	1
Telchinia rahira rahira	Marsh Acraea		1LC	1	2
Vanessa cardui	Painted Lady		1LC	1	2

FAMILY & SCIENTIFIC NAME	COMMON NAME	GAUTENG LEGAL STATUS	RED LIST STATUS	LoO IN QDS	LoO IN PORTION 15
PAPILIONIDAE	**Swallowtails, swordtails & relatives**				
Papilio demodocus demodocus	Citrus Swallowtail		1LC	1	1
PIERIDAE	**Tips, whites & relatives**				
Belenois aurota	Brown-veined White		1LC	1	1
Belenois creona severina	African Common White		1LC	3	3
Catopsilia florella	African Migrant		1LC	1	2
Colias electo electo	African Clouded Yellow		1LC	2	2
Eurema brigitta brigitta	Broad-bordered Grass Yellow		1LC	1	1
Eurema hecabe solifera	Lowveld / Common Grass Yellow		1LC	3	3
Mylothris agathina agathina	Common Dotted Border		1LC	3	3
Pinacopteryx eriphia eriphia	Zebra White		1LC	3	3
Pontia helice helice	Common Meadow White		1LC	1	1
Teracolus subfasciatus	Lemon Traveller		1LC	3	4

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

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

Sources: Transvaal Nature Conservation Ordinance (1983); Mecenero *et al.* (2013); LepiMAP (2017)

13.7. Odonata list for the study area

FAMILY & SCIENTIFIC NAME	COMMON NAME	BIOTIC INDEX SCORE	LoO IN QDS	LoO IN PORTION 15
AESHNIDAE	**Hawkers**			
Anax ephippiger	Vagrant Emperor	2	2	2
Anax imperator	Blue Emperor	1	1	3
Anax speratus	(Eastern) Orange Emperor	2	2	3
Zosteraeschna minuscula	Friendly Hawker	5	3	4
COENAGRIONIDAE	**Pond damsels**			
Africallagma glaucum	Swamp Bluet	1	1	2
Africallagma sapphirinum	Sapphire Bluet	4	1	3
Ischnura senegalensis	Tropical / Marsh Bluetail	0	1	2
Pseudagrion citricola	Yellow-faced Sprite	3	2	3
Pseudagrion kersteni	Powder-faced / Kersten's Sprite	1	3	4
Pseudagrion salisburyense	Slate Sprite	1	2	2
LESTIDAE	**Spreadwings**			
Lestes plagiatus	Highland Spreadwing	2	3	3
LIBELLULIDAE	**Skimmers**			
Crocothemis erythraea	Broad Scarlet	0	1	2
Orthetrum abbotti	Little Skimmer	2	3	4
Orthetrum caffrum	Two-striped Skimmer	3	3	1
Orthetrum trinacria	Long Skimmer	1	3	4
Palpopleura jucunda	Yellow-veined Widow	2	3	4
Pantala flavescens	Wandering Glider / Pantala	0	3	1
Sympetrum fonscolombii	Red-veined Darter / Nomad	0	2	2
Trithemis arteriosa	Red-veined Dropwing	0	2	2
Trithemis dorsalis	Highland / Round-hook Dropwing	0	3	4
Trithemis stictica	Jaunty Dropwing	1	3	3
PLATYCNEMIDIDAE	**Featherlegs**			
Elattoneura glauca	Common Threadtail	1	2	2
SYNLESTIDAE	**Malachites**			
Chlorolestes fasciatus	Mountain Malachite	4	2	3

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

Sources: Samways (2008); OdonataMAP (2017)

13.8. Scorpion list for the study area

FAMILY & SCIENTIFIC NAME	LoO IN REGION	LoO IN PORTION 15
BUTHIDAE (Fat-tailed scorpions)		
Pseudolychas pegleri	2	2
Uroplectes triangulifer	2	2
HORMURIDAE (Flat rock scorpions)		
Cheloctonus jonesii	3	3
Hadogenes gunningi	3	4
SCORPIONIDAE (Burrowing scorpions)		
Opistophthalmus pugnax	2	2

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

Sources: Leeming (2003)

Basic Assessment for the Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

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 PIGGERY ON PORTION 15 OF FARM BULTFONTEIN 192, NIGEL 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:

Mojaletema Co-Operative (Pty) Ltd

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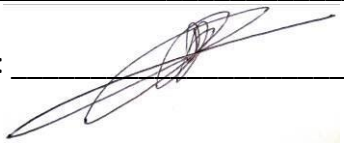
06 February 2017

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 piggery on Portion 15 of Farm Bultfontein 192, Nigel Magisterial District, Gauteng. The site lies at S26° 27' 13" E28° 30' 56" and is about 5 km southeast of Nigel.

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 heritage resources were found within the study area. However, in close proximity there is a farmhouse and outbuildings that are greater than 60 years of age. They are probably early-mid-20th century and of relatively low significance. Historical aerial photography shows that historical tree lines were present in the area. These, however, have largely been destroyed in recent years.

No significant impacts to heritage resources are expected and no cumulative impacts were identified. As such, it is recommended that the proposed piggery be authorised but subject to the following condition being 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.

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

EAP: environmental assessment practitioner

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 piggery on Portion 15 of Farm Bultfontein 192, Nigel Magisterial District, Gauteng. The site lies at S26° 27' 13" E28° 30' 59" and is about 5 km southeast of Nigel (Figure 1).

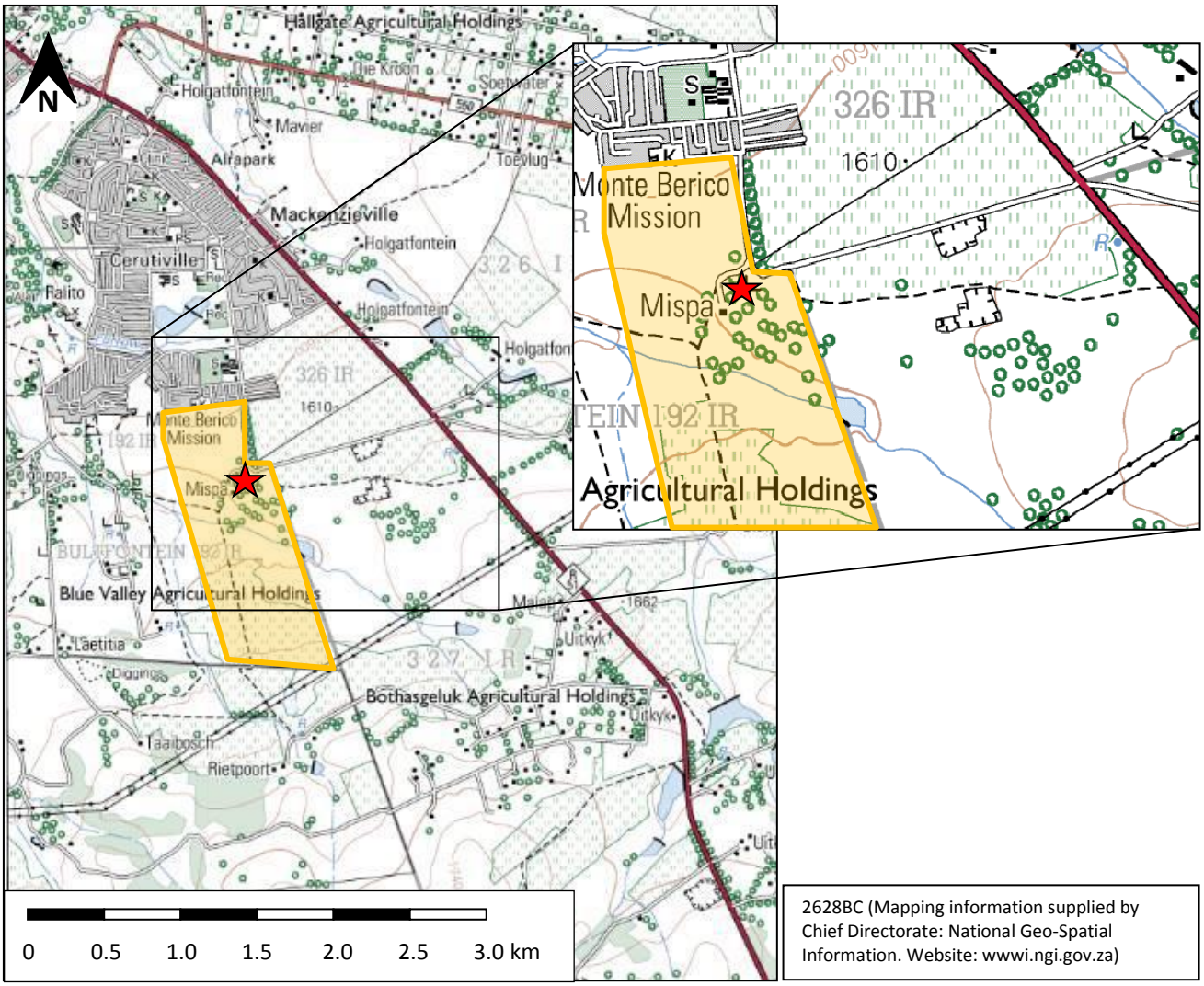


Figure 1: *Map showing the location of the site (red star) and farm portion (shaded orange polygon). Nigel lies just out of picture to the northwest along the R51 which is the main road bisecting the map from northwest to southeast.*

1.1. Project description

Mojaletema Co-Operative (Pty) Ltd is proposing a small-scale pig production endeavour of 1.8 hectares extent. The proposed project will include the following components:

- Build a pig house for 240 sow and 8 boars;
- Build a processing and packaging room.

No new services will be required because the development would connect to already existing municipal infrastructure (roads and electricity connection).

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 authors

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 project location was shifted slightly to the east after the fieldwork had taken place. The original site was subjected to a detailed foot survey on 28th February 2017 but the current site has not been looked at in detail. The survey was in late summer and the grass cover was very dense meaning that visibility of any surface archaeological resources was almost non-existent. 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 study was limited by the fact that the study area was shifted after the survey. However, because the surface was densely covered in grass and pioneer bush which hampered visibility of archaeological remains, it is highly likely that the results would have been the same. Although some ruins present on site were not examined physically by the heritage consultant, photographs and observations provided by the environmental assessment practitioner (EAP) are suitable for assessment.

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. During the survey of the original footprint the landowner was asked about heritage resources on site but was not aware of any.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site context

The site lies in a generally rural area but the south-eastern edge of Nigel, the suburb of Mackenzieville, lies about 600 m north and northeast of the study area. There is a farmhouse on the subject property to the southwest of the study area, while some ruins inside the study area.

4.2. Site description

The proposed development site is a fairly open area with scattered trees to the northeast of the existing farmhouse. Dense grass was present during the heritage survey of the original site (Figures 3 & 4). During the EAP's site visit, however, drought conditions pertained and the surface was well exposed (Figures 5 & 6). The substrate in the study area is generally sandy but low rocky outcrops and stones do occur (Figure 6).

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

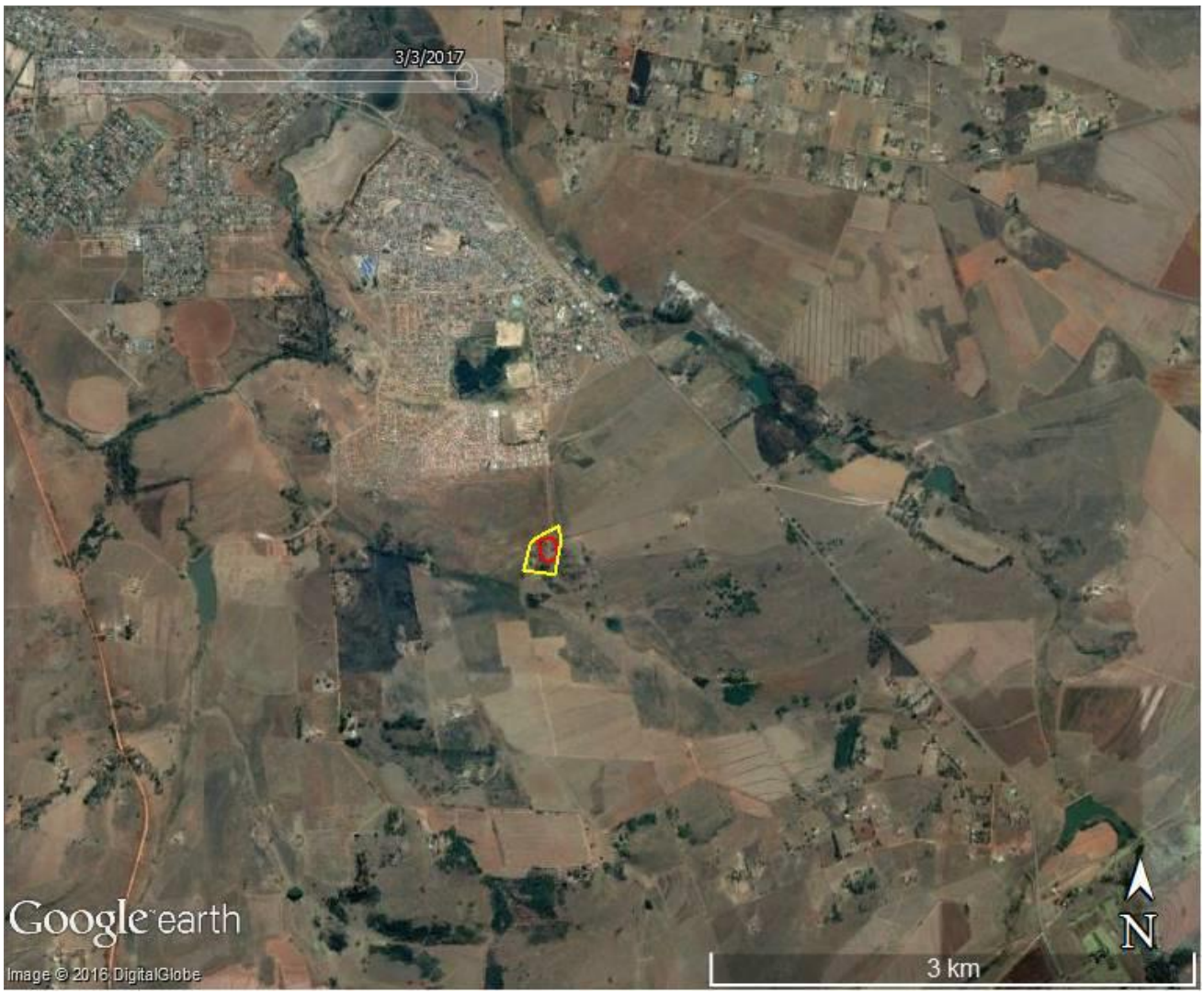


Figure 2: *Aerial view of the property (yellow polygon) and study area (red polygon) showing their broader context.*

Figure 3: *View across the original site towards the south. The farmhouse lies among the trees in the background.*

Figure 4: *View towards the east with the study area behind the fence. The ruins lie in the background.*

Figure 5: *View across the site towards the east from showing scattered trees in the vicinity and foundations in the middle ground. This area is to the south of the main ruin.*

Figure 6: *View across the site towards the southeast showing a low rock outcrop and two small circular foundations. This area is just to the south of the main ruin.*

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. It was found that very little research has been carried out in close proximity to Nigel.

5.1. Archaeological aspects

Approximately 50 km to the west of the study area is the Klipriviersberg Nature reserve where large Tswana settlements occur. These sites originate from Fokeng settlements that spread north across the Vaal River into the Balfour, Suikerbosrand, Klipriviersberg and Vredefort areas where the Fokeng interacted with the Sotho Tswana. Associated Ntsuanatsatsi pottery and Type N walling date from the 15th to 17th centuries and are also referred to as Klipriviersberg walling. In Gauteng, Klipriviersberg walling would not have been constructed after about AD 1823, when Mzilikazi entered the area (Huffman 2007). Some 28 km to the west at Suikerbosrand Nature Reserve is another cluster of Late Iron Age stone walled settlements. Here 760 ruins have been recorded (Sadr 2012) and classified into one of Taylor's (1979) three main types. No Iron Age stone walling or other archaeological sites are known from the Nigel area.

5.2. Historical aspects

The town of Nigel owes its existence to gold mining. After a few years of prospecting by a Mr Johnstone, the owner of the farm Varkensfontein, Mr Petrus Marais, received an offer to buy the farm from a stranger. He became suspicious and, because he did not live on the farm, he went to visit. On realising that the propecting was yielding results, he started his own mining company which he called Nigel in 1888. Nigel remained a mining camp until, with sufficient growth, a local council was established in 1923. In 1930 this was elevated to a Town Council. The village then grew rapidly because its old mine was found to be very rich (Bacchus International 2016).
The Nigel area was also affected by the Anglo-Boer War. Although there were no battles there (Von der Heyde 2013: 203), Generals Alberts and Grobler led British troops into an ambush on 18th February 1902 in which ten British were wounded and fifty captured (Grobler 2004). The Witwatersrand area saw a total of nine black concentration camps being established, of which one was in the Nigel area (Bergh 1999: 54). These were usually located next to the railway lines. Until 1935, however, the nearest railway station was some eight kilometres to the west (Bacchus International 2016).

Sites dating to the Colonial Period primarily related to the Gold Mining industry of the past century and resulting urbanization and industrialization, occur widely in the Highveld and the Witwatersrand. Several impact assessment reports from the general area have recorded such sites (Fourie 2003; Kruger 2015; Van der Walt 2007; Van Schalkwyk & Pelser 2000).

A number of other impact assessments from the area recorded no heritage resources at all (Gaigher 2013; Tomose 2014; Van der Walt 2008).

6. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project. No specific heritage features were found within the study are, but comments on heritage in the broader landscape are offered as appropriate. Figure 7 shows an aerial view of the study area with the survey tracks indicated.

Figure 7: *Aerial view of the property (yellow polygon) and study area (red polygon) showing the survey tracks (blue lines). Note that the tracks show the survey of the original site.*

6.1. Archaeology

No archaeological resources were recorded in the original study area. Because of the vegetation present after the good summer rains, archaeological survey of the new site is unlikely to provide any new information. There is always the chance that isolated artefacts would be present but from photographs provided by the EAP we are confident that Iron Age stone walled settlements are absent from the proposed development site.

6.2. Palaeontology

The SAHRIS Palaeosensitivity Map indicates that the site lies in an area of low palaeontological sensitivity and that further assessment of this aspect is not required (Figure 8).

6.3. Graves

No graves were observed in the study area or its immediate surrounds. The ruins in the development footprint pertain to a twentieth century dairy which means that it is highly unlikely that graves would be associated with the structures.

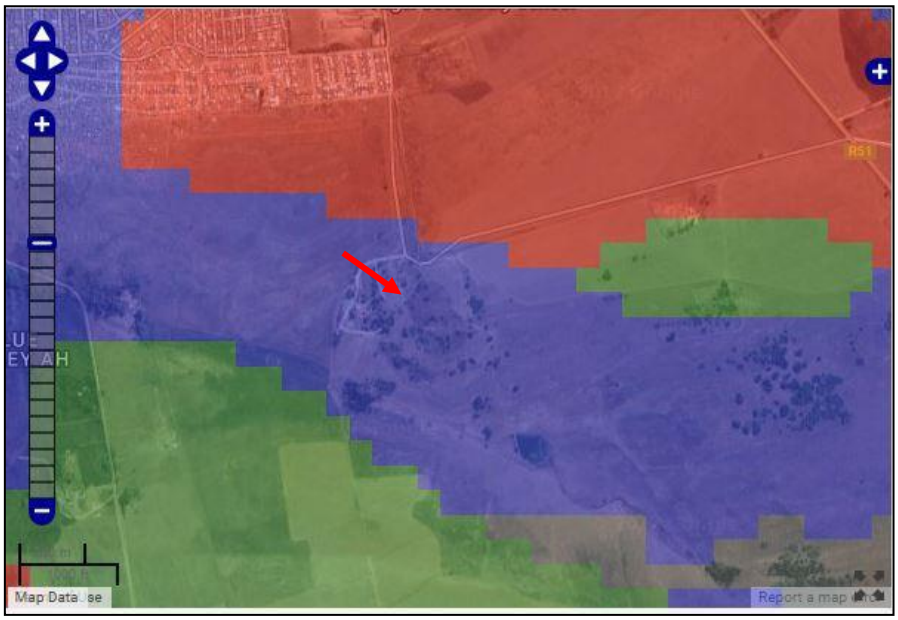


Figure 8: *Aerial view of the study area extracted from the SAHRIS Palaeosensitivity Map and indicating the site (red arrow) to be of low sensitivity (blue shading).*

6.4. Built environment

There are no built heritage resources in the study area but historical aerial photography indicates that the main house and some of its outbuildings predate 1945. The architectural style of the house indicates it to most likely be from the early-mid-20th Century. The outbuildings, some of which are made of stone, are less informative. A series of ruins pre-dating 1945 stand within the study area. The building fabric indicates that they are relatively modern, likely also dating to the early-mid-290th century. The main ruin was a dairy building, while smaller structures served as outbuildings and reservoirs. A stone and cement kraal (livestock enclosure) was built onto the dairy (Figure 13). Because of their age and derelict state respectively, they are not legally protected as either archaeology or buildings.

Figure 9: *View of the farm complex from the study area. The farm house is in the centre, while stone outbuildings occur to the left and right.*

Figure 12: *View towards the northwest of the main dairy building (centre) and an outbuilding (left).*

Figure 13: *View of the northern wall of the main dairy building showing modern bricks with a concrete lintel above the doorway. The stone and cement kraal is visible to the right.*

Figure 14: *View of the north wall of a second outbuilding to the south of the main dairy building. Some cement foundations are visible to the right. Again, modern bricks are evident.*

6.5. Cultural landscape

The vast majority of the trees comprising the historical tree lines visible in earlier aerial photography have been chopped down. Figure 4 shows a view towards the east through the area where a large tree line used to stand. This has unfortunately impacted on the historical cultural landscape. Figure 15 shows the broader area in 1945 and indicates that it has been an agricultural landscape for many years. Zooming in, one can see that the tree lines date back to before 1944 and were possibly originally planted as windrows to protect agricultural lands (Figure 16). However, it does not appear that the intervening land was under cultivation at the time. By 1958 the trees had grown larger (Figure 17).

Figure 15: *1945 aerial image (Job 55, strip 021, photograph 01231) and a modern view of the broader landscape around the site. Red arrow indicates the dairy.*

Figure 16: *1945 aerial image (Job 55, strip 021, photograph 01231) and a modern view of the immediate context of the site. Red arrow indicates the dairy.*

Figure 17: *1958 aerial photograph (Job 412, strip 010, photograph 01967) and modern view of the immediate context of the site.*

The first 1:50 000 topographic map of the area dates to 1966 and shows the developing town to the north of the site (Figure 18). The farm is labelled 'Mispa' and the main house and main dairy building are indicated.

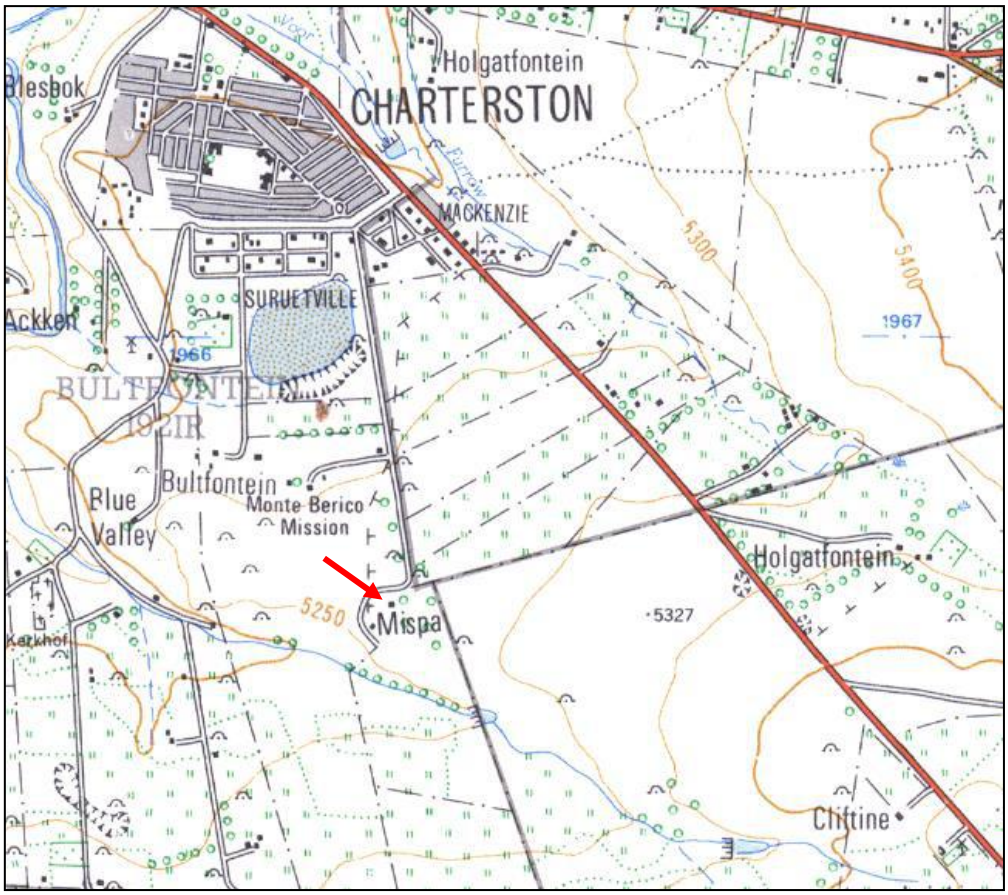


Figure 18: *1966 topographic map (1st edition). The dairy is arrowed.*

6.6. Summary of heritage resources

There are no heritage resources within the study area, but the house and outbuildings on the property are regarded as heritage resources.

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.

The only heritage resources in close proximity to the site appear to be the existing buildings on the farm. These are deemed to have no more than low-medium cultural significance for their architectural and social value. PHRAG does not have a grading guide and the SAHRA system applies only to archaeological and palaeontological resources so no grading is applied.

There is a possibility that isolated stone artefacts or potsherds are present on the site, but, because of their isolated nature and poor context, such finds would be regarded as having very low cultural significance for their scientific value. Following the SAHRA grading system, they would be graded as “General Protection C’.

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).

The farm house and outbuildings greater than 60 years of age will not be directly impacted by the proposed development. The only possible impact is an indirect, contextual impact but, because the project is essentially adding another outbuilding to the existing farm complex, 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 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, there are no further legal requirements that need to be met in terms of heritage resources. No permits are needed, since no heritage resources have been found on site.

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.

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

No significant impacts to heritage resources are expected and the proposed development is in keeping with the generally agricultural land use in the surrounding area.

12. RECOMMENDATIONS

Because no heritage impacts are expected, it is recommended that the proposed piggery development should be authorised but subject to the following condition which 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.

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 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
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

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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
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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
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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 Mojaletema Primary Co-Operative (Pty) Ltd's proposed piggery facility on Portion 15 of Farm Bultfontein 192 IR, Nigel, Gauteng.

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 (December 2014, as amended) 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 Mojaletema Primary Co-Operative's proposed piggery development. This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by the piggery's 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 Mojaletema Primary Co-Operative's proposed piggery development Portion 15 of Farm Bultfontein 192 IR in Nigel, Johannesburg. 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 piggery's 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 982 of 4 December 2014, presented in Table 1 below.

Table 1: Compliance with Appendix 4 of Government Notice Regulation 982 of 4 December 2014 and Section 24N of the National Environmental Management Act 107 of 1998.

Requirements according to Appendix 4 of GNR 982 of 4 December 2014	Section
(1) An EMPr must comply with section 24N of the Act and include- 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 contemplated in paragraph (f);	Section 4

Requirements according to Appendix 4 of GNR 982 of 4 December 2014	Section
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
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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

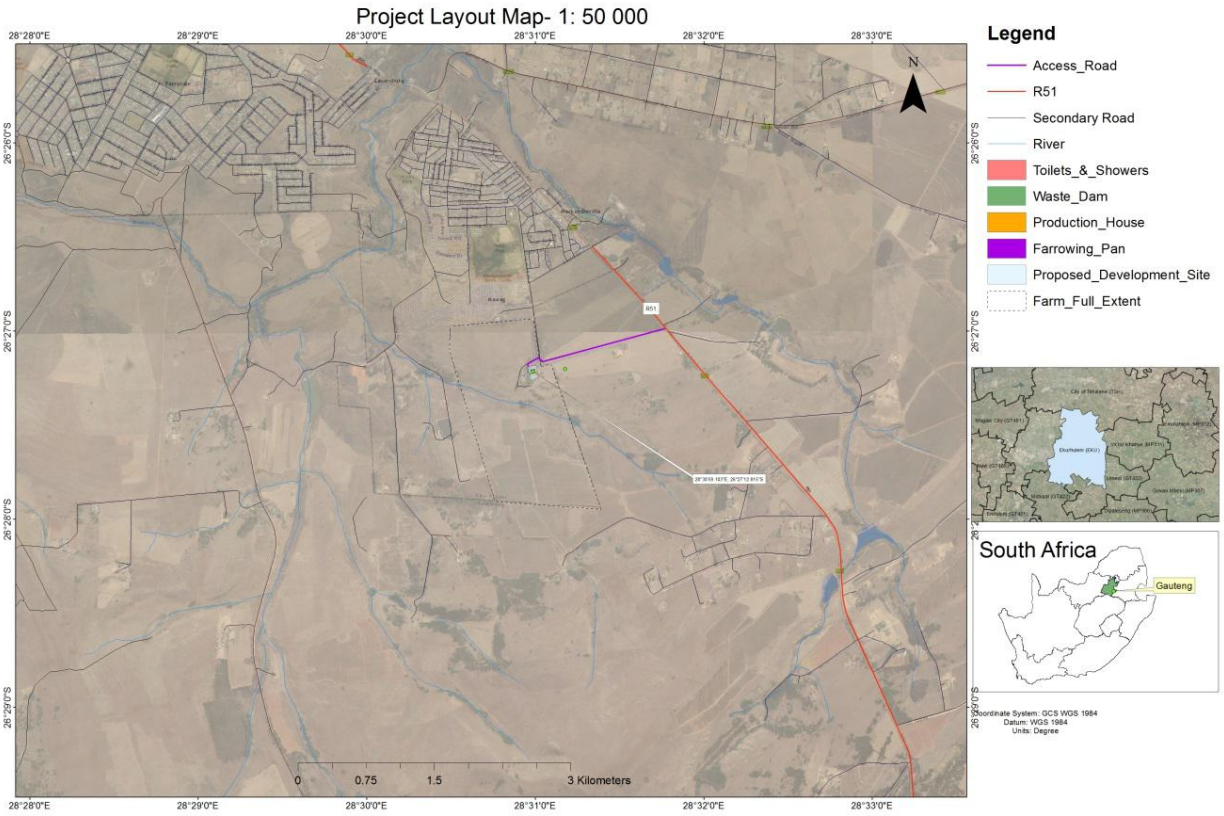
This Environmental Management Programme that has been compiled in fulfilment of the requirements of the Environmental Impact Assessment Regulations (2014). This EMPr describe the activities that are proposed, and prescribe the management, mitigation and monitoring measures that must be implemented to 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 piggery.

2. PROJECT BACKGROUND

2.1 Project Activities

The proposed site is located on Portion 15 of Farm Bultfontein 192 IR in Nigel. The project is within the 88th Ward of the Ekurhuleni Metropolitan Municipality in Gauteng province. The property is located 1.5 kilometers of the major R51 which links Nigel to Springs. The site is currently zoned and operating as agricultural use. The Mojaletema Primary Co-operative is an initiative of five family members who are currently farming maize whilst selling sheep, goats and cattle to the local market. This application is for the commencement of a piggery production. The proposed project seeks to increase its sustainable production of local produce to the market with the inclusion of 248 pigs (240 sows & 8 boars) with a through put of roughly 4800 pigs of mixed ages.

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 1.2 ha. This will be broken down into a 119 m^3 Slurry Dam, 3 pig houses, 2 pig houses and sales office, living quarters and feeding silo. The pig housing will have a mixture of both slated and concrete floors. The pig waste will fall through the slatted flooring and stored there temporarily before being washed via a closed gutter to the slurry dam. The slurry dam will be water covered with the waste settling at the bottom to eliminate the smell. The overflowing water will be disinfected and reused to clean the piggery again. After the digestion period the waste will be pumped out of the dam and used as fertilizer on the maize crops.



2.1.1 Reproduction Cycle

The chosen breed is Landrace because it provides a high litter birth weight, good carcass quality and reproduction characteristics as the sow has a good temperament. All the different stages of the pig production process have different requirements, housing, nutrition and treatment. The sows will be introduced to a boar within 21 days of oestrus, being pregnant after 114 days of the farrowing the litter will be allowed to wean at 28 days. A week after weaning the sow will be mated again, producing twice a year and ending it pregnant.

2.1.2 Piglets

Piglets are kept in farrowing pen with their mother until weaning. They suck from their mother within the first three hours, have iron injections and be marked for identification

2.1.3 Weaner stage

Weaners will be fed grower meal at the start and substituted with feed which will fatten the weaner as it becomes a piglet, eating 2.5 kg feed per day. After 8 to 10 weeks the weaners will be moved to the grower pen and start the next level of the production cycle.

2.2 Listed Activities

As part of the proposed piggery expansion, listed activities defined under the National Environmental Management Act, Act No. 107 of 1998 (NEMA, 1998), as amended, in terms of the Environmental Impact Assessment (EIA) Regulations, Government Notice (GNR) 983 of 4 December 2014, and in terms of the

National Environmental Management Waste Act (NEM:WA) Regulations GNR 921 of 29 November 2013 there under will take place. Relevant listed activities triggered by the proposed activities are described as follows:

- **GN R 983**, 8 December 2014 Activity 4: The development and related operation of facilities or infrastructure for the concentration of animals for the purpose of commercial production in densities that exceeds- (ii) 8 square meters per small stock unit and; (a) More than 1 000 units per facility excluding pigs were (b) more than 250 pigs per facility excluding piglets that are not yet weaned.
- **GN R 983**, 8 December 2014 Activity 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.
- **GNR 921**, 29 November 2013 Category A1: Storage of waste- The storage of general waste in lagoons
- **GNR 921**, 29 November 2013 Category A2: Construction, expansion or decommissioning of facilities and associated structures and infrastructure- The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).

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)	An application for a Waste Management Licence will be submitted in terms of NEM:WA as the proposed activity pertains to the following activities of the Act: *Category A (1):* The storage of general waste in lagoons. *Category A (12):* The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).
Environmental Impact Assessment Regulations, 2014	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

Description of compliance with the relevant legislation, policy or guideline:	
Legislation, policy of guideline	**Description of compliance**
	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.
Ekurhuleni Integrated Development Plan: 2016-2021 Ekurhuleni Spatial Development Framework:	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 88 of Region EMM of the Spatial Development Framework and is located on the South Eastern part of the Municipality of Ekurhuleni. As a resource, the farm portion 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 EMM) for Ekurhuleni, The proposed project is in an area regarded as rural which is marked for creating employment providing food and work opportunities.

4. ENVIRONMENTAL MANAGEMENT STRUCTURE

Mojaletema Primary 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 piggery development are as follows:

Mojaletema Primary 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. Mojaletema Primary 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.

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.

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 Mojaletema Primary 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.

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 piggery. The table below lists potential impacts and mitigation measures recommended for the proposed Mojaletema Primary Co-Operative piggery 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	Avoid disturbing in situ and neighbouring wetland areas and their buffers.	Demarcate or fence in the construction site.		Prior to and during construction	Mojaletema Management, Construction Crew
		Highlight all prohibited activities to workers through training and notices.		Prior to and during construction	Mojaletema Management, Construction Crew
		Commence (and preferably complete) construction activities during winter when the risk of erosion and sedimentation should be least.		Prior to and during construction	Mojaletema 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, Mojaletema 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	Mojaletema Management, Construction Crew
Loss of terrestrial vegetation and faunal habitat	Avoid unnecessary loss of indigenous vegetation and faunal habitats.	Modify the layout of planned infrastructure to avoid important floral communities (rocky grassland around the entrance area) and large		Pre-construction	CSIR, Mojaletema Management, with advice from a Botanist / Horticulturist

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		indigenous trees.			
		Identify and mark any indigenous trees (these are limited on site) on the ground. Those that are small and cannot be avoided should be transplanted elsewhere on site.		Pre-construction	Mojaletema Management, Construction Crew, with advice from a Botanist / Horticulturist
		Demarcate or fence in the construction site.		Prior to and during construction	Mojaletema Management, Construction Crew
		Highlight all prohibited activities to workers through training and notices.		Prior to and during construction	
		Commence (and preferably complete) construction activities during winter, when the risk of disturbing growing plants should be least.		Prior to and during construction	Mojaletema 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	Mojaletema 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	Mojaletema Management, Construction Crew, with advice from a Botanist / Horticulturist

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		Do not undertake any landscaping with alien flora.		During construction	Mojaletema Management, Construction Crew, with advice from a Botanist / Horticulturist
Loss of CI or medicinal flora	Adhere to law and best practice guidelines regarding CI and medicinally important flora.	Obtain permits to remove CI species.		Pre-construction	CSIR, Mojaletema Management
		Transplant CI and medicinally important floral specimens from the infrastructure footprint to suitable and safe locations elsewhere on site or nearby.		Pre-construction	Mojaletema 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	
	Prohibit harvesting of CI and medicinally important flora.	Highlight all prohibited activities to workers through training and notices.		Prior to and during construction	Mojaletema 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	Mojaletema Management

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
Loss of CI fauna	Adhere to law and best practice guidelines regarding the displacement of CI faunal species.	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	Mojaletema 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	Mojaletema 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	Mojaletema 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	Mojaletema Management
Introduction and proliferation of alien species	Limit / Regulate access by potential vectors of alien flora.	Demarcate or fence in the construction site.		Prior to and during construction	Mojaletema Management, Construction Crew
		Carefully limit / regulate access by vehicles and materials to the construction site.		Prior to and during construction	Mojaletema Management, Construction Crew
		Prohibit the introduction of		During construction	Mojaletema

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		domestic animals such as dogs and cats.			Management, Construction Crew
	Maintain a tidy construction site.	Keep construction activities neat and tidy. When complete, remove all sand piles, and landscape all uneven ground while re-establishing a good topsoil layer.		During construction	Mojaletema Management, Construction Crew
		Plant only locally indigenous flora if landscaping needs to be done.		During construction	Mojaletema 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	Mojaletema Management, Construction Crew, with advice from a Botanist / Horticulturist
Increased dust and erosion	Implement effective measures to control dust and erosion.	Limit vehicles, people and materials to the construction site.		During construction	Mojaletema Management, Construction Crew
		Commence (and preferably complete) construction during winter, when the risk of erosion should be least.		During construction	Mojaletema Management, Construction Crew
		Revegetate denude areas with locally indigenous flora a.s.a.p.		During construction	Mojaletema Management, Construction Crew
		Implement erosion protection		During construction	Mojaletema

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		measures on site. Measures could include bunding around soil stockpiles, and vegetation of areas not to be developed.			Management, Construction Crew
		Implement effective and environmentally-friendly dust control measures, such as mulching or periodic wetting.		During construction	Mojaletema Management, Construction Crew
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	Mojaletema Management, Construction Crew
	Minimize noise pollution.	Minimize noise to limit its impact on calling and other sensitive fauna (e.g. frogs).		During construction	Mojaletema Management, Construction Crew
	Minimize light pollution.	Limit construction activities to day time hours.		During construction	Mojaletema 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	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	Mojaletema Management, Farm Management

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	Mojaletema Management, Farm Management
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, Mojaletema 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	Mojaletema Management, Farm Management
		Adhere to best practice pig husbandry and waste disposal norms.		Throughout operation	CSIR, Mojaletema Management, Farm Management, with advise from agricultural experts
		All hazardous waste should be disposed of at an appropriate licensed facility for this.		Throughout operation	Mojaletema Management, Farm Management
		Waste recycling should be incorporated into the facility‟s		Throughout operation	Mojaletema Management, Farm

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		operations as far as possible.			Management
		Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices.		Throughout operation	Mojaletema 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	CSIR, Mojaletema Management
		Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists.		A.s.a.p. following contamination	Mojaletema 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	Mojaletema Management, Farm Management
Poor / Inappropriate control of animal pests	Control the access and proliferation of pests as far as possible.	Ensure that floors are sloped and slatted to facilitate drainage.		Pre-construction	CSIR, Mojaletema Management, Construction Crew
		Ensure that there is effective storm water drainage around the facility.		All phases	CSIR, Mojaletema 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		Construction and	Construction Crew, Farm

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		pipes and reservoirs containing slurry, to prevent animals from accessing the effluent.		operation	Management
		Ensure that the facility is sufficiently ventilated to keep floors, bedding, and fodder as dry as possible.		Pre-construction, construction and operation	CSIR, Mojaletema 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	Mojaletema 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		Throughout operation	Farm Management and

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.			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	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	As described above.		As described above.	As described above.

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
	contamination event.				
	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	Limit / Regulate access by potential vectors of alien flora.	Carefully limit / regulate access by vehicles and materials to the site.		Throughout operation	Mojaletema Management, Farm Management
		Prohibit the introduction of domestic animals such as dogs and cats.		Throughout operation	Mojaletema 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 weed management.		Throughout operation	Farm Management and Team
		Plant only locally indigenous flora if landscaping needs to be done.		Throughout operation	Mojaletema 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	Mojaletema Management, Farm Management and Team, with advice from a Botanist / Horticulturist
Loss of CI or medicinal flora	Harvesting of indigenous flora for medicine, fire wood, building materials,	Highlight all prohibited activities to workers through training and notices.		Prior to and during operation	Mojaletema Management, Farm Management

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
	and other purposes must be prohibited.				
		Prohibit harvesting of CI and medicinal flora on site by community members through notices and site access control (e.g. fencing).		Throughout operation	Mojaletema Management, Farm Management
Loss of CI 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	Mojaletema 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	Mojaletema Management, Farm Management
Sensory disturbance of fauna	Minimize essential lighting	Install motion-sensitive lights.		Construction and operation	Mojaletema Management, Farm Management
		Ensure that all outdoor lights are angled downwards and/or fitted with hoods.		Construction and operation	Mojaletema 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,		Throughout operation	Farm Management and

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		mercury or other bulbs that emit high UV (blue-white) light that is highly and usually fatally attractive to insects.			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	Mojaletema Management, Farm Management

6. ENVIRONMENTAL AWARENESS AND TRAINING PLAN

Mojaletema Primary 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 piggery 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 piggery, at least once a year, or as new information becomes available.


SAPPO Training Course
Housing for small Piggeries 2
Why house pigs at all? Because:-
• It makes for better biosecurity
• It reduces parasites – mange, worms, ticks
• It allows controlled feeding
• It makes treatment easier
• It reduces theft
1
Housing for small Piggeries
Welfare aspects:
Keeping dry sows outside is often successful, provided there is plenty of space and good shelter for all.
Free range systems sound fine , but:-
• There is little disease control
• Free access to toxic plants, human excreta
• Bullying is not eliminated
• Rough stony ground, dirty wallows, Ascaris eggs
• Feeding is not controlled
2
Housing for small piggeries
Intensive housing is not all bad:-
–Individuals can be observed, treated, fed, protected individually;
–Record-keeping is much easier, so production is easily measured;
–Space is more economically used;
–All-in all-out systems become possible
3
Housing for small piggeries
Is there a practical, affordable compromise?
Consider the pig's housing needs, such as:-
• Protection from bad weather
• Protection from direct sun, and extreme temperatures
• Protection from each other
• Protection from thirst, hunger, pain, fear, injury
• Protection from mishandling by cruel or careless people
4
Housing for small piggeries
Whatever housing system is used, it can be made to work, provided that good farming practice is understood and applied.
• Be receptive to the messages that pigs are sending out all the time;
• Be aware of the pigs' needs;
• Be informed about what remedy to apply;
• Have the resources to carry out the necessary correction
5
Housing for small piggeries
Specifications for the construction of pig pens:
• It must be pig-proof;
• It should have a hard drained cleanable floor;
• It must have clear areas for sleeping, eating, dunging;
• Water must be provided in secure, clean containers in every pen: drinking nipples are best;
• Different age groups need separate pens;
• Face the pens away from the worst weather and cold winds;
• Ensure good light and ventilation
6

Housing for small piggeries

- *Some dimensions: (see sketches on p19)*
- *An all- purpose pen can be—*

- 4m by 3m i.e. 12 square metres,
- Roof will be 3m x 3m or 3m x 4m in area, sloping from back to front; height 2.5m at back, 1.65 in front;
- Where sows and piglets share the same pen, a creep area across the rear of 1m x 3m keeps sow from creep feed and piglet sleeping area;
- Floor slopes 1% to gate and drain – outside and to a pond or soak-away.

7

This all-purpose pen will accommodate any of the following:-

- 1 or 2 sows with litters (this pen will have a creep area);
- 2 or 3 litters of weaned pigs up to 10 weeks old;
- 4 dry sows or gilts;
- 1 boar with a couple of sows;
- 15 grower pigs up to 70kg live mass; or
- 12 baconers up to 90 - 95 kg live mass

Note: a general rule for space per pig is to allow at least 1sq m per 100 kg of live pig in closed pens; boars and sows need double or more .

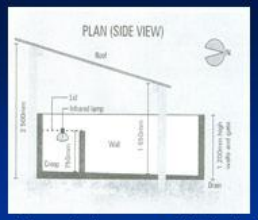
8

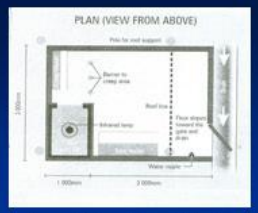
Housing for small piggeries

There are cheaper alternatives that are quite acceptable; using locally available materials and ingenuity can go a long way, provided that the basic specs are met.

The following pictures show some examples of inexpensive housing that has been built with an understanding of the needs of pigs of all ages; there are also some that do not meet requirements.

9





An inexpensive all-purpose pen as sketched here has been used successfully for small commercial piggeries

One version with walls – poles or pipes or even old pallets will be

10

BASIC ASSESSMENT REPORT

APPENDIX I: DETAILS OF EAP AND EXPERTISE

contents

Appendix I: DETAILS OF EAP AND EXPERTISE

Minnelise Levendal (Project Leader)

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South Africa

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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
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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 in September 2011)*	EIA for a proposed wind farm near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (complete)	Basic Assessment for the erection of two wind monitoring masts near Swellendam and Bredasdorp in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (complete)	Basic Assessment for the erection of two wind monitoring masts near Jeffrey's Bay	Project Manager	Windcurrent (Pty Ltd

Completion Date	Project description	Role	Client
	in the Eastern Cape		
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)

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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