

# FINAL BASIC ASSESSMENT REPORT

Basic Assessment for the  
proposed Pacific Ora Projects  
(Pty) Ltd Pig and Vegetable  
Production facility on farm  
Bultfontein 107-JR, Gauteng

Report prepared for:  
Pacific Ora (Pty) Ltd

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GDARD Ref No: 002/16-17/I0002

OCTOBER 2016



## Basic Assessment Process

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng

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***Lead Authors:***  
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# report details

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**Title:** Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng

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**Purpose of this report:** The purpose of this BA Report is to:

- Present the proposed project and the need for the project;
- Describe the affected environment at a sufficient level of detail to facilitate informed decision-making;
- Provide an overview of the BA Process being followed, including public consultation;
- Assess the predicted positive and negative impacts of the project on the environment;
- Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project;
- Provide an Environmental Management Programme (EMPr) for the proposed project.

This BA Report is the Final Version submitted to GDARD for decision making.

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**Prepared for:** Pacific Ora (Pty) Ltd

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**Authors:** Kelly Stroebel and Minnelise Levendal

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**Date:** October 2016

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**To be cited as:** CSIR, 2016. Draft Basic Assessment Report for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng. CSIR Report Number.

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# executive summary

## INTRODUCTION, BACKGROUND AND ENVIRONMENTAL ASSESSMENT PROCESS

In terms of the NEMA EIA Regulations 2014, the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng, requires a Basic Assessment (BA) process, and an application for Environmental Authorisation has been submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) as the competent Authority. GDARD Ref No: 002/16-17/I0002

In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 983, 984 and 985 on the 4 December 2014 Government Gazette Number 38282, and NEM:WA Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083, a Basic Assessment (BA) process and a Waste Management License is required as the project applies to the following listed activities (detailed in Table S1 below).

**Table S1: 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; or (ii) Maintenance purposes undertaken in accordance with a maintenance management plan.
GN. R 921, 29 November 2013	Category A (1)	The storage of general waste in lagoons.

## PROJECT DESCRIPTION

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Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tshwane Metropolitan Municipality, and is approximately 35 km north of Pretoria.

The proposed project will include the following components:

- Office building and employee facilities;
- 40 cubic metre slurry dam to store pig waste for use as fertilizer;
- Approximately 5 hectares of granadilla and spinach crop;
- Approximately 12 pig houses holding a total of 910 pigs; and
- 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 Pacific Ora project will seek to boost local economic development in the area and provide opportunities to decrease poverty and unemployment. Pacific Ora Projects (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 obtaining Environmental Authorization in order to enhance local economic development.

## IMPACT ASSESSMENT

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A total of 53 direct and indirect impacts were identified by respective specialists. These were relating to loss of ecology, air and water quality, social factors etc.

## EAP'S RECOMMENDATION

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Based on the findings of this BA Process, it is therefore the opinion of the EAPs that conducted this BA Process, i.e. Mrs Minnelise Levendal and Ms Kelly Stroebel, that there are no negative impacts that should be considered as "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project. Based on the findings of this Draft BA Report, it is the opinion of the EAPs that the project benefits outweigh the negative environmental impacts, and that the project will make a positive contribution towards local economic development and food security in the Rooiwal/Bultfontein area.

Due to the fact that the project proponent, i.e. Pacific Ora Projects, is being assisted *pro-bono* under the DEA Special Needs and Skills Development Programme and thus does not have the economic opportunity to have more than one alternative site available, it is therefore recommended by the EAPs that the proposed layout and site alternative (proposal) be included in the Environmental Authorisation (should such authorisation be granted for the proposed project).

An Environmental Management Programme (EMPr) has been compiled for the proposed project. This EMPr captures the project specific information for all phases of the development and includes all mitigation actions identified in this BA Process. The EMPr is a dynamic document that should be updated regularly and provide clear and implementable measures for the establishment and operation of the proposed project. It is our recommendation that all the mitigation measures be implemented for the proposed project.



**Concluding statement from EAPs: Provided that the specified mitigation measures are applied effectively, it is proposed that the project receives Environmental Authorisation in terms of the EIA Regulations promulgated under the NEMA.**

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# glossary

BA	Basic Assessment
BID	Background Information Document
CI	Conservation Important
CSIR	Council for Scientific and Industrial Research
DEA	National Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EAPs	Environmental Assessment Practitioners
EAPSA	Environmental Assessment Practitioner for South Africa
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ERAP	Emergency Response Action Plan
ERM	Environmental Resources Management (PTY) Ltd
GDARD	Gauteng Department of Agriculture and Rural Development
HAZOP	Hazard and Operability Analysis
HSSE	Health, Security, Safety and Environment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
NDP	National 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)
NHRA	National Heritage Resources Act (Act 25 of 1999)
PPE	Personal Protective Equipment
PPP	Public Participation Process
RIDP	Regional Integrated Development Plan
SACNASP	South African Council for Natural Scientific Professions
SANS	South African National Standards
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAPPO	South African Pork Producers Organisation
SDF	Spatial Development Framework

SEA	Strategic Environmental Assessment
SNSD	Special Needs and Skills Development
TOR	Terms of Reference
TSP	Threatened Plant Species Programme

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**Summary of where requirements of Appendix 1 of the 2014 NEMA EIA Regulations (GN R 983, as amended) are provided in this Basic Assessment Report.**

APPENDIX 1 OF THE REGULATIONS	YES / NO	SECTION IN BAR
1) 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 –	✓	Appendix I
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 B
(ii) where available, the physical address and farm name;	✓	Section A
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	N/A	N/A
(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	✓	Section B
(ii) on land where the property has not been defined, the coordinates within which the activity		
(iii) is to be undertaken;		
(d) a description of the scope of the proposed activity, including		
(i) all listed and specified activities triggered and being applied for; and	✓	Section A2
(ii) a description of the activities to be undertaken including associated structures and infrastructure ;		
(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	✓	Section A1 Appendix E

<u>APPENDIX 1 OF THE REGULATIONS</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments		
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	<b>√</b>	Section E9
(g) a motivation for the preferred site, activity and technology alternative;	<b>√</b>	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,	<b>√</b>	Section E Appendix E,F,G

<u>APPENDIX 1 OF THE REGULATIONS</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
<p>consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>(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;</p> <p>(viii) the possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) the outcome of the site selection matrix;</p> <p>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</p> <p>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;</p>		
<p>(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-</p> <p>(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;</p>	√	Section E Appendix H
<p>(j) an assessment of each identified potentially significant impact and risk, including-</p>	√	Section E Appendix G

APPENDIX 1 OF THE REGULATIONS	YES / NO	SECTION IN BAR
(l) 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;		
(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;	✓	Section B7 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;	✓	Section E2
(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	✓	Section E8

<u>APPENDIX 1 OF THE REGULATIONS</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
authorisation;		
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;		N/A
(r) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	√	Appendix I
(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	√	Appendix E5
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A	N/A



**FINAL BA REPORT:**  
Basic Assessment for the  
proposed Pacific Ora Projects  
(Pty) Ltd Pig and Vegetable  
Production facility on farm  
Bultfontein 107-JR, Gauteng

# FINAL BASIC ASSESSMENT REPORT

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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)*

<b>NEAS Reference Number:</b>						
<b>File Reference Number:</b>						
<b>Application Number:</b>						
<b>Date Received:</b>						

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?  Np

if not, state reasons for not including the closure plan.  
 This project is not mining related

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.  
 N/A

Have State Departments including the competent authority commented?  No

If no, why?  
 The report is yet to receive comments from state departments and the competent authority.

# 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 Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng**

Select the appropriate box:

The application is for an upgrade of an existing development	<input type="checkbox"/>	The application is for a new development	<input checked="" type="checkbox"/>	Other, specify	<input type="checkbox"/>
--------------------------------------------------------------	--------------------------	------------------------------------------	-------------------------------------	----------------	--------------------------

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

YES

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

The proposed project also requires a Waste Management License under the National Environmental Management: Waste Act (NEM:WA Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083) Category A (1) of GN. R 921 (29 November 2013) for the storage of general waste in lagoons.

If yes, have you applied for the authorisation(s)?	<input checked="" type="checkbox"/> YES
If yes, have you received approval(s)? (attach in appropriate appendix)	<input type="checkbox"/> NO

*Note from CSIR:* The Waste Management License Application was submitted in conjunction with this Draft Report and EA Application form therefore no outcome has been reached to date.

## 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	
National Water Act, 1998 (Act No. 36 of 1998) as amended	National & Provincial	26 August 1998
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	National & Provincial	1999
National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)	National & Provincial	2004
Environmental Impact Assessment Regulations, 2014	National & Provincial	4 December 2014
National Development Plan	National	2012
DEA Guidelines on Public Participation	National (DEA)	10 October 2012
Tshwane Metropolitan Municipality IDP and SDF	Provincial	2015/2016

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management: Waste Act, as amended.	National and Provincial	29 November 2013

Description of compliance with the relevant legislation, policy or guideline:	
Legislation, policy of guideline	Description of compliance
National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).	The Environmental Authorisation for the proposed development is lawfully applied for in terms of the EIA Regulations, 2014, promulgated under NEMA. The conditions on the Environmental Authorisation, if approved, will be adhered to.
National Water Act, 1998 (Act No. 36 of 1998) as amended	Pertinent legislation published under this act will be adhered to.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	An application for Heritage Resources review was submitted to SAHRA (Ref No. 9493) in terms and respect of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) as amended (NHRA).
National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)	The fauna and flora prevailing in the proposed project site will be handled in terms or respect of 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.
Environmental Impact Assessment Regulations, 2014	Please see Section C and Appendix E relating to public participation.  Appendix H relating to the content of the Environmental Management Programme.
National Development Plan	<p>The South African Government through the Presidency has published a National Development Plan. The Plan aims to eliminate poverty and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety. It proposes the following strategies to address the above goals:</p> <ol style="list-style-type: none"> <li>1. Creating jobs and improving livelihoods;</li> <li>2. Expanding infrastructure;</li> <li>3. Transition to a low-carbon economy;</li> <li>4. Transforming urban and rural spaces;</li> <li>5. Improving education and training;</li> <li>6. Providing quality health care;</li> <li>7. Fighting corruption and enhancing accountability;</li> <li>8. Transforming society and uniting the nation.</li> </ol>
Tshwane Metropolitan Municipality IDP and SDF	<p>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.</p> <p>The proposed project falls within ward 49 of Region 2 of the Spatial Development Framework and is centred between the north western and north eastern quadrants of the CoT. As a resource, the region holds large undeveloped areas, which could in future accommodate growth.</p>

Description of compliance with the relevant legislation, policy or guideline:	
	According to the Regional IDP (Region 2) for CoT, The proposed project falls within an area which is demarcated as “rural”, and the intention of development in this area is to create vibrant, equitable and sustainable rural development which provides food and work opportunities.
National Environmental Management: Waste Act, as amended.	The Waste Management License will be undertaken in respect of the National Environmental Management: Waste Act (Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083) as amended NEM:WA. Pieces of legislation published under this act will be adhered to.

In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 983, 984 and 985 on the 4 December 2014 Government Gazette Number 38282, and NEM:WA Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083, a **Basic Assessment (BA)** process 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- (iii) The undertaking of a linear activity; or (iv) Maintenance purposes undertaken in accordance with a maintenance management plan.
GN. R 921, 29 November 2013	Category A (1)	The storage of general waste in lagoons.

### **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 alternative was drawn up based on the site sensitivities as determined by the ecological (fauna and flora) specialist studies undertaken as part of this process. There are no additional locational alternatives for this proposed project.

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 (preferred alternative)	<p><b>1. <u>Site location &amp; layout:</u></b></p> <p>The proposed site is located on Portion 107-JR of the farm Bultfontein in Ward 49 of the Tshwane Metropolitan Municipality (CoT). The property is located at 120 Maroela Road, in the Rooiwal area. The site lies approximately on 10 km from the major R101 north/south route which links Pretoria North and Hammanskraal. The site is currently zoned for agricultural use. The proposed project is aimed at providing "sustainable" produce and ecologically responsible practices will be incorporated into the life cycle of the development.</p> <p>The layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping. The total development footprint would thus be 8.57 ha. This will be broken down into a 40 m<sup>2</sup> Slurry Dam, 5 ha of granadilla and spinach crops and the remaining 2-3 ha for office structures and pig houses. The site is currently serviced by the Municipality and services are available. Bulk Services that may be required, i.e. sewerage, will thus be installed privately to the satisfaction of the Municipality. A borehole exists on site for water provision for the proposed project activities and Pacific Ora Projects holds a borehole certificate supported by a qualified contractor confirming capacity of 1500 litres per hour. Power will be sourced from Eskom. The use of solar panels on individual houses and for the pump mechanism on the borehole will be promoted. Access roads to and on the site are already in existence.</p>



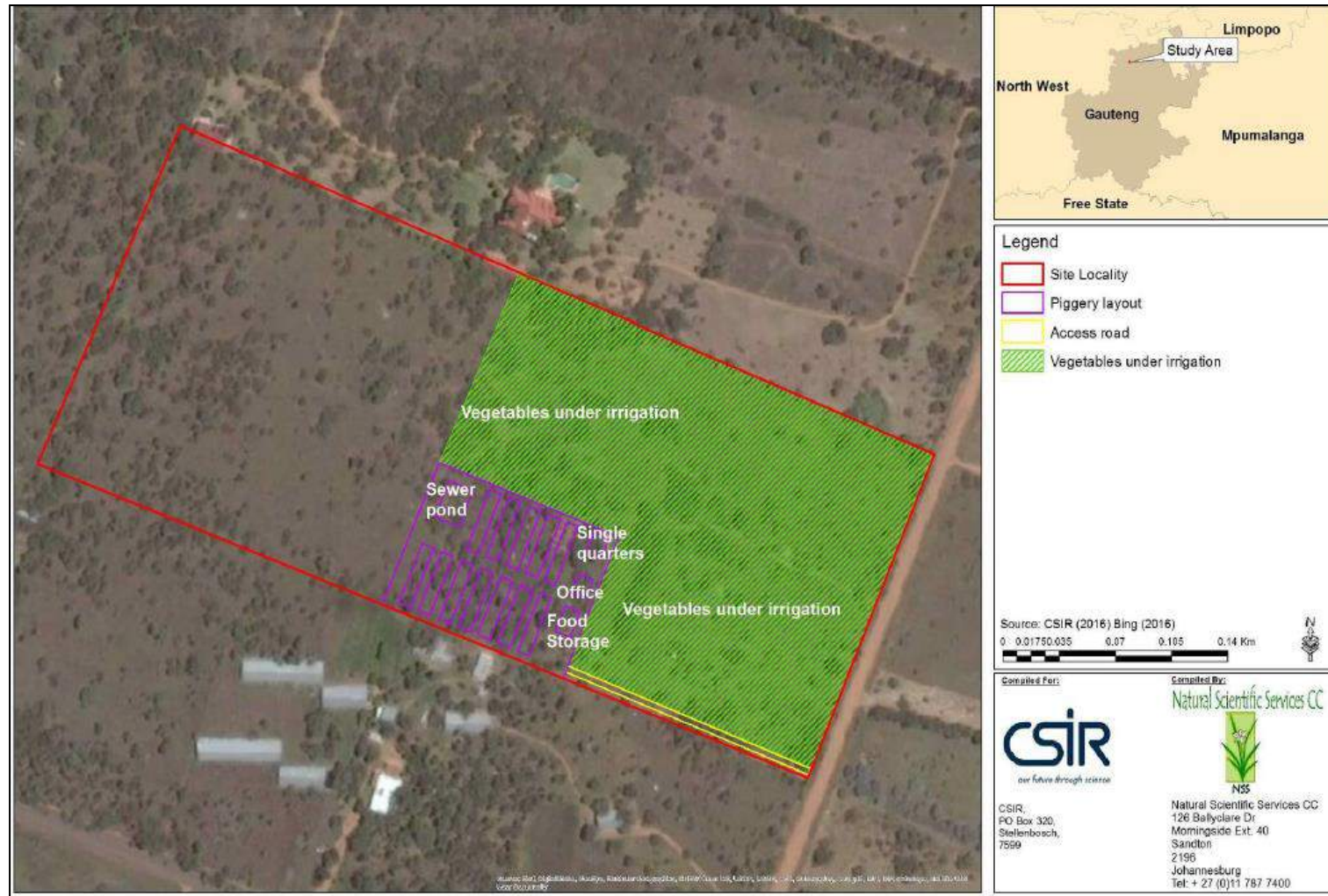


Figure 1: Site location and layout of the preferred alternative (proposal)

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

**Motivation for the exclusion of alternatives:**

**1. Site location and layout alternatives**

The Department of Environmental Affairs (DEA) commissioned the Council for Scientific and Industrial Research (CSIR) to run the “Special Needs and Skills Development (SNSD) Programme” which is aimed at providing *pro bono* Environmental Impact Assessments (EIAs) for people who are classified as special needs clients/applicants, specifically Small, Medium and Micro Enterprises (SMMEs), Community Trusts, Individuals or Government Programmes. The CSIR received an application from Pacific Ora Projects (Pty) Ltd under the SNSD Programme. The CSIR identified the Pacific Ora Projects (Pty) Ltd as a client or a special needs applicant and has agreed to assist them with acquiring Environmental Authorization for the project on a *pro bono* basis, including the cost of the basic assessment, specialist studies, site visits and human resources.

Pacific Ora Projects (Pty) Ltd is a 100% black owned entity supported by government funding. The land is being leased to Pacific Ora and the intention is to buy land through Land Bank. The Land Bank offers support to previously disadvantaged individuals who do not have the startup capital to launch their own enterprise. Thus, the site which is being investigated in this report is the only site available to this entity and there are no available alternative sites to be considered.

The layout of the proposed project has been carefully informed by the findings of the Ecological Impact Assessment (Appendix G) so as to avoid removing too many species of special concern.

**2. Design, technology & operational alternatives**

The operating plan for the proposed project has been informed by extensive market research and an assessment of the need of the products that will be produced. A robust economic assessment has been submitted to the Land Bank for the approval of this project. In addition to the economic viability, the project does not make use of major technologies, which in turn results in the proposed development requiring very little energy. All waste from the piggery is being re-cycled into fertilizer for the vegetable production. The pork and fresh produce is being sold 100% locally and the jobs being created by the proposed development will be sourced to local communities.

The operations of this facility will be under the constant supervision of a professional consultant in the field who has 25 years of piggery experience. In addition, the project design, technology and operations will make use of Agricultural Technical Support of SAPPO (South African Pork Producers Organisation).

In terms of the positives which have given rise to this development option being pursued, some of the major factors are:

- The turnaround production time is quicker for pork than red meat production.
- Piggeries can be established in relatively small areas.
- Feed costs are much lower than alternative meat production costs.
- The demand for pork products has increased significantly over recent years due to the high price and unavailability of red meat substitutes.

Thus, due to the nature of the industry, the support structures and the knowledge and experience of Pacific Ora, the proposed 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:

<p>Proposed activity (<b>Total environmental (landscaping, parking, etc.) and the building footprint</b>)</p> <p><b>Alternatives:</b> Alternative 1 (if any) Alternative 2 (if any)</p>	<p><b>Size of the activity:</b></p> <table border="1" style="width: 100%; text-align: right;"> <tr> <td style="width: 80%;"></td> <td>8.57 ha</td> </tr> </table> <table border="1" style="width: 100%; height: 20px; background-color: black;"></table> <p style="text-align: right;">Ha/ m<sup>2</sup></p>		8.57 ha
	8.57 ha		

or, for linear activities:

<p>Proposed activity</p> <p><b>Alternatives:</b> Alternative 1 (if any) Alternative 2 (if any)</p>	<p><b>Length of the activity:</b></p> <table border="1" style="width: 100%; text-align: right;"> <tr> <td style="width: 80%;"></td> <td>N/A</td> </tr> </table> <table border="1" style="width: 100%; text-align: right;"> <tr> <td style="width: 80%;"></td> <td>N/A</td> </tr> </table> <table border="1" style="width: 100%; text-align: right;"> <tr> <td style="width: 80%;"></td> <td>N/A</td> </tr> </table> <p style="text-align: right;">m/km</p>		N/A		N/A		N/A
	N/A						
	N/A						
	N/A						

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

<p>Proposed activity</p> <p><b>Alternatives:</b> Alternative 1 (if any) Alternative 2 (if any)</p>	<p><b>Size of the site:</b></p> <table border="1" style="width: 100%; text-align: right;"> <tr> <td style="width: 80%;"></td> <td>9 ha</td> </tr> </table> <table border="1" style="width: 100%; height: 40px; background-color: black;"></table>		9 ha
	9 ha		

#### 5. SITE ACCESS

##### Proposal

<p>Does ready access to the site exist, or is access directly from an existing road? If NO, what is the distance over which a new access road will be built</p> <p>Describe the type of access road planned:</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 70%;">YES</td> <td style="width: 30%; background-color: black;"></td> </tr> <tr> <td colspan="2" style="text-align: right;">N/A</td> </tr> </table> <table border="1" style="width: 100%;"> <tr> <td>N/A</td> </tr> </table>	YES		N/A		N/A
YES						
N/A						
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

<p>Does ready access to the site exist, or is access directly from an existing road? If NO, what is the distance over which a new access road will be built</p> <p>Describe the type of access road planned:</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">YES</td> <td style="width: 50%;">NO</td> </tr> <tr> <td colspan="2" style="text-align: right;">N/A</td> </tr> </table> <table border="1" style="width: 100%;"> <tr> <td>N/A</td> </tr> </table>	YES	NO	N/A		N/A
YES	NO					
N/A						
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

<p>Does ready access to the site exist, or is access directly from an existing road? If NO, what is the distance over which a new access road will be built</p> <p>Describe the type of access road planned:</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;">YES</td> <td style="width: 50%;">NO</td> </tr> <tr> <td colspan="2" style="text-align: right;">N/A</td> </tr> </table> <table border="1" style="width: 100%;"> <tr> <td>N/A</td> </tr> </table>	YES	NO	N/A		N/A
YES	NO					
N/A						
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
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 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)

**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.

*Note from CSIR:* The proposed project layout plan overlaid on a locality map can be seen in **Appendix A**. Maps indicating the location of sensitive features on site can be found in the Ecological Specialist Report (NSS, May 2016) attached as **Appendix G**.

## **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 in **Appendix B**. Photographs indicating sensitive features on site can be found in the Ecological Specialist Report (NSS, May 2016) 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:* A facility illustration can be seen in **Appendix C**.

## SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

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

### Instructions for completion of Section B for linear activities

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

Section B has been duplicated for sections of the route  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 alternative 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  times (complete only when appropriate)

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

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

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

Section B - Section of Route  (complete only when appropriate for above)

Section B – Location/route Alternative No.  (complete only when appropriate for above)

### 1. PROPERTY DESCRIPTION

**Property description:**  
(Including Physical Address and Farm name, portion etc.)

**Farm 120 Bultfontein, Portion 107-JR in Rooiwal/Onderstepoort.**

## 2. ACTIVITY POSITION

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

Alternative:

Latitude (S):	Longitude (E):
-25.504101	28.189283

In the case of linear activities:

Alternative:

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):	Longitude (E):

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

Addendum of route alternatives attached N/A

The 21 digit Surveyor General code of each cadastral land parcel

PROPOSAL	T	0	J	R	0	0	0	0	0	0	0	0	0	1	0	7	0	0	0	0
	1	2		3			4				5									

## 3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

	1:20 – 1:15	
--	-------------	--

## 4. LOCATION IN LANDSCAPE

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

	Undulating plain/low hills X	
--	---------------------------------	--

## 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)
- Dolomite, sinkhole or doline areas
- Seasonally wet soils (often close to water bodies)

	NO
	NO
	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	YES

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

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

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

Latitude (S): \_\_\_\_\_ Longitude (E): \_\_\_\_\_

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

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

Latitude (S): \_\_\_\_\_ Longitude (E): \_\_\_\_\_

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

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

Latitude (S): \_\_\_\_\_ Longitude (E): \_\_\_\_\_

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

## 6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?  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).

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

<input type="checkbox"/>	Natural veld with scattered aliens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10%			

**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.

*Note from CSIR:* For evidence of the above, please see Ecological Specialist study, including an indication of the groundcover, attached to this report as **Appendix G**.

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



If YES, specify and explain:

According to the Ecological Specialist Report – Appendix G (NSS, 2016):

### 1. Flora

The study area is situated in the Savanna Biome, and more specifically the *SVcb 12 Central Sandy Bushveld* (**Figure 5-6**), as classified by Mucina & Rutherford (2006). This vegetation occurs in low undulating areas, sometimes between mountains and sandy plains and catena supporting tall, deciduous woodlands *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils, low broad leaf *Combretum* woodland on shallow rocky or gravelly soils. Species of *Acacia*, *Ziziphus* and *Euclea* are found on the flats and lower slopes on eutrophic sands and some less sandy soils. *Acacia tortillis* may dominate some areas on the valley. Grass-dominated herbaceous layer with relatively low basal cover on dystrophic sands.

The conservation status of this vegetation unit is **Vulnerable (V)** as less than 3% of this vegetation unit is statutorily conserved and over 24% of the unit is transformed (including approximately 19% cultivated and 4% urban). Several alien plants are widely scattered but often at low densities and these include *Cereus jamacaru* (Queen-of-the night), *Eucalyptus* species (Gum trees), *Lantana camara* (tickberry), *Melia azedarach* (white cedar), *Opuntia ficus-indica* (Prickly pear) and *Sesbania punicea* (Spanish gold). Biogeographically important taxa include *Mosdenia leptostachys* and *Oxygonum dregeanum* subsp. *canescens* var. *dissectum* (Mucina & Rutherford, 2006).

The current site is minimally disturbed and is actually underutilised in terms of grazing and fire management. Although considered a brief Vegetation Scan report, NSS has included a section on Conservation Important (CI) species that were detected or could possibly be detected on site. Within this section the CI species are discussed. These include the National Threatened Plant Species Programme (TSP) lists, any Protected species according to the Nature Conservation Ordinance (12 of 1983) and any specific Endemic or Rare species.

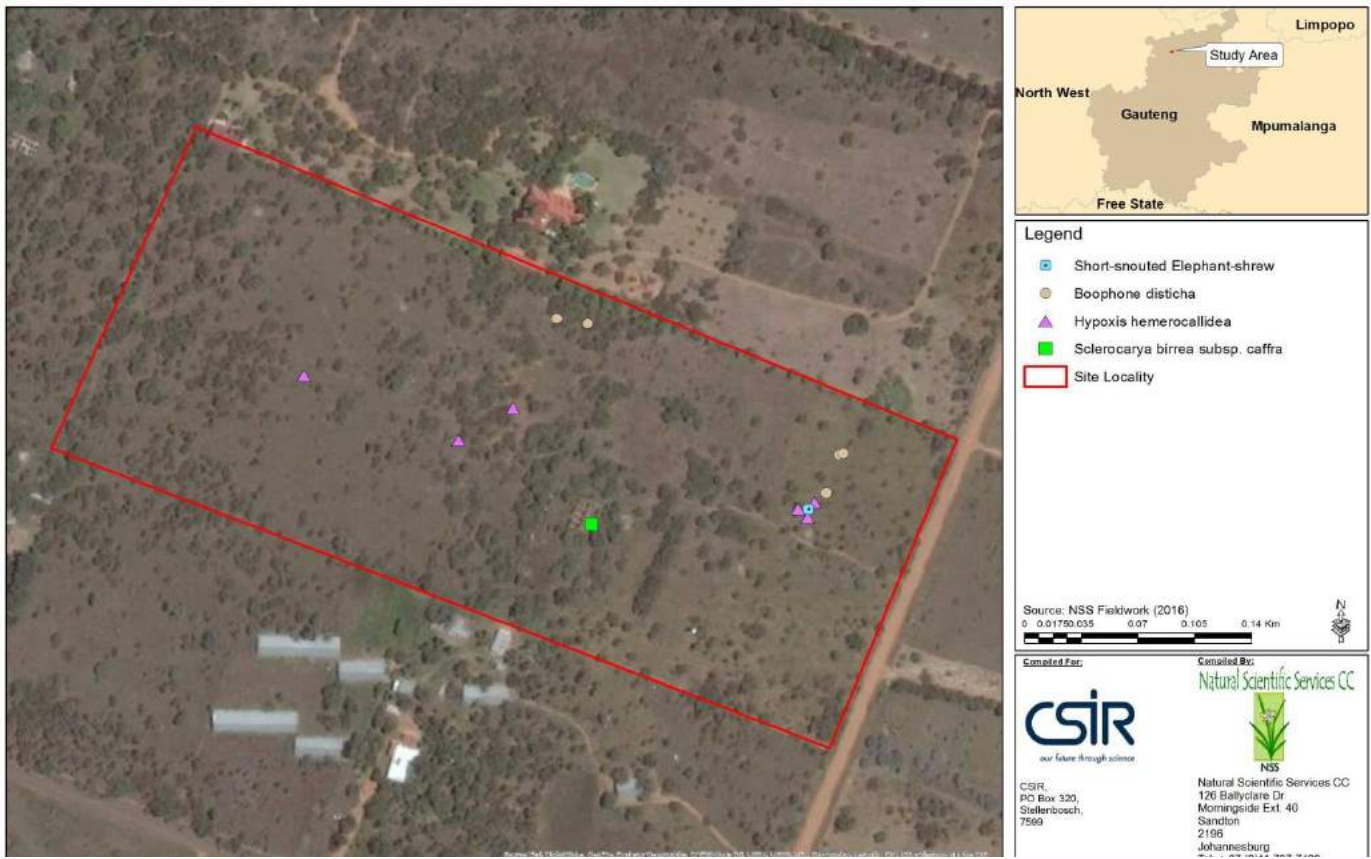
From the POSA website (2528CA QDS) a large number of CI species has been recorded in the greater region. However, a number of these species distributions are restricted to specific habitats in specific provinces such as the Western Cape indicating errors in the POSA data. Therefore NSS has excluded these and only represented those species that could occur within the region around the site. From the 35 species listed, habitat potentially exists for approximately 13 species, 7 species are unlikely to occur and there is no habitat available for 14 species. The declining *Boophone disticha* and the declining *Hypoxis hemerocallidea* were, however, identified on site. These species are also considered Protected species under the Nature Conservation Ordinance, 12 of 1983. A sufficiently sized population of *Boophone disticha* was located within the *Acacia caffra* –*Combretum apiculatum* -*Heteropogon contortus* Open Woodland, whereas *Hypoxis hemerocallidea* was scattered between this.

### 2. Fauna

An extraordinary wealth of faunal diversity has been documented during atlassing projects in the QDS 2528CA (and pentad 2530\_2810) covering the Pacific Ora study site (**Appendices 2-8**). This is likely the joint product of both the topographic heterogeneity (several main river systems and dams, the Magaliesberg and surrounding koppies) and the disproportionately high sampling effort associated with the QDS (given that it includes parts of the Pretoria CBD).

However, the small size of the site, lack of rocky outcrops, deep sandy soils or any wetlands and open waterbodies of any significance precludes the presence of a large proportion of these regionally occurring species. As such only a limited number of Conservation Important Species (CIS) are expected to occur on site and even fewer (if any) are likely to be resident or entirely dependent on it.

## CONSERVATION IMPORTANT SPECIES



## AREAS OF CONCERN

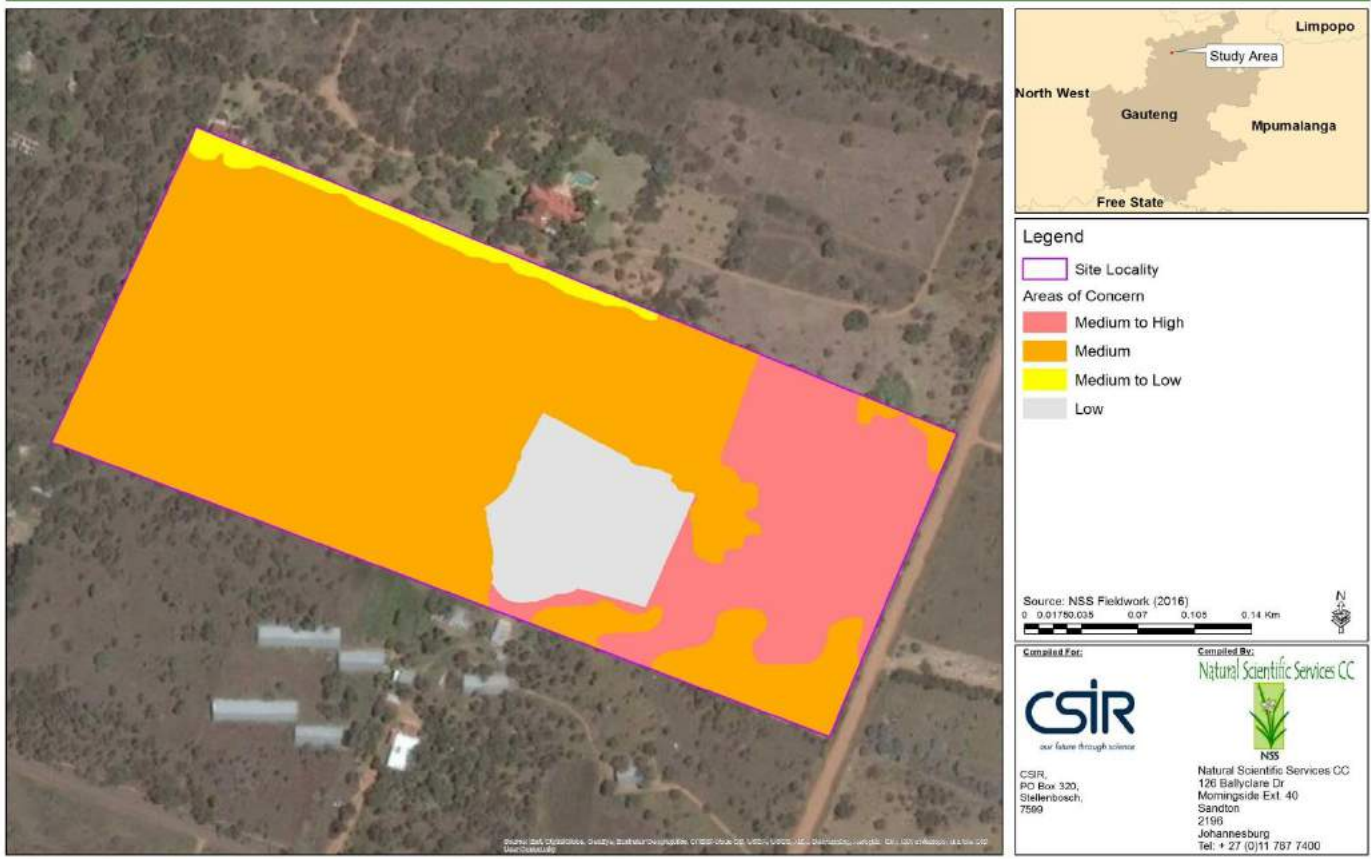


Figure 2: Spatial representation of Conservation Important Species and areas of concern.

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

If YES, specify and explain:

**Flora:**

**1. *Boophone disticha***

This species is considered Protected species under the Nature Conservation Ordinance, 12 of 1983. Protected Species may not be cut, disturbed, damaged, and destroyed without obtaining a permit from a delegated authority.

**2. *Hypoxis hemerocallidea***

This species is considered Protected species under the Nature Conservation Ordinance, 12 of 1983. Protected Species may not be cut, disturbed, damaged, and destroyed without obtaining a permit from a delegated authority.



*Boophone disticha*



*Hypoxis hemerocallidea*

**Fauna:**

**3. *Short-snouted Elephant-shrew***

Although the evidence for this record namely the presence of clearly defined runways or circuits constructed through grass is a feature more typically associated with the similar Bushveld Elephant-shrew (Skinner & Chimimba, 2005) only Short-snouted Elephant-shrew is expected to occur on site, as the nearest known record for Bushveld Elephant-shrew occurs in the sandy bushveld near Lephalale approximately 170 km north-west.



Short-snouted Elephant-shrew  
(*Elephantulus brachyrhynchus*) runway

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

YES	
-----	--

If YES, specify and explain:

**On Site - Vegetation Communities**

The *Combretum zeyheri* Mixed Bushclumps was the most dominant vegetation community on the site representing almost 4 of the 9 hectares. The tree layer was dominated by *C. zeyheri* but also included *Acacia tortillis*, *Dichrostachys cinerea*, *Vitex zeyheri*, *A caffra*, *Searsia lancea* and *Dombeya rotundifolia*. Species within the understorey included *Panicum maximum*, *Heteropogon contortus*, *Aerva leucura*, *Melinis repens* and *Felicia muricata*. The condition of these wooded areas was considered fairly intact. However, within a number of these bushclumps the understorey was dominated by the Category 1b Alien Invasive – *Lantana camara*.

In some areas of the site, the wooded vegetation opens out and trends more towards a grassland structure. This includes the *Acacia caffra* – *Combretum apiculatum* - *Heteropogon contortus* Open Woodland and the *Combretum apiculatum* – *Themeda triandra* Open Woodland within the east and western sections of the site respectively. Within these areas *C. apiculatum* rather than *C. zeyheri* is the common tree species. *Themeda triandra*, *Heteropogon contortus* and *Cymopogon* species dominate the grass layer. Approximately 5% of the site falls within the transformed *Acacia-Heteropogon* Past Fields. A limited diversity in the forb and tree layer is evident. This unit is in recovery phase and is dominated by *Heteropogon contortus*.

The table below highlights the habitats of Species of Special Concern:

Vegetation Community	Conservation Significance	Area - Ha	Area - %
<b>Woodland Habitats</b>			
<i>Acacia caffra</i> – <i>Combretum apiculatum</i> - <i>Heteropogon contortus</i> Open Woodland	Medium-High	1.74	19.40
<i>Combretum zeyheri</i> Mixed Bushclumps	Medium	3.98	44.17
<i>Combretum apiculatum</i> – <i>Themeda triandra</i> Open Woodland	Medium	1.73	19.24
<b>Transformed (Habitat In Recovery)</b>			
<i>Acacia-Heteropogon</i> Past Fields	Medium	0.45	5.07
Mixed Buchclumps (including <i>Lantana camara</i> )	Medium-Low	0.23	2.55
<b>Transformed</b>			
Two-Track Road and Abandoned House	Low	0.86	9.57
Alien Bushclumps			

Was a specialist consulted to assist with completing this section

YES	
-----	--

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) (2000 – 2001)  
B Sc Hons University of the Witwatersrand, Johannesburg (1999)  
B Sc University of the Witwatersrand, Johannesburg (1998)

Postal address:

126 Ballyclare Dr  
Morningside ext 40  
Sandton, Johannesburg

Postal code:

2196

Telephone:

(011) 787-7400

Cell:

E-mail:

susan@nss-sa.co.za

Fax:

Are any further specialist studies recommended by the specialist?

NO

If YES,

specify:

If YES, is such a report(s) attached?

If YES list the specialist reports attached below

Signature of specialist: See below

Date:

*Note from CSIR:* Please see the Specialist Declaration as per Appendix 6 of the NEMA EIA Regulations 2014) on Page 6 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

	7. Agriculture			
			34. Small Holdings	

**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

<b>NORTH</b>					
	<b>7</b>	<b>7</b>	<b>7</b>	<b>34</b>	<b>34</b>
	<b>7</b>	<b>7</b>	<b>7</b>	<b>34</b>	<b>34</b>
<b>WEST</b>	<b>7</b>	<b>7</b>	<b>34</b> Site	<b>34</b>	<b>34</b>
	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>
	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>
<b>SOUTH</b>					

**Note from CSIR:** The proposed development is surrounded by small holdings with some mixed agricultural practices. The density of these small holdings is very low and the dwellings are fairly spaced apart. Please see locality and aerial maps for an indication of the density of the small holdings (**Page 17 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  
If yes indicate the type of reports below

YES	
-----	--

ECOLOGICAL STUDY FOR A PROPOSED PIG AND VEGETABLE PRODUCTION FACILITY , BULTFONTEIN 107-JR, ROOIWAL, GAUTENG  
NSS, 2016  
**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.

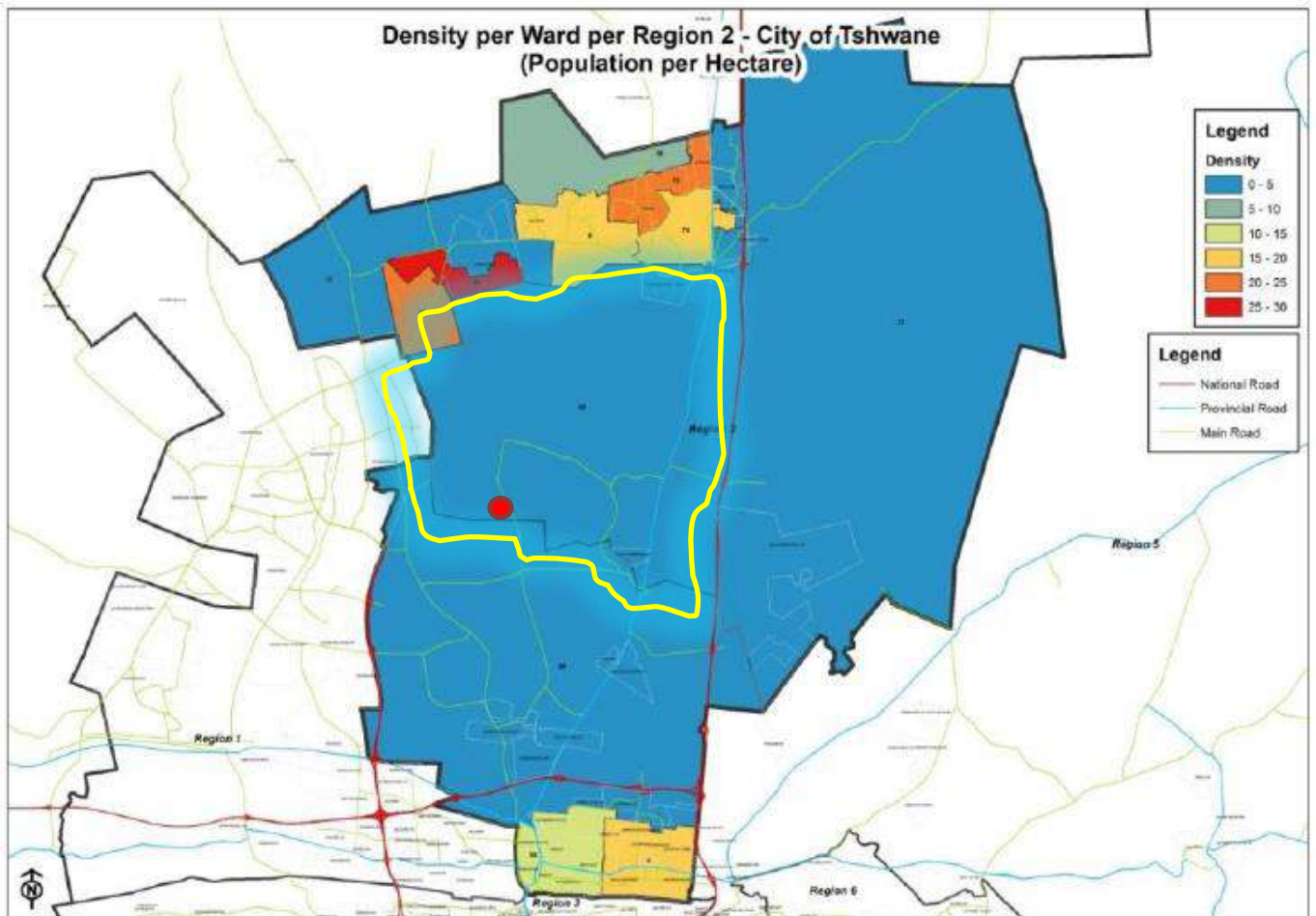
### ***9.1 Baseline demographic information***

When conceptualising a proposed project, the anticipated social and environmental impacts are generally broad and not limited to the exact site or location. However, compared to the direct, environmental impacts which are usually limited to the site, socio-economic impacts (i.e. additional labour requirements) may impact a wider area, and it is, therefore, important to consider the particular Municipality as well as the nearby towns or Wards in the most holistic way possible.

The baseline study will, therefore, include a brief overview of the socio-economic factors in the Gauteng Province, with a focus on the Tshwane Metropolitan Municipality (CoT) and the Rooiwal area. The project falls within Ward 49 of CoT. Households and communities within Ward 49 should, therefore, be provided preference when implementing socio-economic policies and mitigation measures.

Bultfontein is a farm named after a farm Bultfontein in 1973, bearing the Afrikaans name for “hill fountain”. According to the latest population report (Statistics South Africa, 2011), the total population for the Bultfontein is population 2,147 comprising of 462 households. Ward 49 as a whole has a population of 35 424 residents with a very low density of 2 residents per ha. The average household size for Ward 49 is 3.50 people per household. The majority of the Bultfontein population is aged between 15 and 19 years of age, with an high percentage of just over 15% being under 18 years of age, average being 5% between 30 and 44 years. The least most populated being over 70 years. The large percentage of youth in the area will mean additional pressure on job creation in future. It also implies a high dependency ratio, with a large number of people not yet economically active.

Figure 3 provides an overview of population density per ward in Region 2 of the CoT (the highlighted ward being the ward pertinent to the proposed project). Table 2 indicates that the gender distribution of the Bultfontein area is 53.7% male and 46.3% female.



(Source: StatsSA Census 2011)

Figure 3: Population density per ward for Region 2 of the CoT

Table 2: Gender percentage of the population

Group	Percentage
Male	53,7%
Female	46,3 %

According to Table 3, the Bultfontein community is comprised of mainly White citizens with a weight of 50% of the population profile. Secondly is the black racial group with a weight of 48% of the population profile. According to the Tshwane Region 2 IDP (2014/15), Ward 49 is situated in a previously disadvantaged area, requiring a specific focus in terms of service delivery and the creation of sustainable human settlements.



**Table 3: Population by racial group**

Group	Percentage
<b>Black African</b>	47,6%
<b>Coloured</b>	1,2%
<b>Indian/Asian</b>	0,4%
<b>White</b>	50,0%
<b>Other</b>	0,7 %

The language most spoken at home within the Bultfontein area is Afrikaans 61,5%, followed by English 8,5% and IsiNdebele 2,7%. In terms of education, 5% of adults have no schooling whatsoever and 21% of adults are schooled up to Grade 12. In general, the level of education in the region is low which makes access to employment and economic growth a challenge.

According to Statistics South Africa (2011), majority of the households (40%) have access to a flush toilet (with septic tank) and 35% with a flushing toilet (connected to sewerage system). 88.7% of households in the Bultfontein have access to electricity for cooking, heating and lighting. In terms of tenure status, 30.8% occupied rent free, 21% own their dwellings and rented dwellings account for 23%. The main sources of water for households in the area are 84.8% borehole abstracted, 10% regional/local water scheme and the remainder a combination of tanks, springs and dams.

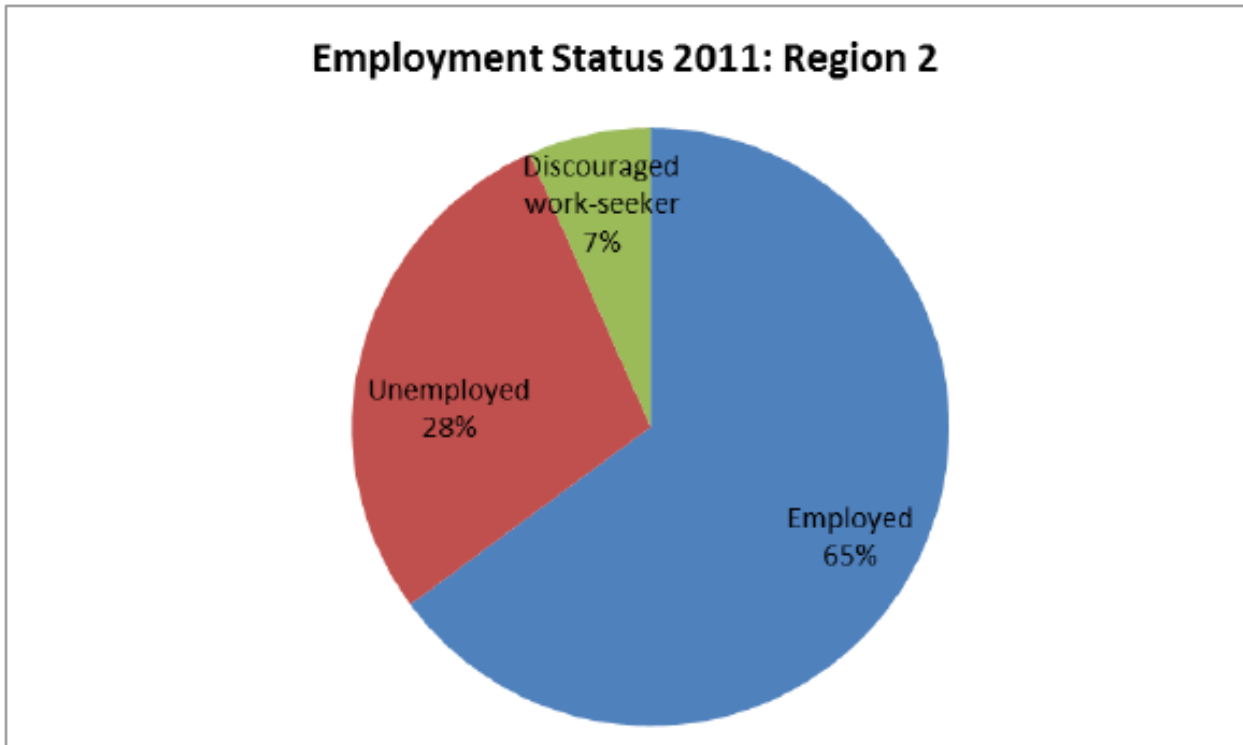
## **9.2 Baseline economic information**

The entire Region 2 of CoT is seen as relatively rural, especially Ward 49. Bultfontein, specifically, is in a mainly farming district and several farmers in the district breed pedigree cattle. Table 4 indicates the monthly incomes of residents in the area.

**Table 4: Employees by monthly income**

Income	Percentage
<b>No income</b>	11,9%
<b>R1 - R4,800</b>	1,7%
<b>R4,801 - R9,600</b>	4,5%
<b>R9,601 - R19,600</b>	20,5%
<b>R19,601 - R38,200</b>	19,2%
<b>R38,201 - R76,400</b>	10,6%
<b>R76,401 - R153,800</b>	8,4%
<b>R153,801 - R307,600</b>	11,6%
<b>R307,601 - R614,400</b>	6,3%
<b>R614,001 - R1,228,800</b>	3,7%
<b>R1,228,801 - R2,457,600</b>	0,9%
<b>R2,457,601+</b>	0,9%

According to Statistics SA (2011), approximately 28% of economically active persons are unemployed in this region. This high unemployment ratio is linked to other factors mentioned above, e.g. low skills levels. Figure 4 below highlights the overall unemployment status for the region.



(Source: StatsSA Census 2011)

Figure 4: Employment status for Region 2

Residents in this area are very dependent on public transport. There are crucial gaps in the transportation network, both in terms of road and rail. The area is further characterised by a poor network of social infrastructure, limited retail facilities, limited investment by the private sector and major backlogs in infrastructure provision.

In conclusion, region 2 consists of peripheral urban settlements in the north, suburban settlements and nodal development in the south, and a large rural area. Employment and education levels are low and a fifth of dwelling units in the region are informal.

## **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?

	NO
--	----

If YES, explain:

N/A

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

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

A Heritage Screening Study was completed by Cedar Tower and is attached as **Appendix F**. The findings from this screening were that the heritage resources in the area proposed for development are sufficiently recorded. The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. Thus, no further heritage work is recommended for the proposed development.

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)?

	NO
	NO

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

Note from CSIR: A heritage screening was submitted to SAHRA via the SAHRIS portal (Case I.D: 9493).

## 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

If yes, has any comments been received from the local authority?

NO

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

This Draft is currently out for a 30-day review period until the 5<sup>th</sup> September 2016, thus no comments from the local authority have been received to date.

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

N/A

#### 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?

NO

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

N/A

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

The Draft report was released on XXX and no comments have been received to date.

#### 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 –**N/A at this stage of the process**

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

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 alternative 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  times (complete only when appropriate)

Section D Alternative No.  (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?  
If yes, what estimated quantity will be produced per month?

YES	
Not able to predict at this stage of the project	

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

All construction waste will be collected in weather and scavenger proof containers on site and disposed of at a registered landfill site.

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

A registered landfill site.

Will the activity produce solid waste during its operational phase?  
If yes, what estimated quantity will be produced per month?

YES	
40 m <sup>3</sup>	

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

---

The waste produced by the pig facility (910 pigs) will be stored in a 40 m<sup>3</sup> cement constructed slurry dam and used for the fertilization of the vegetables. Fertilizer will be created for the vegetables by method of a separation procedure, as described below. The recent increased interest in composting has arisen because of the need for environmentally sound waste treatment technologies. Composting is seen as an environmentally acceptable method of waste treatment. The stored manure will be treated, either before or during storage.

The reasons for treatment include:

- Odour control
- Energy recovery
- Reduction of manure volume—especially where extended transportation is necessary
- Reduction of nutrient content—in some circumstances where insufficient land is available to receive the manure
- Enhance (speed up) the decomposition of manure

The process will involve separating liquid swine manure into its biosolid and liquid fractions. The process destroys pathogens, converts N from unstable ammonia to stable organic forms, reduces the volume of waste and improves the nature of the waste. The recommended upper limit for moisture content of substrates to be composted is reported to be 65%. However, composting may be feasible with initial moisture contents above 65% as long as there is enough air in the compost to satisfy the oxygen needs of the microbes.

The raw slurry is drained by a pipeline to a processing building. The raw slurry is passed across a gravity screen-roll process separator to remove separable solids. The separated slurry is mixed with polymer and passed across a gravity belt thickener to remove suspended solids. The resulting separated effluent is stored in the slurry dam until land applied during the vegetable growing season via an irrigation system.

**Please note the GUIDELINE MANUAL FOR THE MANAGEMENT OF ABATTOIRS AND OTHER WASTE OF ANIMAL ORIGIN (GDARD, 2009) will be adhered to.**

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? [REDACTED] NO

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

Please see above.

**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? [REDACTED] 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? [REDACTED] 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 waste produced by the pig facility (910 pigs) will be stored in a 40 m<sup>3</sup> cement constructed slurry dam and used for the fertilization of the vegetables. See description of this separation process above.

**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? [REDACTED] 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 [REDACTED]

the liquid effluent to be generated by this activity(ies)?

--

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

	NO
--	----

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

N/A

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?  
If yes, provide the particulars of the facility:

	NO
--	----

Facility name:

Contact person:

Postal address:

Postal code:

Telephone:

E-mail:

--

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

N/A

**Liquid effluent (domestic sewage)**

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?  
If yes, what estimated quantity will be produced per month?

YES	
Not able to predict at this stage of the project.	
YES	

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?

Will the activity produce any effluent that will be treated and/or disposed of on site?  
If yes describe how it will be treated and disposed off.

	NO
--	----

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?

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 odours which will be produced by the pig production facility do not require an Air Emissions License as per NEM:AQA. The relevant impacts of these odours have been assessed in the Impact Assessment (Section E).

**2. WATER USE**

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

	Groundwater	
	X	



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:

200 000 liters

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?

NO

If yes, list the permits required

N/A

If yes, have you applied for the water use permit(s)?

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

### **3. POWER SUPPLY**

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

Tshwane Metropolitan Municipality/Eskom

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:

Water Pump:

- The borehole pumping system will make use of solar PV powered pumps, thus lessening the energy requirements.

Office buildings and pig houses:

- Use of building material originating from sensitive environmental resources should be minimised.
- Building material should be legally obtained by the supplier, e.g. wood must have been legally harvested, sand should be obtained only from legal borrow pits and from commercial sources.
- Building material that can be recycled/ reused should be used rather than building material that cannot.
- Use highly durable material for part of the building that is unlikely to be changed during the life of the buildings (unlikely to change due to e.g. renovation, fashion, changes in family life cycle) is highly recommended.

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

As above.

## 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 (18 March 2016) and **prior** to the release of this Draft Basic Assessment Report can be seen in the comments and responses report which is attached as **Appendix E5**:

The Comments and Responses Report (CRR) 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 (18 March 2016) and **prior** to the release of this 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 E5**.

### **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 all specialists, for incorporation into specialist assessments:

### 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:

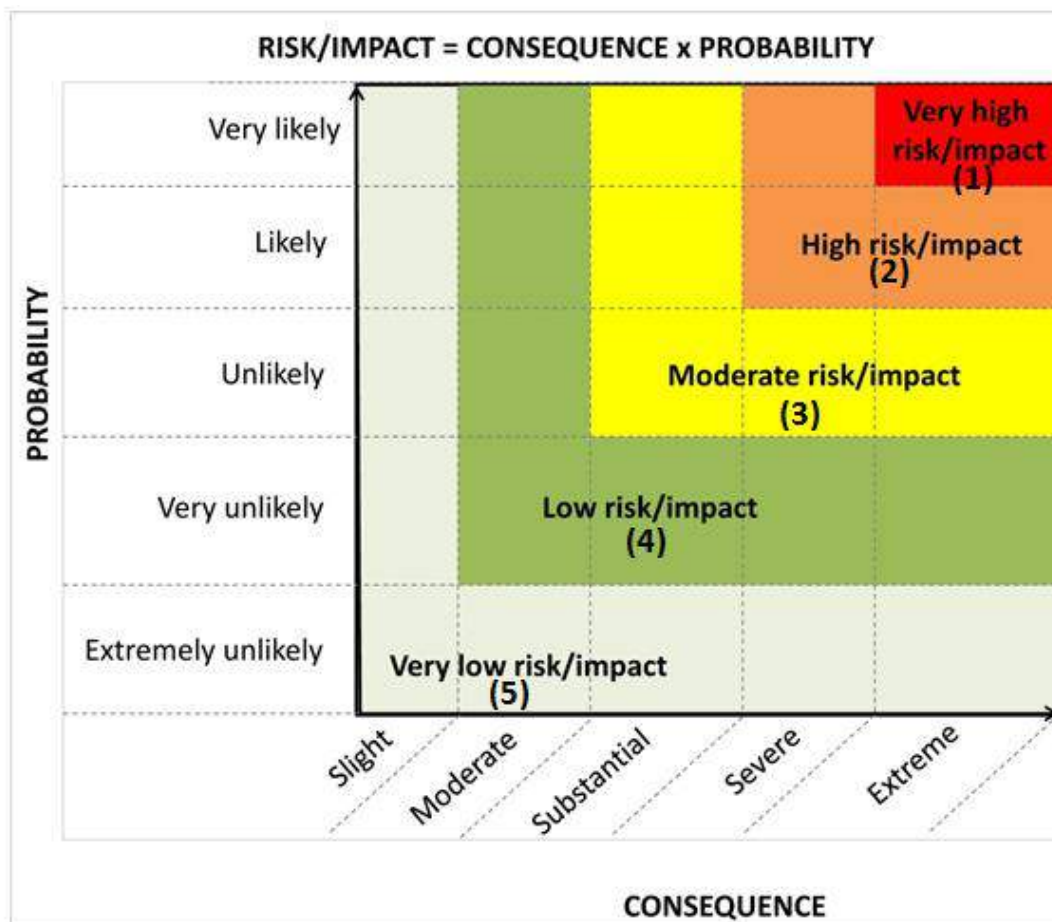
- Improbable (little or no chance of occurring);
- Probable (<50% chance of occurring);
- Highly probable (50 – 90% chance of occurring); or
- Definite (>90% chance of occurring).

**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 site alternatives (i.e. location and property alternatives) do not exist for the proposed project. The No-Go alternative will be considered.

<b>IDENTIFIED IMPACTS- CONSTRUCTION PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
<b>ALTERNATIVE A1 (PREFERRED ALTERNATIVE)</b>			
<b>Direct impacts:</b>			
<ul style="list-style-type: none"> <li>Loss of terrestrial vegetation via the clearance of 8 hectares of indigenous vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>High (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Revise the planned layout of the facility and all associated infrastructure to avoid all High sensitive areas as far as possible.</li> <li>Clearly demarcate or fence in the construction site specimens that are situated in the construction footprint, according to the advice of an appropriate specialist.</li> <li>Commence (and preferably complete) construction during winter, when the risk of disturbing growing plants should be least.</li> <li>Briefly and effectively stockpile topsoil preferably 1-1.5m in height. Natural vegetation must be allowed to recover in areas of disturbance. If recovery is slow, then a seed mix for the area (using indigenous grass species listed within this report) should be sourced and planted.</li> <li>Identify and mark large trees both on the ground and digitally to facilitate the incorporation of as many large trees into the final project layout as possible. Wherever possible endeavour to conserve large trees in situ.</li> </ul>	<ul style="list-style-type: none"> <li><b>Medium (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Increased risk of the spread of alien invasive species.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods.</li> <li>The removed alien invasive vegetation should be immediately disposed of correctly and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.</li> <li>Carefully regulate / limit access by vehicles and materials to the construction site. Demarcate or fence in the construction area.</li> <li>Prohibit the introduction of domestic animals such as dogs and cats.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>

<b>IDENTIFIED IMPACTS- CONSTRUCTION PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		<ul style="list-style-type: none"> <li>• If any landscaping is to be done -Only plant locally indigenous flora</li> <li>• Keep construction activities neat and tidy. When complete remove all sand piles and landscape all uneven ground while re-establishing a good topsoil layer.</li> <li>• Mechanical removal of these species is recommended. However, the removal must be carefully performed so as to not excessively disturb the soil layer</li> </ul>	
<ul style="list-style-type: none"> <li>• Loss of CI or medicinal flora.</li> </ul>	<ul style="list-style-type: none"> <li>• Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Submit permits for the removal of CI important species within the study site.</li> <li>• Prior to construction all CI and medicinally important floral specimens within the site layout footprint should be collected and stored for replanting in surrounding areas or later during rehabilitation of certain areas.</li> <li>• Guidance from a suitably qualified vegetation specialist or horticulturist regarding the collection, propagation/storage and transplantation of plants is advised.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Loss of faunal habitat due to the clearance of 8 hectares of indigenous vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>• Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Revise the planned layout of the facility and all associated infrastructure to avoid all High sensitive areas as far as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Faunal Mortality and Displacement (including CI species)</li> </ul>	<ul style="list-style-type: none"> <li>• Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to construction, commission a suitably qualified ecologist to remove and relocate species to suitable surrounding habitats. E.g. All termitaria within the project footprint should be carefully searched for Striped Harlequin Snakes. Grass should also be searched for grass lizards and these searches should continue into the night for hedgehogs.</li> <li>• Ensure policies and procedures are in place regarding the handling and removal of fauna encountered on site.</li> <li>• Ensure that staff are trained and properly equipped to safely handle fauna (particularly snakes and bullfrogs) or that the services of a trained professional are</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (negative)</b></li> </ul>



<b>IDENTIFIED IMPACTS- CONSTRUCTION PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		<p>readily available on call.</p> <ul style="list-style-type: none"> <li>• Construction activities should be timed to start (and preferably end) during winter, when activity levels and the presence of breeding and migratory species are lowest. Bullfrogs are, however a concern in this regard as overwintering individuals may be unearthed during construction activities.</li> <li>• Check open trenches for trapped animals (e.g. bullfrogs, hedgehogs and snakes), which should be carefully caught and relocated according to the specifications of a relevant specialist.</li> <li>• Prohibit the introduction of domestic animals such as dogs and cats.</li> <li>• Educate staff on prohibited actions involving the utilisation of wildlife (i.e. poaching / harvesting) through training and notices.</li> <li>• Routinely walk fence lines to remove snares.</li> </ul>	
<ul style="list-style-type: none"> <li>• Impact on the regional water balance as a result of increased water usage.</li> </ul>	<ul style="list-style-type: none"> <li>• Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Water is required during the construction phase for various purposes, such as earthworks, as well as to fulfil the requirements of construction personnel on-site. Where possible, water conservation should be practiced. Water conservation techniques include making construction personnel aware of the importance of limiting water wastage, as well as reducing water use during the cleaning of the site (such as sweeping the site before it is being washed). Pacific Ora Projects should also ensure that the water infrastructure on site is monitored for leakages on a regular basis to prevent wastage.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Very Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Potential spillage of effluent (from portable sanitation facilities for construction personnel).</li> </ul>	<ul style="list-style-type: none"> <li>• Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Normal sewage management practises should be implemented. These include ensuring that portable sanitation facilities are regularly emptied and the resulting sewage is transported safely (by an appointed (suitable) service provider) for correct disposal at an appropriate, licenced facility. Proof of disposal (in the form of waste disposal slips or waybills) should be retained on file for auditing</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Very Low (Negative)</b></li> </ul>

<b>IDENTIFIED IMPACTS- CONSTRUCTION PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		<p>purposes.</p> <ul style="list-style-type: none"> <li>As part of the Environmental Awareness Training, all construction personnel should be made aware of the sewage management practises.</li> </ul>	
<ul style="list-style-type: none"> <li>Pollution caused by spillage or discharge of construction waste water into the surrounding environment.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that adequate containment structures are provided for the storage of construction materials on site.</li> <li>Ensure the adequate removal and disposal of construction waste and material,</li> </ul>	<ul style="list-style-type: none"> <li><b>Very Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Air Quality Impact: Emissions from construction vehicles and generation of dust as a result of earthworks, demolition, as well as the delivery and mixing of construction materials.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water (obtained from an approved source) to minimise dust generation.</li> <li>Approved soil stabilisers may be utilised to limit dust generation.</li> <li>Ensure that construction vehicles travelling on unpaved roads do not exceed a speed limit of 40 km/hour.</li> <li>Limit vehicles, people and materials to the construction site</li> <li>Adequate dust control strategies should be applied to minimise dust deposition, for example: Periodic spraying of the entrance road and environmentally-friendly dust control measures (e.g. mulching and wetting) where and when dust is problematic</li> <li>Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.</li> <li>Noise should also be minimised throughout construction to limit the impact on sensitive fauna such as owls and large terrestrial birds such as Korhaans and Secretary birds.</li> <li>Limit construction activities to day time hours.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Increase in erosion degrading habitat integrity.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Commence (and preferably complete) construction during winter, when the risk of erosion should be least.</li> <li>Revegetate denude areas with locally indigenous flora a.s.a.p.</li> <li>Erosion protection measures must be</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>

IDENTIFIED IMPACTS- CONSTRUCTION PHASE			
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
		<p>implemented on the site to reduce erosion and sedimentation of the receiving environment. Measures could include bunding around soil stockpiles; and vegetation of areas not to be developed.</p> <ul style="list-style-type: none"> <li>Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna.</li> </ul>	
<ul style="list-style-type: none"> <li>Socio-economic Impact: Employment creation and skills development opportunities during the construction phase, which is expected to give rise to approximately 6-10 new jobs. This impact is rated as positive.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Positive)</li> </ul>	<ul style="list-style-type: none"> <li>Liaise with TNPA to maximise job creation opportunities during the construction phase.</li> <li>Enhance the use of local labour and local skills as far as reasonably possible.</li> <li>Where the required skills do not occur locally, and where appropriate and applicable, ensure that relevant local individuals are trained.</li> <li>Ensure that an equitable percentage allocation is provided for local labour employment as well as specify the use of small-to-medium enterprises and training specifications in the Contractors contract.</li> <li>Ensure that goods and services are sourced from the local and regional economy as far as reasonably possible.</li> </ul>	<ul style="list-style-type: none"> <li><b>High (Positive)</b></li> </ul>
<ul style="list-style-type: none"> <li>Potential visual intrusion of construction/demolition activities on the views of sensitive visual receptors.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>No specific mitigation measures are required other than standard construction site housekeeping and dust suppression. These are included below: <ul style="list-style-type: none"> <li>The contractor(s) should maintain good housekeeping on site to avoid litter and minimise waste.</li> <li>Litter and rubble should be timeously removed from the construction site and disposed at a licenced waste disposal facility.</li> <li>The project developer should demarcate construction boundaries and minimise areas of surface disturbance.</li> <li>Appropriate plans should be in place to minimise fire hazards and dust generation.</li> <li>Night lighting of the</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>

<b>IDENTIFIED IMPACTS- CONSTRUCTION PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		construction site should be minimised within requirements of safety and efficiency.	
<ul style="list-style-type: none"> <li>Potential noise impact from the use of construction equipment (for the construction of the proposed infrastructure and demolition of existing infrastructure).</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Limit construction activities to day time hours</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Noise generation from demolition and construction work (e.g. grinding and use of angle grinders), as well as from the removal of waste material (e.g. crane and truck engines). This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>Construction personnel must wear proper hearing protection, which should be specified as part of the Construction Phase Risk Assessment carried out by the Contractor.</li> <li>The Contractor must ensure that all construction personnel are provided with adequate Personal Protective Equipment (PPE), where appropriate.</li> <li>The Contractor must prescribe, to construction personnel, what is required by Pacific Ora Projects permit to work system.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>Potential health injuries to construction personnel as a result of construction work (i.e. welding fumes. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>The Contractor must ensure that all construction personnel are provided with adequate PPE for use where appropriate.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>Traffic, congestion and potential for collisions during the construction phase. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>During the construction phase, suitable parking areas should be created and designated for construction trucks and vehicles.</li> <li>A construction supervisor should be appointed to co-ordinate construction traffic during the construction phase (by drawing up a traffic plan prior to construction).</li> <li>Road barricading should be undertaken where required and road safety signs should be adequately installed at strategic points within the construction</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>

<b>IDENTIFIED IMPACTS- CONSTRUCTION PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		site.	
<ul style="list-style-type: none"> <li>Construction safety injuries: potential impact on the safety of construction workers due to construction activities (such as welding, cutting, working at heights, lifting of heavy items etc.). This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>High (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that a skilled and competent Contractor is appointed during the construction phase. The Contractor must be evaluated during the tender/appointment process in terms of safety standards.</li> <li>The Contractor must ensure that all construction personnel are provided with adequate PPE for use where appropriate.</li> <li>The Contractor must undertake a Construction Phase Risk Assessment.</li> <li>A Construction Site Manager or Safety Supervisor should be appointed, in conjunction with the project manager, to monitor all safety aspects during the construction phase. This could be the same person that is assigned to co-ordinate the construction traffic.</li> <li>Ensure that roads are not closed during construction, which may restrict access for emergency services.</li> </ul>	<ul style="list-style-type: none"> <li><b>Medium (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>Pollution of the surrounding water and ground as a result of generation of building rubble and waste scrap material. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>High (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>The amount of hazardous materials and liquids (such as cleaning materials) handled will be minimal. Fumes generated during welding will be minimal, within a well-ventilated area.</li> <li>All construction waste (including rubble) should be frequently removed from site and correctly disposed by a suitable waste Contractor.</li> <li>The construction site should be cleaned regularly.</li> <li>The Contractor should provide adequate waste skips (or similar) on site and the Construction Contract should specify that the Contractor must be responsible for the correct disposal of the contents of the waste skips.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>
<b>Indirect impacts:</b>			
<ul style="list-style-type: none"> <li>Socio-economic impact: Secondary industries may benefit from the proposed project in the form of the provision of produce</li> </ul>	<ul style="list-style-type: none"> <li>Low (Positive)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that local industries are utilised as suppliers, where applicable/practical.</li> </ul>	<ul style="list-style-type: none"> <li><b>Medium (Positive)</b></li> </ul>

IDENTIFIED IMPACTS- CONSTRUCTION PHASE			
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
and pork products. This impact is rated as positive.			
<b>Cumulative impacts:</b>			
• As explained above.			

No-go alternative
<p><b>Direct impacts:</b></p> <ul style="list-style-type: none"> <li>• None of the impacts mentioned above will occur.</li> <li>• The existing site will remain uncleared which will result in no clearance of indigenous vegetation and in addition, no clearance of present alien species.</li> <li>• If the proposed project does not proceed, increased income and economic spin-off activities will not be realised.</li> <li>• Approximately 6-10 new jobs will not be created during the construction phase.</li> <li>• Customers of the proposed pig and vegetable facility will not be provided with an increase of produce and pork products on a local scale.</li> <li>• If the proposed project does not proceed, the industries that rely on the supply of fresh produce and pork products, could experience hindered economic growth potential.</li> </ul> <p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>• There are no indirect impacts during the construction phase for the No-go Option.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>• There are no cumulative impacts during the construction phase for the No-go Option.</li> </ul>

<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
<b>ALTERNATIVE A1 (PREFERRED ALTERNATIVE)</b>			
<b>Direct impacts:</b>			
<ul style="list-style-type: none"> <li>Environmental contamination of the surrounding environment (various contaminants are present in pig effluents including nutrients, pathogens, veterinary pharmaceuticals (including inter alia antibiotics) and naturally excreted hormones).</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Ensure that the pig houses and associated drains and slurry facility are designed and lined with impermeable substances (clay-type soils, geosynthetic plastic, or concrete) in accordance with advice from suitably qualified agricultural experts and international best practice norms.</li> <li>Adhere to best practice pig husbandry and waste disposal norms.</li> <li>Ensure that if vehicles, equipment or visiting personnel are to be decontaminated make sure this is done in a designated area that can effectively contain excess disinfectants / biocides / surfactants.</li> <li>General waste should be stored in waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material and correctly labelled. Waste separation should take place.</li> <li>Establish appropriate emergency procedures for accidental contamination of the surroundings. Waste recycling should be incorporated into the facility's operations as far as possible. Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medications.</li> <li>Educate workers regarding the handling of hazardous substances and about waste management and emergency procedures with regular training and notices and talks.</li> <li>Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>

<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		<p>specialists.</p> <ul style="list-style-type: none"> <li>General waste (i.e. packaging material, paper and domestic waste etc.) should be removed from the site on a regular basis and disposed of at an appropriate, licensed waste disposal facility. Hazardous waste should be removed by an approved waste management Contractor. General solid waste could be removed from the site by municipal services. Waste disposal slips or waybills should be kept on file for auditing purposes as proof of disposal, as applicable.</li> <li>Ensure that the facility is kept clean at all times.</li> </ul>	
<ul style="list-style-type: none"> <li>Increase in vertebrate and invertebrate pests.</li> </ul>	<ul style="list-style-type: none"> <li>High (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Detect and control pest infestations before they become a problem through frequent and careful cleaning, monitoring and control.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Increase in the transmission of diseases.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that pests and other potential vectors are unable to enter areas where they might encounter production animals, carcasses, excrement or bedding, by thoroughly sealing these areas using effective, humane and environmentally-friendly means.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Reduction in CI Species - Harvesting of CI or medicinal flora.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Harvesting of indigenous flora for medicine, fire wood, building materials, and other purposes must be prohibited.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Increased burning resulting in degrading habitat integrity and/or the destruction of Species</li> </ul>	<ul style="list-style-type: none"> <li>High (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that flammable materials are stored in an appropriate safe house. Ensure that there are appropriate control measures in place for any accidental fires.</li> <li>If artificial burning is considered necessary to reduce risks to human and infrastructure safety from wild fires, a fire management plan should be compiled with input from an appropriate floral specialist, and diligently implemented.</li> <li>Annual wild fires should be strictly prohibited.</li> </ul>	<ul style="list-style-type: none"> <li><b>Medium (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Increased municipal water usage as a result of domestic uses in</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>The amount of potable water required (for drinking purposes) is considered to be small. Therefore, increased demand on municipal water services as a result of the</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>



<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
the facility.		<p>proposed project is considered to be small. However, water conservation should still be practiced during the operational phase.</p> <ul style="list-style-type: none"> <li>Water conservation techniques include making operational personnel aware of the importance of limiting water wastage, as well as reducing water use during the cleaning of the facility (such as sweeping the site before it is being washed). Pacific Ora Projects should also ensure that the water infrastructure on site is monitored for leakages on a regular basis to prevent wastage. Pacific Ora Projects should consider installing water saving devices (e.g. dual flush toilets, automatic shut-off taps, etc.).</li> </ul>	
<ul style="list-style-type: none"> <li>Increased water usage as a result of abstraction from the borehole for the operation of the pig facility and irrigation of the vegetables.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Water conservation should still be practiced during the operational phase. This includes water saving techniques during irrigation as well as conservative irrigation practices.</li> <li>Irrigation systems, borehole abstraction devices and water tanks for storage should be inspected regularly so as to insure there are no leakages.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Increased stormwater discharge into the surrounding environment.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>A suitable stormwater/surface water quality monitoring programme should be established and implemented.</li> <li>Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.</li> <li>Monitoring programmes should be implemented to ensure that no materials enter the surface water drainage system.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Air Quality Impact: Increased odours resulting from the pig production facility.</li> </ul>	<ul style="list-style-type: none"> <li>High (negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that excrement, carcasses, feed, and other operational waste and hazardous materials are appropriately and effectively contained and disposed of without detriment to the air quality of the receiving environment.</li> </ul>	<ul style="list-style-type: none"> <li><b>Medium (negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Socio-economic</li> </ul>	<ul style="list-style-type: none"> <li>Medium</li> </ul>	<ul style="list-style-type: none"> <li>Enhance the use of local labour and local</li> </ul>	<ul style="list-style-type: none"> <li><b>High</b></li> </ul>

<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
Impact: Skills development opportunities and economic spin off activities will also occur during the operational phase. This impact is rated as positive.	(Positive)	skills as far as reasonably possible.  <ul style="list-style-type: none"> <li>Where the required skills do not occur locally, and where appropriate and applicable, ensure that relevant local individuals are trained.</li> <li>Ensure that goods and services are sourced from the local and regional economy as far as reasonably possible.</li> </ul>	<b>(Positive)</b>
<ul style="list-style-type: none"> <li>Potential re-establishment of alien plants on site.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that any alien invasive plants that become re-established on site are removed promptly. The removal of these species must be carried out in line with relevant municipal and provincial procedures, guidelines and recommendations.</li> <li>The removed alien invasive vegetation should be immediately disposed of correctly and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Air Quality Impact: Emissions from staff vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Efficient movement of traffic through the entrance and exit in order to reduce congestion and vehicle emissions.</li> <li>Ensure that the facility is operated in such a manner whereby potential odours are minimised.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Improved service delivery with regards to produce and pork products. This impact is rated as positive.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Positive)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the proposed infrastructure is maintained appropriately to ensure that all facilities and infrastructure operate within its design capacity to deliver as the market requires.</li> </ul>	<ul style="list-style-type: none"> <li><b>High (Positive)</b></li> </ul>
<ul style="list-style-type: none"> <li>Potential visual intrusion of structures and buildings associated with the proposed development on existing views of sensitive visual receptors. This impact is rated as</li> </ul>	<ul style="list-style-type: none"> <li>Low (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>No specific mitigation measures are recommended.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>

<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
neutral.			
<ul style="list-style-type: none"> <li>Potential impact of night lighting of the development on the nightscape of the surrounding landscape. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>No specific mitigation measures are recommended as it is assumed that night lighting of the proposed storage facility will be planned in such a manner so as to minimize light pollution such as glare and light spill (light trespass) by:                             <ul style="list-style-type: none"> <li>Using light fixtures that shield the light and focus illumination on the ground (or only where light is required).</li> <li>Using minimum lamp wattage within safety/security requirements.</li> <li>Avoiding elevated lights within safety/security requirements.</li> <li>Where possible, using timer switches or motion detectors to control lighting in areas that are not occupied continuously (if permissible and in line with minimum security requirements).</li> <li>Switching off lights when not in use in line with safety and security.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>Potential noise impact from operations and road transport of products during the operational phase (i.e. increased road traffic).</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>It is recommended that the drivers of the vehicles be discouraged from using air brakes at night.</li> <li>Limit the affects of noise associated disturbances from pigs and operational activities on sensitive fauna such as owls and medium-large mammals (especially carnivores), potentially occurring hedgehogs and large terrestrial birds such as Korhaans and Secretarybirds.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Atmospheric pollution due to fumes, smoke from fires (involving plant and vegetable oils or MEG). This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>Portable fire extinguishers and fire water hydrants (i.e. appropriate fire-fighting equipment) should be provided at the terminal as required. Mobile fire-fighting equipment should be provided at the berths as a safety precaution during the vessel offloading process. It should be noted that the products planned to be stored at the terminal have high flash points and low volatility. As a result, fires are unlikely, unsustainable, and can be extinguished with basic fire water and portable fire extinguishers.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>

<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
<ul style="list-style-type: none"> <li>Groundwater contamination as a result of the storage of pig waste in the proposed cement lagoon.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that that the pig houses and associated drains and slurry facility are designed and lined with impermeable substances (clay-type soils, geosynthetic plastic, or concrete) in accordance with advice from suitably qualified agricultural experts and international best practice norms.</li> <li>Personnel should ensure careful transportation of waste from the pig facilities to the lagoon as to avoid spillage.</li> <li>Adequate infrastructure should ensure waste will not exit the lagoon in an extreme weather event.</li> <li>Ensure adequate treatment of the waste to avoid extreme odours and contaminations.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Potential impact on the health of operating personnel resulting in potential health injuries. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>Operational personnel must wear basic PPE (e.g. gloves, goggles etc.) as necessary during the operational phase.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>Minor accidents to the public and moderate accidents to operational staff (e.g. fires). This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>An Emergency Plan should be compiled in order to deal with potential spillages and fires. Records of practices should be kept on site.</li> <li>Scheduled inspections should be implemented by operating personnel in order to assure and verify the integrity of hoses, piping and storage lagoon.</li> <li>Portable fire extinguishers and fire water hydrants (i.e. appropriate fire-fighting equipment) should be provided at the facility as required.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>Impact of extra operational vehicles on the road network.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Undertake re-calibration of existing traffic signals if required.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>

<b>IDENTIFIED IMPACTS- OPERATIONAL PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
<b>Indirect impacts:</b>			
<ul style="list-style-type: none"> <li>Socio-economic impact: Secondary industries may benefit from the proposed project in the form of the provision of produce and pork products. This impact is rated as positive.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Positive)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that local industries are utilised as suppliers, where applicable/practical.</li> </ul>	<ul style="list-style-type: none"> <li><b>Medium (Positive)</b></li> </ul>
<b>Cumulative impacts:</b>			
<ul style="list-style-type: none"> <li>As explained above.</li> </ul>			

### No-go alternative

#### Direct impacts:

- None of the impacts mentioned above will occur.
- The existing site will remain uncleared which will result in no clearance of indigenous vegetation and in addition, no clearance of present alien species.
- If the proposed project does not proceed, increased income and economic spin-off activities will not be realised.
- Approximately 6-10 new jobs will not be created during the construction phase.
- Customers of the proposed pig and vegetable facility will not be provided with an increase of produce and pork products on a local scale.
- If the proposed project does not proceed, the industries that rely on the supply of fresh produce and pork products, could experience hindered economic growth potential.

#### Indirect impacts:

- There are no indirect impacts during the construction phase for the No-go Option.

#### Cumulative impacts:

- There are no cumulative impacts during the construction phase for the No-go Option.

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

- Ecological scan/opinion for a proposed pig and vegetable production facility, Bultfontein 107-JR, Gauteng (Pacific Ora Projects Pty Ltd) – Natural Scientific Services June 2016 – **Attached as Appendix G.**

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

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 late summer site visit may be due to:

- The short duration of fieldwork as well as the timing of the fieldwork (which occurred close to the end of the growing season). At the end of summer many species have died back and retracted making it difficult to confirm identification. The 2015/2016 season also experienced below average rainfall in the beginning of the season.
- 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 DECOMMISSIONING 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.

<b>IDENTIFIED IMPACTS- DECOMMISSIONING AND CLOSURE PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
<b>ALTERNATIVE A1 (PREFERRED ALTERNATIVE)</b>			
<b>Direct impacts:</b>			
<ul style="list-style-type: none"> <li>• Increased water usage during the decommissioning phase.</li> </ul>	<ul style="list-style-type: none"> <li>• Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Where possible, water conservation should be practiced. Water conservation techniques include making decommissioning personnel aware of the importance of limiting water wastage, as well as reducing water use during the cleaning of the site (such as sweeping the site before it is being washed).</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Introduction &amp; proliferation of alien species and competition and change in structure.</li> </ul>	<ul style="list-style-type: none"> <li>• High (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Regulate / limit access by potential vectors of alien plants.</li> <li>• Maintain a neat and tidy production facility.</li> <li>• By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site must require a permit.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Potential spillage</li> </ul>	<ul style="list-style-type: none"> <li>• Medium</li> </ul>	<ul style="list-style-type: none"> <li>• Normal sewage management practises</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low</b></li> </ul>

<b>IDENTIFIED IMPACTS- DECOMMISSIONING AND CLOSURE PHASE</b>			
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
of effluent to the surrounding environment (from portable sanitation facilities for decommissioning personnel).	(Negative)	should be implemented. These include ensuring that portable sanitation facilities are regularly emptied and the resulting sewage is transported safely (by an appointed service provider) for correct disposal at an appropriate, licenced facility. Proof of disposal (in the form of waste disposal slips or waybills) should be retained on file for auditing purposes.	<b>(Negative)</b>
<ul style="list-style-type: none"> <li>Discharge of contaminated stormwater into the surrounding environment. Contamination could result from chemicals, oils, fuels, sewage, solid waste, litter etc.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>The appointed Contractor should compile a Method Statement for Stormwater Management during the decommissioning phase.</li> <li>Provide secure storage for oil, chemicals and other waste materials to prevent contamination of stormwater runoff.</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>Pollution of the surrounding environment as a result of the handling, temporary storage and disposal of solid waste.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>General waste (i.e. building rubble, demolition waste, discarded concrete, bricks, tiles, wood, glass, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) and hazardous waste (i.e. empty tins, paint and paint cleaning liquids, oils, fuel spillages and chemicals etc.) generated during the decommissioning phase should be stored <u>temporarily</u> on site in suitable (and correctly labelled) waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate.</li> <li>Should the on-site storage of general waste and hazardous waste exceed 100 m<sup>3</sup> and 80 m<sup>3</sup> respectively, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.</li> <li>Ensure that general waste and hazardous waste generated are removed from the site on a regular</li> </ul>	<ul style="list-style-type: none"> <li><b>Low (Negative)</b></li> </ul>

<b>IDENTIFIED IMPACTS- DECOMMISSIONING AND CLOSURE PHASE</b>			
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
		<p>basis and disposed of at an appropriate, licensed waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file for auditing purposes as proof of disposal.</p> <ul style="list-style-type: none"> <li>• Ensure that sufficient general waste disposal bins are provided for all personnel throughout the site. These bins must be emptied on a regular basis.</li> <li>• Appropriately time demolition / rehabilitation activities to minimise sensory disturbance to fauna.</li> </ul>	
<ul style="list-style-type: none"> <li>• Air Quality Impact: Emissions from decommissioning vehicles and generation of dust as a result of earthworks and demolition.</li> </ul>	<ul style="list-style-type: none"> <li>• Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water (obtained from an approved source) to minimise dust generation.</li> <li>• Approved soil stabilisers may be utilised to limit dust generation.</li> <li>• Ensure that decommissioning vehicles travelling on unpaved roads do not exceed a speed limit of 40 km/hour.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Negative)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Potential visual intrusion of decommissioning activities on the existing views of sensitive visual receptors.</li> </ul>	<ul style="list-style-type: none"> <li>• Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>• No specific mitigation measures are required other than standard site housekeeping and dust suppression. These are included below: <ul style="list-style-type: none"> <li>▪ The contractor(s) should maintain good housekeeping on site to avoid litter and minimise waste.</li> <li>▪ Litter and rubble should be timeously removed from the work site and disposed at a licenced waste disposal facility.</li> <li>▪ The project developer should demarcate decommissioning boundaries and minimise areas of surface disturbance.</li> <li>▪ Appropriate plans should be in place to minimise fire hazards and dust generation.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Negative)</b></li> </ul>



<b>IDENTIFIED IMPACTS- DECOMMISSIONING AND CLOSURE PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
		<ul style="list-style-type: none"> <li>▪ Night lighting of the decommissioning site should be minimised within requirements of safety and efficiency.</li> <li>• Limit the effects of light pollution on nocturnal fauna (e.g. The potentially occurring Hedgehog and Rusty Pipistrelle but also various invertebrate species)</li> </ul>	
<ul style="list-style-type: none"> <li>• Noise generation from demolition activities (e.g. grinding, steel falling, use of angle grinders) during the decommissioning phase. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>• Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>• A method statement, including detailed procedures, must be drawn up prior to any decommissioning of existing tanks.</li> <li>• Decommissioning personnel must wear proper hearing protection, which should be specified as part of the Decommissioning Phase Risk Assessment carried out by the Contractor.</li> <li>• The Contractor must ensure that all decommissioning personnel are provided with adequate PPE, where appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Potential health injuries to demolition staff during the decommissioning phase. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>• Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>• The Contractor must ensure that all decommissioning personnel are provided with adequate PPE for use where appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Heavy traffic, congestion and potential for collisions. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>• Medium (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable parking areas should be created and designated for trucks and vehicles.</li> <li>• A supervisor should be appointed to co-ordinate traffic during the decommissioning phase.</li> <li>• Road barricading should be undertaken where required and road safety signs should be adequately installed at strategic points within the site.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Low (Neutral)</b></li> </ul>
<ul style="list-style-type: none"> <li>• Demolition safety injuries. This</li> </ul>	<ul style="list-style-type: none"> <li>• High (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that a skilled and competent Contractor is appointed. The</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Medium (Neutral)</b></li> </ul>

<b>IDENTIFIED IMPACTS- DECOMMISSIONING AND CLOSURE PHASE</b>			
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>PROPOSED MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
impact is rated as neutral.		<p>Contractor must be evaluated during the tender/appointment process in terms of safety standards.</p> <ul style="list-style-type: none"> <li>The Contractor must ensure that all decommissioning personnel are provided with adequate PPE for use where appropriate.</li> <li>The Contractor must undertake a Decommissioning Phase Risk Assessment.</li> <li>A Site Manager or Safety Supervisor should be appointed, in conjunction with the project manager, to monitor all safety aspects during the decommissioning phase. This could be the same person that is assigned to co-ordinate the decommissioning traffic.</li> </ul>	
<ul style="list-style-type: none"> <li>Pollution of the surrounding water and ground as a result of spillages, generation of building rubble and waste scrap material. This impact is rated as neutral.</li> </ul>	<ul style="list-style-type: none"> <li>High (Neutral)</li> </ul>	<ul style="list-style-type: none"> <li>The amount of hazardous materials and liquids (such as cleaning materials) handled will be minimal. Fumes generated during welding will be minimal, within a well-ventilated area.</li> <li>All demolition waste (including rubble) should be frequently removed from site and correctly disposed by a suitable waste Contractor.</li> <li>The work area should be cleaned regularly.</li> <li>The Contractor should provide adequate waste skips (or similar) on site and the contract should specify that the Contractor must be responsible for the correct disposal of the contents of the waste skips.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Neutral)</li> </ul>
<b>Indirect impacts: social impacts e.g. loss of jobs or income?</b>			
<b>Cumulative impacts:</b>			

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

- Ecological Study for a proposed pig and vegetable production facility, Bultfontein 107-JR, Gauteng (Pacific Ora Projects Pty Ltd) – Natural Scientific Services June 2016 – **Attached as Appendix G.**

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

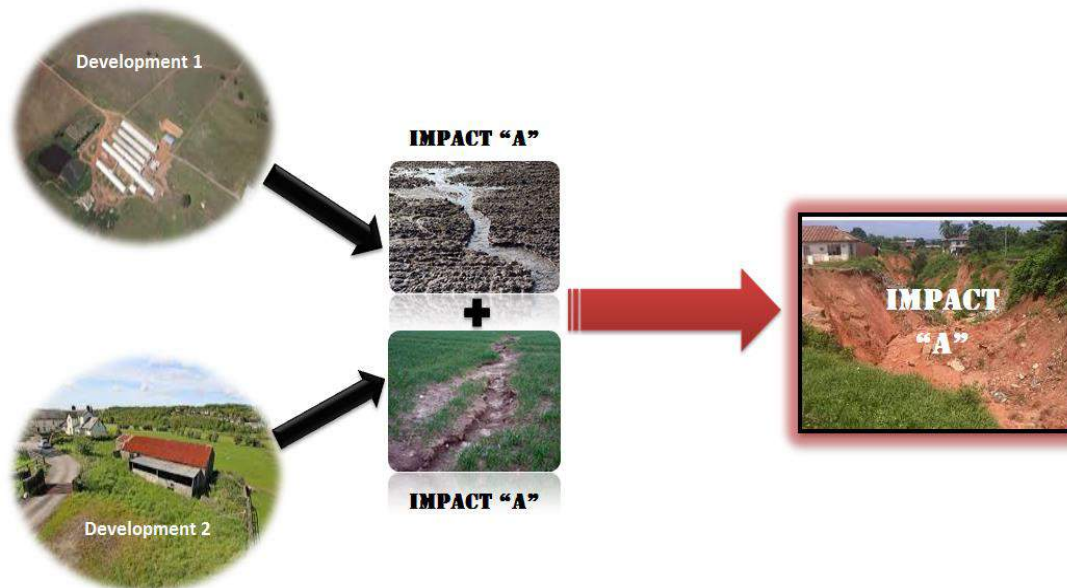
N/A

#### **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:

##### **Cumulative impacts that may arise from the proposed project**

Consideration must be 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. Figure 6 below highlights an example of how cumulative impacts manifest in the environment due to the impacts resulting from numerous developments on given spatial scale.



**Figure 6: Schematic diagram indicating an example of a cumulative impact**

Cumulative Impacts which could result from the proposed project are described below:

CUMULATIVE IMPACTS			
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
<ul style="list-style-type: none"> <li>Reduction in water availability due to increased abstraction from ground and surface water resources.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Water conservation should still be practiced during the operational phase. This includes water saving techniques during irrigation as well as conservative irrigation practices.</li> <li>Irrigation systems, borehole abstraction devices and water tanks for storage should be inspected regularly so as to insure there are no leakages.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>
<ul style="list-style-type: none"> <li>Impact of extra operational vehicles on the road network.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>	<ul style="list-style-type: none"> <li>Undertake re-calibration of existing traffic signals if required.</li> </ul>	<ul style="list-style-type: none"> <li>Low (Negative)</li> </ul>
<ul style="list-style-type: none"> <li>Increased job opportunities and boosting of local economic development in the area</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Positive)</li> </ul>	<ul style="list-style-type: none"> <li>No mitigation measures are identified.</li> </ul>	<ul style="list-style-type: none"> <li>Medium (Positive)</li> </ul>

## 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

#### **Proposed activity: Development of Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on 8 hectares of farm Bultfontein 107-JR, Gauteng**

The development of a pig and vegetable production facility and associated infrastructure measuring around 8 ha in size will exert an impact on the environment; but based on the findings of the Ecological Impact Assessment (Appendix G), and as per the ecologist recommendation and the locality of the site, the impacts associated with this proposed development can be mitigated to an acceptable level (Low, Low-Medium).

The creation of temporary and permanent job opportunities in the Rooiwal area will have a positive impact on the surrounding community. The increase in the production of food products in the region is also viewed as a positive impact. With the implementation of the mitigation measures suggested in this report and based on the information available to date, the site visit undertaken, it is the EAP's opinion that there are no fatal flaws to the project, provided the mitigation set out is adhered to and that the developer shows commitment to the sustainable development.

### No-go (compulsory)

This option assumes that a conservative approach would ensure that the environment is not impacted upon

any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the Competent Authority decline the application, the 'No-Go' option will be followed and the status quo of the site will remain.

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

For proposal:

IMPACT SUMMARY- CONSTRUCTION PHASE		
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
• Loss of terrestrial vegetation	• High (Negative)	• Medium (Negative)
• Increased risk of the spread of alien invasive species.	• Medium (Negative)	• Low (Negative)
• Loss of CI or medicinal flora.	• Medium (Negative)	• Low (Negative)
• Loss of faunal habitat.	• Medium (Negative)	• Low (Negative)
• Faunal Mortality and displacement.	• Medium (Negative)	• Low (negative)
• Impact on the regional water balance.	• Low (Negative)	• Very Low (Negative)
• Potential spillage of effluent.	• Low (Negative)	• Very Low (Negative)
• Pollution caused by spillage or discharge of construction waste water.	• Low (Negative)	• Very Low (Negative)
• Emissions from construction vehicles and generation of dust.	• Medium (Negative)	• Low (Negative)
• Increase in erosion.	• Medium (Negative)	• Low (Negative)
• Employment creation and skills development opportunities.	• Medium (Positive)	• High (Positive)
• Potential visual intrusion of construction/demolition activities.	• Low (Negative)	• Low (Negative)
• Potential noise impact from the use of construction equipment.	• Low (Negative)	• Low (Negative)
• Noise generation from demolition and construction work.	• Medium (Neutral)	• Low (Neutral)
• Potential health injuries to construction personnel.	• Medium (Neutral)	• Low (Neutral)
• Traffic, congestion and potential for collisions.	• Low (Neutral)	• Low (Neutral)
• Construction safety injuries.	• High (Neutral)	• Medium (Neutral)
• Pollution of the surrounding water and ground.	• High (Neutral)	• Low (Neutral)
• Secondary industries may benefit from the proposed project in the form of the provision of produce and pork products.	• Low (Positive)	• Medium (Positive)

<b>IMPACT SUMMARY- OPERATIONAL PHASE</b>		
<b>IMPACT</b>	<b>SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION</b>	<b>SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION</b>
• Environmental contamination of the surrounding environment	• Medium (Negative)	• Low (Negative)
• Increase in vertebrate and invertebrate pests.	• High (Negative)	• Low (Negative)
• Increase in the transmission of diseases.	• Medium (Negative)	• Low (Negative)
• Reduction in CI Species	• Low (Negative)	• Low (Negative)
• Increased burning	• High (Negative)	• Medium (Negative)
• Increased municipal water usage	• Medium (Negative)	• Low (Negative)
• Increased water usage as a result of abstraction from the borehole	• Medium (Negative)	• Low (Negative)
• Increased stormwater discharge	• Low (Negative)	• Low (Negative)
• Increased odours resulting from the pig production facility.	• High (negative)	• Medium (negative)
• Skills development opportunities and economic spin off activities	• Medium (Positive)	• High (Positive)
• Potential re-establishment of alien plants on site.	• Low (Negative)	• Low (Negative)
• Emissions from staff vehicles.	• Low (Negative)	• Low (Negative)
• Improved service delivery with regards to produce and pork products.	• Medium (Positive)	• High (Positive)
• Potential visual intrusion of structures and buildings	• Low (Neutral)	• Low (Neutral)
• Potential impact of night lighting of the development	• Low (Neutral)	• Low (Neutral)
• Potential noise impact from operations and road transport of products	• Low (Negative)	• Low (Negative)
• Atmospheric pollution due to fumes, smoke from fires	• Medium (Neutral)	• Low (Neutral)
• Groundwater contamination as a result of the storage of pig waste in the proposed cement lagoon.	• Medium (Negative)	• Low (Negative)
• Potential impact on the health of operating personnel	• Medium (Neutral)	• Low (Neutral)
• Minor accidents to the public and moderate accidents to operational staff	• Medium (Neutral)	• Low (Neutral)
• Impact of extra operational vehicles on the road network.	• Low (Negative)	• Low (Negative)
• Secondary industries may benefit from the proposed project in the form of the provision of produce and pork products.	• Low (Positive)	• Medium (Positive)

IMPACT SUMMARY- CLOSURE PHASE		
IMPACT	SIGNIFICANCE RATING OF IMPACT BEFORE MITIGATION	SIGNIFICANCE RATING OF IMPACT AFTER MITIGATION
• Increased water usage	• Low (Negative)	• Low (Negative)
• Introduction & proliferation of alien species	• High (Negative)	• Low (Negative)
• Potential spillage of effluent	• Medium (Negative)	• Low (Negative)
• Discharge of contaminated stormwater into the surrounding environment.	• Medium (Negative)	• Low (Negative)
• Pollution of the surrounding environment (waste)	• Medium (Negative)	• Low (Negative)
• Emissions from decommissioning vehicles and generation of dust	• Low (Negative)	• Low (Negative)
• Potential visual intrusion of decommissioning activities	• Low (Negative)	• Low (Negative)
• Noise generation from demolition activities	• Medium (Neutral)	• Low (Neutral)
• Potential health injuries to demolition staff	• Medium (Neutral)	• Low (Neutral)
• Heavy traffic, congestion and potential for collisions.	• Medium (Neutral)	• Low (Neutral)
• Demolition safety injuries.	• High (Neutral)	• Medium (Neutral)
• Pollution of the surrounding water and ground as a result of spillages.	• High (Neutral)	• Low (Neutral)

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.

*Note from CSIR:* The proposed project does not have location alternatives, therefore the impacts assessed were specific to the preferred alternative/proposal.

## 7. SPATIAL DEVELOPMENT TOOLS

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

### 1. City of Tshwane Metropolitan Spatial Development Framework (June, 2012).

The proposed project falls within ward 49 of Region 2 of the Spatial Development Framework and is centred between the north western and north eastern quadrants of the CoT. Incomes received in the region are very low on average, falling beneath the Tshwane average. The need for affordable housing is therefore very significant in this area, where several job opportunities already exist, resulting in the continued attraction of many young people to the area. Some of the northern areas within the region are plagued by the problems associated with historic land use and settlement policies and previous administrative boundaries, making township establishment and the benefits associated with this difficult in some areas. Other challenges include the role of the tribal authorities in land management. The infrastructure landscape differs vastly across the region. The southern section is well catered for, while the northern section requires several upgrades in order to support development plans for the area. As a resource, the region holds large undeveloped areas, which could in future accommodate growth.

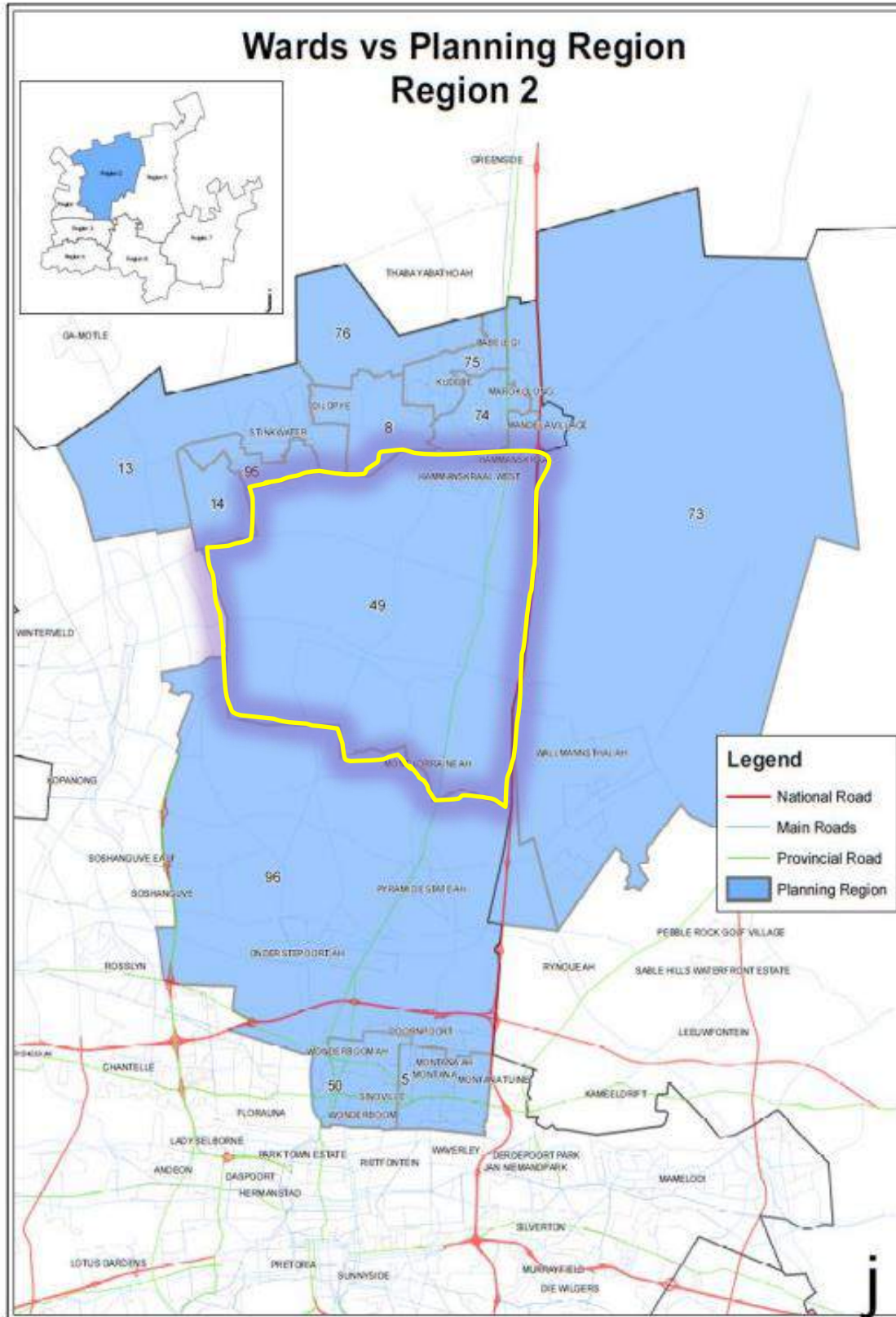


Figure 7: Planning region and wards of Region 2 (City of Tshwane Metropolitan Spatial Development Framework, June, 2012).



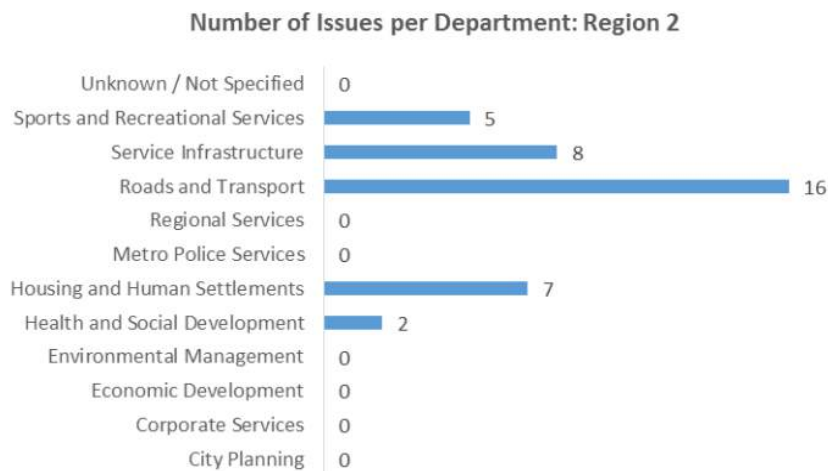
## 2. Tshwane Regional Integrated Development Plan 2014-15 (Region 2)

The introduction of land uses that will create job opportunities in the Region 2 was one of the primary development objectives of the CDS and Zone of Choice and is confirmed in this framework.

The following job opportunity focus areas are recognised:

- The Babelegi Industrial Park.
- New Proposed Tshwane Freight Hub
- Bon Accord Area
- Onderstepoort
- Lavender Road
- Derdepoort Area

During the public participation process in preparation of the 2014/15 IDP, the top priorities per ward in terms of community needs / service delivery were compiled and confirmed. The proposed project could contribute towards economic opportunities which could in turn influence social development. The following graphic illustrates the key priorities in this region:



**Figure 8: Key priorities as identified by the public for Region 2 of CoT (Tshwane Regional Integrated Development Plan, 2014-15)**

The proposed project falls within the The City of Tshwane’s vision for regions as superb areas to live, work and visit, which capitalize on their unique strengths, creating strong, resilient and prosperous centers. To achieve the vision for stronger regions, city wide and regional actions are being implemented based on the following four regionalization priorities:

- **Infrastructure and services:** Ensuring Regional Tshwane emerges more resilient from natural disasters and anticipates future growth to improve productive capacity and sustain long-term growth.
- **People:** Promoting Regions as centres offering residents the full range of areas of opportunities in life through career and education, as well as the amenities that contribute to livability.
- **Business:** Supporting business to attract new investment to generate sustained employment areas of opportunities and strengthen the economic base.
- **Partnerships:** Fostering partnerships at local, national and provincial levels to promote coordination and drive local leadership

Figure 9 below highlights the planned developmental overview of region 2. As this image indicates, the proposed project falls within an area which is demarcated as “rural”, and the intention of development in this area is to create vibrant, equitable and sustainable rural development which provides food and work opportunities.

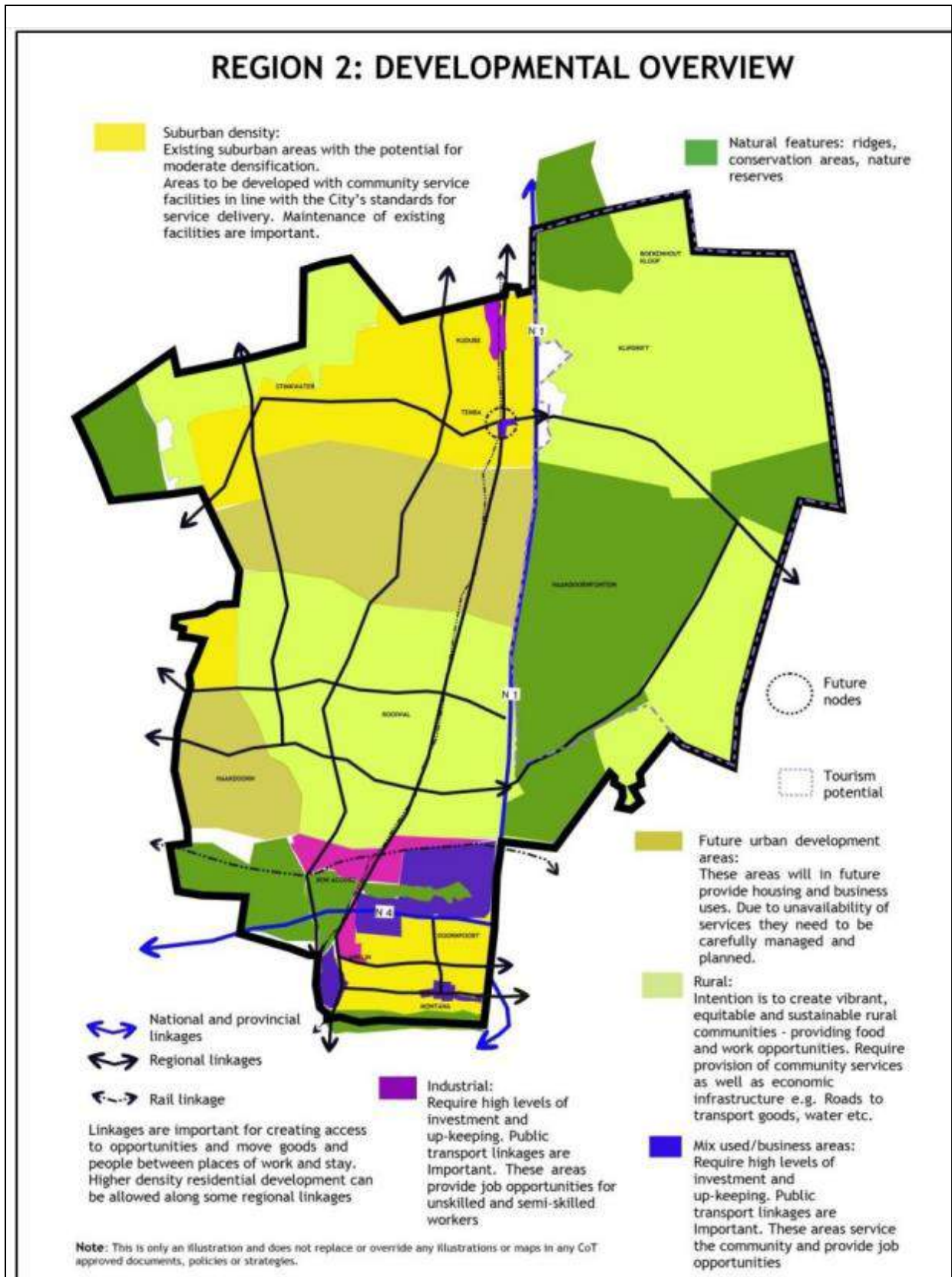


Figure 9: Regional Developmental Overview for Region 2 (Tshwane Regional Integrated Development Plan, 2014-15)

## 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	
-----	--

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:

1. Restrict all habitat loss and disturbances from construction activities to within the proposed and agreed upon site layout.
2. Adhere to law and best practice guidelines regarding the displacement of CI and medicinally important floral species.
3. Limit indiscriminate killing, persecution or hunting of fauna.
4. Regulate / limit access by potential vectors of alien plants.
5. By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site must require a permit.
6. 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.
7. Detect and control pest infestations before they become a problem through frequent and careful cleaning, monitoring and control.
8. Harvesting of indigenous flora for medicine, fire wood, building materials, and other purposes must be prohibited.
9. Ensure that flammable materials are stored in an appropriate safe house. Ensure that there are appropriate control measures in place for any accidental fires. If artificial burning is considered necessary to reduce risks to human and infrastructure safety from wild fires, a fire management plan should be compiled with input from an appropriate floral specialist, and diligently implemented. Annual wild fires should be strictly prohibited.
10. Limit the effects of noise associated disturbances from pigs and operational activities on sensitive fauna such as owls and medium-large mammals (especially carnivores), potentially occurring hedgehogs and large terrestrial birds such as korhaans and Secretarybirds.
11. A site specific Stormwater Management Plan must be designed and implemented which includes appropriate attenuation facilities on site.
12. Erosion control measures must be implemented (Including appropriate attenuation facilities).
13. If any herpetological species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. This remediation requires the employment of a herpetologist to oversee the removal of any herpetofauna during the initial ground-clearing phase of construction.
14. Conservation orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
15. During the construction phase there will be increased surface water runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would help mitigate the environmental impact.
16. The monitoring of the construction site must be carried out by a qualified Environmental Compliance Officer (ECO) with proven expertise in the field so as to ensure compliance to the Environmental Management Programme (EMPr)
17. All mitigation measures listed in the BAR as well as the EMPr must be implemented and adhered to.
18. A Waste Management License must be obtained for the on-site storage of pig waste in the lagoon.
19. Mitigation measures and strict waste management should ensure the prevention of groundwater contamination on site.

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

<b>NEED AND DESIRABILITY OF THE PROPOSED PROJECT</b>		
<b>Questions (Notice 792, NEMA, 2012)</b>		<b>Answer</b>
<b>PART I: NEED</b>		
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?	<p>Yes. The City’s regional services model and regional structures are an integral part of its rationale to bring services closer to the people and to transform regions into superb places to live, work and stay while capitalising on each regions’ uniqueness to create strong, resilient and prosperous areas. The City of Tshwane adopted its Integrated Development Plan (IDP) in 2011 which maps out the delivery agenda of the current term of office of the City for the period 2011 to 2016.</p> <p>As part of the process of establishing the seven (7) service delivery regions, the City have embarked on a process to develop Regional Integrated Development Plans (RIDPs) which will complement the City-wide IDP. The budget to implement this plan has been drafted until 2017.</p>
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, according to the Regional Developmental Overview for Region 2 (Tshwane Regional Integrated Development Plan, 2014-15), the proposed project falls within an area which is demarcated as “rural”, and the intention of development in this area is to create vibrant, equitable and sustainable rural development which provides food and work opportunities.
3.	Does the community/area need the activity and the associated land use concerned? This refers to the strategic as well as local level.	<p>The 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 proposed project will seek to boost local economic development in the area and provide opportunities to decrease poverty and unemployment.</p> <p>The pork and fresh produce is being sold to a 100% local market. Thus this provides the opportunity for higher competition, and consequently, lower prices of the products. This will benefit the local communities financially.</p> <p>On a strategic level, the increase in produce will have an effect on South Africa’s poverty and food crisis, and this project will aid in the National priority of boosting local economic development to improve the standard of living for rural communities.</p>

<b>NEED AND DESIRABILITY OF THE PROPOSED PROJECT</b>		
Questions (Notice 792, NEMA, 2012)	Answer	
4.	<p>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?</p>	<p>Yes. The proposed project will be using water directly for the registered borehole and will not rely on municipal water services. In addition, the site already has access to municipal electricity. The road networks are fully intact and the project will not have a major impact on road congestion. Thus, additional capacity does not need to be created for the development.</p>
5.	<p>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)?</p>	<p>The development is not provided for in the infrastructure planning of the municipality as it is a small development of local importance. Thus, the proposed project will not have any implications for the infrastructure planning, as no services and/or infrastructure needs to be upgraded or created to cater for this development. The current status of the infrastructure in the area will suffice for the proposed development.</p>
6.	<p>Is the project part of a national programme to address an issue of national concern or importance?</p>	<p>This project addresses the national challenge of food security in South Africa. The current food security challenge in South Africa consists of two dimensions: the first tries to maintain and increase South Africa's ability to meet its national food requirements, and the second seeks to eliminate inequalities and poverty amongst households that is made apparent by inadequate and unstable food production, lack of purchasing power, poor nutritional status and weak institutional support networks and disaster management systems.</p> <p>According to the most recent data from Statistics South Africa (Stats SA), approximately 14.3 million South Africans are vulnerable to food insecurity. In response, the Government of South Africa is implementing the Integrated Food Security Strategy (IFSS) of 2002.</p> <p>In addition, The National Development Plan (NDP) Vision for 2030 offers a long-term perspective. It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal. The main goals highlighted in the NDP which pertain to the proposed project are employment and adequate nutrition. Chapter 6 of the National Development Plan highlights an “inclusive rural economy” and the objectives of this plan are to create jobs in agriculture, maintain a positive trade balance for primary and processed agricultural products and activating rural economies through service to small and micro farmers.</p>

<b>NEED AND DESIRABILITY OF THE PROPOSED PROJECT</b>	
Questions (Notice 792, NEMA, 2012)	Answer
<b>PART II: DESIRABILITY</b>	
1.	Is the development the best practicable environmental option for this land/site?
	Yes. This site does not have high crop agricultural potential according to the Gauteng Agricultural Potential Atlas (GAPA 4), which makes the site ideal for pork and small scale vegetable production. The site is also located close to local markets and abattoirs and the area is characterized by very low-density dwellings.
2.	Would the approval of this application compromise the integrity of the existing approved and credible IDP and SDF as agreed to by the relevant authorities?
	No. The proposed project aligns itself with the Tshwane Vision 2055 outlined in the IDP. The following strategic objectives are sought to be achieved and are aligned with the objectives of the proposed project: <ul style="list-style-type: none"> <li>• Promote shared economic growth and job creation</li> <li>• Improve financial sustainability</li> <li>• Continue institutional development, transformation and innovation</li> </ul>
3.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?
	No, the integrity of the existing environmental management priorities for the area will not be compromised by this development. The City of Tshwane Municipality has been identified by the Environmental Management Framework for the whole of Gauteng (GPEMF) in 2014 as one of seven “hubs” for agricultural development. <p>The following three indicators were used to decide on the hub-boundaries:</p> <ul style="list-style-type: none"> <li>o Land capability = high potential agricultural land;</li> <li>o High intensity of existing agriculture; and</li> <li>o Location and adjacency constraints.</li> </ul> <p>The objectives of implementing the Gauteng agricultural hubs were:</p> <ul style="list-style-type: none"> <li>• Prioritise agriculture as the preferred land-use within a confined and pre-defined fixed-boundary area;</li> <li>• Focused farm-support and allocation of government resources;</li> <li>• Creating hubs of preferred agricultural commodities based on crop suitability and market requirements; and</li> <li>• Fulfilling and meeting the requirements of the Gauteng Growth and Development Strategy.</li> </ul>
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
	Yes, as mentioned in Question 3 above, this area has been demarcated for agricultural development in the greater context of the province due to its location and

NEED AND DESIRABILITY OF THE PROPOSED PROJECT	
Questions (Notice 792, NEMA, 2012)	Answer
	broader context).
	adjacency to favourable markets, high land capability and high intensity of existing agriculture resulting in the services, technologies support and labour to be easily accessible in the area.
5.	<p>How will the activity of the land use associated with the activity being applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?</p> <p>The development of the proposed development associated infrastructure measuring around 8 ha in size will exert an impact on the environment; but based on the findings of the Ecological Impact Assessment (Appendix G), and as per the ecologist recommendation and the locality of the site, the impacts associated with this proposed development can be mitigated to an acceptable level (Low, Low-Medium).</p> <p>Kindly see Section E for a further explanation of the impacts of the proposed project on the environment.</p>
6.	<p>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.)?</p> <p>Kindly see Section E of this Report with regards to the Impact Assessment.</p> <p>In summary, due to the fact that this area has an extremely low density of residents and dwellings (2 people per hectare) and the area is zoned for agriculture (meaning the majority of the visual and sense of place aesthetics in the area are correlated to agricultural activities), the impacts on well-being, following mitigation, will be as follows:</p> <ul style="list-style-type: none"> <li>• Visual: Low</li> <li>• Odours: Medium</li> <li>• Noise: Low</li> <li>• Sense of place: Low</li> </ul>
7.	<p>Will the proposed activity or the land use associated with the activity being applied for, result in unacceptable opportunity costs?</p> <p>No. The pork industry in South Africa is developing rapidly for the following reasons:</p> <ul style="list-style-type: none"> <li>• The increasing presence of foreign and local pig production consuming caused by the urbanization and economic growth, and in South Africa, pork has overtaken mutton in consumption following the 59 percent rise in pig production;</li> <li>• Pigs multiply really fast, which means one sow can produce up to 16-36 piglets in a single year and these piglets can reach a market size of 70kg in 6-7 months;</li> <li>• Pigs are highly adaptable and easy to farm: pigs eat everything humans eat and grass, forage and feed eaten by other animals, which help farmers to reduce feeding costs and waste.</li> <li>• Pigs also have high resistance to diseases, so pigs</li> </ul>

NEED AND DESIRABILITY OF THE PROPOSED PROJECT	
Questions (Notice 792, NEMA, 2012)	Answer
	<p>make great candidates for intensified or diversified agriculture suitable for a wide range of budgets;</p> <ul style="list-style-type: none"> <li>• Pigs yield more meat: pigs can yield up to 70 percent edible meat.</li> </ul>
8. Will the proposed land use result in unacceptable cumulative impacts?	No. The proposed project has only been identified to have 3 cumulative impacts that can be mitigated to an acceptable level. The measures outlined in the EMP attached will serve as a method to keep the proposed project from having any serious long term cumulative impacts on the receiving environment. Please see Section E4 for a description of the potential cumulative impacts.

**10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED (CONSIDER WHEN THE ACTIVITY IS EXPECTED TO BE CONCLUDED)**

The Environmental Authorisation (EA) is required for at least 15 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 (**Appendix H**)



**FINAL BA REPORT:**  
Basic Assessment for the  
proposed Pacific Ora Projects  
(Pty) Ltd Pig and Vegetable  
Production facility on farm  
Bultfontein 107-JR, Gauteng

# SECTION F: APPENDICES

## SECTION F: APPENDIXES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix:

<b>APPENDIX A:</b>	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) – <b>Attached</b>
<b>APPENDIX B:</b>	Photographs – <b>Attached</b>
<b>APPENDIX C:</b>	Facility illustration(s) – <b>Attached</b>
<b>APPENDIX D:</b>	Route position information – <b>N/A</b>
<b>APPENDIX E:</b>	Public Participation information – <b>Attached</b> <ul style="list-style-type: none"> <li>• E1: Proof of site notice</li> <li>• E2: Written notices issued as required in terms of the regulations</li> <li>• E3: Proof of newspaper advertisements</li> <li>• E4: Communications to and from interested and affected parties</li> <li>• E5: Comments and Responses Report</li> <li>• E6: Copy of the register of I&amp;APs</li> </ul>
<b>APPENDIX F:</b>	<ul style="list-style-type: none"> <li>• F1: Borehole Certificate</li> <li>• F2: SAHRA information – <b>Heritage Screening Study Attached</b></li> </ul>
<b>APPENDIX G:</b>	Specialist report- <b>Attached</b>
<b>APPENDIX H:</b>	EMPr- <b>Attached</b>
<b>APPENDIX I:</b>	Other information <ul style="list-style-type: none"> <li>• I1: CV's of the project team (EAPs who prepared the report)</li> <li>• I2: EAP declaration</li> </ul>

### CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.

**FINAL BA REPORT:**  
Basic Assessment for the  
proposed Pacific Ora Projects  
(Pty) Ltd Pig and Vegetable  
Production facility on farm  
Bultfontein 107-JR, Gauteng

# SECTION F: APPENDICES

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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# BASIC ASSESSMENT REPORT

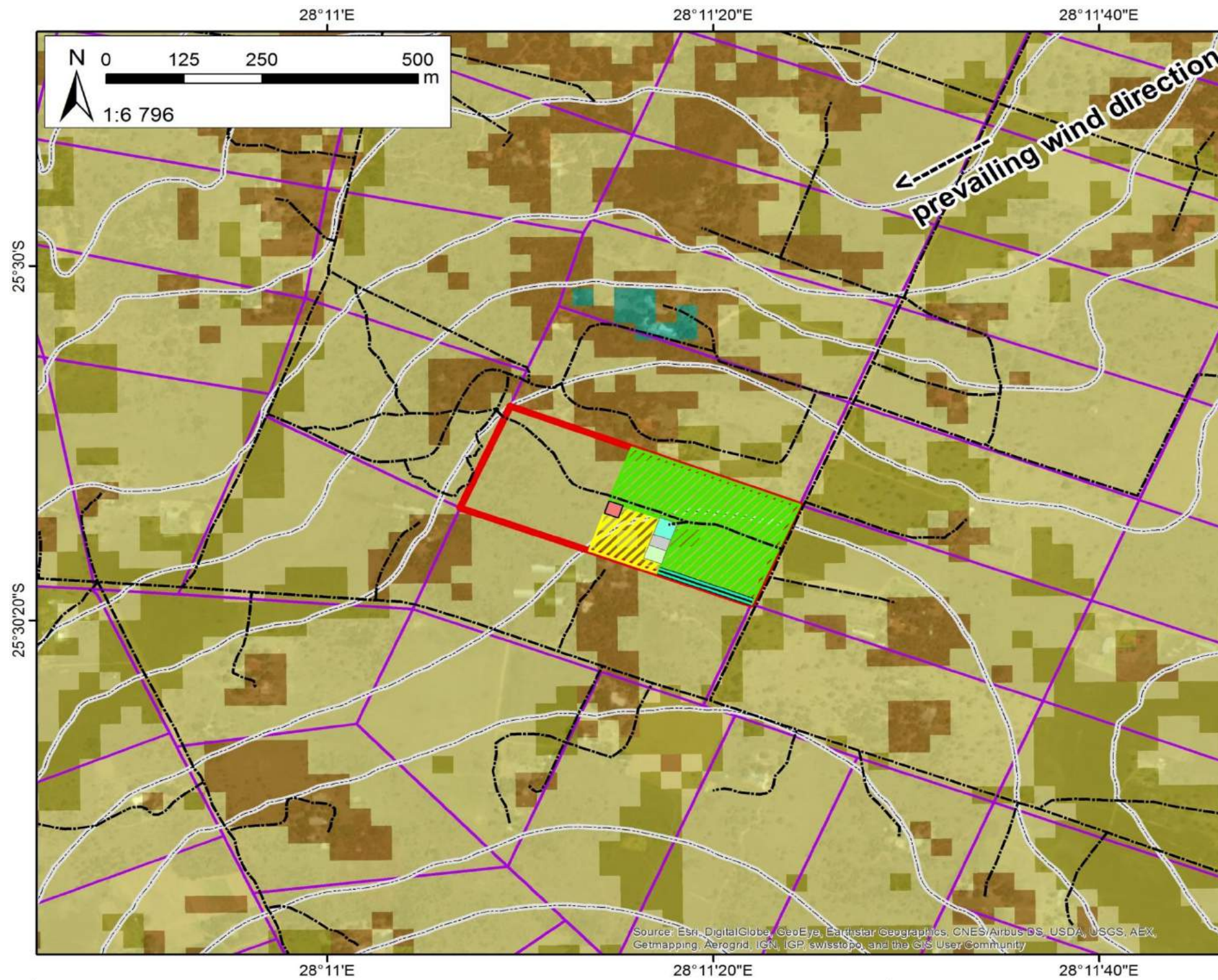
## APPENDIX A: SITE LAYOUT PLANS

### contents

Map A.1: Site and locality map of the proposed project (including wind direction) _____	2
Map A.2: Map indicating sensitive species on site _____	3

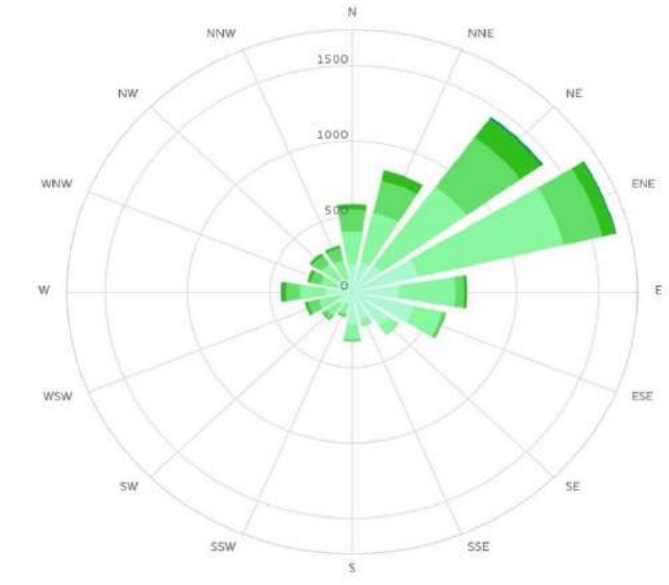
SECTION F: APPENDICES

Map A.1: Site and locality map of the proposed project (including wind direction)



**Legend**

- Land portions
  - Existing roads
  - Site locality
- Pacific Ora Piggery proposed layout**
- Food storage
  - Office
  - Piggery
  - Sewer pond
  - Single quarters
  - Vegetables under irrigation
  - Access road
- Land cover (2015)**
- Plantations / Woodlots mature
  - Urban smallholding (dense trees / bush)
  - Urban smallholding (low veg / grass)
  - Urban smallholding (open trees / bush)
  - 5 m contours



0 >1 >5 >12 >19 >28 >38 >50 >61 km/h

\*Wind rose shows how many hours per year the wind blows from the indicated direction.

<b>Additional information</b>	
Vegetation (Mucina & Rutherford, 2006)	Transformed Central Sandy Bushveld
Land use (DEA, 2015)	Agriculture (smallholdings)
Prevailing wind direction (Meteoblue, 2016)	East-North-East; North-East

DEA, 2015. 2013-2014 South African National Land-Cover Dataset. DEA: Pretoria.  
 Meteoblue, 2016. Climate Soshanguve Gauteng, South Africa. [Url] [https://www.meteoblue.com/en/weather/forecast/modelclimate/soshanguve\\_south-africa\\_954013](https://www.meteoblue.com/en/weather/forecast/modelclimate/soshanguve_south-africa_954013). Date accessed: 30 Jul, 2016  
 Mucina, L. & Rutherford, M.C., eds. 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. Pretoria: South African National Biodiversity Institute.

Map A.2: Map indicating sensitive species on site

**CONSERVATION IMPORTANT SPECIES**



**Legend**

- Short-snouted Elephant-shrew
- Boophone disticha
- ▲ Hypoxis hemerocallidea
- Sclerocarya birrea subsp. caffra
- Site Locality

Source: NSS Fieldwork (2016)

0 0.01750.035 0.07 0.105 0.14 Km

<p><b>Compiled For:</b></p>  <p>our future through science</p> <p>CSIR, PO Box 320, Stellenbosch, 7599</p>	<p><b>Compiled By:</b></p> <p>Natural Scientific Services CC</p>  <p>NSS</p> <p>Natural Scientific Services CC 126 Ballyclare Dr Morningside Ext. 40 Sandton 2196 Johannesburg Tel: + 27 (0)11 787 7400</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Sources: ESA, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroVIG, GeoEye, IGN, CNR, endustop, and the GIS User Community

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

---

# BASIC ASSESSMENT REPORT

## APPENDIX B: PHOTOGRAPHS

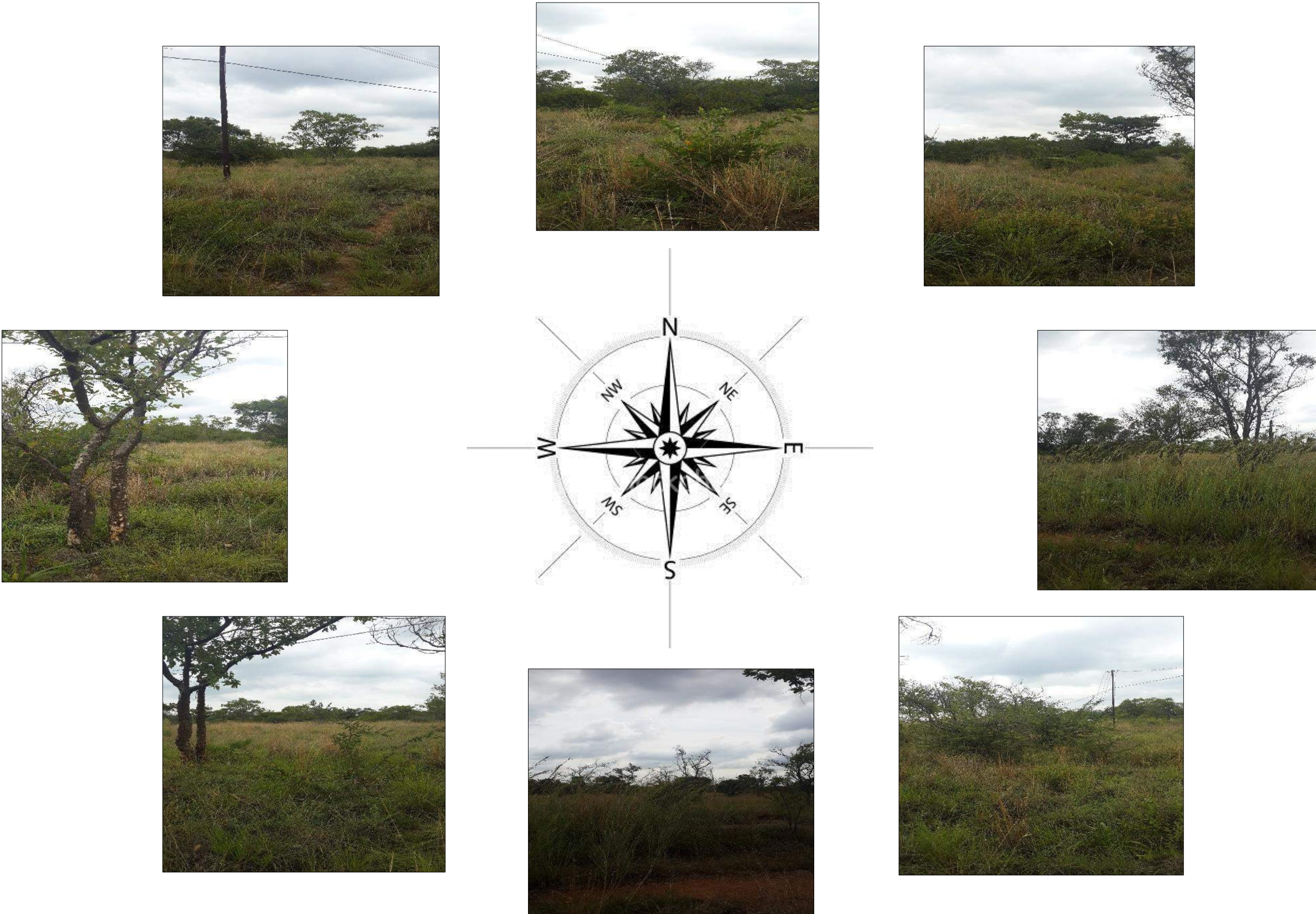
contents

Figure B.1: Site photographs \_\_\_\_\_ 2



SECTION F: APPENDICES

Figure B.1: Site photographs



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

---

# BASIC ASSESSMENT REPORT

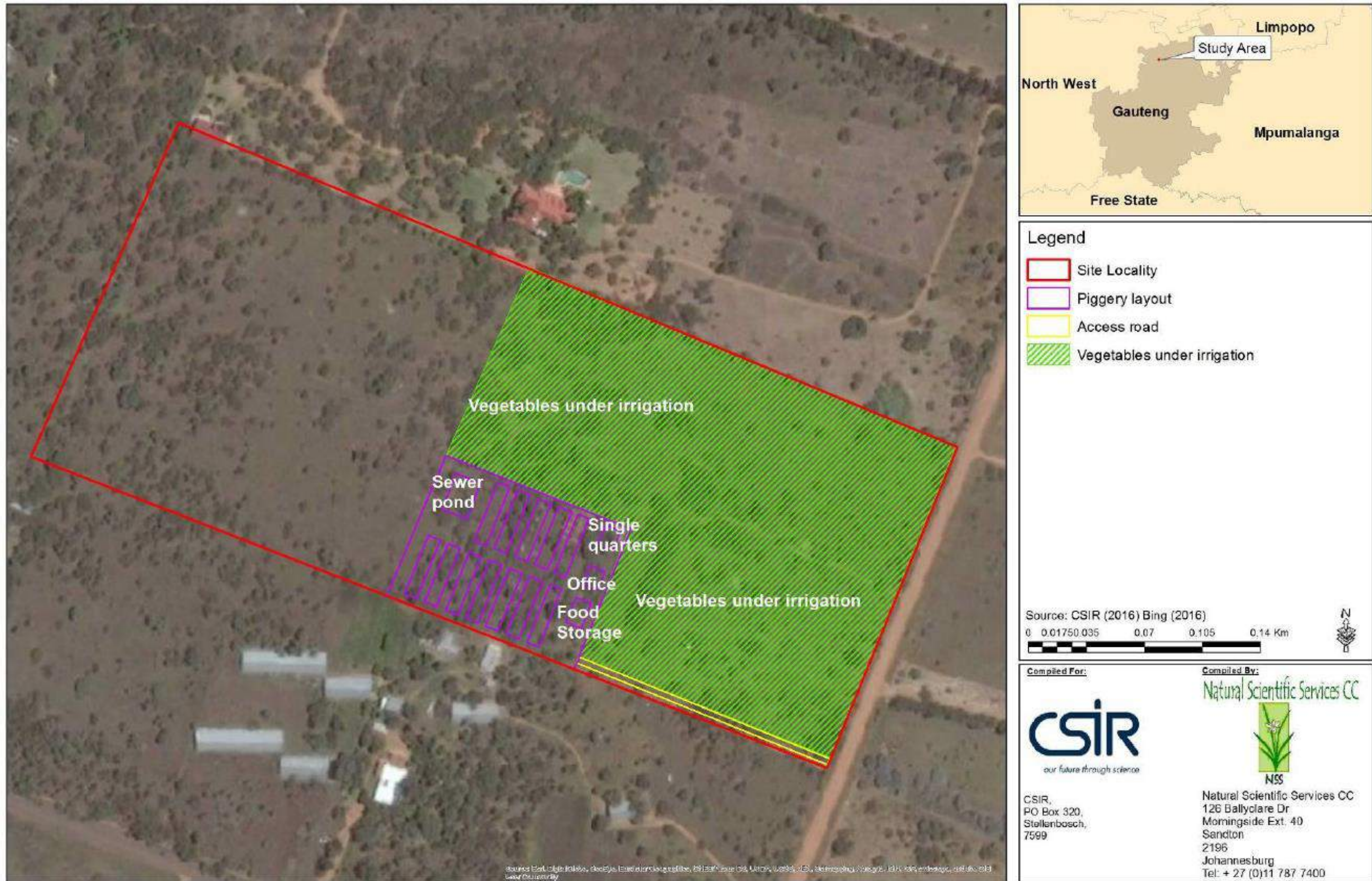
## APPENDIX C: FACILITY ILLUSTRATIONS

### contents

Figure C.1: Facility illustration of the proposed project	2
Figure C.2: Pig House and Slurry Dam illustrations	3

SECTION F: APPENDICES

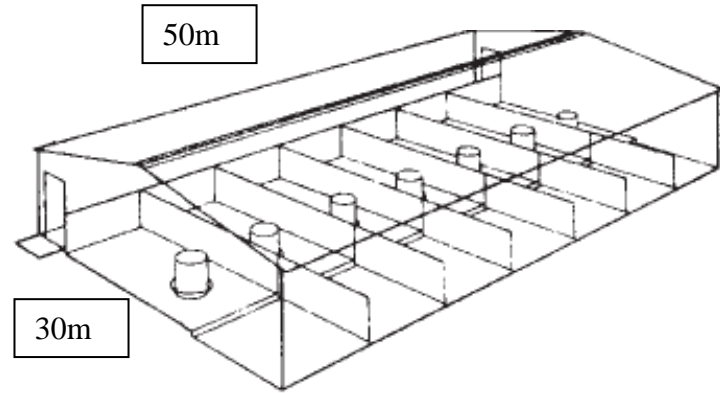
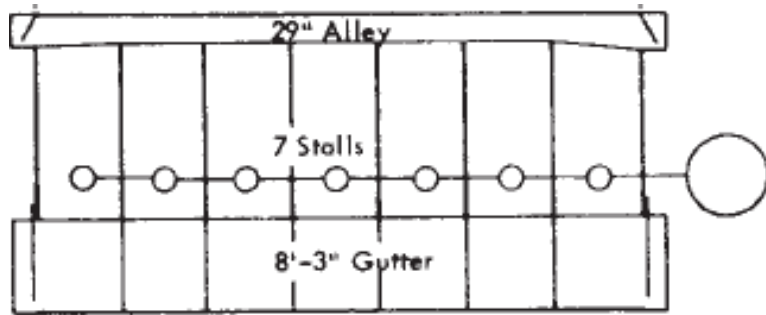
Figure C.1: Facility illustration of the proposed project



SECTION F: APPENDICES

Figure C.2: Pig House and Slurry Dam illustrations

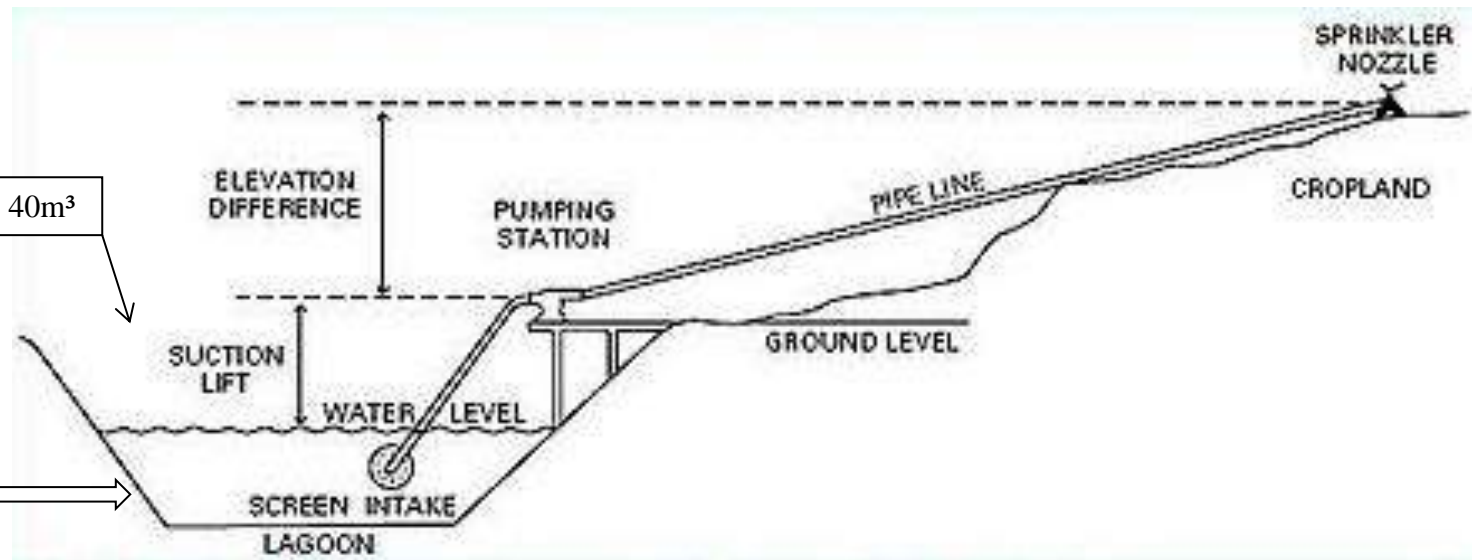
Pig houses



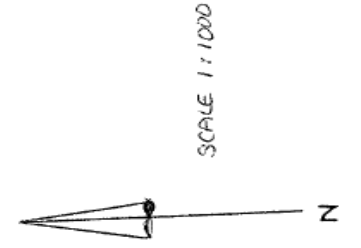
Slurry Dam (called sewer pond on the below illustration)

40m<sup>3</sup>

Concrete base



SECTION F: APPENDICES



120 MARDELA ROAD  
BULTFOONTEIN

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

---

# BASIC ASSESSMENT REPORT

## APPENDIX E: PUBLIC PARTICIPATION

### contents

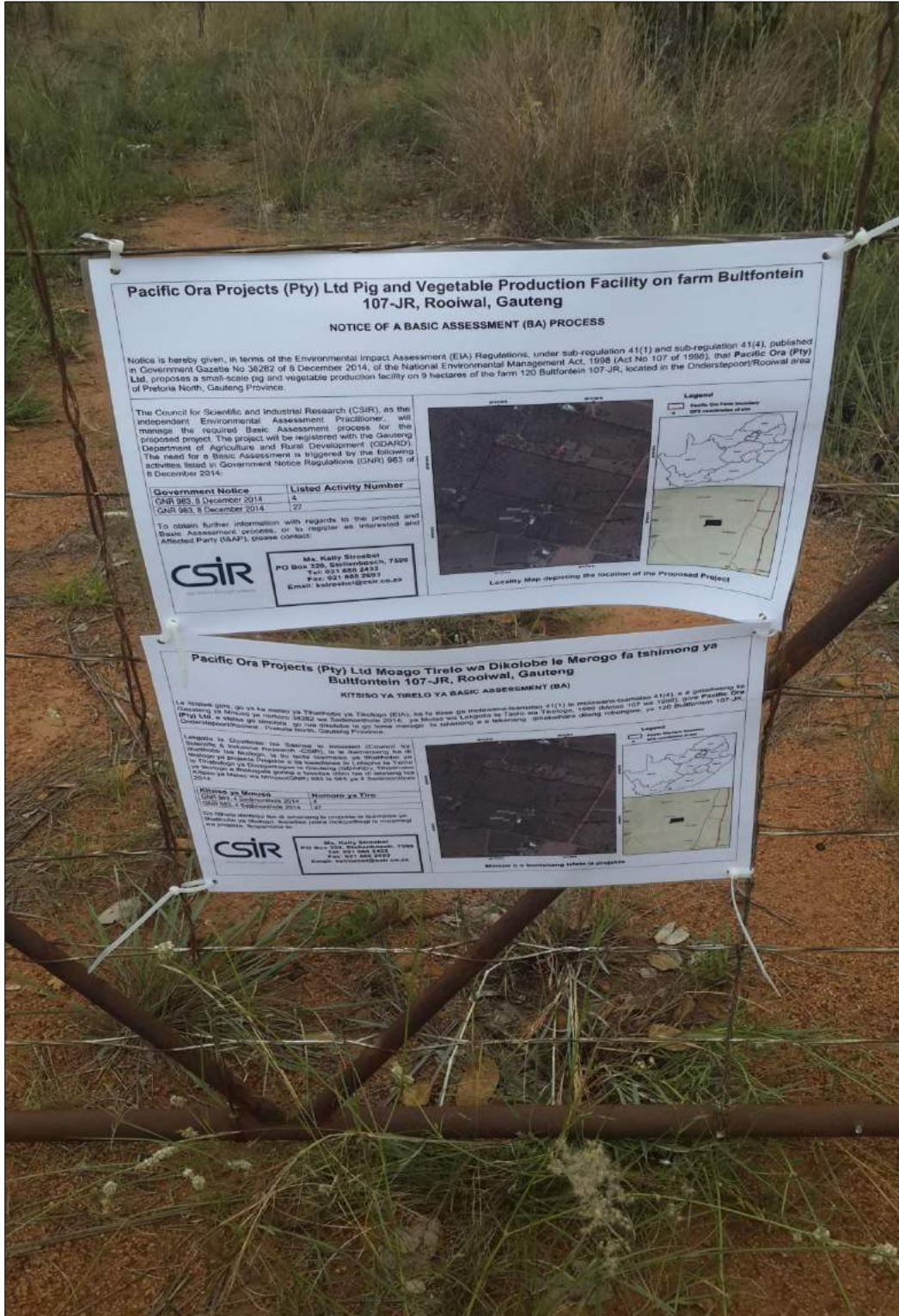
Appendix E1:	Proof of site notice _____	2
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# SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: DRAFT BASIC ASSESSMENT REPORT

## Appendix E1: Proof of site notice

Site notices (English and Tswana) placed at the gate to the proposed site  
(GPS co-ordinates: 25°30'16.432"S, 28°11'23.104"E)



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

Contents of the site notices (English) placed at the gate to the proposed site (GPS co-ordinates: 25°30'16.432"S, 28°11'23.104"E)

### Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production Facility on farm Bultfontein 107-JR, Rooiwal, Gauteng

#### 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 **Pacific Ora (Pty) Ltd**, proposes a small-scale pig and vegetable production facility on 9 hectares of the farm 120 Bultfontein 107-JR, located in the Onderstepoort/Rooiwal area of Pretoria North, Gauteng Province.

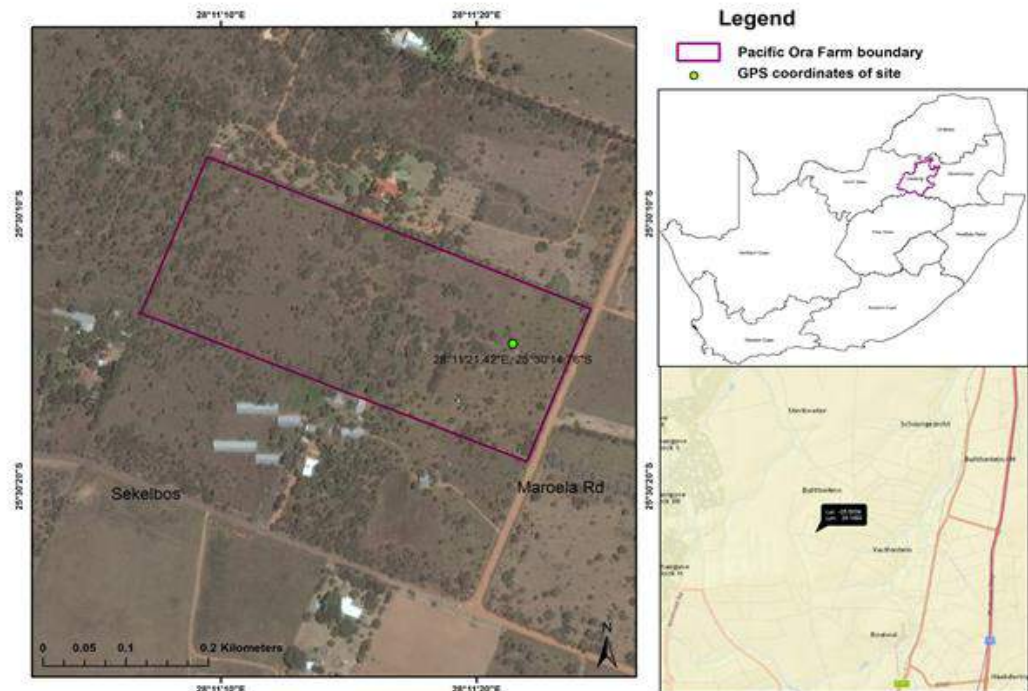
The Council for Scientific and Industrial Research (CSIR), as the independent Environmental Assessment Practitioner, will manage the required Basic Assessment process for the proposed project. The project will be registered with the Gauteng Department of Agriculture and Rural Development (GDARD). The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

Government Notice	Listed Activity Number
GNR 983, 8 December 2014	4
GNR 983, 8 December 2014	27

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



**Ms. Kelly Stroebel**  
PO Box 320, Stellenbosch, 7599  
Tel: 021 888 2432  
Fax: 021 888 2693  
Email: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)



**Locality Map depicting the location of the Proposed Project**



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

**Contents of the site notices (Setswana) placed at the gate to the proposed site (GPS co-ordinates: 25°30'16.432"S, 28°11'23.104"E)**

### Pacific Ora Projects (Pty) Ltd Moago Tirelo wa Dikolobe le Merogo fa tshimong ya Bultfontein 107-JR, Rooiwal, Gauteng

#### KITSISO YA TIRELO YA BASIC ASSESSMENT (BA)

Le itsisiwe gore, go ya ka melao ya Tlathhobo ya Tikologo (EIA), ka fa tlase ga molawana-tsamaiso 41(1) le molawana-tsamaiso 41(4), e e gatisitweng ka Gazeteng ya Mmuso ya nomoro 38282 wa Sedimonthole 2014, ya Molao wa Lekgotla la Taolo wa Tikologo, 1998 (Molao 107 wa 1998), gore **Pacific Ora (Pty) Ltd**, e eletsa go simolola go rua dikolobe le go lema merogo fa tshimong e e lekanang dihekethara dileng robongwe, ya 120 Bultfontein 107-JR, Onderstepoort/Rooiwal, Pretoria North, Gauteng Province.

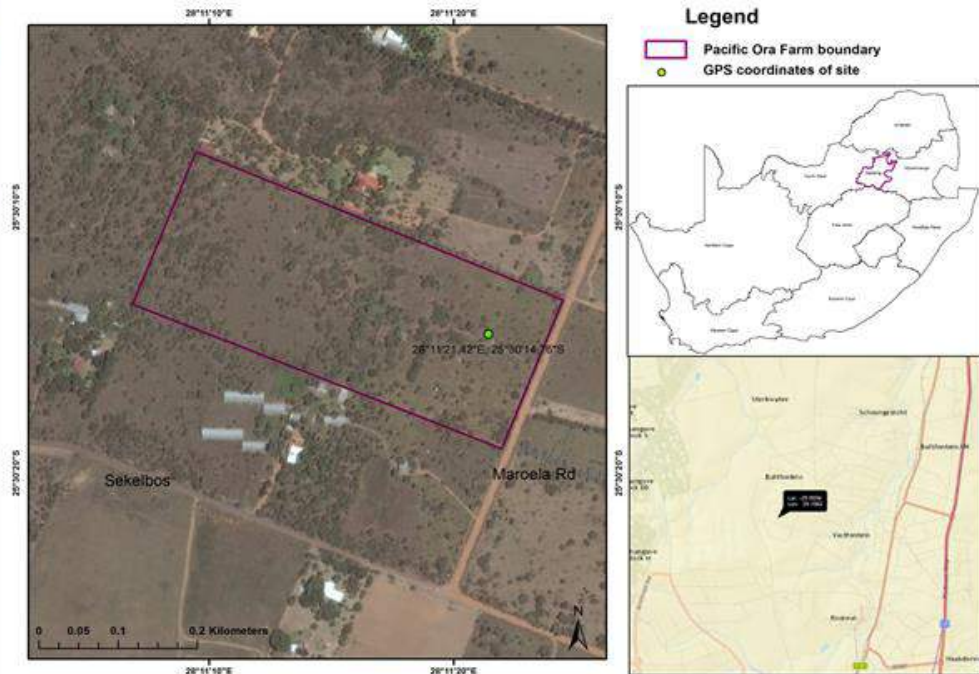
Lekgotla la Dipatlisiso tsa Saense le Indasteri (Council for Scientific & Industrial Research -CSIR), le le ikemetseng ka di tlatlhobo tsa tikologo, le tlo laola tsamaiso ya tlatlhobo ya tikologo ya projekte Projekte e tla kwadisiwa le Lefapha la Temo le Tlhabologo ya Dinagamagae la Gauteng (GDARD). Tlathhobo ya tikologo e tlhokagala gonne e tsositse ditiro tse di latelang tsa Kitsiso ya Melao wa Mmuso(GNR) 983 le 985 ya 4 Sedimonthole 2014.

Kitsiso ya Mmuso	Nomoro ya Tiro
GNR 983, 4 Sedimonthole 2014	4
GNR 983, 4 Sedimonthole 2014	27

Go fitlhela dikitsiso tse di amanang le projekte le tsamaiso ya tlatlhobo ya tikologo, ikwadise jaaka mokgatlhegi le moamegi wa projekte. Ikopantshe le:



**Ms. Kelly Stroebel**  
PO Box 320, Stellenbosch, 7599  
Tel: 021 888 2432  
Fax: 021 888 2693  
Email: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)



**Mmepe o o bontshang lefelo la projekte**

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

### Appendix E2: Written notices issued as required in terms of the regulations and communications to interested and affected parties

#### Letter 1 to I&APs: Project Announcement (18 March 2016)



**CSIR Specialist Services**  
PO Box 320  
Stellenbosch  
7599  
South Africa  
Tel: +27 21 888 2432  
Fax: +27 21 888 2693  
Email: kstroebel@csir.co.za

18 March 2016

Dear Interested and/or Affected Party,

#### PROJECT ANNOUNCEMENT

#### **BASIC ASSESSMENT FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN 107-JR, ROOIWAL, GAUTENG**

The National Department of Environmental Affairs (DEA) and the Council for Scientific and Industrial Research (CSIR) have initiated the Special Needs and Skills Development Programme, whereby small-medium micro-enterprises and community trusts who are lacking financial means are provided with *pro-bono* environmental services to decrease the burden of the cost associated with starting a business. Pacific Ora Projects (Pty) Ltd has been identified as an eligible client for this service and is proposing to develop a small-scale pig and vegetable production on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province.

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

In line with the Environmental Impact Assessment requirements of December 2014, Interested and Affected Parties (I&APs) must be notified and are requested to register for this project in order to receive future correspondence on this project and/or provide comments on issues of concern that will be considered during the Basic Assessment process. Please find enclosed with this letter a **Background Information Document (BID)** and a **Comment and Registration form**. You have until on or before **20 April 2016** to register and submit your comments for this project. To register and submit comments for the project please complete the Registration Form together with your full name, contact details (preferred method of notification, e.g., full postal or email address), fax/phone number(s) and an indication of any direct business, financial, personal or other interest you have in the application to the contact person listed below.

Yours sincerely,

Ms. Kelly Stroebel (Project Manager)

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

Board members: Prof T. Majoor (Chairperson), Adv G. Badela, Ms P. Balesi, Dr P. Goyts, Dr A. Ubbell, Dr R. Masango, Ms M. Maseko, Mr J. Ntshongza, Ms A. Noah, Prof M. Bheko, Dr S. Sibisi (CEO)



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

### Email 1 to I&APs: Project Announcement (18 March 2016)

**From:** Kelly Stroebel

**To:**

**BC** mrbothata@environment.gov.za; SHlela@environment.gov.za; tnenarude@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; khayaletu.matrose@dmr.gov.za; MMolefane@thedti.gov.za; thokob@daff.gov.za; steven.mukhola@gauteng.gov.za; karabo.mohatla@gauteng.gov.za; phuti.matlamela@gauteng.gov.za; albert.marumo@gauteng.gov.za; MusekeneM@dwa.gov.za; RakgothoT@dwa.gov.za; bethuel.netshiswinzhe@gauteng.gov.za; Shoki.Tshabalala@gauteng.gov.za; Albert.chanee@gauteng.gov.za; shantalp@tshwane.gov.za; DineoMAT@tshwane.gov.za; Zingisa.Smale@gauteng.gov.za; celiam@tshwane.gov.za; lelokop@tshwane.gov.za; shanellec@tswane.gov.za; minetteb@tswane.gov.za; rudzanim@tshwane.gov.za; karenmeyer@absamail.co.za; innocentia\_molepo@yahoo.com; frikkie.sithuthe@gmail.com; willariekert@gmail.co.za; debthuman@mweb.co.za; maila.george1@gmail.com; makoam@nra.co.za; stephaniea@ewt.org.za; tumi.lehabe@wessa.co.za; adamp@ewt.org.za; ewt@ewt.org.za; maphata.ramphela@gauteng.gov.za; advocacy@birdlife.org.za; motsisl@eskom.co.za

**Date:** 18/03/2016 11:44

**Subject:** BA project announcement & registration period

**Attachments:** Letter to I&APs\_BID.docx; Comments & Reg Form.docx; Pacific Ora (Pty) Ltd BID March 2016.pdf

Dear Interested and/or Affected Party,

Project announcement

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng

Please see the attached letter and Background Information Document pertaining to the initiation of a **Basic Assessment Process** for the above-mentioned project.

In terms of Government Notice Regulations (GNR) 983, 984 and 985 of the National Environmental Management Act (Act 107 of 1998) published in Government Gazette 38282 on 4 December 2014, Environmental Authorisation from the Competent Authority, in this case the Gauteng Department of Agriculture and Rural Development, is required prior to the undertaking of any activity.

In order to register as an interested and/or affected party for this process or to obtain any further information, kindly complete the attached comments and registration form and send to the Project Manager (contact details below) on or before the **20th April 2016** :

Ms. Kelly Stroebel (Project Manager)

Postal address: PO Box 320, Stellenbosch, 7599, South Africa

Tel: 021 888 2432

Fax: 021 888 2693

E-mail: kstroebel@csir.co.za

Kind Regards,

Kelly Stroebel

Junior Environmental Assessment Practitioner (EAP)

Environmental Management Services (EMS)

CSIR Stellenbosch

---

kstroebel@csir.co.za

Tel. : 021 888 2432

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

### Letter 2 to I&AP's – release of Draft Basic Assessment Report for comment (1 August 2016)



CSIR Environmental Management Services

PO Box 320  
Stellenbosch  
7599  
South Africa  
Tel: +27 21 888 2432  
Fax: +27 21 888 2693  
Email: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)

1 August 2016

Dear Interested and Affected Party

#### NOTICE OF RELEASE OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT

**Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng**

The National Department of Environmental Affairs (DEA) and the Council for Scientific and Industrial Research (CSIR) have initiated the Special Needs and Skills Development Programme, whereby small-medium micro-enterprises and community trusts who are lacking financial means are provided with *pro-bono* environmental services to decrease the burden of the cost associated with starting a business. Pacific Ora Projects (Pty) Ltd has been identified as an eligible client for this service and is proposing to develop a small-scale pig and vegetable production on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province.

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

In line with the above, as a registered Interested and Affected Party (I&AP) on the project database, you are hereby notified of the release of the Draft BA Report to all I&APs for a 30-day review period, which will extend from **1 August 2016 to 13<sup>th</sup> September 2016** (excluding public holidays). Please submit any comments on the Draft BA Report to the CSIR Project Manager at the contact details provided above by **13<sup>th</sup> September 2016**.

A hard copy of the Draft BA Report is available for public viewing at the Pierre van Ryneveld Public Library (Fouche Road). The Draft BA Report can also be downloaded from the following website:

<http://www.csir.co.za/ems/specialneeds/>

The next step in the BA Process will entail compiling the Final BA Report and including all comments received from I&APs during the 30-day review of the Draft BA Report. Once finalised, the Final BA Report will be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) for decision making. As a registered I&AP on the project database, you will be notified in writing of the submission of the Final BA Report, as well as the outcome of the decision making process.

Should you have any queries or require additional information please do not hesitate to contact the undersigned using the contact details provided above.

Sincerely,

Ms. Kelly Stroebel  
CSIR Project Manager  
CSIR Environmental Management Services

Board members: Prof T. Majazi (Chairperson), Adv G. Badela, Ms P. Baleni, Dr P. Goyns, Dr A. Liobell,  
Dr R. Masango, Ms M. Maseko, Mr J. Netshitenzhe, Ms A. Noah, Prof M. Phakeng, Dr S. Sibisi (CEO)

[www.csir.co.za](http://www.csir.co.za)

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

### Email 2 to I&APs: release of Draft Basic Assessment Report for comment (1 August 2016)

**From:** Kelly Stroebel  
**To:**  
**BC** steven.mukhola@gauteng.gov.za; karabo.mohatla@gauteng.gov.za; phuti.matlamela@gauteng.gov.za; albert.marumo@gauteng.gov.za; MusekeneM@dwa.gov.za; RakgothoT@dwa.gov.za; bethuel.netshiswinzhe@gauteng.gov.za; Shoki.Tshabalala@gauteng.gov.za; Albert.chanee@gauteng.gov.za; shantalp@tshwane.gov.za; DineoMAT@tshwane.gov.za; Zingisa.Smole@gauteng.gov.za; celiam@tshwane.gov.za; lelokop@tshwane.gov.za; shanellec@tshwane.gov.za; minetteb@tshwane.gov.za; rudzanim@tshwane.gov.za; karenmeyer@absamail.co.za; SHlela@environment.gov.za; tmemarude@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; khayaletu.matrose@dmr.gov.za; MMolefane@thedti.gov.za; thokob@daff.gov.za; innocentia\_molepo@yahoo.com; frikkie.sithuthu@gmail.com; willariekert@gmail.co.za; debthuman@mweb.co.za; maila.george1@gmail.com; stephaniea@ewt.org.za; tumi.lehabe@wessa.co.za; adamp@ewt.org.za; ewt@ewt.org.za; maphata.ramphele@gauteng.gov.za; advocacy@birdlife.org.za; motsisl@eskom.co.za; thinusoosthuizen@gmail.com  
**Date:** 01/08/2016 15:25  
**Subject:** Notice of Release of Draft Basic Assessment Report for comment: Pacific Ora Projects

Dear Stakeholder,

#### Notice of Release of Draft Basic Assessment Report for comment

#### **Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng**

Please see attached **letter** notifying you of the release of the Draft Basic Assessment Report for a 30 day public review period for the above-mentioned project.

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

In line with the above, the review period will extend from 1 August 2016 to 13 September 2016 (excluding public holidays). Please submit any comments on the Draft BA Report to the CSIR Project Manager at the contact details provided below by 13<sup>th</sup> September 2016:

Ms. Kelly Stroebel (Project Manager)

Postal address: PO Box 320, Stellenbosch, 7599, South Africa

Tel: 021 888 2432

Fax: 021 888 2693

E-mail: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)

A hard copy of the Draft BA Report is available for public viewing at the Pierre van Ryneveld Public Library (Fouche Road). The Draft BA Report can also be downloaded from the following website:

<http://www.csir.co.za/ems/specialneeds/>

Kind Regards,

Kelly Stroebel  
Environmental Assessment Practitioner (EAP)  
CSIR Stellenbosch

---

[kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)  
Tel. : 021 888 2432  
PO Box 320, Stellenbosch, 7599

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

### **Email 3 to I&APs: Reminder about public comment period for Draft Basic Assessment Report for comment (8 September 2016)**

**From:** Kelly Stroebel  
**To:**  
**BC** karenmeyer@absamail.co.za; advocacy@birdlife.org.za; mashuduma@daff.gov.za; thokob@daff.gov.za; kgauta.mokoena@dmr.gov.za; khayalethu.matrose@dmr.gov.za; ncamisile.nkabinde@drdlr.gov.za; MohapiN@dwa.gov.za; MusekeneM@dwa.gov.za; MuthraparsadN@dwa.gov.za; RakgothoT@dwa.gov.za; SHlela@environment.gov.za; tnemarude@environment.gov.za; motsisl@eskom.co.za; adamp@ewt.org.za; ewt@ewt.org.za; stephaniea@ewt.org.za; Albert.chanee@gauteng.gov.za; albert.marumo@gauteng.gov.za; bethuel.netshiswinzhe@gauteng.gov.za; karabo.mohatla@gauteng.gov.za; maphata.ramphela@gauteng.gov.za; phuti.matlamela@gauteng.gov.za; Shoki.Tshabalala@gauteng.gov.za; steven.mukhola@gauteng.gov.za; Zingisa.Smale@gauteng.gov.za; willariekert@gmail.co.za; frikkie.sithuthe@gmail.com; Maila.george1@gmail.com; thinusoothuizen@gmail.com; Henk Human Ortopedies; MMolefane@thedi.gov.za; celiam@tshwane.gov.za; DineoMAT@tshwane.gov.za; lelokop@tshwane.gov.za; rudzanim@tshwane.gov.za; shantalp@tshwane.gov.za; minetteb@tswane.gov.za; shanellec@tswane.gov.za; tumi.lehabe@wessa.co.za; innocentia\_molepo@yahoo.com  
**Date:** 08/09/2016 09:37  
**Subject:** Notice of Release of Draft Basic Assessment Report for comment: Pacific Ora Projects  
**Attachments:** CSIR Letter to I&APs\_Pacific Ora Draft BAR.pdf

Dear Stakeholder,

#### **Reminder: Public Comment Period for Draft Basic Assessment Report**

Please note that the public comment period for the below-mentioned project ends on **Tuesday 13 September 2016.**

A hard copy of the Draft BA Report is available for public viewing at the Pierre van Ryneveld Public Library (Fouche Road). The Draft BA Report can also be downloaded from the following website:  
<http://www.csir.co.za/ems/specialneeds/>

Please send through any comments on the Draft Report by the end of the above mentioned date to:

Ms. Kelly Stroebel (Project Manager)  
Postal address: PO Box 320, Stellenbosch, 7599, South Africa  
Tel: 021 888 2432  
Fax: 021 888 2693  
E-mail: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)

Kind Regards,

Kelly Stroebel  
Environmental Assessment Practitioner (EAP)  
CSIR Stellenbosch

---

[kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)  
Tel. : 021 888 2432  
PO Box 320, Stellenbosch, 7599

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

### Proof of delivery of email: Project announcement (18 March 2016)

adamp@ewt.org.za		Transferred
Transferred	18/03/2016 11:45	
Delivered	18/03/2016 12:17	
BC: adamp@ewt.org.za		
advocacy@birdlife.org.za		Transferred
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FINAL BASIC ASSESSMENT REPORT

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DAILY SUN

23

# PEOPLE SUPPORT ARRESTED ELDERS

**By RAYMOND MORARE**  
THE residents of Lephengville in Hammanskraal, north of Pretoria, are fully behind the four elders charged with murder.

This was evident when the elderly people appeared in court on Tuesday.

The community came out in numbers to support them.

The elders were arrested after an allegedly well-known thief in the area was beaten and died in hospital.

The residents who were carrying placards with different messages demanded that the four be released.

Gogo Adolphina Moekeletsí (60), madala Jack Murume (66), Judas Moekeletsí (68) and Sello Moholane (64) were in court for the murder of the 29-year-old man known as Jack.

According to Fannie Hlongwane (60), the chairman of the task team selected to oversee the court case of the four accused, Jack was allegedly killed by the members of the community.

"He was beaten after he was found with a stolen



The community of Lephengville protested outside the Moretele Magistrates Court on Tuesday. Photo by Raymond Morare

plasma TV and electrical cables. The four are not the ones who killed the victim, but the community." Constable Herman Moremi said the four were released on R800 bail on Tuesday.

They will appear in Moretele Magistrates Court on 19 April.

"The suspects were not wrongly accused as they are the ones who told the police that they committed the act. It is not the police's job to release the suspects but the court's," he said.

# Our street is safe from speeding cars!

**By KARABO RAMMUTLA**  
THE Nellmapius community was excited when the road linking their kasi to the industrial area around Samcor Park was opened.

Their joy soon turned into a nightmare as motorists and taxis took to the residential road to avoid traffic jams on Alwyn Road.

But when Lillian Mahlangu (43) nearly lost her life early last year, after being hit by a car while going to look for work, she decided to do something about it.

Lillian and other women from extension 3 regulate traffic driving along Robertham Street every week day – and stop residents being hit by cars!

Since they started their safety project in November 2014, no one has been hit by a car in the area.

Lillian said they approached a



Ellen Mokgehle (left) and Lillian Mahlangu barricade their street in Nellmapius extension 3 to keep residents safe from cars. Photo by Karabo Rammutla

road construction company and asked for plastic barricades to close the street.

Since then the barricades have been in place five days a week from 5am to 8pm until traffic has subsided.

"We only allow scholar transport and residents' cars to use

Robertham Street," she said. "Since we started doing this job, no one has been hit by a car in our area. The fact that we are able to save lives is what carries us through difficult times. I don't want anyone else, or worse, a child, to go through what I went through."

# Tuk-tuks spark taximen's anger!



Taxi drivers have accused tuk-tuk drivers of stealing their customers. Photo by Samson Ratswana

**By DOREEN MOKGOLO**

TSHWANE taximen are demanding that the city's tuk-tuk taxis are taken off the road.

The taximen claim the tuk-tuk drivers operate outside their designated areas and are stealing their clients.

But the Tshwane municipality has hit back, saying the taximen shouldn't confuse competition with theft.

City of Tshwane spokesman Blessing Manale said the tuk-tuk service was only one of many modes of public transport.

"Tuk tuks offer passengers an alternative to taxis. They do not steal, but compete with other modes of transport such as minibus taxis, buses and metered taxis."

The three-wheeled taxis were rolled out by the City of Tshwane in November last year.

Taxi owner Oupa Magano said the tuk-tuks should not be allowed to operate on taxi routes.

"These three-wheeled taxis are not safe for passengers. They don't have safety belts or doors."

"Five years ago, the department of transport took a decision to scrap minibuses and Siyaya taxis. They said these were not safe because they didn't have safety belts."

"The same department has introduced tuk-tuks with no safety measures," he said.

Bruce Cowie, managing partner of Shesha Tuks, said tuk-tuk drivers must not worry about the safety of their passengers.

"Taximen must mind their own business. Our business has been approved by the government. We are public transport operators, just like them. They are intimidated by us because we are attracting more business. They are trying to scare us out of the market."

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For more information please visit [www.i-auctions.co.za](http://www.i-auctions.co.za)

**IMPERIAL AUTO AUCTIONS**

**KITSISO YA TIRELO YA BASIC ASSESSMENT (BA)**  
Pacific Ora Projects (Pty) Ltd Moago Tirelo wa Dikolobe le Merogo fa tshimong ya Bultfontein 107-JR, Rooiwal, Gauteng

Le itsiwe gore, go ya ka melao ya Tlathhobo ya Tikologo (EIA), ka fa tlase ga molawana-tsamaiso 41(1) le molawana-tsamaiso 41(4), e e gatisitweng ka Gazeteng ya Mmuso ya nomoro 38282 wa Sedimonthole 2014, ya Molao wa Lekgotla la Taolo wa Tikologo, 1998 (Molao 107 wa 1998), gore **Pacific Ora (Pty) Ltd**, e eletsa go simolola go rua dikolobe le go lema merogo fa tshimong e e lekanang dihekethara dileng robongwe, ya 120 Bultfontein 107-JR, Onderstepoort/Rooiwal, Pretoria North, Gauteng Province.

Lekgotla la Dipatlisiso tsa Saense le Indasteri (Council for Scientific & Industrial Research -CSIR), le le ikemetseng ka di tlathhobo tsa tikologo, le tlo laola tsamaiso ya tlathhobo ya tikologo ya projekete Projekete e fta kwadiswa le Tlathhobo ya Dinagamagae la Gauteng (GDARD). Tlathhobo ya tikologo e tlhokagala gonne e tsositse ditiro tse di latelang tsa Kitsiso ya Melao wa Mmuso (GNR) 983 ya 04 Sedimonthole 2014.  
GNR 983, Tiro (4)  
GNR 983: Tiro (27)  
GNR 921: Karolo A, Tiro (1)

Go fitlhela dikitsiso tse di amanang le projekete le tsamaiso ya tlathhobo ya tikologo, ikwadise jaaka mokgatlhegi le moamegi wa projekete. Ikopantshe le: **Ms. Kelly Stroebel, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2693 or Email: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za).** O na le go fitlhela ka di 20 Moranang 2016 go dira bjalo.

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## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

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### Contents of the Newspaper Advertisement (English) placed in Die Beeld on 18 March 2016

#### **Notice of Basic Assessment (BA) Process**

#### **Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, 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 **Pacific Ora Projects (Pty) Ltd** proposes a small-scale **pig and vegetable production** on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province.

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

*GNR 983 Activities (4) and (27)*

*GNR 921 Category A, Activity (1)*

You are invited to register as an Interested and/or Affected Party (I&AP) and/or to provide any written comments on the BA process. To obtain further information, to comment and/or to register as an I&AP, please provide your full name, full postal address, phone numbers, email address and state your area of interest and/or concern to: **Ms. Kelly Stroebel, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2693 or Email: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)**. You have until or before **20 April 2016** to do so (30 days from the date of this publication - including weekends, but excluding public holidays).



**CSIR**  
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## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

Contents of the Newspaper Advertisement (Setswana) placed in The Daily Sun on 18 March 2016

### **KITSISO YA TIRELO YA BASIC ASSESSMENT (BA)**

**Pacific Ora Projects (Pty) Ltd Moago Tirelo wa Dikolobe le Merogo fa tshimong ya Bultfontein 107-JR, Rooiwal, Gauteng**

Le itsisiwe gore, go ya ka melao ya Tlhatlhobo ya Tikologo (EIA), ka fa tlase ga molawana-tsamaiso 41(1) le molawana-tsamaiso 41(4), e e gatisitweng ka Gazeteng ya Mmuso ya nomoro 38282 wa Sedimonthole 2014, ya Molao wa Lekgotla la Taolo wa Tikologo, 1998 (Molao 107 wa 1998), gore **Pacific Ora (Pty) Ltd**, e eletsa go simolola go rua dikolobe le go lema merogo fa tshimong e e lekanang dihekethara dileng robongwe, ya 120 Bultfontein 107-JR, Onderstepoort/Rooiwal, Pretoria North, Gauteng Province.

Lekgotla la Dipatlisiso tsa Saense le Indasteri (Council for Scientific & Industrial Research -CSIR), le le ikemetseng ka di tlhatlhobo tsa tikologo, le tlo laola tsamaiso ya tlhatlhobo ya tikologo ya projekte Projekte e tla kwadisiwa le Tlhabologo ya Dinagamagae la Gauteng (GDARD). Tlhatlhobo ya tikologo e tlhokagala gonne e tsositse ditiro tse di latelang tsa Kitsiso ya Melao wa Mmuso (GNR) 983 ya 04 Sedimonthole 2014.

*GNR 983, Tiro (4)*

*GNR 983: Tiro (27)*

*GNR 921: Karolo A, Tiro (1)*

Go fitlhela dikitsiso tse di amanang le projekte le tsamaiso ya tlhatlhobo ya tikologo, ikwadise jaaka mokgatlhegi le moamegi wa projekte. Ikopantshe le: **Ms. Kelly Stroebel, CSIR, PO Box 320, Stellenbosch 7599, Phone: (021) 888 2432, Fax: (021) 888 2693 or Email: kstroebel@csir.co.za.** O na le go fihlela ka di 20 Moranang 2016 go dira bjalo.

The logo for the Council for Scientific and Industrial Research (CSIR) features the letters 'CSIR' in a bold, sans-serif font. The 'C' and 'S' are connected, and the 'I' and 'R' are separate. The letters are black and set against a white background.

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## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

### Appendix E4: Communications from interested and affected parties

#### Comments received following the project announcement on 18 March 2016 (prior to the release of the Draft Basic Assessment Report)

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng

March 2016

#### COMMENT AND REGISTRATION FORM

<b>Name:</b> Thinus Oosthuizen		<b>Telephone:</b> 082 785 6346
<b>ID no:</b> 6203135010 082	<b>Fax:</b> 012 5654906	
<b>Organisation:</b> Bultfontein Gemeenskap	<b>Email:</b> thinus.oosthuizen@gmail.com	
<b>Position:</b> Chair Person	<b>Postal address:</b> Postbus 52643	
<b>Physical address:</b> Plot 165 Bultfontein	Doranda 0188	

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

NO

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

Personal

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

- waste water management
- Pollution of underground water
- Roads and Infrastructure
- Pests Control like flies and Virusses.

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:

<p><b>Ms. Kelly Stroebel</b> P O Box 320, Stellenbosch, 7599 Tel: 021 888 2432 Fax: 021 888 2693 E-mail: <a href="mailto:kstroebel@csir.co.za">kstroebel@csir.co.za</a></p>
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Board members: Prof T. Majazi (Chairperson), Adv G. Badela, Ms P. Baleni, Dr P. Goyns, Dr A. Lobell, Dr R. Masango, Ms M. Maseko, Mr J. Ntshirizha, Ms A. Noah, Prof M. Phakeng, Dr S. Sibi (CEO)

[www.csir.co.za](http://www.csir.co.za)

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT



### CSIR Specialist Services

PO Box 320  
Stellenbosch  
7599  
South Africa  
Tel: +27 21 888 2432  
Fax: +27 21 888 2693  
Email: kstroebel@csir.co.za

18 March 2016

Dear Interested and/or Affected Party,

### PROJECT ANNOUNCEMENT

#### BASIC ASSESSMENT FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN 107-JR, ROOIWAL, GAUTENG

The National Department of Environmental Affairs (DEA) and the Council for Scientific and Industrial Research (CSIR) have initiated the Special Needs and Skills Development Programme, whereby small-medium micro-enterprises and community trusts who are lacking financial means are provided with *pro-bono* environmental services to decrease the burden of the cost associated with starting a business. **Pacific Ora Projects (Pty) Ltd** has been identified as an eligible client for this service and is proposing to develop a small-scale pig and vegetable production on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province.

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

In line with the Environmental Impact Assessment requirements of December 2014, Interested and Affected Parties (I&APs) must be notified and are requested to register for this project in order to receive future correspondence on this project and/or provide comments on issues of concern that will be considered during the Basic Assessment process. Please find enclosed with this letter a **Background Information Document (BID)** and a **Comment and Registration form**. You have until on or before **20 April 2016** to register and submit your comments for this project. To register and submit comments for the project please complete the Registration Form together with your full name, contact details (preferred method of notification, e.g., full postal or email address), fax/phone number(s) and an indication of any direct business, financial, personal or other interest you have in the application to the contact person listed below.

Yours sincerely,

**Ms. Kelly Stroebel (Project Manager)**

Postal address: PO Box 320, Stellenbosch, 7599, South Africa

Tel: 021 888 2432

Fax: 021 888 2693

E-mail: kstroebel@csir.co.za

Website: <http://www.csir.co.za/ems/specialneeds/>

Board members: Prof T. Majazi (Chairperson), Adv G. Badela, Ms P. Baleni, Dr P. Göyns, Dr A. Llobell, Dr R. Masango, Ms M. Masoko, Mr J. Netshitenzhe, Ms A. Noah, Prof M. Phakeng, Dr S. Sibisi (CEO)

[www.csir.co.za](http://www.csir.co.za)

THE SOUTH AFRICAN NATIONAL  
ROADS AGENCY LIMITED  
NORTHERN REGION

THE NRA HAS NO COMMENT/OBJECTION  
TO THIS APPLICATION AS IT DOES NOT  
AFFECT A NATIONAL ROUTE/INTER-  
CHANGE.

p.p REGIONAL MANAGER

8/4/2016  
DATE

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## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

**Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng**

March 2016

### COMMENT AND REGISTRATION FORM

<b>Name:</b> Jan Oliver	
<b>ID no:</b>	<b>Telephone:</b> 083 283 6083
<b>Organisation:</b> SANRAL	<b>Fax:</b>
<b>Position:</b> Statutory Control Officer	<b>Email:</b> oliverj@nra.co.za
<b>Physical address:</b> 38 Ida Street Menlo Park, Pretoria	<b>Postal address:</b>

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.

NO

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

No

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

**THE SOUTH AFRICAN NATIONAL  
ROADS AGENCY LIMITED  
NORTHERN REGION**

THE NRA HAS NO COMMENT/OBJECTION  
TO THIS APPLICATION AS IT DOES NOT  
AFFECT A NATIONAL ROUTE/INTER-  
CHANGE.

8/4/2016

REGIONAL MANAGER

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

DATE

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

**Ms. Kelly Stroebel**  
P O Box 320,  
Stellenbosch, 7599  
Tel: 021 888 2432  
Fax: 021 888 2693  
E-mail: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)

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Board members: Prof T. Majoz (Chairperson), Adv G. Badela, Ms P. Baleni, Dr P. Goyns, Dr A. Lobeil, Dr R. Masengo, Ms M. Maseko, Mr J. Netshitenzhe, Ms A. Noah, Prof M. Phakeng, Dr S. Sibisi (CEO)

[www.csir.co.za](http://www.csir.co.za)

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

**From:** "Jan Oliver (NR)" <OliverJ@nra.co.za>  
**To:** "KStroebel@csir.co.za" <KStroebel@csir.co.za>  
**CC:** "Khathutshelo Ramavhoya (HO)" <RamavhoyaK@nra.co.za>, "Victoria Bota (HO)" <BotaV@nra.co.za>, "Tiyiselani Mashele (NR)" <MasheleT@nra.co.za>  
**Date:** 08/04/2016 14:21  
**Subject:** RE: BA project announcement & registration period  
**Attachments:** SNR1stFloor16040813220.pdf

Dear Kelly Stroebel

No national roads will be affected by the proposed Pacific Ora Projects(Pty) Ltd pig and vegetable production facility – See attachment. Please remove the name of all SANRAL officials from your list of Affected parties for the project.

In future please send any EIA and WULA related applications to Victoria Bota or Khathutshelo Ramavhoya of SANRAL at:

BotaV@nra.co.za<mailto:BotaV@nra.co.za>  
RamavhoyaK@nra.co.za

Yours sincerely,  
Jan Oliver  
Statutory Control Section  
The South African National Road Agency SOC Limited  
Northern Regional Office  
38 Ida Street, Menlo Park, Pretoria, 0081  
Private Bag X17, Lynnwood Ridge, 0040  
e-Mail: oliverj@nra.co.za<mailto:oliverj@nra.co.za>

From: Khathutshelo Ramavhoya (HO)  
Sent: 08 April 2016 10:03 AM  
To: Tiyiselani Mashele (NR) <MasheleT@nra.co.za>; Jan Oliver (NR) <OliverJ@nra.co.za>  
Cc: Victoria Bota (HO) <BotaV@nra.co.za>  
Subject: FW: BA project announcement & registration period

Hi colleagues

Please assist on the email below.

Thanks

Khathutshelo

From: Mpati Makoa (HO)  
Sent: 07 April 2016 09:54 AM  
To: Khathutshelo Ramavhoya (HO) <RamavhoyaK@nra.co.za<mailto:RamavhoyaK@nra.co.za>>; Victoria Bota (HO) <BotaV@nra.co.za<mailto:BotaV@nra.co.za>>  
Subject: FW: BA project announcement & registration period

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

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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](mailto:nhlakad@daff.gov.za)

CSIR  
PO Box 320  
Stellenbosch  
7599

13 April 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: Basic Assessment*

Your reference:

Property Description: *Bultfontein 107-JR (Pig & Vegetable production facility)*

Dated: *18 March 2016*

Please use the following reference number in all enquiries:

**AgriLand reference number: 2016\_04\_0153**

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.aqis.agric.za/aqiland>



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

---

### Comments received on the Draft Basic Assessment Report (1 August 2016)

>>> Lungile Motsisi <MotsisiL@eskom.co.za> 25/08/2016 10:52 >>>

Dear Kelly,

Please send me the locality and locality map.

Regards,  
Lungile Motsisi

**From:** Kelly Stroebel [mailto:KStroebel@csir.co.za]

**Sent:** 01 August 2016 03:27 PM

**Subject:** Re: Notice of Release of Draft Basic Assessment Report for comment: Pacific Ora Projects

Dear Stakeholder,

#### **Notice of Release of Draft Basic Assessment Report for comment**

#### **Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng**

Please see attached **letter** notifying you of the release of the Draft Basic Assessment Report for a 30 day public review period for the above-mentioned project.

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

In line with the above, the review period will extend from **1 August 2016 to 13 September 2016** (excluding public holidays). Please submit any comments on the Draft BA Report to the CSIR Project Manager at the contact details provided below by **13<sup>th</sup> September 2016**:

#### **Ms. Kelly Stroebel (Project Manager)**

Postal address: PO Box 320, Stellenbosch, 7599, South Africa

Tel: 021 888 2432

Fax: 021 888 2693

E-mail: kstroebel@csir.co.za

A hard copy of the Draft BA Report is available for public viewing at the Pierre van Ryneveld Public Library (Fouche Road). The Draft BA Report can also be downloaded from the following website:  
<http://www.csir.co.za/ems/specialneeds/>

Kind Regards,

Kelly Stroebel  
Environmental Assessment Practitioner (EAP)  
CSIR Stellenbosch

---

kstroebel@csir.co.za

Tel. : 021 888 2432

PO Box 320, Stellenbosch, 7599

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## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT



### Environmental Management Services Department

Room 200 | 2<sup>nd</sup> Floor | Old Mercedes Benz Building | 11 Francis Baard Street | Pretoria | 0002  
PO Box 1454 | Pretoria | 0001  
Tel: 012 358 2449 / 012 358 1351 | Fax: 012 358 4999  
Email: [mthobelik@tshwane.gov.za](mailto:mthobelik@tshwane.gov.za) | [www.tshwane.gov.za](http://www.tshwane.gov.za) | [www.facebook.com/CityOfTshwane](http://www.facebook.com/CityOfTshwane)

My ref: 8/4/R/2  
Your ref:  
Contact person: T Mphephu  
Section: Environmental Planning & Open Space Management Section

Tel: 012 358 8667  
Fax: 012 358 8934  
Email: [TshinyadzoM@tshwane.gov.za](mailto:TshinyadzoM@tshwane.gov.za)  
Date: 07 September 2016

Council for Scientific and Industrial Research (CSIR)  
P O Box 320,  
Stellenbosch,  
7599

**Attention:** Kelly Stroebel  
**Tel:** (021) 888 2432  
**Fax:** (021) 888 2473  
**Email:** [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)

Dear Sir/Madam

### DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED PROPOSED PACIFIC ORA PROJECTS (PTY) LTD PIG AND VEGETABLE PRODUCTION FACILITY ON PORTION 120 OF THE FARM BULTFONTEIN 107-JR, ROOIWAL, GAUTENG.

The above application dated July 2016 refers.

#### 1. INTRODUCTION

The Environmental Management Services Department (the Department) has considered the Draft Basic Assessment Report dated July 2016 in respect of the abovementioned application. The Draft Basic Assessment Report is submitted to the Environmental Management & Parks Division of the City of Tshwane, hereafter referred to as 'the City', as a commenting authority as required in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 04 December 2014. The application is made in terms of the National Environmental Management: Waste Act No. 58 of 2008 (NEMA: WA) GN 921 of 29 November 2013.

#### 2. PROJECT LOCATION AND DESCRIPTION

Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tshwane Metropolitan Municipality, and is approximately 35 km north of Pretoria.

The proposed site is located on Portion 107-JR of the farm Bultfontein in Ward 49 of the Tshwane Metropolitan Municipality (CoT). The property is located at 120 Maroela Road, in the Rooiwal area.



Kgoro ya Taolo ya Tikologo • Departamente Ongewingsabesutur • Lefapha la Tomatso ya Tikologo  
Ndzawulo ya Mafambialo ya awa Mbangi • UMoyango Wesokaphathwa Kwemvelo  
Environmental Management Department

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

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The site lies approximately on 10 km from the major R101 north/south route which links Pretoria North and Hammanskraal. The site is currently zoned for agricultural use.

The proposed project will include the following components:

- Office building and employee facilities;
- 40 cubic metre slurry dam to store pig waste for use as fertilizer;
- Approximately 5 hectares of granadilla and spinach crop;
- Approximately 12 pig houses holding a total of 910 pigs; and
- Already existing municipal infrastructure (roads and electricity connection).

The activity entails undertaking the following listed activity in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Assessment Regulations, 04 December 2014, under:

### GNR 983, 4 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 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.*
- *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- (iii) The undertaking of a linear activity; or (iv) Maintenance purposes undertaken in accordance with a maintenance management plan.*

In terms of the National Environmental Management (NEM): Waste Act Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 37083, Waste Management License is required as the project applies to the following listed activities:

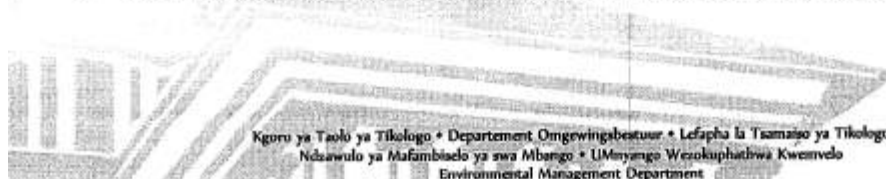
### Category A

- *Activity (1) the storage of general waste in lagoons.*

### 3. KEY FACTORS INFORMING THE COMMENTS

In making its comments in respect of the proposed activity the Department has taken, inter alia, the following into consideration:

- a) The information contained in the final Basic Assessment Report compiled by Council for Scientific and Industrial Research (CSIR) dated July 2016 and received by the Department on 01 August 2016.
- b) Information obtained from the Departments' s information base including *inter alia*:
  - Geographic Information System (GIS data).
  - Gauteng Open Space Plan (GOSP).
- c) Compliance with applicable Municipal, provincial and national policies and guidelines including:
  - The National Environmental Management Act 1998 (Act 107 of 1998) (NEMA): its decision-making principles and Environmental Impact Assessment Regulations;
  - The Tshwane Integrated Environmental Policy (TIEP);
  - The Tshwane Open Space Framework (TOSF) Policy Statements and Typologies.



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

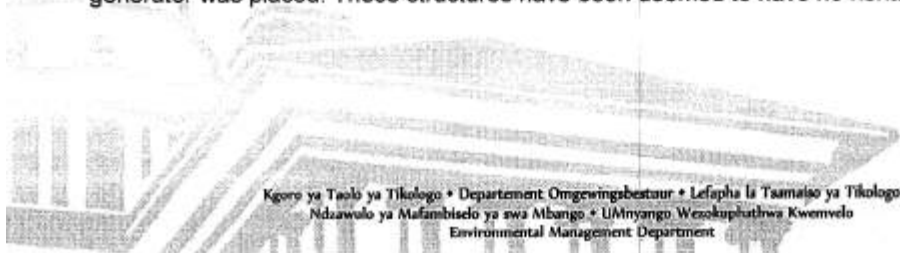
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- The Bioregional Plan for the Gauteng Metropolitan Municipalities.
  - The Gauteng Provincial Environmental Management Framework (GPEMF)
- d) The findings on the site inspection undertaken by Mr T Mphephu on 29 August 2016.

### 4. DISCUSSION

In reviewing the application the Department made the following findings:

- a) According to the Tshwane Open Space Framework the proposed development site is not affected by any open space typologies.
- b) According to the Bioregional Plan for the Gauteng Metropolitan Municipalities the proposed site is situated within and adjacent to the following areas:
- **Other Natural Area:** *Natural areas not included in the Protected, Critical Biodiversity and Ecological Support Areas categories.*
- c) According to the Gauteng Provincial Environmental Management Framework (GPEMF) November 2014 the proposed activity is situated within **Zone 4: Normal control zone**. This zone is dominated by agricultural uses outside the urban development zone as defined in the Gauteng Spatial Development Framework. No listed activities may be excluded from environmental assessment requirements in this zone.
- d) The report indicates that the layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping.
- e) The report indicates that the total development footprint would therefore be 8.57 ha and this will be broken down into a 40 m<sup>2</sup> Slurry Dam, 5 ha of granadilla and spinach crops and the remaining 2- 3 ha for office structures and pig houses.
- f) The site is currently serviced by the Municipality and services are available and bulk services that may be required such as sewerage will therefore be installed privately to the satisfaction of the Municipality.
- g) The report indicates that a borehole exists on site for water provision for the proposed project activities and Pacific Ora Projects holds a borehole certificate supported by a qualified contractor confirming capacity of 1500 litres per hour.
- h) The report indicates that power will be sourced from Eskom and the use of solar panels on individual houses and for the pump mechanism on the borehole will be promoted.
- i) The Heritage Screening Study Report indicates that according to the South African Heritage Resources Agency (SAHRA) map the area to be impacted by the proposed development is underlain by stratigraphy that has insignificant sensitivity for potential impacts to palaeontological resources as the entire area is underlain by rocks of the Rashedoop Granophyre Suite.
- j) The Heritage Screening Study Report indicates that during site inspection it was noted that the remains of a house forms part of the yard and a small building like a shed in which power generator was placed. These structures have been deemed to have no heritage significance.



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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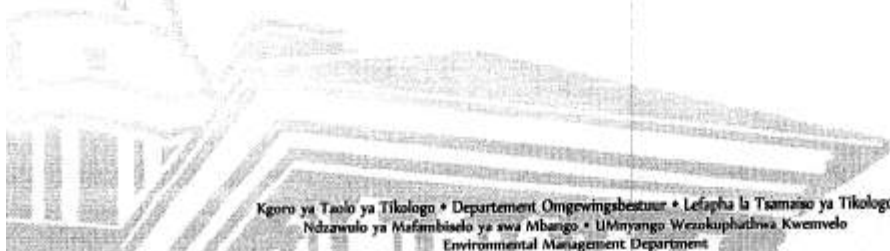
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- k) The Heritage Screening Study Report indicates that the proposed development is located within a highly transformed area and it is therefore recommended that no further heritage studies are required in terms of section 38 of the National Heritage Resources Act (Act 25 of 1999).
- l) The Heritage Screening Study Report indicates that the heritage resources in the area proposed for development are sufficiently recorded and there are no known sites which require mitigation or management plans.
- m) The report indicates that access roads to and on the site are already in existence.
- n) The Ecological Scan Report indicates that The *Combretum zeyheri* Mixed Bushclumps, *Combretum apiculatum* – *Themeda triandra* Open Woodland and the *Acacia-Heterpogon* Past Fields were rated with Medium Significance and the *Acacia caffra* – *Combretum apiculatum* - *Heterpogon contortus* Open Woodland was rated as Medium-High.
- o) The Ecological Scan Report indicates that with the implementation of the mitigation measures suggested in the report, the significance of most impacts on site from an ecological perspective are considered to be of *Low Significance*.
- p) The Ecological Scan Report indicates that based on the information available to date, with the brief field scan of the site, it is Natural Scientific Services (NSS)'s opinion that there are no fatal flaws to the project and that provided the mitigation set out is adhered to and that the developer shows commitment to the sustainable development, NSS have no objections to the project going forward.
- q) This Department acknowledges that impacts to the surrounding environment can be mitigated to acceptable levels by strict and proactive implementation of the migratory measures contained in the EMP. However, issues such as odour management, mortality pit, management of nuisance flies, ground water monitoring, diseases outbreak, maintenance of effluent system and addressing emergency events related to the proposed activity are not addressed by attached EMP.

### 5. RECOMMENDATIONS

The Department recommends that the following issues be taken into consideration:

- a) A site specific Stormwater Management Plan should be compiled and submitted as part of the final Basic Assessment Report (BAR) with the comments and response from City of Tshwane Roads and Stormwater Division. The stormwater management plan should aim to separate of dirty water from clean water, to prevent pollutants and ensure that runoff water is stored and released at a rate that will not impact negatively on the natural environment.
- b) A waste management plan should be compiled and submitted as part of the final Basic Assessment Report. The plan should address the collection, transportation, disposal of waste and recycling of recoverable waste if any.
- c) An Emergency Preparedness Plan should be compiled in consultation with the City of Tshwane Emergency Services Department and approved by a qualified risk consultant. The plan should be submitted as part of the final Basic Assessment Report (BAR).

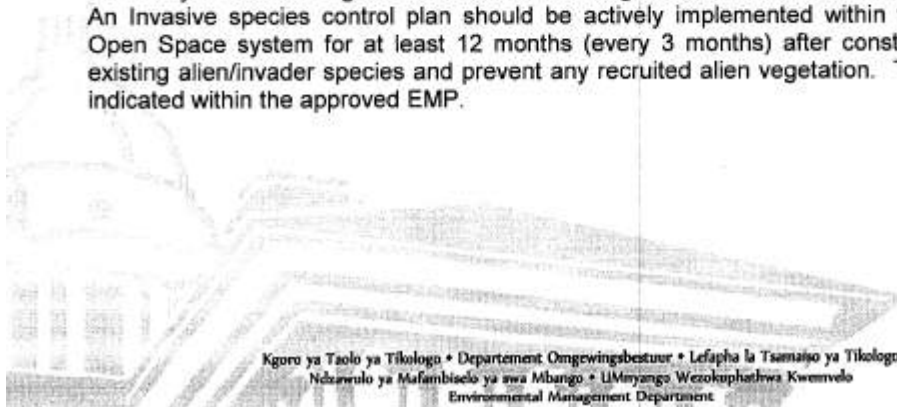


## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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- d) Biosecurity measures for proposed piggery should be compiled and included in the final Basic Assessment Report to control contagious pig diseases, especially classical swine fever and foot and mouth disease and should form part of the environmental authorisation.
- e) The Department is not in support of septic tank systems. It is the recommendation from the Department to evaluate possible alternative sewage systems which are more environmentally acceptable. The septic drain system could easily pollute the groundwater if not properly managed and maintained.
- f) Detail Designs of the proposed pig houses and slurry dam should be completed and submitted as part of the final Basic Assessment Report. This should be approved by Gauteng Department of Agriculture and Rural Development (GDARD) and Department of Water and Sanitation (DWS).
- g) Odour Assessment should be undertaken for the proposed activity. The surrounding area is in close proximity of the application site and nuisance from odours should be prevented.
- h) The treated effluent water used for the purpose of irrigation should at all times adhere to the South African Water Quality Guidelines for Agricultural Use: Irrigation of the Department of Water and Sanitation.
- i) Disinfecting of the pig sheds inside and outside and daily management and sanitation on floor areas, walls, ceilings and other equipment used for the pig sheds should be implemented regularly, to prevent any air pollution in the form of odours.
- j) Appropriate damp proofing and drainage precautions must be implemented beneath all effluent storage areas to prevent groundwater pollution.
- k) The borehole certificate should be included within the final Basic Assessment Report (BAR) confirming capacity of 1500 litres per hour.
- l) The pig mortality pit if any should be designed to ensure that detrimental fluids created by the degrading process do not contaminate or percolate into the surrounding soil or water table. An emergency plan for the mortality pit should be included within the section for emergency plan within the final BAR.
- m) All activities on the site must comply with the Tshwane Municipality's By-Laws.
- n) The EMP as submitted within the report must be amended to address the issues such as odour management, mortality pit, management of nuisance flies, ground water monitoring, diseases outbreak, maintenance of effluent system and addressing emergency events related to the proposed activity and attached as part of the final BAR.
- o) All Alien invasive plant species should be eradicated on the study area and within the water course system according to the Conservation of Agricultural Resources Act (Act no. 43 of 1983). An Invasive species control plan should be actively implemented within the study area and Open Space system for at least 12 months (every 3 months) after construction to eradicate existing alien/invader species and prevent any recruited alien vegetation. This must be clearly indicated within the approved EMP.



Kgoro ya Taolo ya Tikologo • Departement Omgewingsbestuur • Lefapha la Tsamaiso ya Tikologo  
Ndzawulo ya Mafambiselo ya swa Mbangano • UMnyango Wezokuphathwa Kwemvelo  
Environmental Management Department



## SECTION F: APPENDICES

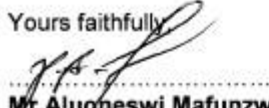
Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

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### 6. CONCLUSION

The Department will provide final comments upon receipt and review of the final Basic Assessment Report with the inclusion of the above-mentioned recommendations.

Yours faithfully



Mr Aluoneswi Mafunzwaini

2016/09/05

Date:

**EXECUTIVE DIRECTOR: ENVIRONMENTAL MANAGEMENT AND PARKS DIVISION**

**Letter signed by: Leloko Puling**

**Designation: Director: Environmental Planning & Open Space Management**

CC Gauteng Department of Agriculture and Rural Development Attn:

Mr. Steven Mukhola

Tel: (011) 240 2572

Fax: (011) 240 2700



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Ndzanwalo ya Mafambiselo ya swa Mlanga • UMnyango Wezokuphatlwa Kwemvelo  
Environmental Management Department



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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**agriculture,  
forestry & fisheries**

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

Private Bag X 120, Pretoria (Tshwane), 0001  
Delpen Building, C/o Annie Botha & Union Street, Riviera, 0084

From: Directorate Land Use and Soil Management  
Tel: 012-319-7634 Fax: 012-329-5938 ThokoB@daff.gov.za  
Enquiries: Helpdesk Ref: 2016\_04\_0153

CSIR Specialist Services  
P. O. Box 320  
**STELLENBOSCH**  
7599

For attention: Ms. Kelly Stroebel

### **BASIC ASSESSMENT FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN NO. 107-JR, ROOIWAL, GAUTENG PROVINCE**

Your letter dated 18 March 2016 refers.

With reference to the above-mentioned matter, the Department wishes to inform you that there is no objection against the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production Facility on a portion not exceeding 8 hectares.

This comment does not exempt any person from any provisions of any other law, with special reference to the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) and does not purport to interfere with the rights of any person who may have an interest in the agricultural land.

Yours faithfully

**DR M.E. TAU**  
**DEPUTY DIRECTOR GENERAL: FORESTRY AND NATURAL RESOURCES MANAGEMENT**  
**DELEGATE OF THE MINISTER**

DATE: 09.09.16



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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**GAUTENG PROVINCE**  
AGRICULTURE AND RURAL DEVELOPMENT  
REPUBLIC OF SOUTH AFRICA

Diamond Building, 11 Diagonal Street, Newtown, Johannesburg  
P O Box 8769, Johannesburg, 2000

Telephone: 011 240 2500  
Fax: 011 240 2700  
Website: <http://www.gdard.gpp.gov.za>

### FAX COVER SHEET

Receiver's Details		Sender's Details	
To:	Kelly Stroebel	From:	Phuti Matlamela
Company:	Council for Scientific and Industrial Research (CSIR)	Section:	EPIA
Email	kstroebel@csir.co.za	Floor:	3 <sup>rd</sup> Floor, Diamond Building
Tel no.	021 888 2432	Tel:	011 240 3420
Date:	2016	Pages:	02 including fax cover sheet
SUBJECT:	GAUT : 002/16-17/I0002 SUBJECT: COMMENTS ON DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD, PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN 107-JR, CITY OF TSHWANE METROPOLITAN MUNICIPALITY.		

CC CTMM: Open Space Management Section

Attn: Rudzani Mukheli  
Tel: 012 358 8731  
Fax: 012 358 8934

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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**GAUTENG PROVINCE**  
AGRICULTURE AND RURAL DEVELOPMENT  
REPUBLIC OF SOUTH AFRICA

**OFFICE OF THE HEAD OF DEPARTMENT (HOD)**  
Diamond Building, 11 Diagonal Street, Newtown  
PO Box 8769, Johannesburg, 2000  
Tel: 011 240 2500  
Fax: 011 240 2700

Reference: Gaut 002/16-17/10002  
Enquiries: Phuti Matlamela  
Telephone: 011 240 3420  
E-mail: Phuti.Matlamela@gauteng.gov.za

**CSIR**  
P.O. Box 320  
Stellenbosch  
7599

Tel No.: 021 888 2432  
Fax No: 021 888 2473  
E-mail: kstroebel@csir.co.za

Dear Kelly Stroebel,

**SUBJECT: COMMENTS ON DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD, PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN 107-JR, CITY OF TSHWANE METROPOLITAN MUNICIPALITY**

The draft report regarding the above-mentioned development received by the Department on 14 September 2016 has reference.

The proposed project will include:

- i. The construction of two office Buildings, a store room and an overnight sleeping quarters
- ii. A 40 cubic meter slurry dam to store pig waste for use as a fertilizer
- iii. 12 Pig houses holding a total of 910 pigs
- iv. A crop production for granadilla and spinach
- v. Upgrading of existing municipal infrastructure

Listed as Activity No 1(i), Activity 4(i)(ii) and Activity 27 of Listing Notice 1 of the Environmental Impact Assessment Regulations, 2014 and Listed in terms of Government Notice R921, Category A(1).

The Department's comments are as follows:

### **A. Alignment of the activity with applicable legislations and policies**

The proposed activity is for a vegetable and piggery production with a holding capacity of 910 pigs, which has an impact in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).

### **B. Alternatives**

The proposal and the motivation for the exclusion of alternatives provided are noted.

### **Locality map and layout plans or facility illustrations**

Locality Maps and Layout Plans must meet the requirements below:

- The scale of locality map must be at least 1:50 000. The scale must be indicated on the map.
- The locality map and all other maps must be in colour.

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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Department of Agriculture and Rural Development  
Environmental Application Registration Number: 002/15-16/10002

- For gentle slopes, the 1 meter contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500 millimeter contours must be indicated on the plan.
- Locality map must show exact position of development site or sites.
- Locality map must show and identify (if possible) public and access roads.
- The current land use as well as the land use zoning of each of the properties adjoining the site or sites must be indicated.
- The layout plan must be printed in colour and overlaid with a sensitivity map and printed on A4 size paper and 1:8000 scale.

### C. Environmental Management Programme (EMPr)

The attached EMPr is noted and appears adequate to address impacts that may arise as a result of the proposed development (activities).

### D. Public participation process

Comments from all relevant stakeholders that were not addressed must be adequately addressed and submitted to the Department with the Final BAR.

Proof of correspondence with stakeholders must be included in the Final BAR. Should you be unable to submit comments, proof of attempts that were made to obtain comments must be submitted to the Department.

### E. Any other issues noted

- i. Final BA report must be complete i.e. it must include all sections that form part and parcel of a Basic Assessment Report as specified in the Regulations.
- ii. The design of a slurry dam to store waste (in the form of effluent) from piggery must be provided in the final BAR.
- iii. The effluent must go through separation of liquids and solids in order to make use of waste as a fertilizer for vegetable production. It is recommended that a brief description of processes to be followed after the separation of the effluent before the fertilizer is soused be provided.
- iv. No effluent (from the storage areas) may be discharged into any water surface or groundwater resource.
- v. Municipal by-laws applicable to the proposed development must be strictly adhered to.

If you have any queries regarding the contents of this letter, contact the official at the number or email address indicated above.

Yours faithfully



Mr. T. Leku  
Acting Director: Impact Management  
Date: 17/10/2016

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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### Appendix E5: Comments and Responses Report

#### Comments received following the project announcement on 18 March 2016 (prior to the release of the Draft Basic Assessment Report)

ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>Issues/Concerns:</p> <ol style="list-style-type: none"> <li>1. Waste Water Management</li> <li>2. Pollution of ground water</li> <li>3. Roads and infrastructure</li> <li>4. Pest control i.e. flies and viruses</li> </ol>	<p>Mr. Thinus Oosthuizen</p> <p>Private</p>	<p>18 March 2016</p>	<p>Thank you for your comment.</p> <ol style="list-style-type: none"> <li>1. In terms of waste water management, a waste water management plan has been included in the Draft EMPr which is attached to this report as Appendix H.</li> <li>2. A contamination plan and waste disposal regime has also been included in the EMPr which highlights how these impacts can be mitigated.</li> <li>3. Please see comments from SANRAL in Appendix E4 indicating that the proposed development will have no effect on roads in the area. Furthermore, a dust control plan for gravel roads has been included in the EMPr (Appendix H).</li> <li>4. The client will adhere to best practice in terms of pest control within his enterprise. Mitigation measures have been suggested in the EMPr (Appendix H).</li> </ol>
<p>The South African National Roads Agency (SANRAL) Ltd-Northern Region has no comment/objection to this application as it does not affect a national route/interchange.</p>	<p>Jan Oliver</p> <p>SANRAL- Northern Region</p>	<p>4 April 2016</p>	<p>Thank you for your comment &amp; noted.</p>
<p>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.</p> <p>Detail of your application as captured:</p> <p><b>Application type: Basic Assessment</b></p>	<p>HJ Buys</p> <p>Director: Land Use and Soil Management</p> <p>DAFF</p>	<p>13 April 2016</p>	<p>Thank you for your comment &amp; noted.</p>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>Your reference: Property Description: <b><i>Bultfontein 107-JR (Pig &amp; Vegetable production facility)</i></b> Dated: <b><i>18 March 2016</i></b></p> <p>Please use the following reference number in all enquiries: <b><i>AgriLand reference number: 2016_04_0153</i></b> Enquiries can be made to the above postal, fax or e-mail address.</p>			

### Comments received on the Draft Basic Assessment Report (July 2016)

ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>With reference to the above-mentioned matter, the Department wishes to inform you that there is no objection against the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production Facility on a portion not exceeding 8 hectares.</p> <p>This comment does not exempt any person from any provisions of any other law, with special reference to the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) and does not purport to interfere with the rights of any person who may have interest in the agricultural land.</p>	<p>DR. ME Tau  DDG:DAFF</p>	<p>09/09/16</p>	<p>Thank you very much for your correspondence that you do not object to the proposed project, this is noted.</p>
<p>In reviewing the application the Department made the following findings:</p> <ul style="list-style-type: none"> <li>a) According to the Tshwane Open Space Framework the proposed development site is not affected by any open space typologies.</li> <li>b) According to the Bioregional Plan for the Gauteng Metropolitan Municipalities the proposed site is situated within and adjacent to the following areas: <ul style="list-style-type: none"> <li>• Other Natural Area: Natural areas not included in the Protected, Critical Biodiversity and Ecological Support Areas categories.</li> </ul> </li> <li>c) According to the Gauteng Provincial Environmental Management Framework (GPEMF) November 2014 the proposed activity is situated Within Zone 4: Normal control zone. This zone is dominated by agricultural uses outside the urban development zone as defined in the</li> </ul>	<p>Mr. Aluoneswi Mafunzwaini  Executive Director: Environmental Management and Parks Division</p> <p>City of Tshwane Metropolitan Municipality</p>	<p>08/09/16</p>	<p>In terms of the factors the Department took into consideration when reviewing the report, <b>as highlighted by points a-p</b>, the CSIR confirms that this information is correct and thanks CoT for a thorough review of the Draft Report.</p> <p>Response to <b>(q)</b>, odour management, mortality pit, management of nuisance flies, ground water monitoring, diseases outbreak, maintenance of effluent system and addressing emergency events related</p>

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
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ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>Gauteng Spatial Development Framework. No listed activities may be excluded from environmental assessment requirements in this zone.</p> <p>d) The report indicates that the layout plan of the preferred alternative has been developed based on the outcome of the specialist studies and sensitivity mapping.</p> <p>e) The report indicates that the total development footprint would therefore be 8.57 ha and this will be broken down into a 40 m<sup>2</sup> Slurry Dam, 5 ha of granadilla and spinach crops and the remaining 2- 3 ha for office structures and pig houses.</p> <p>f) The site is currently serviced by the Municipality and services are available and bulk services that may be required such as sewerage will therefore be installed privately to the satisfaction of the Municipality.</p> <p>g) The report indicates that a borehole exists on site for water provision for the proposed project activities and Pacific Ora Projects holds a borehole certificate supported by a qualified contractor confirming capacity of 1500 litres per hour.</p> <p>h) The report indicates that power will be sourced from Eskom and the use of solar panels on individual houses and for the pump mechanism on the borehole will be promoted.</p> <p>i) The Heritage Screening Study Report indicates that according to the South African Heritage Resources Agency (SAHRA) map the area to be impacted by the proposed development is underlain by stratigraphy that has insignificant sensitivity for potential impacts to palaeontological resources as the entire area is underlain by rocks of the Rашoop Granophyre Suite.</p> <p>j) The Heritage Screening Study Report indicates that during site inspection it was noted that the remains of a house forms part of the yard and a small building like a shed in which a power generator was placed. These structures have been deemed to have no heritage significance.</p> <p>k) The Heritage Screening Study Report indicates that the proposed development is located within a highly transformed area and it is therefore recommended that no further heritage studies are required In terms of section 38 of the National Heritage Resources Act (Act 25 of 1999).</p> <p>l) The Heritage Screening Study Report indicates that the heritage resources in the area proposed for development are sufficiently recorded and there are no known sites which require mitigation or management plans.</p> <p>m) The report indicates that access roads to and on the site are already in existence.</p> <p>n) The Ecological Scan Report indicates that the <i>Combretum zeyheri</i> Mixed Bushclumps, <i>Combretum apiculatum</i> -<i>Themeda triandra</i> Open Woodland and the <i>Acacia-Heterpogon</i> Past Fields were rated with Medium Significance and the <i>Acacia caffra</i> - <i>Combretum apicuiatum</i> <i>Heterpogon confortus</i> Open Woodland was rated as Medium-High.</p>			<p>to the proposed activity <b>have now been included in the Final EMPr</b> as per CoT's recommendation.</p> <p>Response to Section 5 (Recommendations):</p> <ol style="list-style-type: none"> <li>a. Mitigation measures relating to stormwater management have been included in the Final EMPr attached as Appendix H to this report. During the Design, construction and operational phases, the City of Tshwane's Roads and Stormwater Division will be notified of this plan and may provide comments. The development of this plan will begin once the developer is finalizing the design of the facility, so as to be precise and avoid error.</li> <li>b. The collection, transportation, disposal of waste and recycling of recoverable waste (if any) has been included in the EMPr (Appendix H) in Section 6 (i) (management actions).</li> <li>c. Due to the fact that there will be no hazardous chemicals/ matter on site and that this is a relatively small development with a small number of employees, Section 6 (g) in the EMPr highlights the measures</li> </ol>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>o) The Ecological Scan Report indicates that with the implementation of the mitigation measures suggested in the report, the significance of most impacts on site from an ecological perspective are considered to be of Low Significance.</p> <p>p) The Ecological Scan Report indicates that based on the information available to date, with the brief field scan of the site, it is Natural Scientific Services (NSS)'s opinion that there are no fatal flaws to the project and that provided the mitigation set out is adhered to and that the developer shows commitment to the sustainable development, NSS have no objections to the project going forward.</p> <p>q) This Department acknowledges that impacts to the surrounding environment can be mitigated to acceptable levels by strict and proactive implementation of the migratory measures contained in the EMP. However, issues such as odour management, mortality pit, management of nuisance flies, ground water monitoring, diseases outbreak, maintenance of effluent system and addressing emergency events related to the proposed activity are not addressed by attached EMP.</p> <p><b>5. RECOMMENDATIONS</b></p> <p>The Department recommends that the following issues be taken into consideration:</p> <p>a) A site specific Stormwater Management Plan should be compiled and submitted as part of the final Basic Assessment Report (BAR) with the comments and response from City of Tshwane Roads and Stormwater Division. The stormwater management plan should aim to separate dirty water from clean water, to prevent pollutants and ensure that runoff water is stored and released at a rate that will not impact negatively on the natural environment.</p> <p>b) A waste management plan should be compiled and submitted as part of the final Basic Assessment Report. The plan should address the collection, transportation, disposal of waste and recycling of recoverable waste if any.</p> <p>c) An Emergency Preparedness Plan should be compiled in consultation with the City of Tshwane Emergency Services Department and approved by a qualified risk consultant. The plan should be submitted as part of the final Basic Assessment Report (BAR).</p> <p>d) Biosecurity measures for proposed piggery should be compiled and included in the final Basic Assessment Report to control contagious pig diseases, especially classical swine fever and foot and mouth disease and should form part of the environmental authorisation.</p> <p>e) The Department is not in support of septic tank systems. It is the recommendation from the Department to evaluate possible alternative sewage systems which are more environmentally</p>			<p>to be taken relating to emergency preparedness. Should the Competent Authority require more information on emergency preparedness, a consultant can advise in collaboration with CoT in the pre-construction phase of the project.</p> <p>d. Biosecurity measures are highlighted in Section 6 (e) of the EMPr.</p> <p>e. Section 6 (e) in the EMPr highlights how this will be managed to ensure environmental safety and reduced risk of pollution. Please note Section 5.5 (Septic Tanks) in the GUIDELINE MANUAL FOR THE MANAGEMENT OF ABATTOIRS AND OTHER WASTE OF ANIMAL ORIGIN (GDARD, 2009) will be adhered to.</p> <p>f. Due to the nature of these two facilities, a high level of detail is not possible, however, please see designs in Appendix C.</p> <p>g. Please see odour mitigation measures in Section 6 (e) – 6.10 of the EMPr.</p> <p>h. Noted and will be adhered to.</p> <p>i. Noted and will be implemented.</p> <p>j. Noted and will be implemented.</p> <p>k. Please see this attached in Appendix F.</p>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>acceptable. The septic drain system could easily pollute the groundwater if not properly managed and maintained.</p> <p>f) Detail Designs of the proposed pig houses and slurry dam should be completed and submitted as part of the final Basic Assessment Report. This should be approved by Gauteng Department of Agriculture and Rural Development (GDARD) and Department of Water and Sanitation (DWS).</p> <p>g) Odour Assessment should be undertaken for the proposed activity. The surrounding area is in close proximity of the application site and nuisance from odours should be prevented.</p> <p>h) The treated effluent water used for the purpose of irrigation should at all times adhere to the South African Water Quality Guidelines for Agricultural Use: Irrigation of the Department of Water and Sanitation.</p> <p>i) Disinfecting of the pig sheds inside and outside and daily management and sanitation on floor areas, walls, ceilings and other equipment used for the pig sheds should be implemented regularly, to prevent any air pollution in the form of odours.</p> <p>j) Appropriate damp proofing and drainage precautions must be implemented beneath all effluent storage areas to prevent groundwater pollution.</p> <p>k) The borehole certificate should be included within the final Basic Assessment Report (BAR) confirming capacity of 1500 litres per hour.</p> <p>l) The pig mortality pit if any should be designed to ensure that detrimental fluids created by the degrading process do not contaminate or percolate into the surrounding soil or water table. An emergency plan for the mortality pit should be included within the section for emergency plan within the final BAR.</p> <p>m) All activities on the site must comply with the Tshwane Municipality's By-Laws.</p> <p>n) The EMP as submitted within the report must be amended to address the issues such as odour management, mortality pit, management of nuisance flies, ground water monitoring, diseases outbreak, maintenance of effluent system and addressing emergency events related to the proposed activity and attached as part of the final BAR.</p> <p>o) All Alien invasive plant species should be eradicated on the study area and within the water course system according to the Conservation of Agricultural Resources Act (Act no. 43 of 1983). An Invasive species control plan should be actively implemented within the study area and Open Space system for at least 12 months (every 3 months) after construction to eradicate existing alien/invaser species and prevent any recruited alien vegetation. This must be clearly indicated within the approved EMP.</p>			<p>l. See response (a)</p> <p>m. Noted.</p> <p>n. See above responses for direction to the locations of these measures in the report.</p> <p>o. See Section 4 (a), 5(a) and 6(a) in the EMPr relating to the control of Alien Invasive Species.</p>



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p><b>6. CONCLUSION</b> The Department will provide final comments upon receipt and review of the final Basic Assessment Report with the inclusion of the above-mentioned recommendations.</p>			
<p>The draft report regarding the above-mentioned development received by the Department on 14 September 2016 has reference.</p> <p>The proposed project will include:</p> <ol style="list-style-type: none"> <li>i. The construction of two office Buildings, a store room and an overnight sleeping quarters</li> <li>ii. A 40 cubic meter slurry dam to store pig waste for use as a fertilizer</li> <li>iii. 12 Pig houses holding a total of 910 pigs</li> <li>iv. A crop production for granadilla and spinach</li> <li>v. Upgrading of existing municipal infrastructure</li> </ol> <p>Listed as Activity No 1(i), Activity 4(i)(ii) and Activity 27 of Listing Notice 1 of the Environmental Impact Assessment Regulations, 2014 and Listed in terms of Government Notice R921, Category A(1).</p> <p>The Department's comments are as follows:</p> <ol style="list-style-type: none"> <li>a. Alignment of the activity with applicable legislations and policies The proposed activity is for a vegetable and piggery production with a holding capacity of 910 pigs, which has an impact in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).</li> <li>b. Alternatives The proposal and the motivation for the exclusion of alternatives provided are noted. Locality map and layout plans or facility illustrations Locality Maps and Layout Plans must meet the requirements below: <ul style="list-style-type: none"> <li>• The scale of locality map must be at least 1:50 000. The scale must be indicated on the map.</li> <li>• The locality map and all other maps must be in colour.</li> <li>• For gentle slopes, the 1 meter contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500 millimetre contours</li> </ul> </li> </ol>	<p>Mr. T Leku</p> <p>Acting Director: Impact Management</p> <p>Gauteng Department of Agriculture and Rural Development</p>	<p>17/10/16</p>	<p>CSIR thanks the Department for their comments.</p> <ol style="list-style-type: none"> <li>a. Correct.</li> <li>b. Correct. The locality map attached as Appendix A has the following specifications: <ul style="list-style-type: none"> <li>• 1:6796 (indicated on map).</li> <li>• The map is in colour.</li> <li>• 5m contours present</li> <li>• Site location is exact</li> <li>• Roads are indicated</li> <li>• Land cover is indicated</li> <li>• Sensitivities are shown</li> </ul> </li> <li>c. Noted, thank you.</li> <li>d. Please see Appendix E for all PPP related information and the comments and responses trail.</li> <li>e. (i) Please see Page 10 of the report for a summary of where requirements of Appendix 1 of the 2014 NEMA EIA Regulations (GN R 983, as amended) are provided in this Basic Assessment Report. (ii) Please see Appendix C (iii) Please see Section D (1) in report relating to the separation</li> </ol>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

ISSUES RAISED	COMMENTATOR	DATE	RESPONSE
<p>must be indicated on the plan.</p> <ul style="list-style-type: none"> <li>• Locality map must show exact position of development site or sites.</li> <li>• Locality map must show and identify (if possible) public and access roads.</li> <li>• The current land use as well as the land use zoning of each of the properties adjoining the site or sites must be indicated.</li> <li>• The layout plan must be printed in colour and overlaid with a sensitivity map and printed on A4 size paper and 1:8000 scale.</li> </ul> <p>c. Environmental Management Programme (EMPr) The attached EMPr is noted and appears adequate to address impacts that may arise as a result of the proposed development (activities).</p> <p>d. Public participation process Comments from all relevant stakeholders that were not addressed must be adequately addressed and submitted to the Department with the Final BAR. Proof of correspondence with stakeholders must be included in the Final BAR. Should you be unable to submit comments, proof of attempts that were made to obtain comments must be submitted to the Department</p> <p>e. Any other issues noted</p> <p>i. Final BA report must be complete i.e. it must include all sections that form part and parcel of a Basic Assessment Report as specified in the Regulations.</p> <p>ii. The design of a slurry dam to store waste (in the form of effluent) from piggery must be provided in the final BAR.</p> <p>iii. The effluent must go through separation of liquids and solids in order to make use of waste as a fertilizer for vegetable production. It is recommended that a brief description of processes to be followed after the separation of the effluent before the fertilizer is sourced be provided.</p> <p>iv. No effluent (from the storage areas) may be discharged into any water surface or groundwater resource.</p> <p>v. Municipal by-laws applicable to the proposed development must be strictly adhered to.</p> <p>If you have any queries regarding the contents of this letter, contact the official at the number or email address indicated above.</p>			<p>of effluent and the processes involved.</p> <p>(iv) Noted. Mitigation measures for this have been included in the EMPr attached as Appendix H.</p> <p>(v) Noted.</p>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

### Appendix E6: Copy of the register of I&APs

Company/organization	Name	BID + letter 1 + comment form DBAR
Department of Environmental Affairs- National	Mmatlala Rabothata	email + post
Department of Environmental Affairs- National	Sibusisiwe Hlela	email + post
Department of Environmental Affairs- National	Takalani Nemarude	email + post
Department of Rural Development and Land Reform	Bonginkosi Zulu	email
Department of Agriculture, Forestry and Fisheries	Mashudu Marubini	email + post
National Department of Mineral Resources	Kgauta Mokoena	email + post
National Department of Water Affairs	Ms Ndileka K mohapi	email
National Department of Water Affairs	Namisha Muthraparsad	email
National Department Mineral Resources	Khayaletu Matrose	email
National Department of Trade and Industry	Maoto Molefane	email
Department of Agriculture, Forestry and Fisheries	Ms Thoko Buthelezi	email

Department	First Name
Department of Agriculture and Rural Development	Steven Mukhola
Department of Agriculture and Rural Development	Karabo Mohatla
Department of Agriculture and Rural Development	Phuti Matlamela
Department of Health	Albert Marumo
Department of Water and Sanitation	Ms M Musekene
	Ms T Rakgotho
Gauteng Department of Infrastructure Development	
Gauteng Department of Social Development	Shoki Tshabalala
Gauteng Department of Economic Development	Phindile Mbanjwa
Gauteng Dep of Health	Shantal Perry
Gauteng Dep of Health	Dineo Mathopa
GDARD waste management	Zingisa Smale

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng:  
FINAL BASIC ASSESSMENT REPORT

Department	First Name
City of Tshwane Metropolitan Municipality	Ms Celia M
City of Tshwane Metropolitan Municipality	Mr Leloko Puling
City of Tshwane Metropolitan Municipality- Mayor	Kgosientso Ramohgopa
City of Tshwane Metropolitan Municipality- Municipal Manager	Jason Ngobeni
City of Tshwane Metropolitan Municipality	Ms Rudzani Mukheli
City of Tshwane Metropolitan Municipality Ward Councillor	
City of Tshwane Metropolitan Municipality Ward Councillor	
City of Tshwane Metropolitan Municipality Ward Councillor	Karen Meyer

Company/organization	Name	BID + letter 1 + comment form
Landowner	Joel Molepo	email & post
Sithuthe Transport- Business advisor	Frikkie Steencamp	email
Neighbour	Wilmarine Riekert	email
Neighbour	Judy van der Walt	email
Client	George Maila	email + post
South African National Parks (SANParks)	Dr. Howard Hendriks	email+post
South African Heritage Resources Agency (SAHRA)	Marie South	post
Endangered Wildlife Trust (EWT)	Stephanie Aken	email
AgriLand	Anneliza Collett	post
Grasslands Society of South Africa	Feyni Du Toit	post
WESSA	Tumi Lehabe	email
EWT	Adam Pires	email
EWT	Dr Harriet Davies	email
The Provincial Heritage Resources Authority Gauteng	Maphata Ramphele	email
Birdlife	Simon Gear	email
Eskom- servitudes development	Lungile Motsisi	email
Community Member	Thinus Oosthuizen	

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: DRAFT BASIC ASSESSMENT REPORT

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# BASIC ASSESSMENT REPORT

## APPENDIX F:

F1: Waste License Application

F2: SAHRA information

## contents

F1: Borehole Certificate	2
F2: SAHRA information	7



# SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

02-JUN-2008(MON) 11:58 BERT SMITH -PHATUDI (FAX)012 4832390 P.002

Invoice: 3309853550  
Issued: 27/03/08

19000000006082/1644  
11000000085335

MOLEPO, JOEL  
PO BOX 1313  
BULTFONTEIN  
1855

3 Amount Due  
3309853550

5609275343088

---

**1. GENERAL INFORMATION**

Client: 3309853550  
Rasloow A/M Centurion  
2 235 LOCKNER ROAD  
1954922A  
19/02/08 5350.00

23/02/08-26/03/08  
19/02/08 5350.00

25. Amount Due  
3309853550

---

**26. CITY FINANCIAL OFFICE**

City of Tshwane  
012 358 5000  
012 358 6111  
City@tshwane.gov.za

---

**27. GENERAL INFORMATION**

Should you have any queries or require further information, please contact the City of Tshwane. If you wish to appeal or dispute any amount payable to the City, please advise your request in the due time.

Please advise of any changes to your details and ensure payments are reflected in an account statement.

You are responsible for the accuracy of any information, payments made by you.

Payment by one bank account is not accepted.

Interest is payable on any amount due.

Interest accounts will constitute a liability against the property, for which the registered owner is held liable.

---

**28. LEASAGES / LOSS OF SERVICES ON PROPERTY**

Customer responsibility for any leasages or services due to an account holder in connection with any property will appear on the account of the registered owner of the property and for the approval of the registered owner of the property.

---

**29. Current account & 34. THIS STATEMENT ACCOMPANY PAYMENT**

28. Description	29. Amount	30. Amount	31. Amount
Balance brought forward		18493.11	
25/03/08 - Incoming payment	920017	10000.00	
<b>Subtotal</b>		<b>8493.11</b>	
Site value = R500000			
Value of improvements = R1010000			
Lands Rates: Agricultural-2008/2			1440.24
(Land value x Factor / 12)			
City cleaning charge - domestic	1.00		27.91
Waste removal charge - domestic	1.00		27.91
25/03/08-PR0399-157396(1:1)	49474	1	49474.00
25/03/08-PR0399-170926(1:1)	78250	1978	154750.00
25/03/08-PR0399-172286(1:1)	81690	1959	161950.00
Energy charge - farms	3918		1709.62
25/03/08-PR264243(1:1)	5479	5	17.50
Water charge - Public St. Domestic	3484		17.50
VAT 14% on services of R1732.74			249.58
<b>Current account &amp;</b>			<b>3472.56</b>

31/03/08 31/04/08 3309853550 29. AMOUNT DUE 11965.00

MOLEPO, JOEL 27/04/08 3309853550 11965.00

Standard Bank  
First National Bank  
ABSA

CITY OF TSHWANE  
012 358 5000  
012 358 6111

29. Ref no: 3309853550

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**32. TEAR OFF SLIP - PAYMENTS BY POSTED CHECK**

ATTACH ONLY THIS TEAR-OFF SLIP TO YOUR CHECK. AN ORIGINAL RECEIPT WILL BE PRINTED ON THE BACK OF THE CHECK.

Please use the ref. no. when making bank payments.

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

02-JUN-2008(NON) 11:55

BERT SMITH -PHATUDI

(FAX)012 4832390

P. 003

### Annexure 3

Confirmation of visit to client to verify residential address or physical business address and trade name of corporate entity

#### CONFIRMATION OF VISIT TO CLIENT

I, HELEN LE ROUX (name of staff member / agent)  
CLERK (designation)  
\_\_\_\_\_ (personnel number)

hereby confirm that a visit to the premises of  
Raisibe Jehanna Makoa (name of client)


located at  
75 Lebina Farm, Rosettenburg (residential / physical business  
address), was conducted on

7 March 2008 (date of visit)


and that I am now in a position to verify that :-

- client does reside at the address indicated;
- the business in question is operated out of the address visited;
- the business in question is using the trade name that was indicated to us by the business

(please delete whichever is not applicable)

Signed: 

Dated: \_\_\_\_\_

  
Gesertifiseerde Afskrif/Certified Copy  
VICTOR JACOBUS SWANEPOEL  
Commissioner of Oaths/Kommissaris van Ede  
Practising Attorney/Praktiserende Prokureur R.S.A.  
3 LAURISTON PLACE - GLEN LAURISTON  
RD, ROXPOEBUS 1117 - PRETORIA - 0001



# SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

02-JUN-2008(WON) 11:55

BERT SMITH -PHATUDI

(FAX)012 4832390

P 004

## WATER BOREHOLE CERTIFICATE

— 000 —

## WATERBOORGATSERTIFIKAAT

Test No/ Toets Nr 7061501 Test Date/ Toetsdatum 15-6-2007

Borehole Location/ Boorgatligging 120 Marula Way Bultfontein Pretoria

Lat. 25°30,279'S Lon. 28°11,336'E Datum Cape

Casing Diameter/ Voering Deursnit 170 mm Steel/Pvc/plastic casing/ Staal/Pvc/plastiek voering Depth/ Diepte 180,6 Meter

Static Water Level/ Statiese Watervlak 36,9 m from above/ m van bo af


Water level during test/ Watervlak tydens toets Konstant Pump depth during test/ Pompdiepte tydens toets 179 m

Duration of continuous test/ Gedurende opeenvolgende toets van 4 hours/ uur

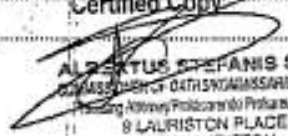
Maximum Test Pump Capacity/ Maksimum Toetspomp Kapasiteit 7 m<sup>3</sup> per hour/ per uur

Maximum constant yield/ Maksimum konstante lewering 2800 per hour/ per uur  
Two thousand eight hundred  
litres per hour


Remarks/ Opmerkinge

  
 Testing Official / Toetsbeampte  
**CHRIS BOEGMAN**

**Gesertifiseerde Afskrif**  
**Certified Copy**

  
**ALBERTUS STEFANUS SMITH**  
 ATTORNEY OF BATHSWANLANDS VAN EDE  
 Prinsing Attorney/Praktiesant/Praktikus R.S.A.  
 8 LAURISTON PLACE  
 GLEN LAURISTON  
 P.O. BOX 1117 • PRETORIA • 0001

BOEGMAN BOREHOLE TESTING  
 ☎ (012) 808-1262  
 083 653 6109  
 PLOT 54  
 KAMEELDRIFT  
 PRETORIA



# SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

02-JUN-2008(MON) 11:55

BERT SMITH -PHATUDI

(FAX)012 4832390

P. 005

## WATER BOREHOLE CERTIFICATE

—

## WATERBOORGATSERTIFIKAAT

Test No/ Toets Nr 70601C1 Test Date/ Toetsdatum 1-6-2007

Borehole location/ Boorgatligging Plot 120 Maroela Weg Bultfontein Pa

Lat 25° 30' 124" S Lon 28° 11' 215" E Datum Cape

Casing Diameter/ Voering Dousnit 170 mm Steel/Pvc/Concrete casing/ Staal/Pvc/ Beton Voering Depth/ Diepte 131,3 Meter

Static Water Level/ Statiese Watervlak 31,9 from above/ m van bo af

Water level during test/ Watervlak tydens toets 130 m Pump depth during test/ Pompdiepte tydens toets 130 m


During continuous test of/ Gedurende opeenvolgende toets van 4 hours/ uur

Maximum Test Pump Capacity/ Maksimum Toetspomp Kapasiteit 7 m<sup>3</sup> per hour/ per uur

Maximum constant yield/ Maksimum konstante lewering 1250L per hour/ per uur


Een duisend twee honderd en vyftig liter per uur.

Remarks/ Opmerkinge .....




Testing Official/ Toetsbeampte  
**CHRISTA-BOEGMAN**

**Gesertifiseerde Afskrif**  
**Certified Copy**



**ROBERT S. STEFANIS SMITH**  
COMMISSIONER OF WATER SERVICES AND ESE  
Pretoria  
5 LAURISTON PLACE  
OLEN LAURISTON  
PO BOX 1117 - PRETORIA • 0001

**BOEGMAN BOREHOLE TESTING**  
☎ (012) 808-1262  
083 653 6100  
PLOT 54  
KAMEELDRIFT  
PRETORIA



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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### F2: SAHRA information

Motivation Letter for exemption from further studies submitted to SAHRA on 26<sup>th</sup> July 2016



#### CSIR Specialist Services

PO Box 320  
Stellenbosch  
7599  
South Africa  
Tel: +27 21 888 2432  
Fax: +27 21 888 2693  
Email: kstroebel@csir.co.za

South African Heritage Resources Agency  
PO Box 4637  
Cape Town  
8001

26 July 2016

Dear Mr. Andrew Salomon,

#### RE: BASIC ASSESSMENT FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN 107-JR, ROOIWAL, GAUTENG

#### (SAHRIS CASE ID: 9493)

The National Department of Environmental Affairs (DEA) and the Council for Scientific and Industrial Research (CSIR) have initiated the Special Needs and Skills Development Programme, whereby small-medium micro-enterprises and community trusts who are lacking financial means are provided with *pro-bono* environmental services to decrease the burden of the cost associated with starting a business. Pacific Ora Projects (Pty) Ltd has been identified as an eligible client for this service and is proposing to develop a small-scale pig and vegetable production on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province.

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

Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tswane Metropolitan Municipality, and is approximately 35 km north of Pretoria (Figure 1). The proposed project will include the following components:

- Office building and employee facilities
- 40 cubic metre slurry dam to store pig waste for use as fertilizer
- Approximately 5 hectares of granadilla and spinach crop
- Pig houses with a total of 910 pigs
- Already existing municipal infrastructure (roads and electricity connection).

An application was submitted to SAHRIS regarding the above mentioned project on 10<sup>th</sup> May 2016 via the SAHRIS online portal, and a response from SAHRA was given on 30<sup>th</sup> May 2016. The letter response highlighted the following:

*"If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority motivating for exemption from having to undertake further heritage assessments."*

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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In response to this, CSIR contracted Cedar Tower CC to complete a "Heritage Screener" which involved a desktop analysis of the site as well as a site inspection for the identification of any possible heritage resources on site. This site inspection was done on 22 July 2016. Kindly see the attached Heritage Screener for the results of the study. In summary, the specialist concluded the following:

- (1) The heritage resources in the area proposed for development are sufficiently recorded. The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.**

Thus, in line with the results of the Screening Study, CSIR would like to motivate for the exemption of undertaking any further heritage assessments.

I trust that you find this submission in order.

Yours sincerely,



**Ms. Kelly Stroebel (Project Manager)**

Postal address: PO Box 320, Stellenbosch, 7599, South Africa

Tel: 021 888 2432

Fax: 021 888 2693

E-mail: [kstroebel@csir.co.za](mailto:kstroebel@csir.co.za)

Website: <http://www.csir.co.za/ems/specialneeds/>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

### Final Comment from SAHRA on the proposed project (28 July 2016)

**Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng**

Our Ref: 9493



an agency of the  
Department of Arts and Culture

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CaseID: 9493

Date: Thursday July 28, 2016  
Page No: 1

### **Final Comment**

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

**Attention:** Pacific Ora (Pty) Ltd

Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tswane Metropolitan Municipality, and is approximately 35 km north of Pretoria (Figure 1). The proposed project will include the following components: • Office building and employee facilities • 40 cubic metre slurry dam to store pig waste for use as fertilizer • Approximately 5 hectares of granadilla and spinach crop • Pig houses with a total of 910 pigs • 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 Pacific Ora project will seek to boost local economic development in the area and provide opportunities to decrease poverty and unemployment. Pacific Ora Projects (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 obtaining Environmental Authorization in order to enhance local economic development.

**Heritage screener: Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107JR, Rooiwal, Gauteng**

The proposed development entails a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. The project will include an office building and employee facilities, 40 cubic metre slurry dam to store pig waste for use as fertilizer, approximately 5 hectares of granadilla and spinach crop, pig houses with a total of 910 pigs and already existing municipal infrastructure.

The heritage screener revealed two ruins, which a site inspection revealed to be no heritage significance. The study area yielded no known sites which require mitigation or management plans.

The SAHRA palaeosensitivity map indicates that the area to be impacted by the proposed development is underlain by stratigraphy that has insignificant sensitivity for potential impacts to palaeontological resources as

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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**Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng**

**Our Ref: 9493**



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the entire area is underlain by rocks of the Rashedoop Granophyre Suite.

### Final Comment

Considering the evidence provided, the SAHRA Archaeology, Palaeontology and Meteorites Unit grants exemption to this project from having to undertake further heritage assessments, on condition that:

- If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments and charcoal/ash concentrations), fossils or other categories of heritage resources are found during the proposed activities, SAHRA must be alerted immediately, and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.

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

Yours faithfully

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Andrew Salomon  
Heritage Officer: Archaeology  
South African Heritage Resources Agency

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John Gribble  
Manager: Maritime and Underwater Cultural Heritage Unit / Acting Manager: Archaeology, Palaeontology and Meteorites Unit  
South African Heritage Resources Agency

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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### Heritage Screening Study completed by Cedar Tower (July, 2016)



### HERITAGE SCREENER

CTS Reference Number:	CTS16_036	
Client:	CSIR	
Date:	18 July 2016	
Title:	Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng	
Recommendation by CTS Heritage Specialists: (Type 1 )	<ul style="list-style-type: none"> <li>- <b>(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.</b></li> </ul>	

Figure 1a. Satellite image with proposed development area indicated in Gauteng province.

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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### 1. Proposed Development Summary

Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tshwane Metropolitan Municipality, and is approximately 35 km north of Pretoria. The proposed project will include the following components:

- Office building and employee facilities
- 40 cubic metre slurry dam to store pig waste for use as fertilizer
- Approximately 5 hectares of granadilla and spinach crop
- Pig houses with a total of 910 pigs
- Already existing municipal infrastructure (roads and electricity connection)

### 2. Application References

Name of relevant heritage authority(s)	South African Heritage Resources Agency
Name of decision making authority(s)	Department of Environmental Affairs and Development Planning (DEA&DP)

### 3. Property Information

Erf number / Farm number	Farm Bultfontein 107-JR
Local Municipality	City of Tshwane
Previous Magisterial District	Wonderboom
Province	Gauteng Province
Current Use	Vacant
Current Zoning	Agricultural
Total Extent	8.741ha



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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### 4. Nature of the Proposed Development

Surface area to be affected/destroyed	8.741 ha
Depth of excavation (m)	< 0.5m
Height of development (m)	+3m
Expected years of operation before decommission	NA

### 5. Category of Development

Triggers: Section 38(8) of the National Heritage Resources Act	X
Triggers: Section 38(1) of the National Heritage Resources Act	
1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.	
2. Construction of a bridge or similar structure exceeding 50m in length.	
3. Any development or activity that will change the character of a site-	
a) exceeding 5 000m <sup>2</sup> in extent	X
b) involving three or more existing erven or subdivisions thereof	
c) involving three or more erven or divisions thereof which have been consolidated within the past five years	
4. Rezoning of a site exceeding 10 000m <sup>2</sup>	
5. Other (state):	

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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### 7. Mapping

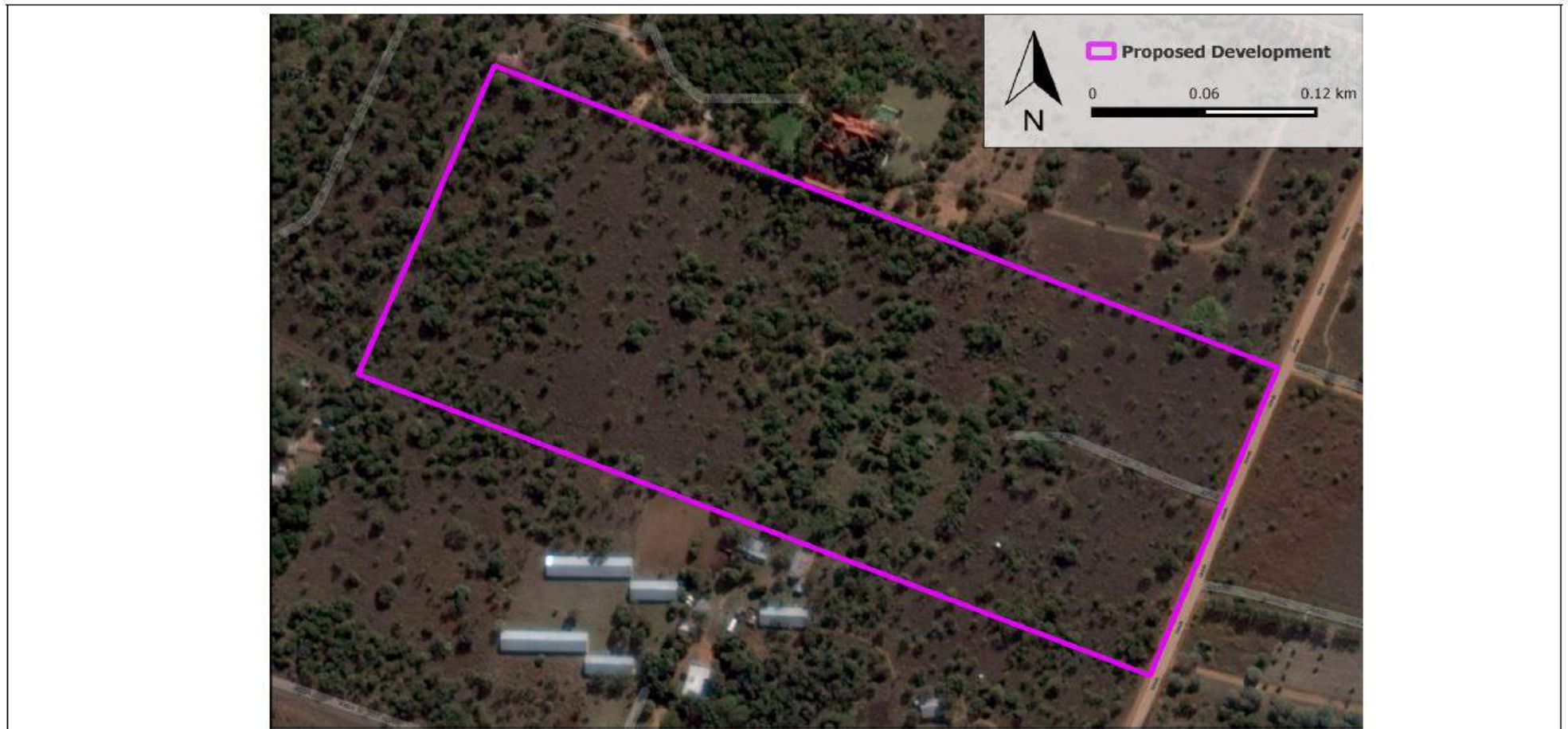


Figure 1b. Overview Map. Satellite image with proposed development area indicated.

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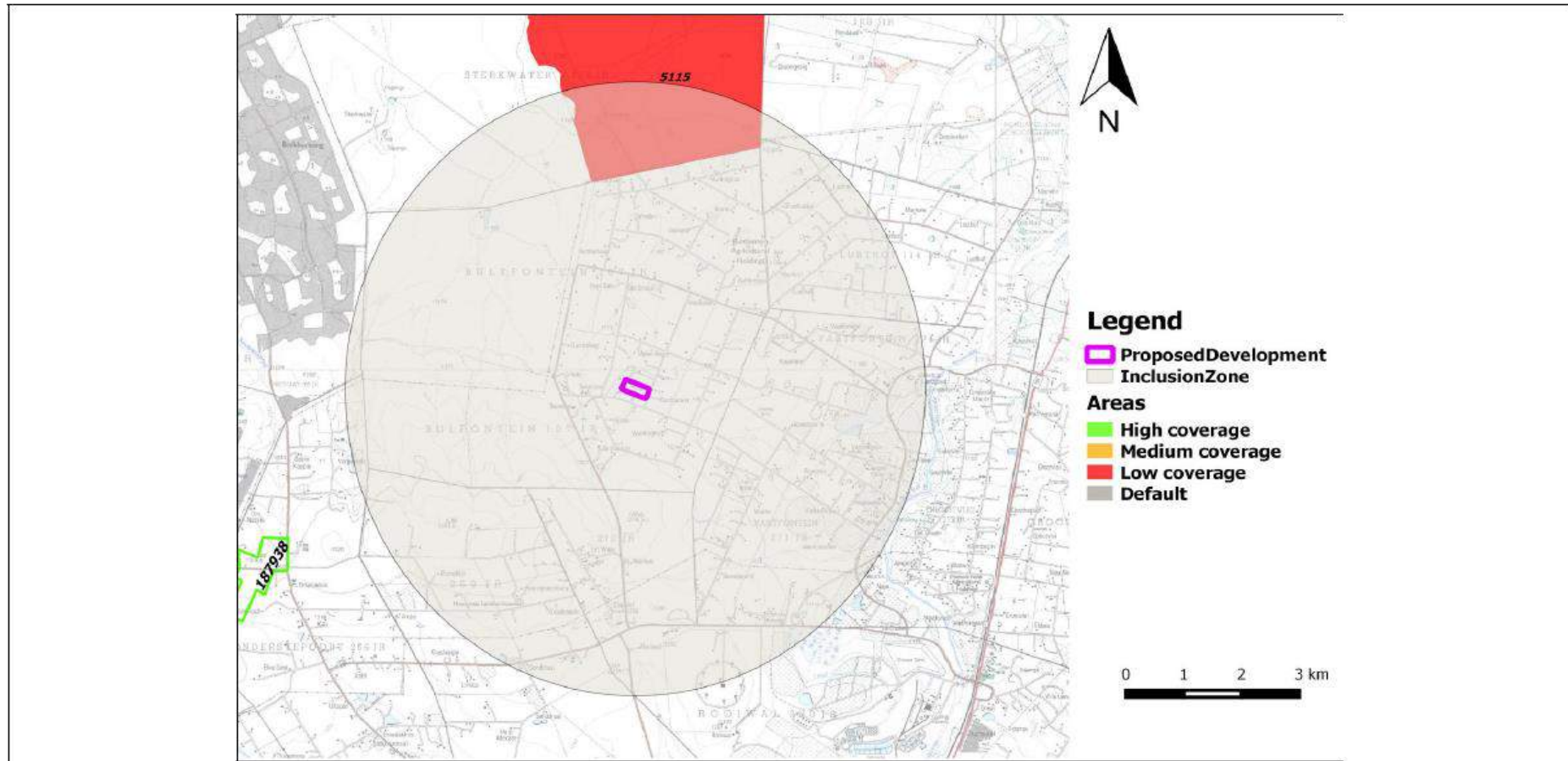


Figure 2. Previous surveys map. Previous research surveys done in and near the proposed development area with reference IDs indicated (please see Appendix 2 for full reference list).

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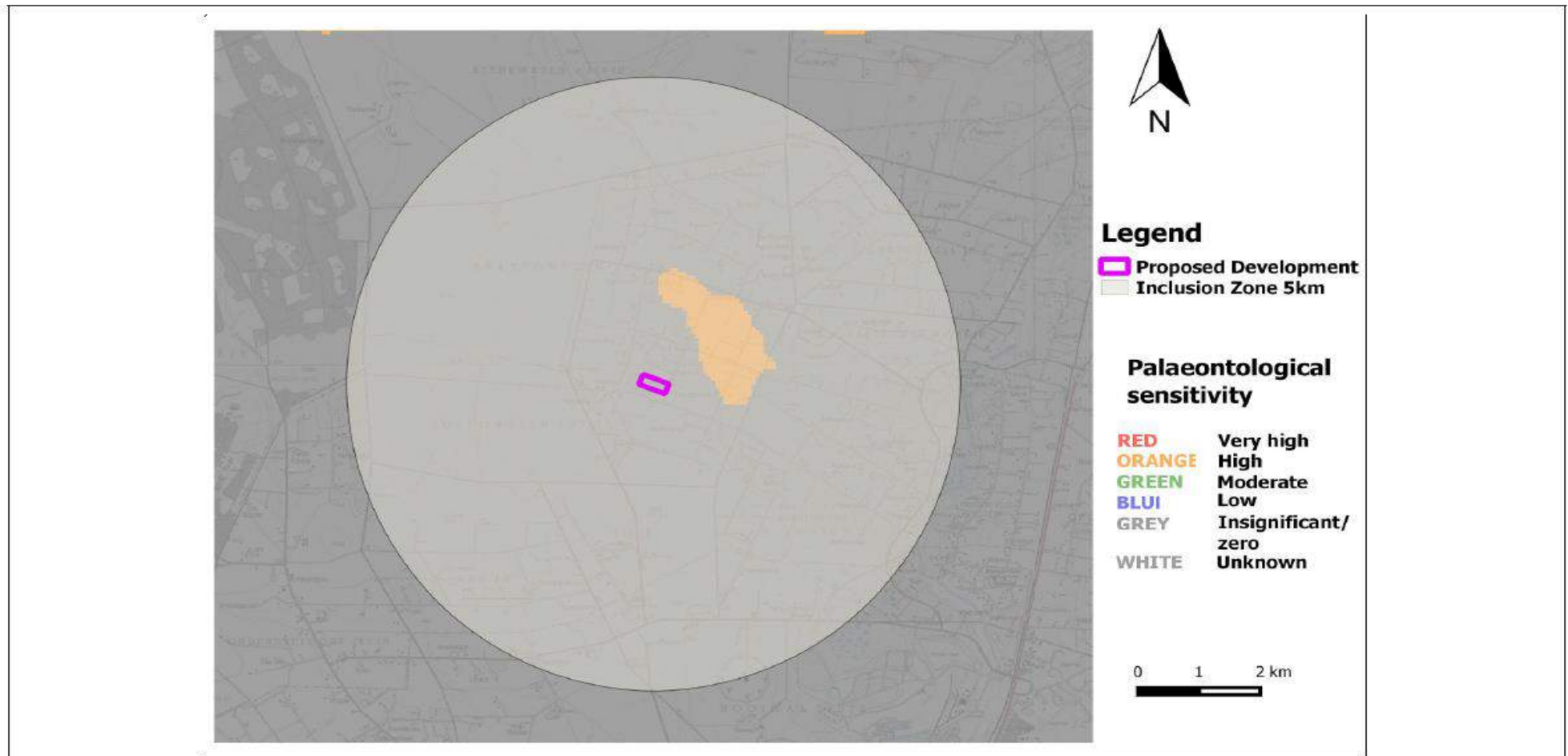


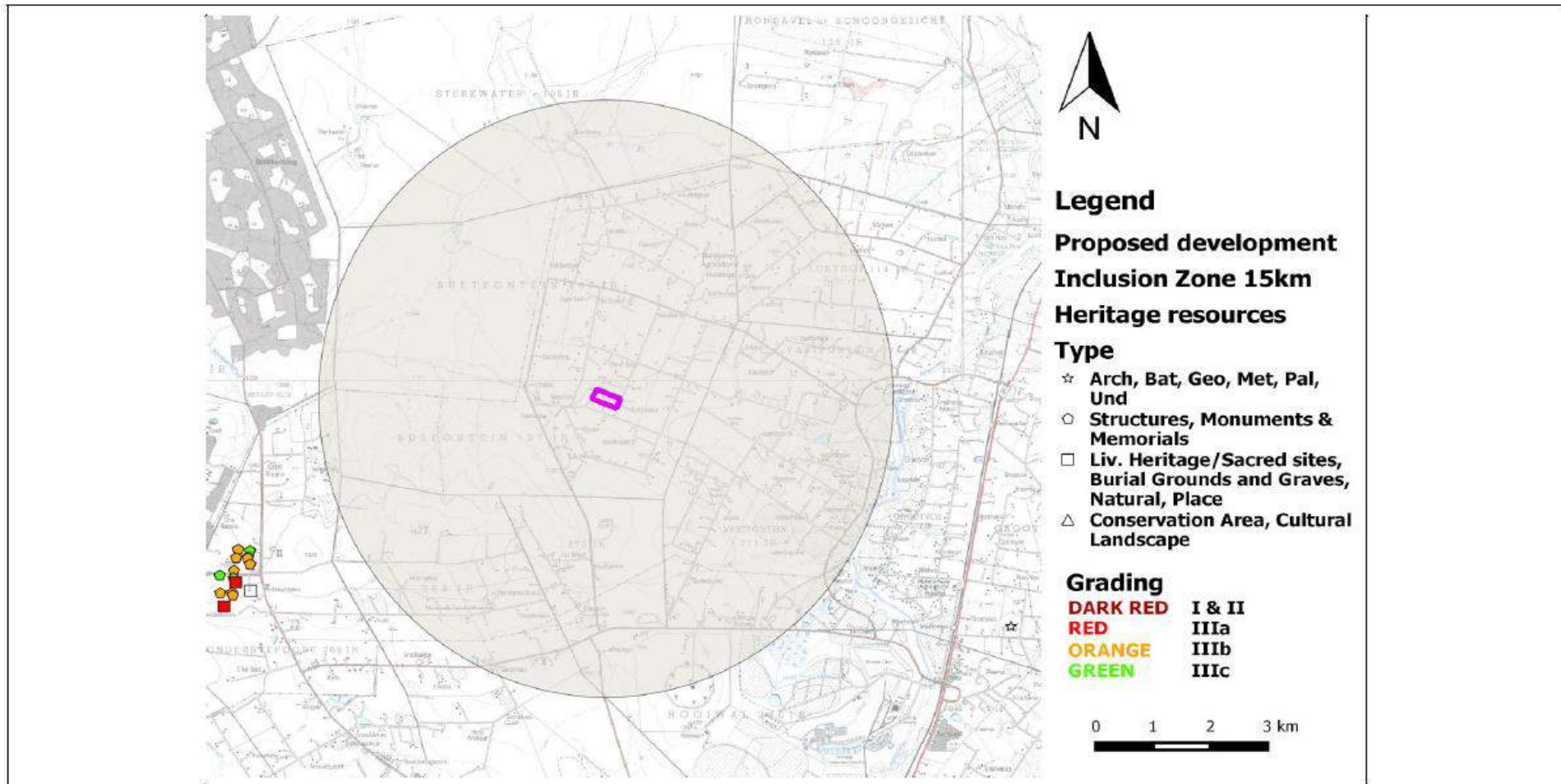
Figure 3. Palaeo Map. Palaeosensitivity of the study area. See Appendix 3 for full guide to the legend.

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**Figure 4a. Heritage Resources Map.** Heritage resources previously identified in and near the study area. No known heritage resources occur within the Inclusion Zone.

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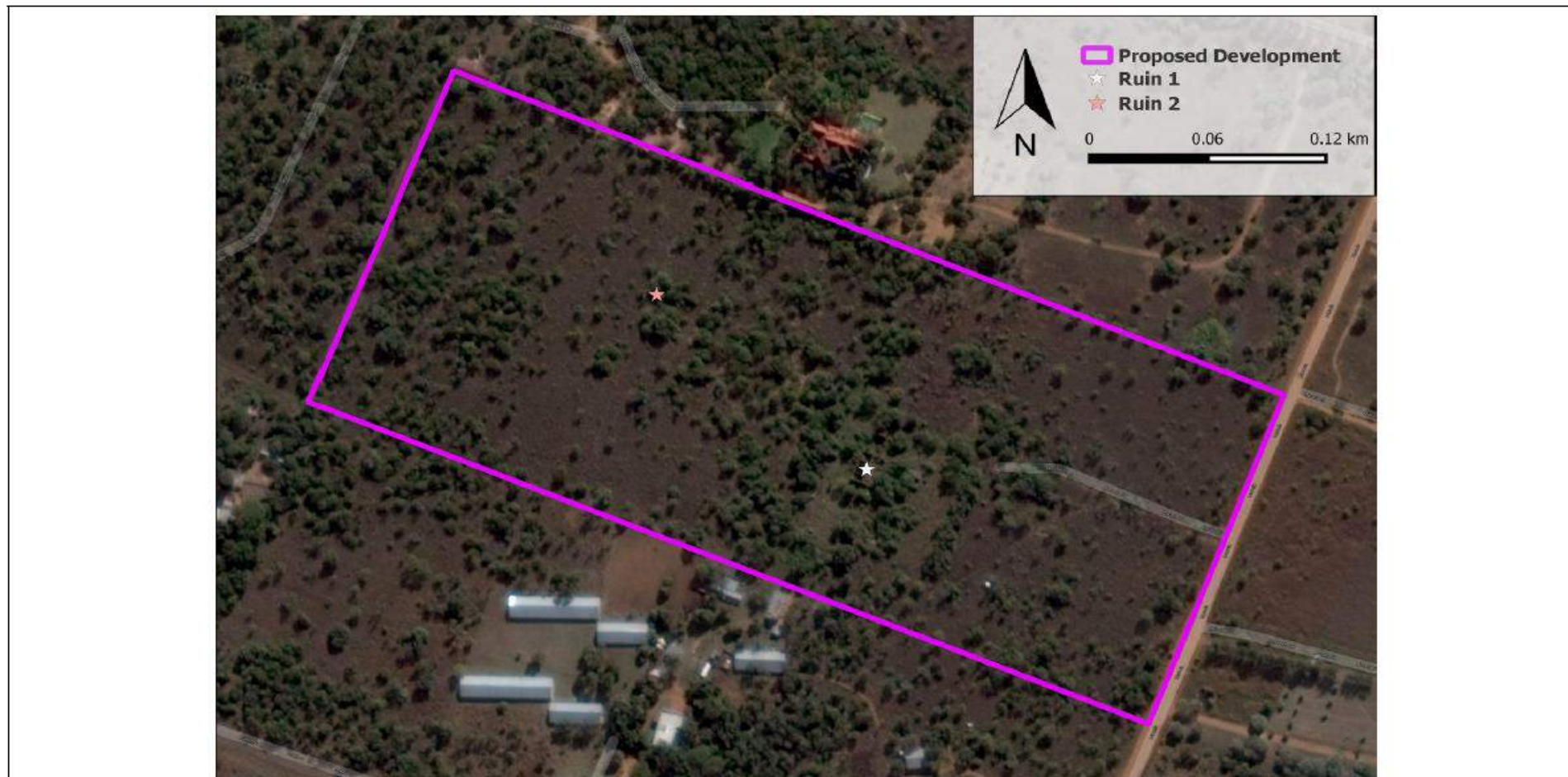


Figure 4b. Heritage Resources Map. Possible heritage resources identified on site through GoogleEarth (Ruin 1 and Ruin 2).

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Figure 4c. 2004 Google Earth aerial image of proposed development area indicating structures that are now ruins

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Figure 4d. 2006 Google Earth aerial image of proposed development area indicating structures that are now ruins



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Figure 4e: 2011 Google Earth aerial image of proposed development area indicating structures that are now ruins

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### 8. Heritage statement and character of the area

Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tshwane Metropolitan Municipality, and is approximately 35 km north of Pretoria (Figure 1). The proposed project will include the following components:

Office building and employee facilities

40 cubic metre slurry dam to store pig waste for use as fertilizer

Approximately 5 hectares of granadilla and spinach crop

Pig houses with a total of 910 pigs

Already existing municipal infrastructure (roads and electricity connection)

The SAHRA palaeosensitivity map indicates that the area to be impacted by the proposed development is underlain by stratigraphy that has insignificant sensitivity for potential impacts to palaeontological resources as the entire area is underlain by rocks of the Rashoop Granophyre Suite.

There were no heritage resources recorded within the inclusion zone for this proposed development. Two ruins were noted within the development footprint on Google Earth (Maps 4b, c, d and e). On Friday 22 July, Prof. A. von Vollenhoven conducted a site inspection to determine the significance of these ruins.

During the inspection, it was noted that Ruin 1 consists of the remains of a house which forms part of a farm yard. It is not very traditional and also includes many additional structures, some of which are temporary (eg asbestos buildings). The bricks used to build these structures indicate that the building was built between 1960 and 1980 and these ruins have been deemed to have no heritage significance.

Ruin 2 is the ruin of a small building, most likely a shed, in which a power generator was placed. The bricks here likely date to approximately the same age as Ruin 1, perhaps even younger. Please see Appendix 1 for photographs taken on site. No other archaeological or other heritage resources were identified on the property proposed for development.

The proposed development is located within a highly transformed area and it is therefore unlikely that significant heritage resources will be directly impacted by the proposed development. It is therefore our recommendation that **no further heritage studies are required in terms of section 38 of the National Heritage Resources Act (Act 25 of 1999).**

**(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.**

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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Picture 1: Ruin 1

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Picture 2: Ruin 1

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**Picture 3: Ruin 2**

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Picture 4: Ruin 2

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### APPENDIX 2 - Reference List

#### Previous heritage research surveys within the 5 km inclusion zone

SAHRIS ID	Report Type	Author	Date	Title	Company
187938	HIA	Polke Birkholtz	12/07/2012	Heritage Impact Assessment - Proposed Development of Portions 68, 69, 112, 113, 114, 115 and 116 of the farm Onderstepoort 266-JR, Tshwane Metropolitan Municipality, Gauteng Province	PGS Heritage and Grave Relocation Consultants
5115	HIA	Udo Kusel	17/09/2007	Cultural Heritage Resources Impact Assessment of the Farm Sterkwater 106 JR, Bultfontein Area, Tshwane, Gauteng;	African Heritage Consultants CC

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### APPENDIX 3 - Keys/Guides

#### Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEA	Department of Environmental Affairs
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

#### Full guide to Palaeosensitivity Map legend

	<b>RED:</b>	VERY HIGH - field assessment and protocol for finds is required
	<b>ORANGE/YELLOW:</b>	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	<b>GREEN:</b>	MODERATE - desktop study is required
	<b>BLUE/PURPLE:</b>	LOW - no palaeontological studies are required however a protocol for chance finds is required
	<b>GREY:</b>	INSIGNIFICANT/ZERO - no palaeontological studies are required
	<b>WHITE/CLEAR:</b>	UNKNOWN - these areas will require a minimum of a desktop study.



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
BASIC ASSESSMENT REPORT

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- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area
- undertaking mitigation measures requested in previous assessments/records of decision.

**(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.**

**Note:**

The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

The compilation of the Heritage Screener will not include any field assessment. The Heritage Screener will be submitted to the applicant within 24 hours from receipt of full payment. **If the 24-hour deadline is not met by CTS, the applicant will be refunded in full.**

**FINAL BA REPORT:**  
Basic Assessment for the  
proposed Pacific Ora Projects  
(Pty) Ltd Pig and Vegetable  
Production facility on farm  
Bultfontein 107-JR, Gauteng

**Appendix G:**  
**SPECIALIST REPORT**

ECOLOGICAL OPINION/SCAN FOR A  
PROPOSED PIG AND VEGETABLE  
PRODUCTION FACILITY , BULTFONTEIN  
107-JR, ROOIWAL, GAUTENG  
(PACIFIC ORA PROJECTS (PTY) LTD)  
Natural Scientific Services CC 2016



# ECOLOGICAL OPINION/SCAN

FOR THE PROPOSED PACIFIC ORA PROJECTS (PTY) LTD PIG AND VEGETABLE PRODUCTION FACILITY ON FARM BULTFONTEIN 107 - JR, ROOIWAL, GAUTENG



Compiled By:

Natural Scientific Services



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Fax: (011) 784-7599

NSS Ref No: 2260  
Date: May 2016

Compiled For:

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



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7600  
Tel: (021) 888 2432  
Fax: (021) 888 2473

All pictures taken on site

**ECOLOGICAL OPINION/SCAN FOR A PROPOSED PIG AND VEGETABLE  
PRODUCTION FACILITY , BULTFONTEIN 107-JR, ROOIWAL, GAUTENG  
(PACIFIC ORA PROJECTS (PTY) LTD)**

Compiled For:



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Ref No: 2260  
Date: May 2016



## EXECUTIVE SUMMARY

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Pacific Ora Projects (Pty) Ltd is proposing a small-scale Pig and Vegetable Production facility within an agricultural holding, on the farm Bultfontein 107-JR, Rooiwal. The proposed project is said to include: Office building and employee facilities; 40 m<sup>3</sup> slurry dam to store pig waste for use as fertilizer; approximately 5 hectares of granadilla and spinach crop; pig houses (+/-910 pigs) and already existing municipal infrastructure (roads and electricity connection). The Council for Scientific and Industrial Research (CSIR) is therefore undertaking the necessary environmental authorisations for the development with Natural Scientific Services (NSS) as the ecologists on the team performing an Ecological Scan of the site. The scan involved desktop research and fieldwork, which was performed during a site visit on 25 April 2016. Certain limitations were attached to this study and are highlighted in the relevant sections.

The site is positioned on the eastern fringe of an open woodland habitat that is associated with the Tshwane River system (approximately 0.6 km to the west). Over a period of approximately 10 years limited change has occurred on or surrounding the site, and therefore the site has remained underutilised with limited management. The study area is situated in the Savanna Biome, and more specifically the *SVcb 12 Central Sandy Bushveld* which is known to occur in low undulating areas, sometimes between mountains and sandy plains. From the field investigations the study area was relatively flat with a homogenous wooded community vegetation structure. The majority of the site was in a natural to near natural state and only slight variations in vegetation structure could be seen.

Vegetation communities identified within three broad groups; Natural Woodland habitat pockets; Transformed (Habitat in Recovery) and Transformed areas. Natural Woodland habitat consisted of *Acacia caffra* – *Combretum apiculatum* - *Heteropogon contortus* Open Woodland; *Combretum zeyheri* Mixed Bushclumps and *Combretum apiculatum* – *Themeda triandra* Open Woodland. Recovery areas consisted of *Acacia-Heteropogon* Past Fields and Mixed Bushclumps (including *Lantana camara*). In terms of floral CI species, a large number have been recorded in the greater region. However, a number of these species distributions are restricted to specific habitats. From the 35 species listed, habitat potentially exists for approximately 13 species, 7 species are unlikely to occur and there is no habitat available for 14 species. The Declining *Boophone disticha* and the Declining *Hypoxis hemerocallidea* were, however, identified on Site.

An extraordinary wealth of faunal diversity has been documented during atlassing projects in the QDS 2528CA (and pentad 2530\_2810) covering the Pacific Ora study site. This is likely the joint product of both the topographic heterogeneity (several main river systems and dams, the Magaliesberg and surrounding koppies) and the disproportionately high sampling effort associated with the QDS (given that it includes parts of the Pretoria CBD).

However, the small size of the site, lack of rocky outcrops, deep sandy soils or any wetlands and open waterbodies of any significance precludes the presence of a large proportion of these

regionally occurring species. As such only a limited number of Conservation Important Species (CIS) are expected to occur on site and even fewer (if any) are likely to be resident or entirely dependent on it. In total four mammal, 32 bird, two reptile and 13 butterfly species were detected on site during the ecoscan. These were mostly widespread and common species. Only one CI mammal species was detected on site namely Short-snouted Elephant-shrew (DD), However, several other species could occur such as Rusty Pipistrelle and Southern African Hedgehog. No CI bird, reptile or amphibian species or signs thereof were detected on site. Though, Giant Bullfrog is deemed likely to occur within the area the site is in. Three Rare / Low Density butterfly species are recorded for the region with Potchefstroom blue being the most likely to occur on site. It is unlikely that the project will adversely affect this species as large tracts of suitable habitat occur to the west of Koraalboom Road. A wealth of odonata species occur in the region but most are likely to be concentrated around dams pans, wetlands and riparian areas associated with significant watercourses. Eighteen odonata species were identified as potentially occurring on site, none of which are of conservation importance nor do any represent a high Dragonfly Biotic Index rating. There are four baboon spider species listed for Gauteng. Despite extensive searching, no baboon spiders or their burrows were detected on site although they are very likely to be present.

The site significance assessment, which includes a significance map for terrestrial biodiversity on the site, was based on the findings from the ecological scan, as well as relevant international, national and provincial planning and other biodiversity conservation initiatives. The *Combretum zeyheri Mixed Bushclumps*, *Combretum apiculatum –Themeda triandra* Open Woodland and the *Acacia-Heterpogon Past Fields* were rated with Medium Significance and the *Acacia caffra – Combretum apiculatum -Heterpogon contortus* Open Woodland was rated as Medium-High.

Potential impacts from the development on the biodiversity and ecology of the site and surrounds were identified and are highlighted in the Summary Table below. With Mitigation measures implemented, the significance of most impacts on site from an ecological perspective are reduced to a **Low Significance** as highlighted in **Table A** below. Based on the information available to date, with the brief field scan of the site, it is NSS's opinion that there are no fatal flaws to the project and that provided the mitigation set out is adhered to and that the developer shows commitment to the sustainable development, NSS have no objections to the project going forward.

**Table A Summary of Impacts and Significance with Mitigation**

POTENTIAL IMPACTS	SIGNIFICANCE	SIGNIFICANCE
	RATING	RATING
CONSTRUCTION	With	Without
<i>Direct loss of terrestrial vegetation and faunal habitat</i>	High	Medium
<i>Loss of CI or medicinal flora</i>	Medium	Low
<i>Introduction &amp; proliferation of alien spp.</i>	High	Low
<i>Faunal Mortality and Displacement (including CI species)</i>	Medium	Low

POTENTIAL IMPACTS	SIGNIFICANCE	SIGNIFICANCE
	RATING	RATING
<i>Increase in dust and erosion degrading habitat integrity</i>	Medium	Low
<i>Sensory disturbances</i>	Medium	Low
<b>OPERATION</b>		
<i>Environmental contamination</i>	Medium	Low
<i>Poor / Inappropriate control of invertebrate pests</i>	High	Low
<i>Poor / Inappropriate control of vertebrate pests</i>	Medium	Low
<i>Transmission of diseases</i>	Medium	Low
<i>Reduction in CI Species - Harvesting of CI or medicinal flora</i>	Low	Low
<i>Increased burning - degrading habitat integrity/ Destruction of Species</i>	High	Medium
<i>Introduction &amp; proliferation of alien spp. - Competition and change in structure</i>	High	Low
<i>Sensory disturbances</i>	Medium	Low
<b>DECOMMISSIONING</b>		
<i>Introduction &amp; proliferation of alien spp. - Competition and change in structure</i>	High	Low
<i>Sensory disturbances</i>	Low	Low

## DECLARATION

### SPECIALIST DECLARATION

I, Susan Abell, 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.

Signature of the specialist: 

Name of Specialist: Susan Abell

Date: 25 May 2016.



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## LIST OF ACRONYMS

ACRONYM	DESCRIPTION
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Areas
CI	Conservation Important
CIS	Conservation Important Species
CR	Critically Endangered – a Red Data classification used by the IUCN for describing species in serious danger of facing extinction
CR PE	Critically Endangered, Possibly Extinct
CSIR	The Council for Scientific and Industrial Research
DD	Data Deficient – a Red Data classification used by the IUCN for describing species for which there is inadequate data available to assess their danger of facing extinction
DDD	Data Deficient - Insufficient Information
DDT	Data Deficient - Taxonomically Problematic
DEA	Department of Environmental Affairs
Dec	Declining
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 DWA)
ECA	Environmental Conservation Act (Act 73 of 1989)
EI	Ecological Importance
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EMPR	Environmental Management Programme Report
EN	Endangered – Red Data for a species in danger of facing extinction
ES	Ecological Sensitivity
ESA	Ecological Support Area
EW	Extinct in the Wild
EX	Extinct
FEPA	Freshwater Ecosystem Priority Areas
GDACE	Gauteng Department of Agriculture, Conservation and Environment (GDACE)
GDARD	Gauteng Department of Agriculture and Rural Development (formally GDACE)
GG	Government Gazette
GN	Government Notice
I	Increasing
IA	Impact Assessment
IBA	Important Bird Areas
IUCN	International Union for the Conservation of Nature, based in Gland, Switzerland
LC	Least Concern – Red Data for species not in danger of facing extinction
LoO	Likelihood of Occurrence
MAP	Mean Annual Precipitation
NE	Not Evaluated

ACRONYM	DESCRIPTION
NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
NEMA	National Environmental Management Act (Act 107 of 1998)
NEPAD	New Partnership for Africa's Development
NFA	National Forest Act (Act 48 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (Act 25 of 1999)
NMPRD	National Mineral and Petroleum Resources Development Act (Act 28 of 2002)
NR	Not Recognised by Birdlife International
NRF	National Research Foundation
NSBA	National Spatial Biodiversity Assessment
NSS	Natural Scientific Services CC
NT	Near Threatened – a Red Data classification used by the IUCN for describing species not yet in danger of facing extinction, but close to such a state
NVFFA	National Veld and Forest Fire Act (Act 101 of 1998)
NVFFA	National Veld and Forest Fire Act (Act 101 of 1998)
NWA	National Water Act (Act 36 of 1998)
PES	Present Ecological State
POSA	Plants of South Africa
PRE	PRECIS database system (National Herbarium Pretoria)
PrSciNat	Registration as a Professional Natural Scientist
PS	Protected Species
QDGS	Quarter Degree Grid Square – the basic unit used by the Surveyor General for creation of 1:50 000 topographical maps
QDSs	Quarter degree squares
R	Rare
RHP	River Health Programme
S	Stable
SABAP	Southern African Bird Atlas Project
SAIAB	South African Institute for Aquatic Biodiversity
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SASS5	South African Scoring System version
SMP	Strategic Management Plans
ToR	Terms of Reference
TSP	Threatened Species Programme – a programme managed by SANBI to assess the Red Data status of South African plants
U	Unknown
UJ	University of Johannesburg
VU	Vulnerable – a Red Data classification used by the IUCN for describing species in danger of facing extinction
WITS	University of the Witwatersrand
WRC	Water Research Commission
WSA	Water Service Act (Act 108 of 1997)
WWF	Worldwide Fund for Nature

# 1. Introduction

South African legislation has affirmed the country's commitment to conservation. Section 24 of the Bill of Rights in 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 –*
  - *Prevent pollution and ecological degradation;*
  - *Promote conservation; and*
  - *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"*.

Whilst the National Environmental Management Act, 1998 (Act 107 of 1998) speaks of "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 objective of the more recently gazetted National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) is to provide for, amongst others the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; and the sustainable use of indigenous biological resources.

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.

In line with the country's legislation, the Council for Scientific and Industrial Research (CSIR) is undertaking the necessary environmental authorisations for the development of the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility. The facility will be approximately 9 hectares in extent on the farm Bultfontein 107-JR, Rooiwal located east of Shoshanguve (**Figure 1-1**). The CSIR is undertaking the work *pro-bono* as part of the "Special Needs Skills and Development Programme". NSS have reduced their costs in order to facilitate in the *pro-bono* project.

# LOCALITY

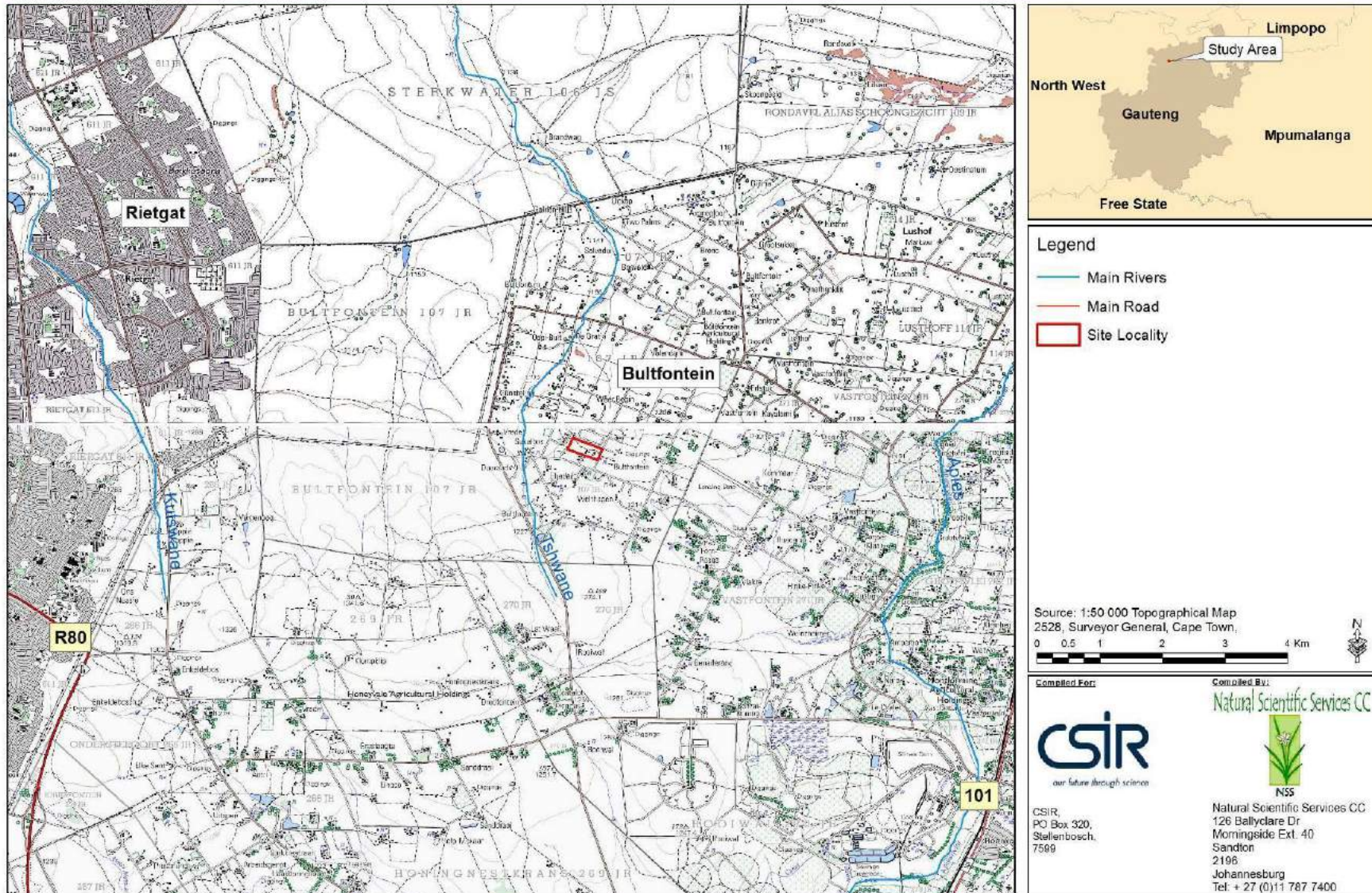


Figure 1-1 Locality Map of the area

## 2. Terms of Reference

As agreed between the CSIR and NSS, our assessment was performed according to the methodology described in **Section 6**, and this report includes:

- A broad description of the biophysical attributes of the study area (relevant to an eco assessment);
- A list of any applicable legislation, guidelines, standards and criteria to be considered in project planning (e.g. whether permits required for removal of certain species);
- Broad determination of the conservation importance (in terms of national and provincial priorities) of the sampled area;
- The different vegetation types found, including overview on structure, dominant plant composition and condition;
- Species of Conservation Concern, if any, (Red Data / endemics / medicinal value) that could potentially occur in the site and surrounds
- An assessment of the potential impacts and a list of mitigation measures that will be required to reduce these impacts.
- Identification of any potential future work that may be required on site through the assessment and motivation as to why.

## 3. Project Team

The ecological scan was conducted and managed by NSS. The NSS team have extensive experience in project management and fieldwork for numerous ecological and biodiversity studies as well as aquatic and wetland assessments. The team have also been involved in the management of Environmental Impact Assessments (EIAs), Environmental Management Programme Reports (EMPRs), Strategic Management Plans (SMPs) and Environmental Management Plans (EMPs) for the Conservation, Mining, Waste, Commercial and Industrial sectors. In terms of accreditation and professional registrations the following is applicable to NSS:

- The senior team members are registered Professional Natural Scientists in the ecological, environmental, aquatic and zoological fields.
- The aquatics team are accredited with Department of Water and Sanitation (DWS) to perform the SASS5 (South African Scoring System version 5) for aquatic macro-invertebrate monitoring.
- The Wetland Specialists is acknowledged by the DWS as a Competent Wetland Delineator.

The details of the project team are included in **Table 3-1**

**Table 3-1 Project team with associated areas of specialisation**



ASPECT INVESTIGATED	SPECIALIST	QUALIFICATIONS
Vegetation & Project Management	Susan Abell	M.Sc. Resource Conservation Biology (WITS). <i>PrSciNat</i> Registered (400116/05) – Ecology & Environmental Science.
Fauna	Tyron Clark	B.Sc. Honours - Zoology (WITS).
GIS mapping	Tim Blignaut	B.Sc. Honours - Geography (UJ).

## 4. Applicable Legislation

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.

### International Agreements

- (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.
- The 7<sup>th</sup> United Nations Millennium Development Goal

### Regional Agreements

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

### National Legislation

- Conservation of Agricultural Resources Act (CARA, Act 43 of 1983).
- Environmental Conservation Act (ECA, Act 73 of 1989).
- Constitution of the Republic of South Africa (Act 108 of 1996).
- Water Services Act (WSA, Act 108 of 1997).
- National Water Act (NWA, Act 36 of 1998).
- National Forests Act (NFA, Act 84 of 1998) and Protected Tree Species.
- National Veld and Forest Fire Act (NVFFA, Act 101 of 1998).
- National Environmental Management Act (NEMA; Act 107 of 1998).
- National Heritage Resources Act (NHRA, Act 25 of 1999).
- National Mineral and Petroleum Resources Development Act (NMPRD, Act 28 of 2002).
- National Environmental Management: Protected Areas Act (NEM:PA, Act 57 of 2003).
- National Environmental Management: Biodiversity Act (NEM:BA; Act 10 of 2004):
  - Threatened, Protected, Alien and Invasive Species Regulations (2007).

- Alien and Invasive Species Regulations (Government Gazette [GG] 37885, 1 August 2014).
- National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of NEM: BA (GG 34809, Government Notice [GN] 1002, 9 December 2011).
- National Environmental Management: Air Quality Act (Act 39 of 2004).

### National Policies, Guidelines & Programmes

- National Spatial Biodiversity Assessment (NSBA) (Driver *et al.* 2004) including Priority Areas and Threatened Ecosystems.
- National Biodiversity Strategy and Action Plan (DEA, 2005).
- National Aquatic Ecosystem Health Monitoring Program including the River Health Programme (initiated by the DWAF, now the DWA).
- National Freshwater Ecosystem Priority Areas project (Driver *et al.* 2011).
- Mining and Biodiversity Guideline (DEA *et al.* 2013).
- National Water Resource Strategy (DWAF 2013).

### 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 Nature Conservation Bill (2014) – to repeal the Gauteng Nature Conservation Ordinance (Ordinance 12 of 1983).
- Gauteng Conservation Plan (C-Plan). Version 3.3 (GDARD 2014).
- Gauteng Protected Areas Expansion Strategy (GDARD 2011).
- GDARD Requirements for Biodiversity Assessments. Version 3 (GDARD 2014).

## 5. Study Site Description

### 5.1. Locality & Land use

Pacific Ora Projects (Pty) Ltd is proposing a small-scale Pig and Vegetable Production facility within an agricultural holding, on the farm Bultfontein 107-JR, Rooiwal (**Figure 1-1**). The proposed project will include the following components:

- Office building and employee facilities
- 40 cubic metre slurry dam to store pig waste for use as fertilizer
- Approximately 5 hectares of granadilla and spinach crop
- Pig houses with a total of 910 pigs
- Already existing municipal infrastructure (roads and electricity connection).

A potential site layout plan is highlighted in **Figure 5-2** below.

The site is positioned on the eastern fringe of an open woodland habitat that is associated with the Tshwane River system (approximately 0.6 km to the west) (**Figure 5-1**). Over a period of approximately 10 years limited change has occurred on or surrounding the site (as per the historical imagery- **Figure 5-1**), and therefore the site has remained underutilised with limited management.



Imagery from 2004



Imagery from 2015

**Figure 5-1 Historical Changes on Site (2004 – 2015)**

The relatively natural state of the open woodland habitat can be seen in **Figure 5-3**. A fenced off section, surrounding an abandoned house, is underutilised and heavily disturbed with *Lantana camara* (Declared CARA – Category 1, NEMBA Category 1b) dominating the area. project.

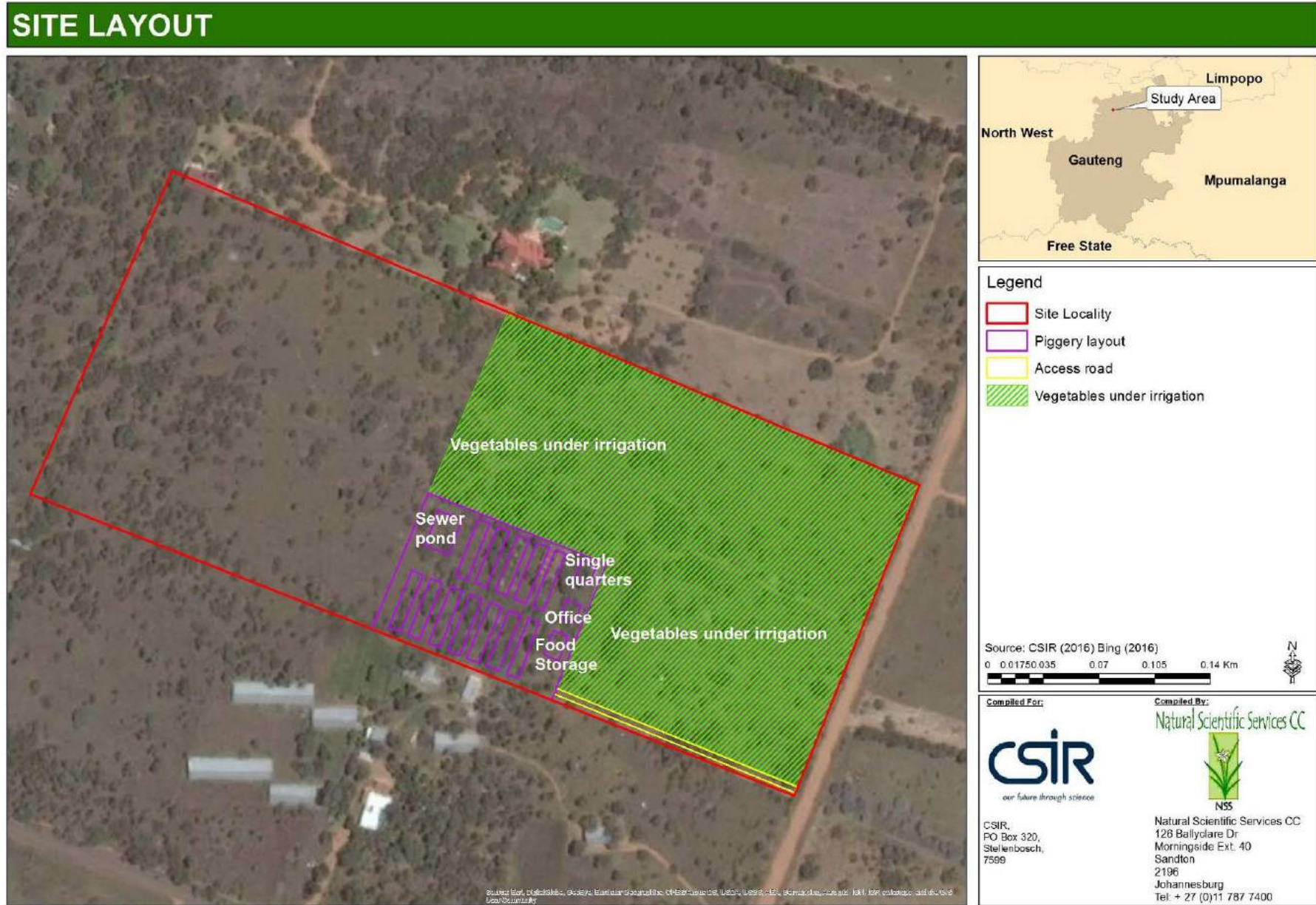


Figure 5-2 Potential Site Layout (provided by the CSIR)



Relatively natural open woodland habitat

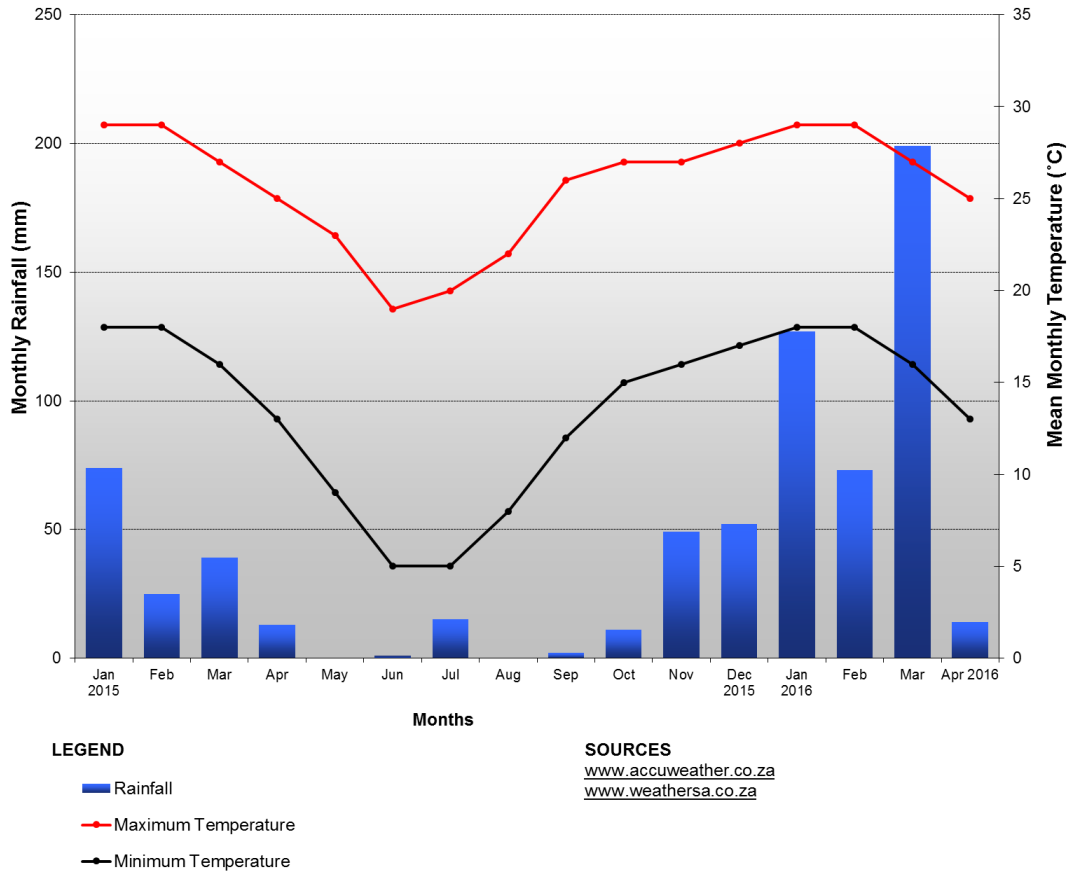
*Lantana camara* infested areas around household

Abandoned house

**Figure 5-3 Current land uses (photo's taken on site)**

## 5.2. Climate

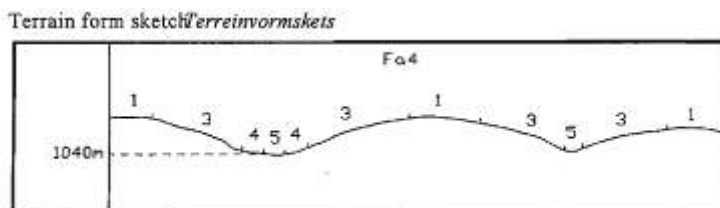
The study site falls within a strongly seasonal summer rainfall region with very dry winters (**Figure 5-4**). The area receives a Mean Annual Precipitation (MAP) of about 500 to 650 mm. Frosts occur fairly infrequent in winter. The hottest part of the year occurs between October and March with an average temperature of  $\sim 28^{\circ}\text{C}$ , while June to August is the coldest period with an average temperature of  $\sim 5^{\circ}\text{C}$ . In the last year (April 2015 – April 2016), which has been considered a drought year, the wettest month was March 2016 ( $>199\text{mm}$ ) ([www.weathersa.co.za](http://www.weathersa.co.za); [www.accuweather.co.za](http://www.accuweather.co.za)). The rainfall in the last summer season was very late with the area only having  $\sim 114$  mm from September 2015 – December 2015, yet 399 mm from January 2016 – March 2016. The NSS field investigations were undertaken in late April, after the heavy rainfall of March and yet also, after the temperatures had begun to decrease from the warmer summer months.



**Figure 5-4 Monthly Rainfall and Temperature Patterns for Pretoria from January 2015 to April 2016**

### 5.3. Geology & Soils

The geology of the study area and greater surrounds predominantly comprises of red granite of the Bushveld Complex (Bushveld granophyre in places in the south); occasional dykes of diabase and syenite (AGIS, 2014). According to AGIS (2014), the study site is situated in land type<sup>1</sup> Fa4 (**Figure 5-6**), supporting mostly shallow Klipfontein, Mispah, Glenrosa and Paardeberg soil (Mucina & Rutherford, 2006). Across a landscape, usually five terrain units can be identified. The catena within land type Fa4 incorporates four of the five terrain units 1, 3, 4 and 5, as shown in **Figure 5-5**. Presented in **Table 5-1** is an overview of the soil forms and their extent of coverage, which can be expected within different terrain units in land type Fa4.



**Figure 5-5 Terrain units occurring within land type Fa4 (AGIS, 2014)**

<sup>1</sup> Land types represent areas that are uniform with respect to climate, terrain form, geology and soil.

**Table 5-1 Soil forms, their wetland potential, coverage, and erodibility classes within the terrain units of land type Fa4 (AGIS, 2014)**

SOIL FORM	Depth (mm)	% COVER PER TERRAIN UNIT			
		1	3	4	5
<b>SLOPE (%)</b>		<b>0-2%</b>	<b>2-6%</b>	<b>1-3%</b>	<b>0-3%</b>
Rock/Rots		21	17		
Klipfontein Ms11, Mispah Ms10, Glenrosa Gs15, Paardeberg Gs12	50-300	48	27		
Uitskot Gc35, Denhere Cv35, Leeudoorn Gc34, Makuya Cv34, Kwezana Gc32, Paleisheuwel Cv32	300-600	24	26	10	
Bontberg Hu25, Clansthal Hu24	250-900	7	9		
Sandvlei Wa31, Wasbank Wa21	300-900		9	20	
Msinga Hu26, Shorrocks Hu36	300-900+		8	10	
Herschel Va30, Arniston Va31, Glengazi Bo31	100-1200				62
Rydalvale Ar30, Phoenix Rg10, Dundee Du10, Jozini Oa36	600-1200+				
Vaalsand Lo31	600-1000		2	10	
Windmeul Av35, Rossdale Av22	900-1200		2	10	
Katarra Kd22, Slangkop Kd15	300-600			10	13

#### 5.4. Vegetation

The study area is situated in the Savanna Biome, and more specifically the *SVcb 12 Central Sandy Bushveld* (Figure 5-6), as classified by Mucina & Rutherford (2006). This vegetation occurs in low undulating areas, sometimes between mountains and sandy plains and catena supporting tall, deciduous woodlands *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils, low broad leaf *Combretum* woodland on shallow rocky or gravelly soils. Species of *Acacia*, *Ziziphus* and *Euclea* are found on the flats and lower slopes on eutrophic sands and some less sandy soils. *Acacia tortillis* may dominate some areas on the valley. Grass-dominated herbaceous layer with relatively low basal cover on dystrophic sands.

The conservation status of this vegetation unit is **Vulnerable (V)** as less than 3% of this vegetation unit is statutorily conserved and over 24% of the unit is transformed (including approximately 19% cultivated and 4% urban). Several alien plants are widely scattered but often at low densities and these include *Cereus jamacaru* (Queen-of-the night), *Eucalyptus* species (Gum trees), *Lantana camara* (tickberry), *Melia azedarach* (white cedar), *Opuntia ficus-indica* (Prickly pear) and *Sesbania punicea* (Spanish gold). Biogeographically important taxa include *Mosdenia leptostachys* and *Oxygonum dregeanum* subsp. *canescens* var. *dissectum* (Mucina & Rutherford, 2006).

**Table 5-2 Dominant floral species – Central Sandy Bushveld**

Vegetation Type	Central Sandy Bushveld
<b>Tall Trees:</b>	<i>Acacia burkei</i> (Black Monkey thorn)
<b>Small Trees:</b>	<i>Burkea africana</i> (wild seringa); <i>Combretum apiculatum</i> (red bushwillow); <i>Combretum zeyheri</i> (Zeyher's bushwillow); <i>Terminalia sericea</i> (Silver cluster-leaf)
<b>Low Shrubs:</b>	<i>Agathisanthemum bojeri</i> ; <i>Indigofera filipes</i> (River Indigo)

<b>Vegetation Type</b>	<b>Central Sandy Bushveld</b>
<b>Geoxylic Suffrutex:</b>	<i>Dichapetalum cymosum</i> (Poison Leaf)
<b>Graminoids:</b>	<i>Brachiaria nigropedata</i> (Black-footed grass); <i>Eragrostis pallens</i> (Lovegrass); <i>Eragrostis rigidior</i> (Curly Leaf); <i>Hyperthelia dissoluta</i> (Yellow thatching grass); <i>Panicum maximum</i> (Guinea grass); <i>Perotis patens</i> (Bottlebrush Grass)
<b>Herbs:</b>	<i>Dicerocaryum senecioides</i> (devil thorn)
<b>Vegetation Type</b>	<b>Biogeographically Important Taxa in the Central Sandy Bushveld</b>
<b>Graminoid:</b>	<i>Mosdenia leptostachys</i>
<b>Herb:</b>	<i>Oxygonum dregeanum</i> subsp. <i>canescens</i> var. <i>dissectum</i>

## 5.5. Hydrology

The study area is located within the Bushveld Basin Eco-region (9.03) and quaternary catchment A32F, approximately 0.6 km east of the Tshwane River system (**Figure 5-7**). The Tshwane River is an Upper Foothill and **Critically Endangered** river system that is not protected (Driver & Nel, 2012; Driver *et al.* 2011). Urban runoff, sewage spills and litter from settlements impact heavily on water quality and the functional integrity of the river. Channel modification plays the largest role in altering the habitat integrity of the riparian zone by changing the natural flow and flood patterns of the river. **Table 5-3** includes a summary of the eco-status and current impacts on the Tshwane River.

**Table 5-3 Summary of the Tshwane River's Ecostatus and impacts (Source: DWS, 2014)**

Quaternary Catchment	Water Resource	Present Ecological State (PES)	Ecological Importance (EI)	Ecological Sensitivity (ES)	Current Impacts
A23F	Tshwane River	<b>D Largely Modified</b>	<b>Moderate</b>	<b>Moderate</b>	<b>SERIOUS:</b> Grazing (land-use) <b>LARGE:</b> Increased flows, bed & channel disturbance <b>MODERATE:</b> Agricultural fields, algal growth, erosion, alien vegetation, overgrazing/trampling, sedimentation & vegetation removal <b>SMALL:</b> Urbanization, inundation, & run-off/effluent from urban areas



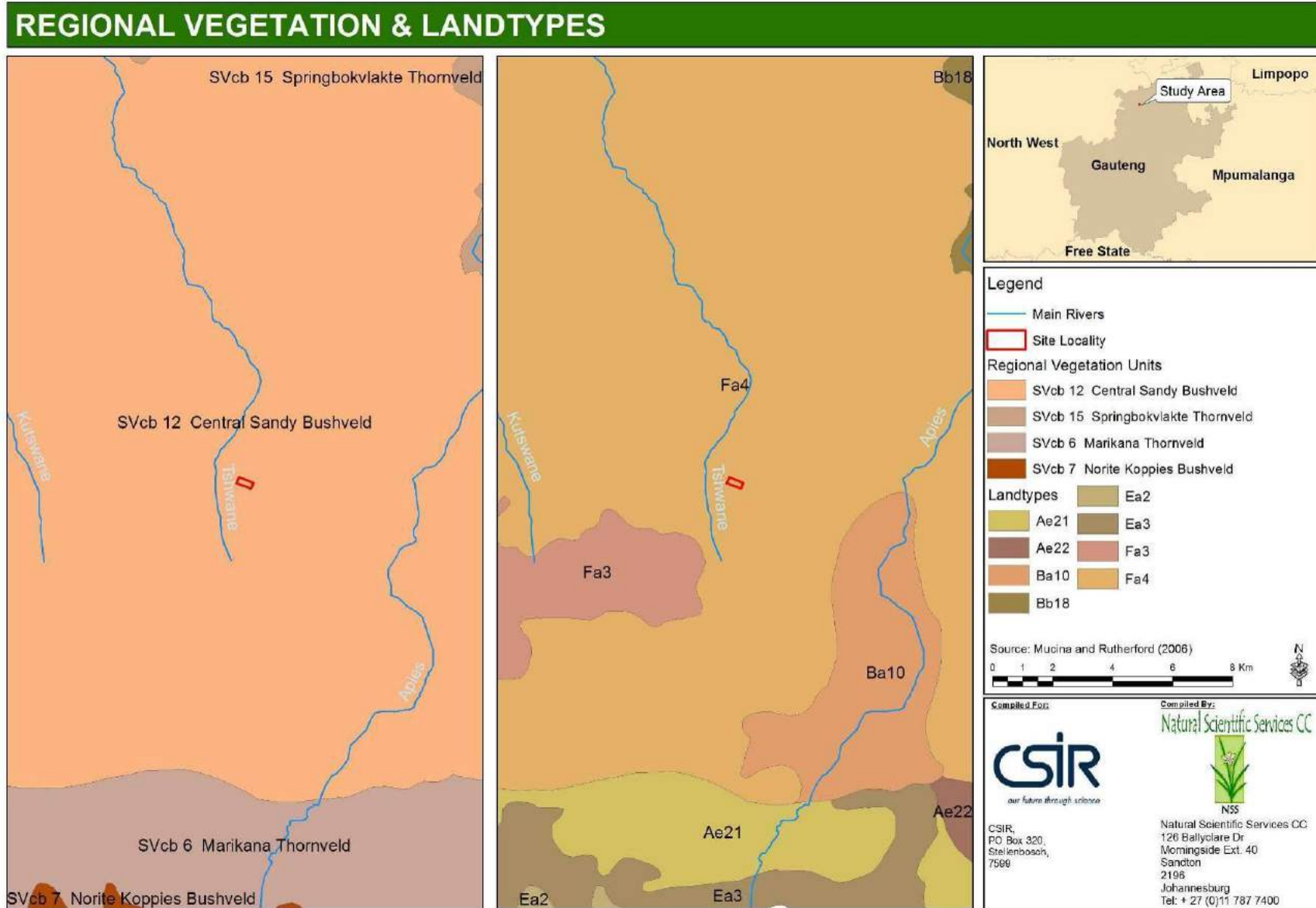


Figure 5-6 Regional Vegetation Units and Land types

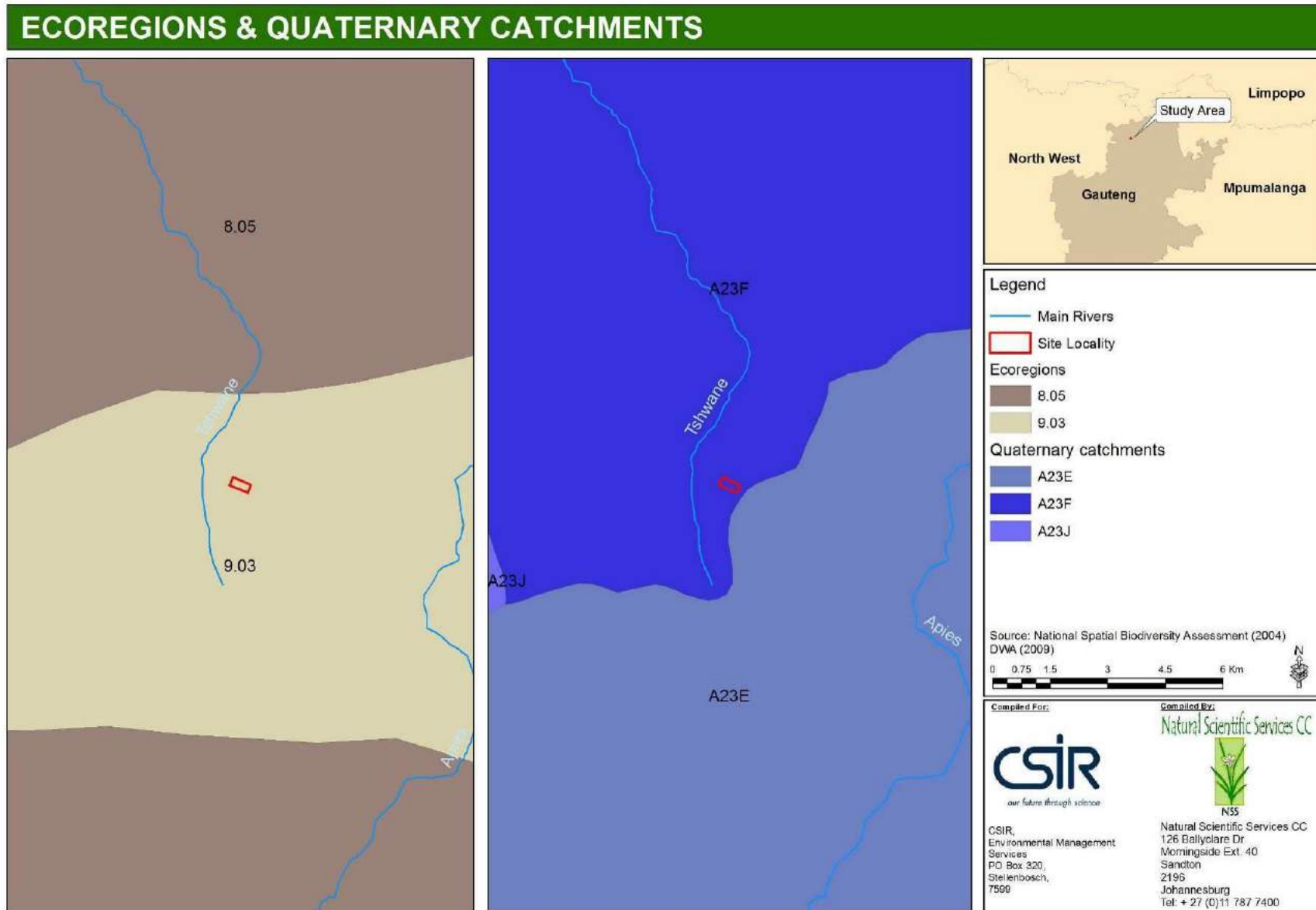


Figure 5-7 Eco-region and Quaternary Catchment

## 6. Methodology

The ecological scan involved desktop research and fieldwork, which was performed during a site visit on 25 April 2016.

### 6.1. 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 TWINSPLAN. 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<sup>2</sup> Plants of South Africa (POSA) 2528CA QDS
  - Mucina & Rutherford's (2006) vegetation map of southern Africa.
  - The current Gauteng C-Plan.
  - 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 6-1**. 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, May 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.

<sup>2</sup> The South African National Biodiversity Institute



## VEGETATION SAMPLING POINTS

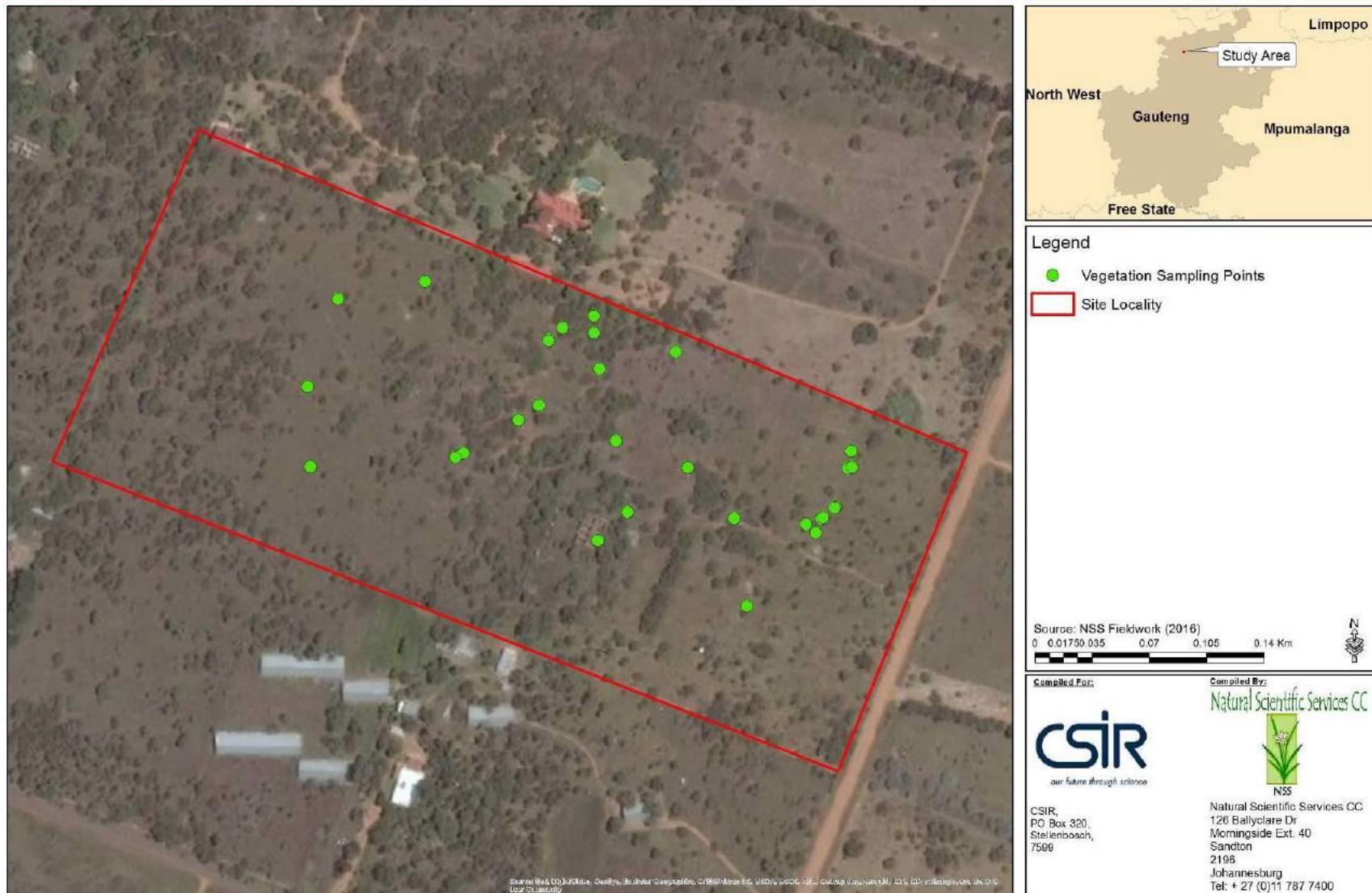


Figure 6-1 Main vegetation sampling points

### 6.1.1 Limitations

It is important to note that the absence of species on site does not conclude that the species is not present at the site. Reasons for not finding certain species during the late summer site visit may be due to:

- The short duration of fieldwork as well as the timing of the fieldwork (which occurred close to the end of the growing season). At the end of summer many species have died back and retracted making it difficult to confirm identification. The 2015/2016 season also experienced below average rainfall in the beginning of the season.
- 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.

## 6.2. Fauna

### 6.2.1 Desktop Research

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

- Mammals using the published species distribution maps in Friedmann & Daly (2004), Stuart & Stuart (2007) and Monadjem *et al.* (2010) as well as online species distribution data from MammalMap (2016).
- Birds, using the latest online list of bird species from the first and second Southern African Bird Atlas Projects (SABAP 1 & 2) for pentad 2530\_2810. Bird species were grouped according to a modified version of Newman's (2002) 12 bird categories.
- Reptiles, using the published species distribution maps in Bates *et al.* (2014) and online species distribution data from ReptileMap (2016).
- Frogs, using the published species distribution maps in Minter *et al.* (2004) and online species distribution data from FrogMap (2016).
- Butterflies, using the published species distribution maps in Mecenero *et al.* (2013) and online species distribution data from LepiMap (2016).
- Scorpions, using the published species distribution maps in Leeming (2003). Currently, ScorpionMap cannot be used reliably to generate geographic species lists.
- Odonta, using distribution maps and habitat description provided in Samways (2008.)
- Baboon spiders using Dippenaar-Schoeman (2002).

The lists were refined based on field observations, where the Likelihood of Occurrence (LO) of each species was rated using the following scale:

- 1 Present: the species, or signs of its presence, was observed on Site or in the immediate surrounding area by NSS.
- 2 High: the species is highly likely to occur, based on available distribution data, and observed habitats.

- 3 Moderate: the species may occur, based on available distribution data, and observed habitats and disturbances.
- 4 The species is unlikely to occur based on marginal distribution or a lack of suitable habitat.

### 6.2.2 Fieldwork

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

### 6.2.3 Conservation Status of Species

In the appended faunal lists, the Global and National status of species is provided, in addition to the status of species as indicated on the Threatened or Protected Species list (ToPS2015) under the National Environmental Management: Biodiversity Act (NEM:BA 2004). National conservation status was assigned as follows:

- Mammals by Friedmann & Daly (2004).
- Birds by Taylor *et al.* (2015).
- Reptiles by Bates *et al.* (2014).
- Frogs by Minter *et al.* (2004) and Measey (2011).
- Butterflies by Mecenero *et al.* (2013).
- Dragonflies and damselflies (i.e. odonata) by Samways (2006).

An atlas and Red Data book for South African scorpion or baboon spider species has not yet been published. Note that due to spatio-temporal variation in human disturbances, the conservation status of some species differs between the IUCN, the relevant national Red Data assessment publication, and the ToPS list. **Unless otherwise stated, the most threatened status of a species is provided (in abbreviated form) in text, whether this is at a global or national scale.**

### 6.2.4 Limitations

- Our visit was limited to a single afternoon; therefore, nowhere near all of the potentially occurring (especially nocturnal) species were 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.

## 6.3. 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 6-1**);



- Impact duration (**Table 6-2**);
- Potential impact intensity (**Table 6-3**);
- Impact reversibility (high, moderate, low or irreversible);
- Irreplaceability of the impacted resource (high, moderate, low or replaceable);
- Impact probability (**Table 6-4**);
- Our confidence in the ratings (high, moderate or low);

Overall impact significance (**Table 6-5**) is calculated as:

**Impact significance = Impact magnitude x Impact probability**

where:

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

**Table 6-1 Rating of impact spatial extent**

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

**Table 6-2 Rating of impact duration**

DURATION DESCRIPTION	SCORE
Temporary (less than 2 years) or duration of the construction period. This impact is fully reversible. <i>E.g. the construction noise temporary impact that is highly reversible as it will stop at the end of the construction period</i>	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. <i>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</i>	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. <i>E.g. The loss of a paleontological resource on site caused by construction activities is permanent and would be irreversible.</i>	5

**Table 6-3 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 <sup>3</sup> (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 <sup>4</sup> , individual economic loss	High	8
Potential to reduce environmental quality – air, soil, water. Potential Loss of habitat, loss of heritage, reduced amenity	Medium	4
Nuisance	Medium-Low	2
Negative change – with no other consequence	Low	1
POSITIVE POTENTIAL INTENSITY DESCRIPTION	RATING	SCORE
Potential Net improvement in human welfare	High	8
Potential to improve environmental quality – air, soil, water. Improved individual livelihoods	Medium	4
Potential to lead to Economic Development	Medium-Low	2
Potential positive change – with no other consequence	Low	1

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

**Table 6-4 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 6-5 Rating of overall impact significance**

SCORE	RATING	SIGNIFICANCE DESCRIPTION
18-26	<b>Fatally flawed</b>	The project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating.
10-17	<b>High</b>	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	<b>Medium</b>	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	<b>Low</b>	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.

<sup>3</sup>Note that a loss of species is a global issue and is differentiated from a loss of “floral/faunal” populations.

<sup>4</sup>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.



## 7. Terrestrial Biodiversity Results

### 7.1. Vegetation Structure

#### 7.1.1 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 2528CA. however, the species recorded in this grid include those within the ridge systems to the south, which could skew the interpretation of the data. Therefore 2528AC show a better representation of the Sandy Central Bushveld. The boundaries of the 2528AC QDG are also immediately adjacent to the site.

This QDG yielded 224 species within 60 families. The dominant families being, POACEAE, ASTERACEAE, and MALVACEAE/FABACEAE (**Table 7-1**), with the graminoids (grasses) representing 33.48%, herbs representing 20.54%, and Dwarf Shrubs representing over 10% of the total species listed for the area (**Table 7-1**). Wooded species in total constitute 28% of the species within the larger study region. In terms of the site, structural representation was following the trend presented within the larger region (2528 QDGs), with wooded species and graminoids being the most dominant – typical of savanna habitats (**Table 7-1**).

**Table 7-1 Top 12 dominant families and most dominant growth forms obtained from the POSA website for the QDS 2528AC and on site**

IMPORTANT FAMILIES	No. OF SPP	GROWTH FORMS	% TOTAL SPP	ON SITE
POACEAE	75	Graminoid	33.48	29.58
ASTERACEAE	17	Herb	20.54	18.31
MALVACEAE	14	Dwarf shrub	10.27	9.86
FABACEAE	14	Shrub / tree	8.48	14.08
CYPERACEAE	6	Shrub	6.7	7.04
CONVOLVULACEAE	6	Succulent	3.57	4.23
APOCYNACEAE	6	Cyperoid	2.68	1.41
ACANTHACEAE	5	Tree	2.68	8.45
LAMIACEAE	5	Bryophyte	2.23	-
COMBRETACEAE	5	Geophyte	2.23	5.63
ANACARDIACEAE	4	Climber	1.79	1.41
COMMELINACEAE	3	Hydrophyte	1.34	-

\*mainly dominated by alien species

#### 7.1.2 On Site - Vegetation Communities

From the field investigations the study area was relatively flat with a homogenous wooded community vegetation structure. The majority of the site was in a natural to near natural state

(Figure 7-1 and Figure 7-3). Therefore only slight variations in vegetation structure could be seen with the following habitat groups being defined:

- Natural Woodland habitat pockets
  - *Acacia caffra* –*Combretum apiculatum* -*Heterpogon contortus* Open Woodland
  - *Combretum zeyheri* Mixed Bushclumps
  - *Combretum apiculatum* –*Themeda triandra* Open Woodland
- Transformed (Habitat In Recovery)
  - *Acacia-Heterpogon* Past Fields
  - Mixed Buchclumps (including *Lantana camara*)
- Transformed
  - Two-Track Road and Abandoned House and Alien Bushclumps

**Table 7-2 Broad Habitat/Vegetation communities**

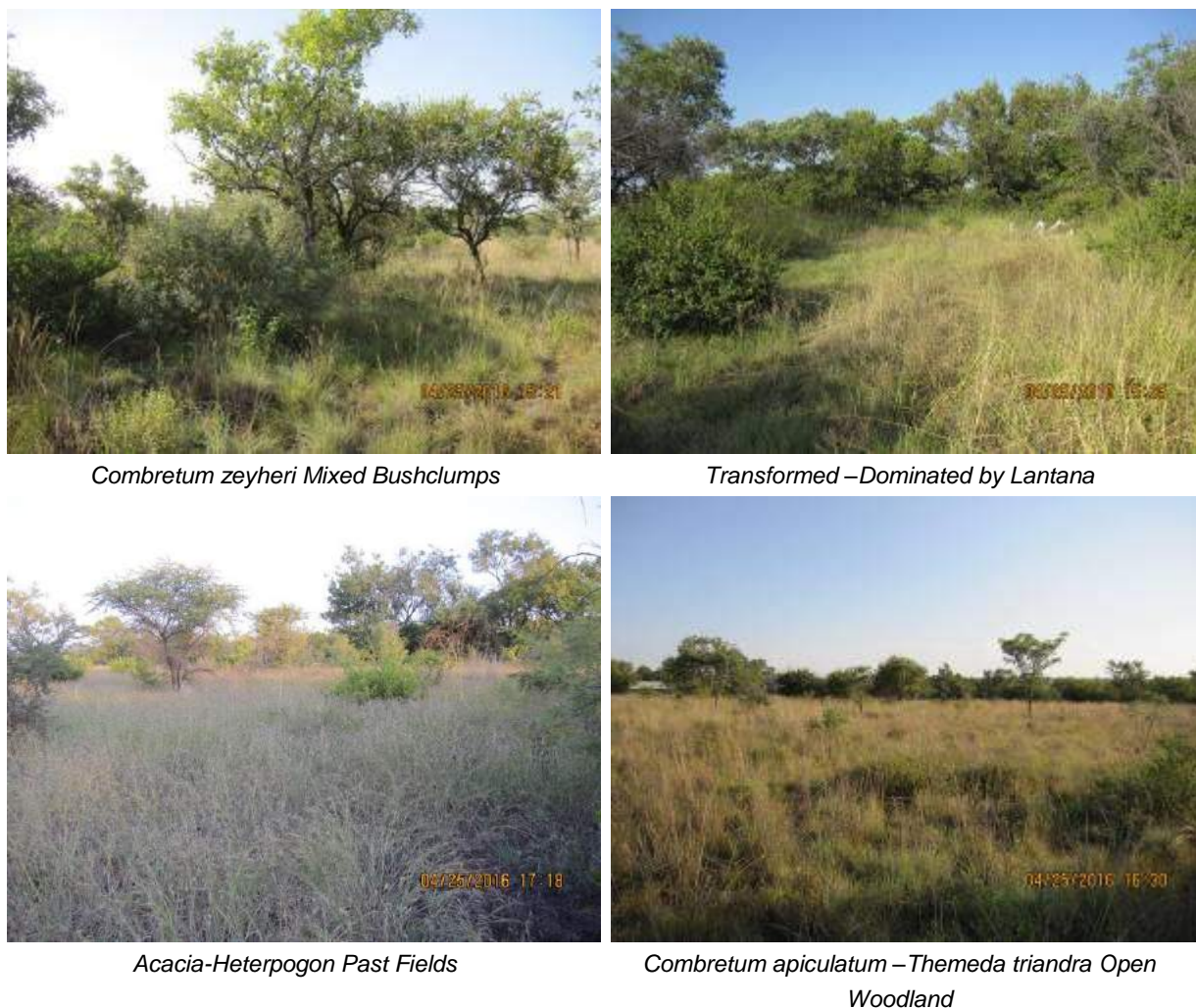
Vegetation Community	Conservation Significance	Area - Ha	Area -%
<b>Woodland Habitats</b>			
<i>Acacia caffra</i> – <i>Combretum apiculatum</i> - <i>Heterpogon contortus</i> Open Woodland	Medium-High	1.74	19.40
<i>Combretum zeyheri</i> Mixed Bushclumps	Medium	3.98	44.17
<i>Combretum apiculatum</i> – <i>Themeda triandra</i> Open Woodland	Medium	1.73	19.24
<b>Transformed (Habitat In Recovery)</b>			
<i>Acacia-Heterpogon</i> Past Fields	Medium	0.45	5.07
Mixed Buchclumps (including <i>Lantana camara</i> )	Medium-Low	0.23	2.55
<b>Transformed</b>			
Two-Track Road and Abandoned House	Low	0.86	9.57
Alien Bushclumps			

The *Combretum zeyheri* Mixed Bushclumps was the most dominant vegetation community on the site representing almost 4 of the 9 hectares. The tree layer was dominated by *C zeyheri* but also included *Acacia tortillis*, *Dichrostachys cinerea*, *Vitex zeyheri*, *A caffra*, *Searsia lancea* and *Dombeya rotundifolia*. Species within the understorey included *Panicum maximum*, *Heteropogon contortus*, *Aerva leucura*, *Melinis repens* and *Felicia muricata*. The condition of these wooded areas was considered fairly intact. However, within a number of these bushclumps the understorey was dominated by the Category 1b Alien Invasive – *Lantana camara*.

In some areas of the site, the wooded vegetation opens out and trends more towards a grassland structure. This includes the *Acacia caffra* –*Combretum apiculatum* -*Heterpogon contortus* Open Woodland and the *Combretum apiculatum* –*Themeda triandra* Open Woodland within the east and western sections of the site respectively (Figure 7-3). Within these areas *C apiculatum* rather than *C zeyheri* is the common tree species. *Themeda triandra*, *Heterpogon contortus* and *Cymopogon* species dominate the grass layer. Approximately 5% of the site falls within the transformed *Acacia-Heterpogon* Past Fields. A

limited diversity in the forb and tree layer is evident. This unit is in recovery phase and is dominated by *Heterpogon contortus*.

As mentioned, species variations within the different natural to semi natural habitats were slight and therefore species recorded within the sampling area were grouped as within **Table 7-3**. Alien species were particularly dominant around the abandoned house, along the boundary line and within the understorey of patches of the *Combretum zeyheri* Mixed Bushclumps. (refer to **Section 7.1.4** below),



**Figure 7-1** Photographs of the more natural habitats within and surrounding the study area



*Combretum zeyheri*



*Vitex zeyheri*



*Dichrostachys cinerea*



*Dombeya rotundifolia*



*Crabbea angustifolia*



*Triumfetta sonderi*

**Figure 7-2**      **Examples of Species found on site**

## VEGETATION UNITS

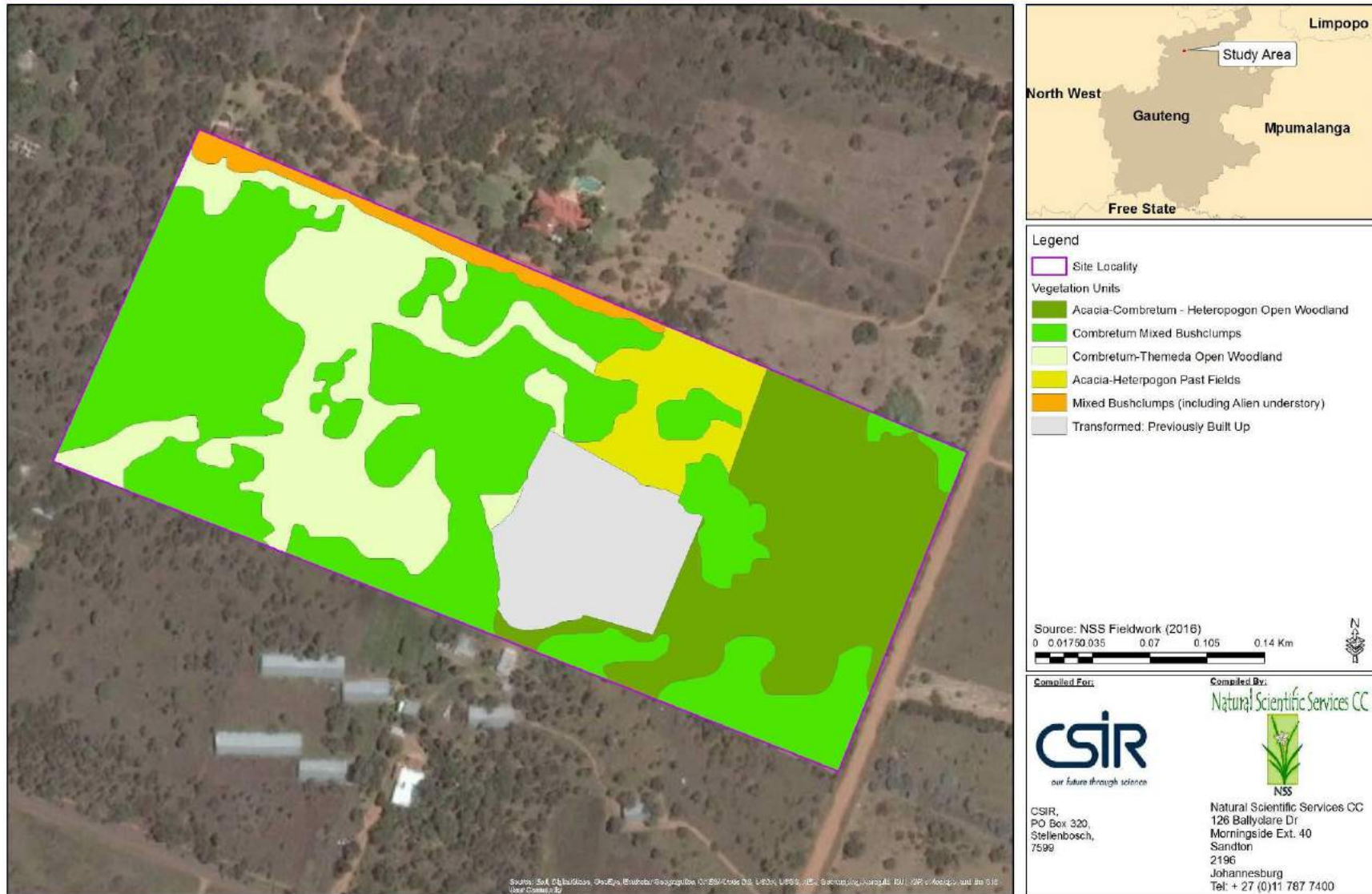


Figure 7-3 Vegetation communities within the study area

Table 7-3 Plant species identified within the different habitats

Family	Species	Threat status	Growth forms				
			C zeyheri Bushclumps	Transformed (Mixed Bushclumps)	C apiculatum Open	Acacia Open	
ACANTHACEAE	<i>Crabbea angustifolia</i> Nees	LC	Herb		x	x	x
AGAVEACEAE	* <i>Agave sisalana</i> Perrine	NE	Shrub		x		
AMARANTHACEAE	<i>Aerva leucura</i> Moq.	LC	Herb	x	x	x	x
	* <i>Gomphrena celosioides</i> Mart.	NE	Herb	x	x		
AMARYLLIDACEAE	<i>Boophone disticha</i> (L.f.) Herb.	DEC	Geophyte		x		x
ANACARDIACEAE	<i>Searsia lancea</i> (L.f.) F.A.Barkley	LC	Shrub, tree	x	x		x
	<i>Searsia leptodictya</i> (Diels) T.S.Yi, A.J.Mill. & J.Wen	NE	Shrub, tree		x		x
APOCYNACEAE	<i>Pentarrhinum insipidum</i> E.Mey.	LC	Climber	x			
ASPHODELACEAE	<i>Bulbine narcissifolia</i> Salm-Dyck	LC	Geophyte	x		x	x
	<i>Aloe greatheadii</i> Schönland var. <i>davyana</i> (Schönland) Glen & D.S.Hardy	LC	Succulent	x	x	x	x
ASTERACEAE	<i>Nidorella anomala</i> Steetz	LC	Herb				x
	<i>Dicoma anomala</i> Sond	LC	Herb				x
	<i>Felicia muricata</i> (Thunb.) Nees subsp. <i>muricata</i>	LC	Shrub	x			x
	<i>Hilliardiella oligocephala</i>	LC	Dwarf Shrub			x	x
	<i>Berkheya</i> spp	LC	Herb	x			
	* <i>Tagetes minuta</i> L.	NE	Herb	x			
	* <i>Zinnia peruviana</i> (L.) L.	NE	Herb			x	
CACTACEAE	* <i>Cereus jamacaru</i> DC.	NE	Succulent		x	x	
CARYOPHYLLACEAE	<i>Pollichia campestris</i> Aiton	LC	Herb			x	
CHRYSOBALANACEAE	<i>Parinari capensis</i> Harv. subsp. <i>capensis</i>	LC	Dwarf shrub			x	x
COMBRETACEAE	<i>Combretum apiculatum</i> Sond. subsp. <i>apiculatum</i>	LC	Shrub, tree	x	x	x	x
	<i>Combretum zeyheri</i> Sond.	LC	Shrub, tree		x	x	x
COMMELINACEAE	<i>Commelina africana</i> L. var. <i>africana</i>	LC	Herb				x
CONVOLVULACEAE	<i>Ipomoea bathycolpos</i> Hallier f.	LC	Herb	x			
CRASSULACEAE	<i>Kalanchoe paniculata</i> Harv.	LC	Shrub	x	x		

Family	Species	Threat status	Growth forms	Growth forms			
				<i>C zeyheri</i> Bushclumps	Transformed (Mixed Bushclumps)	<i>C apiculatum</i> Open	Acacia Open
CYPERACEAE	<i>Cyperus obtusiflorus</i> Vahl var. <i>obtusiflorus</i>	LC	Cyperoid			x	x
EBENACEAE	<i>Euclea undulata</i> Thunb.	LC	Shrub, tree	x			
FABACEAE	<i>Elephantorrhiza elephantina</i> (Burch.) Skeels	LC	Dwarf shrub				x
	<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	LC	Shrub, tree				x
	<i>Dichrostachys cinerea</i> (L.) Wight & Arn. subsp. <i>africana</i> Brenan & Brummitt var. <i>africana</i>	LC	Shrub, tree	x		x	
	<i>Peltophorum africanum</i> Sond.	LC	Tree	x			
	<i>Acacia caffra</i> (Thunb.) Willd.	LC	Shrub, tree	x	x	x	x
	<i>Acacia tortilis</i> (Forssk.) Hayne subsp. <i>heteracantha</i> (Burch.) Brenan	LC	Shrub, tree	x			
	<i>Burkea africana</i> Hook.	LC	Tree		x		
HYPOXIDACEAE	<i>Hypoxis hemerocallidea</i>	DEC	Geophyte				x
LAMIACEAE	<i>Vitex zeyheri</i> Sond.	LC	Tree	x			
MALVACEAE	<i>Triumfetta sonderi</i> Ficalho & Hiern	LC	Dwarf shrub	x			x
	<i>Sida cordifolia</i> L.	LC	Dwarf shrub	x			
	<i>Abutilon austro-africanum</i> Hochr.	LC	Dwarf shrub			x	
	<i>Dombeya rotundifolia</i> (Hochst.) Planch. var. <i>rotundifolia</i>	LC	Shrub, tree			x	
MELIACEAE	* <i>Melia azedarach</i> L.	NE	Tree		x		
PEDALIACEAE	<i>Sesamum triphyllum</i> welw. Ex Ashers	LC	Herb			x	
	<i>Diheteropogon amplexens</i> (Nees) Clayton var. <i>amplexens</i>	LC	Graminoid	x			x
	<i>Themeda triandra</i> Forssk.	LC	Graminoid	x		x	x
	<i>Trachypogon spicatus</i> (L.f.) Kuntze	LC	Graminoid			x	x
	<i>Eragrostis lehmanniana</i> Nees var. <i>lehmanniana</i>	LC	Graminoid				x
	<i>Heteropogon contortus</i> (L.) Roem. & Schult.	LC	Graminoid		x	x	x
	<i>Pogonarthria squarrosa</i> (Roem. & Schult.) Pilg.	LC	Graminoid	x		x	x
	<i>Trichoneura grandiglumis</i> (Nees) Ekman	LC	Graminoid			x	x
POACEAE	<i>Cymbopogon</i> spp	LC	Graminoid				x
	<i>Urelytrum agropyroides</i> (Hack.) Hack.	LC	Graminoid			x	x

Family	Species	Threat status	Growth forms	Growth forms				
				<i>C zeyheri</i> Bushclumps	Transformed (Mixed Bushclumps)	<i>C apiculatum</i> Open	Acacia Open	
	<i>Aristida diffusa</i> Trin. subsp. <i>burkei</i> (Stapf) Melderis	LC	Graminoid	x				
	<i>Cynodon dactylon</i> (L.) Pers.	LC	Graminoid	x	x	x		
	<i>Loudetia simplex</i> (Nees) C.E.Hubb.	LC	Graminoid	x	x			
	<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	LC	Graminoid	x	x	x		
	<i>Panicum maximum</i> Jacq.	LC	Graminoid	x	x			
	<i>Urochloa mosambicensis</i> (Hack.) Dandy	LC	Graminoid	x	x			
	<i>Aristida congesta</i> Roem. & Schult. subsp. <i>congesta</i>	LC	Graminoid		x			
	<i>Cymbopogon nardus</i> (L.) Rendle	LC	Graminoid			x		
	<i>Harpochloa falx</i> (L.f.) Kuntze	LC	Graminoid			x		
	<i>Perotis patens</i> Gand.	LC	Graminoid			x		
	<i>Schizachyrium sanguineum</i> (Retz.) Alston	LC	Graminoid			x		
	<i>Sporobolus africanus</i> (Poir.) Robyns & Tournay	LC	Graminoid		x			
RUBIACEAE	<i>Vangueria infausta</i> Burch. subsp. <i>infausta</i>	LC	Tree		x			
SCROPHULARIACEAE	<i>Manulea parviflora</i> Benth. var. <i>parviflora</i>	LC	Herb				x	
SINOPTERIDACEAE	<i>Pellaea calomelanos</i> (Sw.) Link var. <i>calomelanos</i>	LC	Geophyte		x		x	
THYMELAEACEAE	<i>Gnidia sericocephala</i> (Meisn.) Gilg ex Engl.	LC	Dwarf shrub			x		
VERBENACEAE	<i>Lippia javanica</i> (Burm.f.) Spreng.	LC	Shrub			x	x	
	* <i>Lantana camara</i> L.	NE	Shrub	x	x	x		

**KEY:**

**Acacia Open** : *Acacia caffra* –*Combretum apiculatum* -*Heteropogon contortus* Open Woodland and *Acacia-Heteropogon* Past Fields

**C zeyheri Bushclumps**: *Combretum zeyheri* Mixed Bushclumps

**C apiculatum Open**: *Combretum apiculatum* –*Themeda triandra* Open Woodland

**Transformed (Mixed Bushclumps)**: Mixed Bushclumps (including *Lantana camara*); Two-Track Road and Abandoned House

\*Alien species; DEC-Declining; LC-Least Concern; NE-Not Evaluated



### 7.1.3 Conservation Important Species

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

The Threatened Plant Species Programme (TSP) is an ongoing assessment that revises all threatened plant species assessments made by Craig Hilton-Taylor (1996), using IUCN Red Listing Criteria modified from Davis *et al.* (1986). According to the TSP Red Data list of South African plant taxa (accessed March 2016), there are 77 Red Data listed species (**Table 7-4**) out of a possible 2074 species within Gauteng Province (including Data Deficient species) of which 1 species are Critically Endangered (CR), 10 Endangered (EN), 13 are Vulnerable (VU) and 19 are Near Threatened.

**Table 7-4 Numbers of conservation important plant species per Red Data category within South Africa and Gauteng (date accessed: April 2016)**

Threat Status	South Africa	GAUTENG	2528CA
EX (Extinct)	28	1	1
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	2 (3)
VU (Vulnerable)	1217	13	6 (8)
NT (Near Threatened)	402	19	11 (14)
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	1
Declining (not threatened but processes are causing a continuing decline in the population)	47	9	8
LC (Least Concern)	13 856	1997	1576
DDD (Data Deficient - Insufficient Information)	348	1	0 (1)
DDT (Data Deficient - Taxonomically Problematic)	904	19	6
<b>Total spp (including those not evaluated)</b>	<b>23 399</b>	<b>2074</b>	<b>2048</b>

\*\*Date accessed – April 2016; \*NSS is of the opinion that the data within POSA's 2528CA grid is incorrect as it contains a number of Cape restricted species. The data has therefore been reworked (original quota in parenthesis)

From the POSA website (2528CA QDS) a large number of CI species has been recorded in the greater region. However, a number of these species distributions are restricted to specific habitats in specific provinces such as the Western Cape indicating errors in the POSA data. Therefore NSS has excluded these and only represented those species that could occur within the region around the site (**Table 7-5**). From the 35 species listed, habitat potentially exists for approximately 13 species, 7 species are unlikely to occur and there is no habitat available for 14 species. The Declining *Boophone disticha* and the Declining *Hypoxis hemerocallidea* were, however, identified on Site (**Figure 7-4**). These species are also considered Protected species under the Nature Conservation Ordinance, 12 of 1983. Protected Species may not be cut, disturbed, damaged, destroyed without obtaining a permit from North West Province or a delegated authority. A sufficiently sized population of *Boophone disticha* was located within the *Acacia caffra* –*Combretum apiculatum* - *Heterpogon contortus* Open Woodland, whereas *Hypoxis hemerocallidea* was scattered between this vegetation unit and the *Combretum apiculatum* –*Themeda triandra* Open Woodland.

The survey was conducted in late summer, when a number of the species were not in their flowering time. For example, species such as the three *Drimia* species are difficult to detect within the grass cover after flowering. These species would have all finished flowered before April (the time of the survey).



*Boophone disticha*



*Hypoxis hemerocallidea*

**Figure 7-4** Photographs of Conservation Important plant species on Site

**Table 7-5 Potential CI species based on information obtained from 2528CA QDG**

FAMILY	SPECIES	STATUS	FLOWERING TIME	HABITAT	LoO
RHIZOPHORACEAE	<i>Cassipourea malosana</i> (Baker) Alston	DEC	September-January	In and along the margins of montane evergreen forest, or in thickets on rocky outcrops	No Habitat
POACEAE	<i>Festuca dracomontana</i> H.P.Linder	VU	-	Montane Grassland	Unlikely
ORCHIDACEAE	<i>Habenaria bicolor</i> Conrath & Kraenzl.	NT	March-April	Well-drained sunny grasslands at around 1600 m	No Habitat
ORCHIDACEAE	<i>Habenaria kraenzliniana</i> Schltr.	NT	February-April	Terrestrial in stony, grassy hillsides, recorded from 1000 to 1400m.	Unlikely
ORCHIDACEAE	<i>Holothrix randii</i> Rendle	NT	September-January	Grassy slopes and rock ledges, usually southern aspects.	No Habitat
MYROTHAMNACEAE	<i>Myrothamnus flabellifolius</i> Welw.	DDT	Spring-Summer	In shallow soil over sheets of rock	No Habitat
HYPOXIDACEAE	<i>Hypoxis hemerocallidea</i>	DEC	Summer	Occurs in a wide range of habitats	Present
HYACINTHACEAE	<i>Bowiea volubilis</i> Harv. ex Hook.f. subsp. <i>volubilis</i>	VU	September-April	Shady places, steep rocky slopes and in open woodland, under large boulders in bush or low forest.	Possible
HYACINTHACEAE	<i>Drimia altissima</i> (L.f.) Ker Gawl.	Declining	September-February	Hot, dry bushveld and thicket.	Possible
HYACINTHACEAE	<i>Drimia elata</i> Jacq.	DDT	Summer	Grassland and Bushveld	Possible
HYACINTHACEAE	<i>Drimia sanguinea</i> (Schinz) Jessop	NT	August-December	Open veld and scrubby woodland in a variety of soil types.	Possible
FABACEAE	<i>Acacia erioloba</i> E.Mey.	DEC (PT)	Summer	Deep dry sandy soils	Unlikely
FABACEAE	<i>Argyrolobium campicola</i> Harms	NT	November-February	Highveld Grassland	Possible
FABACEAE	<i>Argyrolobium megarrhizum</i> Bolus	NT	September-January	Mixed Bushveld	Possible
FABACEAE	<i>Melolobium subspicatum</i> Conrath	VU	September-May	Grassland	Unlikely
FABACEAE	<i>Pearsonia bracteata</i> (Benth.) Polhill	NT	Summer	Plateau grassland	Unlikely
EUPHORBIACEAE	<i>Acalypha caperonioides</i> Baill. var.	DDT	Spring-Summer	Grassland, Brachystegia woodland and	Possible

FAMILY	SPECIES	STATUS	FLOWERING TIME	HABITAT	LoO
	<i>caperonioides</i>			at margins of vleis	
CUCURBITACEAE	<i>Cucumis humifructus</i> Stent	VU	January-April	Woodland and grassland, on deep sand.	Possible
CRASSULACEAE	<i>Adromischus umbraticola</i> C.A.Sm. <i>subsp. umbraticola</i>	NT	Summer	Rock crevices on rocky ridges -south-facing, or in shallow gravel on top of rocks, but often in shade.	No Habitat
COMMELINACEAE	<i>Commelina bella</i> Oberm.	DDT	-	Heavy clay soils in Springbokvlakte Thornveld	No Habitat
CALLITRICHACEAE	<i>Callitriche compressa</i> N.E.Br.	DDT	-	Freshwater	No Habitat
ASTERACEAE	<i>Callilepis leptophylla</i> Harv.	Declining	August-January & May	Grassland or open woodland, often on rocky outcrops or rocky hillslopes.	Possible
ASTERACEAE	<i>Gnaphalium nelsonii</i> Burtt Davy	Rare	October-December	Seasonally Wet Grasslands	No Habitat
ASTERACEAE	<i>Macleodium pretoriense</i> (C.A.Sm.) S.Ortíz	EX	April	Hillsides	No Habitat
ASPHODELACEAE	<i>Aloe peglerae</i> Schönland	EN	July-August	Grassland, in shallow, gravelly quartzitic soils on rocky north-facing slopes or summits of ridges.	No Habitat
AQUIFOLIACEAE	<i>Ilex mitis</i> (L.) Radlk. var. <i>mitis</i>	Declining	October-December	Riverbanks, streambeds, evergreen forests.	No Habitat
APOCYNACEAE	<i>Brachystelma discoideum</i> R.A.Dyer	EN	November	Savanna in gravelly sandy soil.	Possible
APOCYNACEAE	<i>Ceropegia decidua</i> E.A.Bruce <i>subsp. pretoriensis</i> R.A.Dyer	VU	November-April	Direct sunshine or shaded situations, rocky outcrops of the quartzitic Magaliesberg mountain series.	No Habitat
APOCYNACEAE	<i>Ceropegia turricula</i> E.A.Bruce	NT	December-February	Hills	No Habitat
APOCYNACEAE	<i>Stenostelma umbelluliferum</i> (Schltr.) S.P.Bester & Nicholas	NT	September to March	Deep black turf in open woodland mainly in the vicinity of drainage lines	No Habitat
ANACARDIACEAE	<i>Searsia gracillima</i> (Engl.) Moffett var. <i>gracillima</i>	NT	January-April	Rocky quartzitic outcrops in bushveld	Unlikely

FAMILY	SPECIES	STATUS	FLOWERING TIME	HABITAT	LoO
AMARYLLIDACEAE	<i>Boophone disticha</i> (L.f.) Herb.	Declining	October-January	Dry grassland and rocky areas.	Present
AMARYLLIDACEAE	<i>Crinum macowanii</i> Baker	Declining	October-January	Grassland, along rivers, in gravelly soil or on sandy flats.	Possible
ALLIACEAE	<i>Tulbaghia pretoriensis</i> Vosa & Condry	DDT	Summer	Grassland / Savanna - Often growing with <i>T. acutiloba</i>	Possible
ACANTHACEAE	<i>Dicliptera magaliesbergensis</i> <i>K.Balkwill</i>	VU	Summer (February)	Riverine forest and bush.	Unlikely

\* Vulnerable – VU; Near Threatened – NT; Declining-DEC; Data Deficient Taxonomically – DDT; Data Deficient –DDD; Species found on site highlighted in green

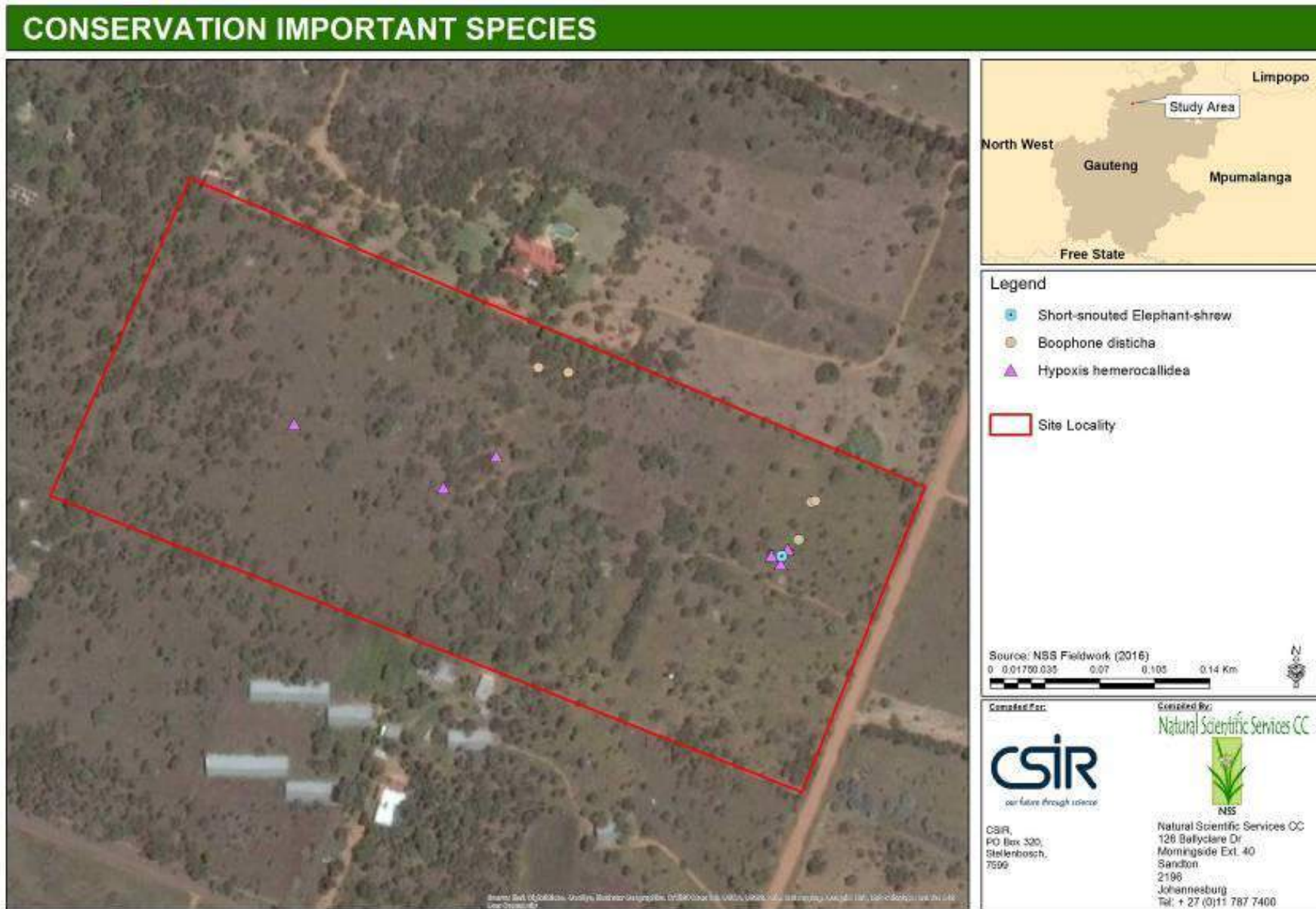


Figure 7-5 Conservation Important species on Site

### 7.1.4 Alien and Invasives Species

Alien, especially invasive<sup>5</sup> plant species are a major threat to the ecological functioning of natural systems and to the productive use of land. Due to the limited disturbances and transformation of the study area, limited alien species were detected. However, the Category 1b *Lantana camara* was prolific around the old abandoned house (**Figure 7-6**) and within a number of the *Combretum* bushclumps.

In the brief scan of the site, a minimum of 8 species were recorded. Four of these were Category Invasive species (**Table 7-6**).

Within the open wooded areas, species such as *Tagetes minuta* and *Zinnia peruviana* were present within the shade of the trees.

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

##### Category 1a

Species requiring compulsory control.

##### Category 1b

Invasive species controlled by an invasive species management programme

##### Category 2

Invasive species controlled by area

##### Category 3

Invasive species controlled by activity

**Table 7-6 Alien and Invasive Species detected during the survey**

Family	Species	Growth forms	CARA	NEMBA
AGAVEACEAE	<i>Agave sisalana Perrine</i>	Shrub,	2	2
CACTACEAE	<i>Cereus jamacaru DC.</i>	Succulent	1	1b
AMARANTHACEAE	<i>Gomphrena celosioides Mart.</i>	Herb	Weed	-
VERBENACEAE	<i>Lantana camara L.</i>	Shrub	1	1b
MELIACEAE	<i>Melia azedarach L.</i>	Tree	3	1b, 3 in urban areas
ASTERACEAE	<i>Campuloclinium macrocephalum</i>	Herb	1	1b
ASTERACEAE	<i>Tagetes minuta L.</i>	Herb	Weed	-
ASTERACEAE	<i>Zinnia peruviana (L.) L.</i>	Herb	Weed	-

<sup>5</sup> Two main pieces of national legislation are applicable to alien, invasive plants, namely the:

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

*Lantana camara**Campuloclinium macrocephalum**Agave sisaliana**Cereus jamacaru***Figure 7-6 Photographs of Alien species on Site**

## 7.2. Faunal Communities

An extraordinary wealth of faunal diversity has been documented during atlassing projects in the QDS 2528CA (and pentad 2530\_2810) covering the Pacific Ora study site (**Appendices 2-8**). This is likely the joint product of both the topographic heterogeneity (several main river systems and dams, the Magaliesberg and surrounding koppies) and the disproportionately high sampling effort associated with the QDS (given that it includes parts of the Pretoria CBD).

However, the small size of the site, lack of rocky outcrops, deep sandy soils or any wetlands and open waterbodies of any significance precludes the presence of a large proportion of these regionally occurring species. As such only a limited number of Conservation Important Species (CIS) are expected to occur on site and even fewer (if any) are likely to be resident or entirely dependent on it.





**Figure 7-7** Examples fauna observed on site

In total four mammal, 32 bird, two reptile and 13 butterfly species were detected on site during the ecoscan. These were mostly widespread and common species (**Table 7-7**). Some examples are illustrated in **Figure 7-7**. Lists of potentially occurring faunal species for the study area (based on nation-wide distribution maps and habitat availability) are presented in **Appendices 2-8**. Potentially occurring CIS are summarised per faunal group in **Table 7-8** to **Table 7-12**.

**Table 7-7** Faunal species detected on site

SPECIES	COMMON NAME	SPECIES	COMMON NAME
<b>Mammals</b>			
<i>Elephantulus brachyrhynchus</i>	Short-snouted Elephant-shrew	<i>Hystrix africaeaustralis</i>	Porcupine
<i>Cryptomys hottentotus</i>	Common Mole-rat	<i>Sylvicapra grimmia</i>	Common Duiker

SPECIES	COMMON NAME	SPECIES	COMMON NAME
<b>Birds</b>			
<i>Bostrychia hagedash</i>	Hadedda Ibis	<i>Cisticola fulvicapilla</i>	Neddicky
<i>Francolinus natalensis</i>	Natal Spurfowl	<i>Prinia flavicans</i>	Black-chested Prinia
<i>Vanellus armatus</i>	Blacksmith Lapwing	<i>Parisoma subcaeruleum</i>	Chestnut-vented Tit-babbler
<i>Columba guinea</i>	Speckled Pigeon	<i>Laniarius ferrugineus</i>	Southern Boubou
<i>Streptopelia semitorquata</i>	Red-eyed Dove	<i>Dryoscopus cubla</i>	Black-backed Puffback
<i>Streptopelia senegalensis</i>	Laughing Dove	<i>Telophorus zeylonus</i>	Bokmakierie
<i>Corythaixoides concolor</i>	Grey Go-away-bird	<i>Malaconotus blanchoti</i>	Grey-headed Bush-shrike
<i>Colius striatus</i>	Speckled Mousebird	<i>Acridotheres tristis</i>	Common Myna
<i>Tockus nasutus</i>	African Grey Hornbill	<i>Lamprotornis nitens</i>	Cape Glossy Starling
<i>Trachyphonus vaillantii</i>	Crested Barbet	<i>Nectarinia talatala</i>	White-bellied Sunbird
<i>Hirundo cucullata</i>	Greater Striped-swallow	<i>Ploceus velatus</i>	Southern Masked-weaver
<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	<i>Spermestes cucullatus</i>	Bronze Mannikin
<i>Corvus albus</i>	Pied Crow	<i>Lagonosticta senegala</i>	Red-billed Firefinch
<i>Turdoides jardineii</i>	Arrow-marked Babbler	<i>Uraeginthus angolensis</i>	Blue Waxbill
<i>Pycnonotus tricolor</i>	Dark-capped Bulbul	<i>Zosterops capensis</i>	Cape White-eye
<i>Sylvietta rufescens</i>	Long-billed Crombec	<i>Passer diffusus</i>	Southern Greyheaded Sparrow
<b>Reptiles</b>			
<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	<i>Trachylepis punctatissima</i>	Speckled Rock Skink
<b>Frogs</b>			
<i>Gegenes pumilio gambica</i>	Dark Hottentot	<i>Danaus chrysippus orientis</i>	African monarch
<i>Papilio demodocus demodocus</i>	Citrus swallowtail	<i>Hypolimnas misippus</i>	Common diadem
<i>Belenois aurota</i>	Brown-veined white	<i>Junonia hierta cebrene</i>	Yellow pansy
<i>Catopsilia florella</i>	African migrant	<i>Junonia oenone oenone</i>	Blue pansy
<i>Acraea neobule neobule</i>	Wandering donkey acraea	<i>Vanessa cardui</i>	Painted lady
<i>Byblia ilithyia</i>	Spotted joker	<i>Virachola antalus</i>	Brown playboy

### 7.2.1 Mammals

Of the approximately 110 regionally occurring species just over 70 species may conceivably occur (LO of 1, 2 or 3 in **Appendix 2**) on site based on distribution and the availability of suitable habitat (mostly rodents, insectivores, bats and small carnivores). Atlasing projects list 36 species for the QDS (Friedmann & Daly, 2004; MammalMap, 2016). During the site visit four mammal species were detected. Eighteen of the 29 regionally occurring non-game CIS are likely to occur albeit mostly non-resident and fleeting.

Only one CI mammal species was detected on site (**Figure 7-5** CI species map) namely Short-snouted Elephant-shrew (**DD**). Although the evidence for this record namely the presence of clearly defined runways or circuits constructed through grass (**Figure 7-7**) is a feature more typically associated with the similar Bushveld Elephant-shrew (Skinner & Chimimba, 2005) only Short-snouted Elephant-shrew is expected to occur on site, as the

nearest known record for Bushveld Elephant-shrew occurs in the sandy bushveld near Lephalale approximately 170 km north-west.

Two **CR** golden mole species occur in the greater region namely Juliana's Golden Mole and Rough-haired Golden Mole. The former is unlikely to occur as the only subpopulation known to occur in Gauteng (one of three nationally) is restricted to the Bronberg range. The latter, which is known only from 11 disjunct locations in South Africa, may potentially occur but may be precluded on site by a lack of suitably sandy soil.

Only one CI bat species is likely to occur on site the Rusty Pipistrelle (**NT**). A lack of known caves or other suitable subterranean roosting habitat in the nearby vicinity (>25 km) likely precludes the presence of the other five regionally occurring CI bat species (Geoffroy's, Darling's and Bushveld horseshoe bats as well as Natal Long-fingered Bat and Percival's Short-eared Trident Bat).

White Tailed Rat (**EN**) may occur based on the presence of dense vegetation cover, one of the species' main habitat requirements of this predominantly grassland species (Skinner & Chimimba, 2005; Coetzee & Monadjem, 2008.). Three (non-game) CI carnivore species namely Cape Fox (**PS**), Black-footed Cat (**VU**) and Serval (**NT**) may occur sporadically but are likely to be rare and fleeting in this peri-urban setting. The same holds true for Aardvark (**PS**).

The Southern African Hedgehog in contrast may well occur on site. Hedgehogs inhabit a diversity of habitats in the temperate to semi-arid interior of South Africa where there is thick, dry vegetation cover suitable for nesting, and an abundance of insects and other food items (Skinner & Chimimba 2005; Stuart & Stuart 2007). Although widespread, hedgehogs are nowhere common. The study site overlaps the distribution ranges of various **DD** shrew species and suitable conditions appear present for most with the exception of Swamp Musk Shrew which requires wetter habitat. The **DD** Single-striped Mouse, Bushveld Gerbil and African Weasel may all be high likely to occur.

**Table 7-8 Present and potentially occurring CI mammal species**

ORDER <sup>1,2</sup> & SPECIES <sup>2,4</sup>	COMMON NAME <sup>2,4</sup>	CONSERVATION STATUS			LO <sup>2,4,6</sup>	ATLAS (N) <sup>6</sup>
		GLOBAL IUCN <sup>5</sup>	S.A. RED DATA <sup>2</sup>	S.A. NEM:BA <sup>3</sup>		
<b>AFROSORICIDA (Golden moles)</b>						
<i>Chrysoxalax villosus</i>	Rough-haired Golden Mole	VU (U)	CR	-	3	
<i>Neamblysomus julianae</i>	Juliana's Golden Mole - Bronberg subpopulation	VU (U)	CR	-	4	
<b>MACROSCELIDEA (Elephant-shrews)</b>						
<i>Elephantulus brachyrhynchus</i>	Short-snouted Elephant-shrew	LC (U)	DD	-	1	
<b>EULIPOTYPHLA (Hedgehogs &amp; shrews)</b>						
<i>Myosorex varius</i>	Forest Shrew	LC (S)	DD	-	2	

ORDER <sup>1,2</sup> & SPECIES <sup>2,4</sup>	COMMON NAME <sup>2,4</sup>	CONSERVATION STATUS			LO <sup>2,4,6</sup>	ATLAS (N) <sup>6</sup>
		GLOBAL IUCN <sup>5</sup>	S.A. RED DATA <sup>2</sup>	S.A. NEM:BA <sup>3</sup>		
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC (U)	DD	-	2	
<i>Suncus infinitesimus</i>	Least Dwarf Shrew	LC (U)	DD	-	2	
<i>Crocidura mariquensis</i>	Swamp Musk Shrew	LC (U)	DD	-	4	
<i>Crocidura fuscomurina</i>	Tiny Musk Shrew	LC (U)	DD	-	3	
<i>Crocidura cyanea</i>	Reddish-grey Musk Shrew	LC (S)	DD	-	2	
<i>Crocidura silacea</i>	Lesser Grey-brown Musk Shrew	LC (S)	DD	-	2	
<i>Crocidura hirta</i>	Lesser Red Musk Shrew	LC (U)	DD	-	2	10
<i>Atelerix frontalis</i>	Southern African Hedgehog	LC (S)	NT	-	2	1
<b>CHIROPTERA (Bats)</b>						
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC (U)	NT	-	4	
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC (U)	NT	-	4	
<i>Rhinolophus blasii</i>	Blasius's Horseshoe Bat	LC (D)	NT	-	3	
<i>Rhinolophus simulator</i>	Bushveld Horseshoe Bat	LC (D)	NT	-	4	
<i>Cloeotis percivali</i>	Percival's Short-eared Trident Bat	LC (U)	VU	-	4	
<i>Miniopterus natalensis</i>	Natal Long-fingered Bat	LC (U)	NT	-	4	
<i>Pipistrellus rusticus</i>	Rusty Pipistrelle	LC (U)	NT	-	2	1
<b>RODENTIA (Rodents)</b>						
<i>Mystromys albicaudatus</i>	White-tailed Rat	EN (D)	EN	-	2	
<i>Lemniscomys rosalia</i>	Single-striped Mouse	LC (S)	DD	-	2	1
<i>Dasymys incomtus</i>	Water Rat	LC (U)	NT	-	4	
<i>Tatera leucogaster</i>	Bushveld Gerbil	LC (S)	DD	-	2	
<b>CARNIVORA (Carnivores)</b>						
<i>Hyaena brunnea</i>	Brown Hyaena	NT (D)	NT	PS	4	2
<i>Panthera pardus</i>	Leopard	NT (D)	LC	PS	4	
<i>Panthera leo</i>	Lion	VU (D)	VU	VU	5	1
<i>Felis nigripes</i>	Black-footed Cat	VU (D)	LC	PS	3	
<i>Leptailurus serval</i>	Serval	LC (S)	NT	PS	3	2
<i>Lycaon pictus</i>	African Wild Dog	EN (D)	EN	EN	5	1
<i>Vulpes chama</i>	Cape Fox	LC (S)	LC	PS	2	
<i>Lutra maculicollis</i>	Spotted-necked Otter	LC (D)	NT	-	4	
<i>Poecilogale albinucha</i>	African Weasel	LC (U)	DD	-	2	
<b>TUBULIDENTATA (Aardvark)</b>						
<i>Orycteropus afer</i>	Aardvark	LC (U)	LC	PS	4	
<b>ARTIODACTYLA (Even-toed ungulates)</b>						
<i>Connochaetes gnou</i>	Black Wildebeest	LC (I)	LC	PS*	5	
<i>Damaliscus lunatus</i>	Tsessebe	LC (D)	EN	PS*	5	
<i>Hippotragus niger</i>	Sable	LC (S)	VU	VU	5	
<i>Ourebia ourebi</i>	Oribi	LC (D)	EN	EN	5	
<b>Key</b>						
<b>Status:</b> CR = Critically Endangered; D = Declining; DD = Data Deficient; EN = Endangered; I = Increasing; LC = Least Concern; NT = Near Threatened; PS = Protected Species; S = Stable; U = Unknown; VU = Vulnerable						
<b>Likelihood of Occurrence (LoO):</b> 1 = Present; 2 = High; 3 = Moderate; 4 = Low; 5 = May occur as a managed population						
<b>Sources:</b> <sup>1</sup> Stuart & Stuart (2007); <sup>2</sup> Friedmann & Daly (2004); <sup>3</sup> ToPS List (2015); <sup>4</sup> Monadjem <i>et al.</i> (2010); <sup>5</sup> IUCN (2015-4); <sup>6</sup> MammalMap (2016)						
*Listed on ToPS (2015) as Protected Game						

## 7.2.2 Birds

Combined data from the SABAP 1 (QDS 2528CA) and 2 (pentad 2600\_2630) list 370 bird species for the region. However, many of these species are likely to be precluded by a lack of open water bodies, mudflats, wetlands and rocky outcrops such that the number of species likely to occur on site is limited to around 270 species comprising a mix of mainly terrestrial grassland and bushveld birds (**Appendix 3**).

No CI bird species or signs thereof were detected on site. Of the 22 CIS that have been recorded regionally only 10 species are likely to be detected, in passing, and none are expected to be resident or entirely dependent on any one specific habitat feature on site. These include Marabou Stork (**NT**), Abdim's Stork (**NT**), Black Stork (**VU**), Secretarybird (**VU**), Cape Vulture (**EN**), Lanner Falcon (**VU**), Red-footed Falcon (**NT**), Verreaux's Eagle (**VU**), Tawny Eagle (**EN**) and European Roller (**NT**).

The Tshwane and larger Appies River located 640 m west and 4.8 km east of the site respectively (and nearby open waterbodies) are likely responsible for the SABAP 2 (pentad-scale) records of Pink-backed Pelican (**VU**), Caspian Tern (**VU**), African Grass-owl (**VU**), Maccoa Duck (**NT**), Lesser Jacana (**NT**), Black-winged Pratincole (**NT**) and Greater Flamingo (**NT**) but likely also support species regionally (QDS) recorded species such as Half-collared Kingfisher (**NT**), African Marsh-harrier (**EN**), Greater Painted-snipe (**VU**) and Yellow-billed Stork (**EN**).

**Table 7-9 Present and potentially occurring CI bird species**

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>	
		GLOBAL IUCN <sup>3</sup>	ATLAS (REG/GLOB) <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		SABAP 1	SABAP 2
<b>1. Ocean birds</b>							
<i>Pelecanus rufescens</i>	Pink-backed Pelican	LC (S)	VU/LC	-	4		x
<i>Sterna caspia</i>	Caspian Tern	LC (I)	VU/LC	-	4		x
<i>Leptoptilos crumeniferus</i>	Marabou Stork	LC (I)	NT/LC	-	3	x	x
<b>2. Inland water birds</b>							
<i>Mycteria ibis</i>	Yellow-billed Stork	LC (D)	EN/LC	-	4	x	
<i>Ciconia abdimii</i>	Abdim's Stork	LC (D)	NT/LC	-	2	x	x
<i>Ciconia nigra</i>	Black Stork	LC (U)	VU/LC	-	3	x	
<i>Phoenicopterus roseus</i>	Greater Flamingo	LC (I)	NT/LC	-	4	x	x
<i>Glareola nordmanni</i>	Black-winged Pratincole	NT (D)	NT/NT	-	4		x
<b>3. Ducks &amp; wading birds</b>							
<i>Oxyura maccoa</i>	Maccoa Duck	NT (D)	NT/NT	-	4		x
<i>Microparra capensis</i>	Lesser Jacana	LC (U)	NT/LC	-	4		x
<i>Rostratula benghalensis</i>	Greater Painted-snipe	LC (D)	VU/LC	-	4	x	
<b>4. Large terrestrial birds</b>							
<i>Sagittarius serpentarius</i>	Secretarybird	VU (D)	VU/VU	-	3	x	
<i>Anthropoides paradiseus</i>	Blue Crane	VU (S)	NT/VU	PS	4	x	

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>	
		GLOBAL IUCN <sup>3</sup>	ATLAS (REG/GLOB) <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		SABAP 1	SABAP 2
<b>5. Raptors</b>							
<i>Gyps coprotheres</i>	Cape Vulture	VU (D)	EN/VU	EN	3	x	x
<i>Falco biarmicus</i>	Lanner Falcon	LC (I)	VU/LC	-	3	x	
<i>Falco vespertinus</i>	Red-footed Falcon	NT (D)	NT/NT	-	3	x	x
<i>Aquila verreauxii</i>	Verreaux's Eagle	LC (S)	VU/LC	-	3	x	x
<i>Aquila rapax</i>	Tawny Eagle	LC (S)	EN/LC	EN	3	x	
<i>Circus ranivorus</i>	African Marsh-harrier	LC (D)	EN/LC	-	4	x	
<b>6. Owls &amp; nightjars</b>							
<i>Tyto capensis</i>	African Grass-owl	LC (D)	VU/LC	-	4		x
<b>8. Aerial feeders, etc</b>							
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	LC (D)	NT/LC	-	4	x	
<i>Coracias garrulus</i>	European Roller	NT (D)	NT/NT	-	2	x	
<b>Key</b>							
<b>Status:</b> D = Declining; EN = Endangered; I = Increasing; LC = Least Concern; NB = Non-breeding; NR = Not Recognised by Birdlife International; NT = Near Threatened; PS = Protected Species; S = Stable; U = Unknown population trend; VU = Vulnerable							
<b>Likelihood of Occurrence (LoO):</b> 2 = High; 3 = Moderate; 4 = Low							
<b>Sources:</b> <sup>1</sup> Newman (2002); <sup>2</sup> ToPS List (2015); <sup>3</sup> IUCN (2015-4); <sup>4</sup> SABAP(2016); <sup>5</sup> Taylor (2015)							

### 7.2.3 Reptiles

Approximately 80 reptile species may occur at a regional scale. Of these, as many as 43 species have been recorded during atlassing projects in the QDS (ReptileMap, 2016) suggesting a high reptile diversity in the area (**Appendix 4**). However, the lack of deep sandy substrate or rocky outcrops on site precludes many of these species. During the brief site visit two species were detected around the derelict household namely Common Tropical House Gecko and Speckled Rock Skink, neither of which are of conservation importance.

Some of the other more common reptiles most likely to be encountered on site include the geckos Common Dwarf Gecko, Transvaal or Cape Gecko (similar), the lizards Holub's Sandveld Lizard, Yellow-throated Plated Lizard, Variable Skink, Common Flap-neck Chameleon and Southern Tree Agama, harmless snakes such as Bibron's Blind Snake, Peters' Thread Snake (either one of the two potentially occurring subspecies), Puff Adder, Black-headed Centipede-eater, Common House Snake, Short-snouted Grass Snake, Spotted Grass Snake (formerly Spotted Skaapsteeker) and venomous snakes such as Bibron's Stiletto Snake Rinkhals, Snouted Cobra Rhombic Egg-eater and Boomslang.

Three CI reptile species occur regionally none of which are likely to occur on site. The site may, however, support seven South African endemics namely Transvaal Gecko, Delalande's Sandveld Lizard, Thin-tailed Legless Skink, Eastern Ground Agama, Aurora Snake, Olive Ground Snake and South African Slug-eater.

**Table 7-10 Present and potentially occurring CI reptile species**

FAMILY <sup>1</sup> & SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	CONSERVATION STATUS			LO <sup>1,4</sup>	ATLAS (N) <sup>1,4</sup>
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>1</sup>	S.A. NEM:BA <sup>2</sup>		
<b>CORDYLIDAE (Girdled lizards &amp; relatives)</b>						
<i>Chamaesaura aenea</i>	Coppery Grass Lizard	1NT	NT (End)	-	4	-
<b>PYTHONIDAE (Python)</b>						
<i>Python natalensis</i>	Southern African Python	2LC	LC	PS	4	-
<b>LAMPROPHIIDAE (Advanced snakes)</b>						
<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake	1LC	NT (End)	-	4	-
<b>Key</b>						
<b>Status:</b> 1 = Global; 2 = Regional; LC = Least Concern; PS = Protected Species; VU = Vulnerable						
<b>Likelihood of Occurrence (LoO):</b> 1 = Present; 2 = High; 3 = Moderate; 5 = May occur as a managed population						
<b>Sources:</b> <sup>1</sup> Bates <i>et al.</i> (2014); <sup>2</sup> ToPS List (2015); <sup>3</sup> IUCN (2015-4); <sup>4</sup> ReptileMap (2014)						

### 7.2.4 Frogs

Approximately 24 frog species may occur at a regional scale (**Appendix 5**). Of these, 14 species have been recorded during atlassing surveys in the QDS covering the study area (FrogMap, 2016). However the lack any open water bodies, streams or marshes on site limits the number of species likely to occur on site to about 11 species. These are generally species capable of persisting some distance from water such as Bushveld Rain Frog, Eastern Olive Toad, Guttural Toad, Red Toad, Raucous Toad, Northern Pygmy Toad, Boettger's Caco and Tremolo Sand Frog, Natal Sand Frog, Tandy's Sand Frog.

Only two CI frog species have been recorded in the relevant QDS namely the **NT** Giant Bullfrog and **PS** African Bullfrog (Minter *et al.* 2004; ReptileMap 2016). However, only Giant Bullfrog is deemed likely to occur on site for two reasons. First extensive field sampling and genetic analysis has only yielded Giant Bullfrog from the Pretoria Rural region (C. A. Lotter *pers. comm*) and second the QDS records for African Bullfrog predate 1996 with no records since (Minter *et al.* 2004). Giant Bullfrog certainly occurs in the peri-urban setting in and around Pacific Ora (C. Lotter *pers. comm*) but no suitable breeding habitat was observed on site. However, a dam/excavation that may provide potentially suitable breeding habitat is located 930 m directly west of the site. Given the reported dispersal abilities of Giant Bullfrogs (Yetman and Ferguson, 2011) it is, at the very least, likely that Bullfrogs utilise the site from a foraging and dispersal perspective, but also potentially for burrowing and aestivation (particularly females which have been known to occupy burrows more than 1 km from breeding sites).

**Table 7-11 Present and potentially occurring CI frog species**

FAMILY <sup>5</sup> & SPECIES <sup>5</sup>	COMMON NAME <sup>3</sup>	CONSERVATION STATUS			LO <sup>3,5</sup>	ATLAS (N) <sup>3,5</sup>
		GLOBAL IUCN <sup>2</sup>	S.A. RED DATA <sup>3</sup>	S.A. NEM:BA <sup>1</sup>		
<b>PYXICEPHALIDAE (African common frogs)</b>						
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC (D)	NT	PS	2	5
<i>Pyxicephalus edulis</i>	African Bullfrog	LC (U)	LC	PS	4	1
<b>Key</b>						
<b>Status:</b> LC = Least Concern; NT = Near Threatened; PS = Protected Species						
<b>Likelihood of Occurrence (LO):</b> 1 = Present; 2 = High; 4 = Low						
<b>Sources:</b> <sup>1</sup> ToPS List (2007); <sup>2</sup> IUCN (2015-4); <sup>3</sup> Minter et al. (2004); <sup>4</sup> Du Preez & Carruthers (2009); <sup>5</sup> FrogMap (2015)						

### 7.2.5 Terrestrial Macro-invertebrates.

An extraordinary number (ca. 190 spp.) of butterfly species may conceivably occur based on distribution (Henning *et al.* 2009; Mecenero *et al.* 2013) and habitat (**Appendix 6**). As many as 130 species have been confirmed in the QDS during atlas surveys alone (LepiMap, 2016). During the very brief site visit 13 species were detected, clearly there is massive scope for further species accumulation yet. Although no Red Data butterfly species occur in the region, three **Rare / Low Density** species occur namely Potchefstroom blue, Marsh Sylph and Hilltop Hopper. The lack of marshy habitat (supporting stands of *Leersia hexandra*) and rocky outcrops preclude the presence of Marsh Sylph and Hilltop Hopper respectively. Potchefstroom Blue (recognised as a **Globally LC Rare Habitat Specialist**) may occur, but it is unlikely that the project will adversely affect this species as large tracts of suitable habitat occur to the west of Koraalboom Road.

A wealth of odonata species occur in the region but most are likely to be concentrated around dams pans, wetlands and riparian areas associated with significant watercourses in the area such as the Apies and Tshwane River systems. On site only a small subset of species that occupy habitats in gardens, around pools and generally away from natural waterbodies are likely to be encountered. Included in **Appendix 7** is a list of the 18 potentially occurring odonata species none of which are of conservation importance nor do any represent a high Dragonfly Biotic Index rating.

Approximately six scorpion species occur regionally. However, two of these namely *Parabuthus mossambicensis* and *P. transvaalicus* are considered to have a low likelihood of occurrence based on marginal distribution and suboptimal substrate conditions. Species whose distribution overlaps the study area and for which suitable habitat exists includes, *Pseudolychas pegleri*, the stinger scorpions *Uroplectes carinatus*, *U. vittatus* and *U. triangulifer* (most likely) and the burrowing scorpions *Opisththalmus pugnax* and *O. glabifrons*. The latter two were formerly recognised as Protected under the old ToPS (2007) but have since been omitted from the ToPS (2015) lists.



Dippenaar-Schoeman (2002) lists four baboon spider species for Gauteng (**Appendix 8**). As with the aforementioned scorpion species although *Harpactira* and *Pterinochilus* spp. were formerly recognised as Protected under the old ToPS (2007) they have since been removed from the ToPS (2015) lists. Despite extensive searching no baboon spiders nor their burrows were detected on site although they are very likely present.

**Table 7-12 Present and potentially occurring CI arachnid species**

SPECIES & FAMILY <sup>2,3</sup>	COMMON NAME <sup>2,3</sup>	STATUS <sup>1</sup>	LO <sup>2,3</sup>
<b>BUTHIDAE</b>			
<i>Parabuthus mossambicensis</i>	Thick-tailed scorpions	-	4
<i>Parabuthus transvaalicus</i>	Thick-tailed scorpions		4
<i>Pseudolychas pegleri</i>	-	-	3
<i>Uroplectes carinatus</i>	Stinger scorpions	-	3
<i>Uroplectes vittatus</i>	Stinger scorpions		2
<i>Uroplectes triangulifer</i>	Stinger scorpions	-	2
<b>SCORPIONIDAE</b>			
<i>Opisththalmus pugnax</i>	Burrowing scorpions	PS*	2
<i>Opisththalmus glabifrons</i>	Burrowing scorpions	PS*	3
<b>THERAPHOSIDAE</b>			
<i>Harpactirella flavipilosa</i>	Botswana Lesser Baboon Spider	-	3
<i>Brachionopus pretoriae</i>	Pretoria Lesser Baboon Spider	-	3
<i>Harpactira hamiltoni</i>	Golden Starbust Baboon Spider	PS*	3
<i>Pterinochilus junodi</i>	Soutpansberg Starburst Baboon Spider	PS*	3
<b>Key</b>			
<b>Status:</b> NT = Near-threatened; PS = Protected Species; VU = Vulnerable			
<b>Likelihood of Occurrence (LoO):</b> 2 = High; 3 = Moderate; 4 = Low			
<b>Sources:</b> <sup>1</sup> ToPS (2007); <sup>2</sup> Leeming (2003); <sup>3</sup> Dippenaar-Schoeman (2002)			
*Old ToPS (2007) list status, ToPS (2015) no longer lists these species as Protected.			

## 8. Areas of Significance

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

### 8.1. International Areas of Conservation Significance

On an International level the site does not fall into any:

- *Ramsar Sites*
- *World Heritage Sites*
- *Important Bird Areas (IBAs)*

### 8.2. National and Regional Areas of Conservation Significance

As inferred in the preceding legislation section of this report, a number of biodiversity features in the region, which are of recognized national or provincial conservation importance, require consideration.

#### 8.2.1 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 is situated in the Bushveld Bankenveld Priority Area (**Figure 8-2**).

A list of Threatened Ecosystems within each terrestrial Priority Area was gazetted on 9 December 2011 under the NEM:BA (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 **does not** fall within any of the Threatened Ecosystems.

#### 8.2.2 Freshwater Ecosystem Priority Areas

South African National Biodiversity Institute (SANBI), in collaboration with DWA, Department of Environmental Affairs (DEA), Water Research Commission (WRC), South African National Parks (SANParks), Worldwide Fund for Nature (WWF), Council for Scientific and Industrial Research (CSIR), South African Institute for Aquatic Biodiversity (SAIAB) and the National Research Foundation (NRF) have prioritised Freshwater systems in the country with an aim to incorporate conservation into Catchment Management Strategies (Nel *et al.* 2011).



According to Freshwater Ecosystem Priority Areas (FEPAs) for the country, the Tshwane River adjacent to the proposed development is not a FEPA as indicated in **but it becomes a Phase 2 FEPA River further downstream after the confluence with the Pienaars River (Driver et al. 2011).**

Driver *et al.* (2011) state that Phase 2 FEPAs were identified in moderately modified rivers (C ecological category), only in cases where it was not possible to meet biodiversity targets for river ecosystems in rivers that were still in good condition (A or B ecological category). River condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once FEPAs in good condition (A or B ecological category) are considered fully rehabilitated and well managed.

### **8.2.3 GDARD – Conservation Plan**

The study site does not form part of Gauteng's C-Plan. However, according to the latest C-Plan, the Tshwane River has been identified as an Ecological Support Area (ESA) as indicated **Figure 8-3**. ESAs are not included as a management objective and only required to be maintained in a functional rather than intact state and hence they may not remain in a condition suitable for meeting biodiversity targets.

- Natural, near-natural or degraded areas required to be maintained in an ecologically functional state to support Critical Biodiversity Areas and/or Protected Areas. These include:
  - Remaining floodplain, corridor, catchment, wetland and other ecological process areas that have not been identified as Critical Biodiversity Areas but which need to be maintained in a functional state to prevent degradation of CBAs and Protected Areas.
- Areas with no natural habitat remaining, but which retain potential importance for supporting ecological processes.

In addition, Gauteng Province (GDARD, 2014) specifies for rivers that the riparian zones and buffer zones must be designated as sensitive with a minimum 100m buffer zone from the edge of the riparian zone for rivers/streams outside urban areas. This would apply to the Tshwane River. The site is over 500 m from the Tshwane River, so the buffer zone would not affect the development.

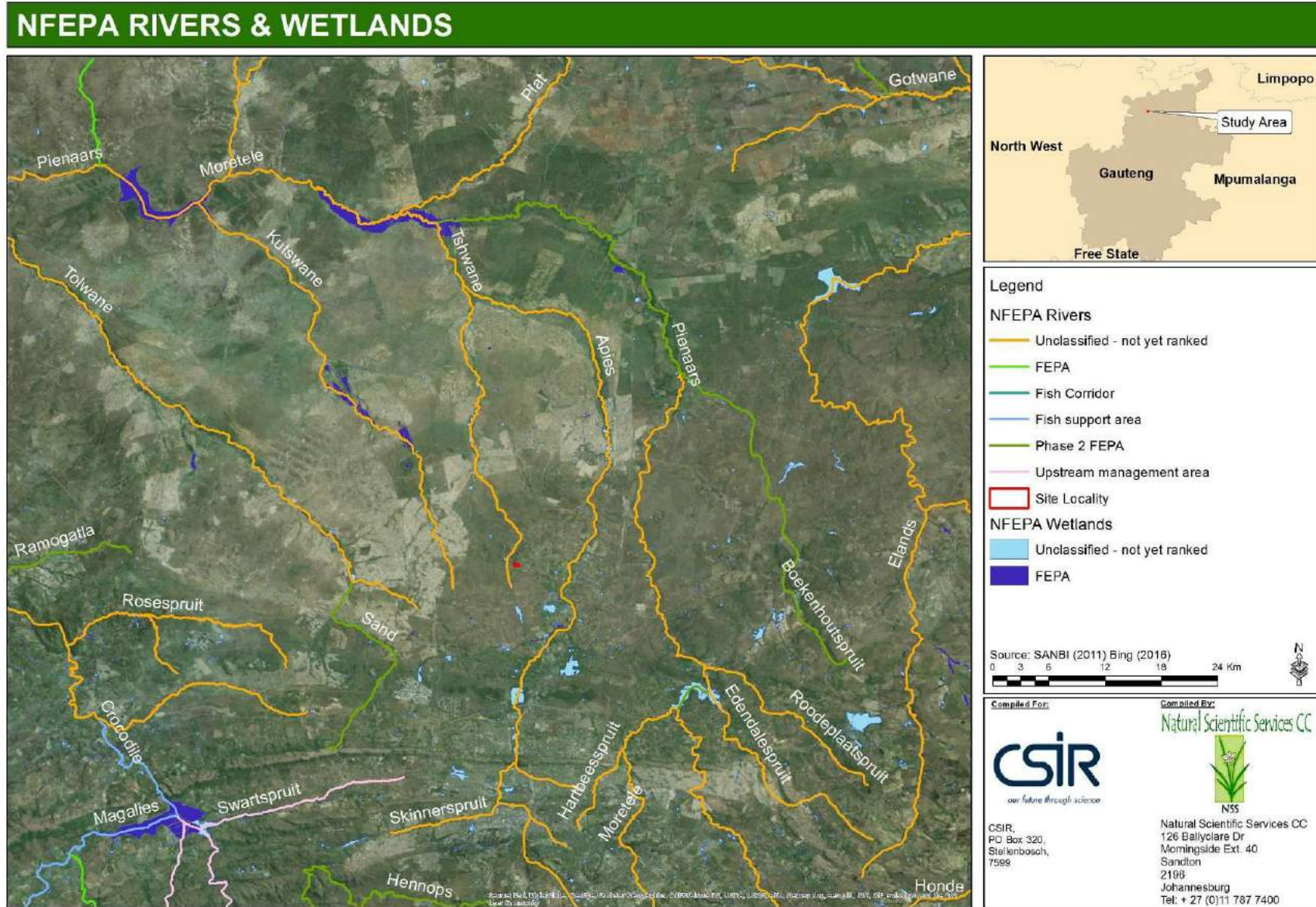


Figure 8-1 NFEPA Rivers and Wetlands

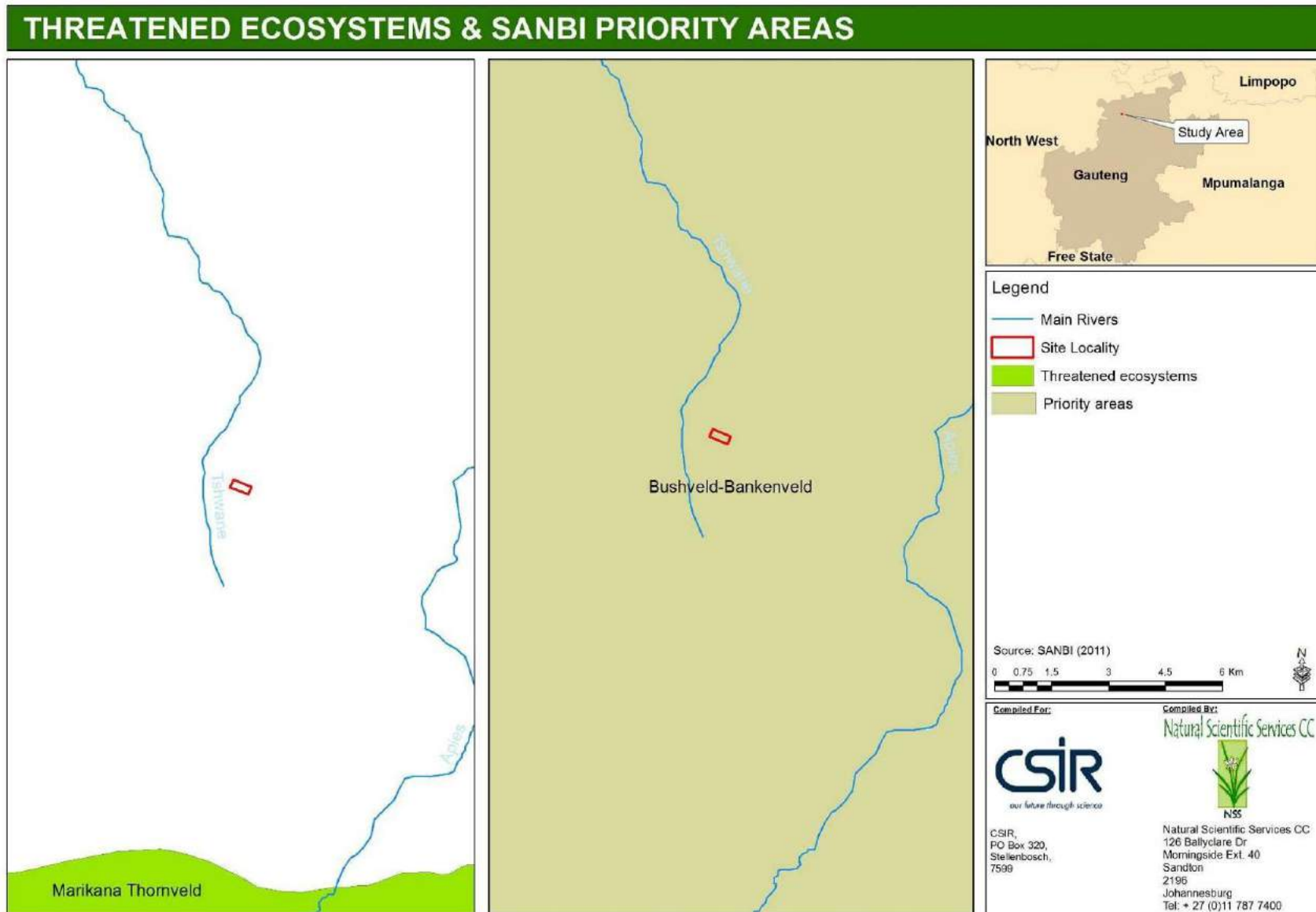


Figure 8-2 Threatened Ecosystems and SANBI Priority Areas

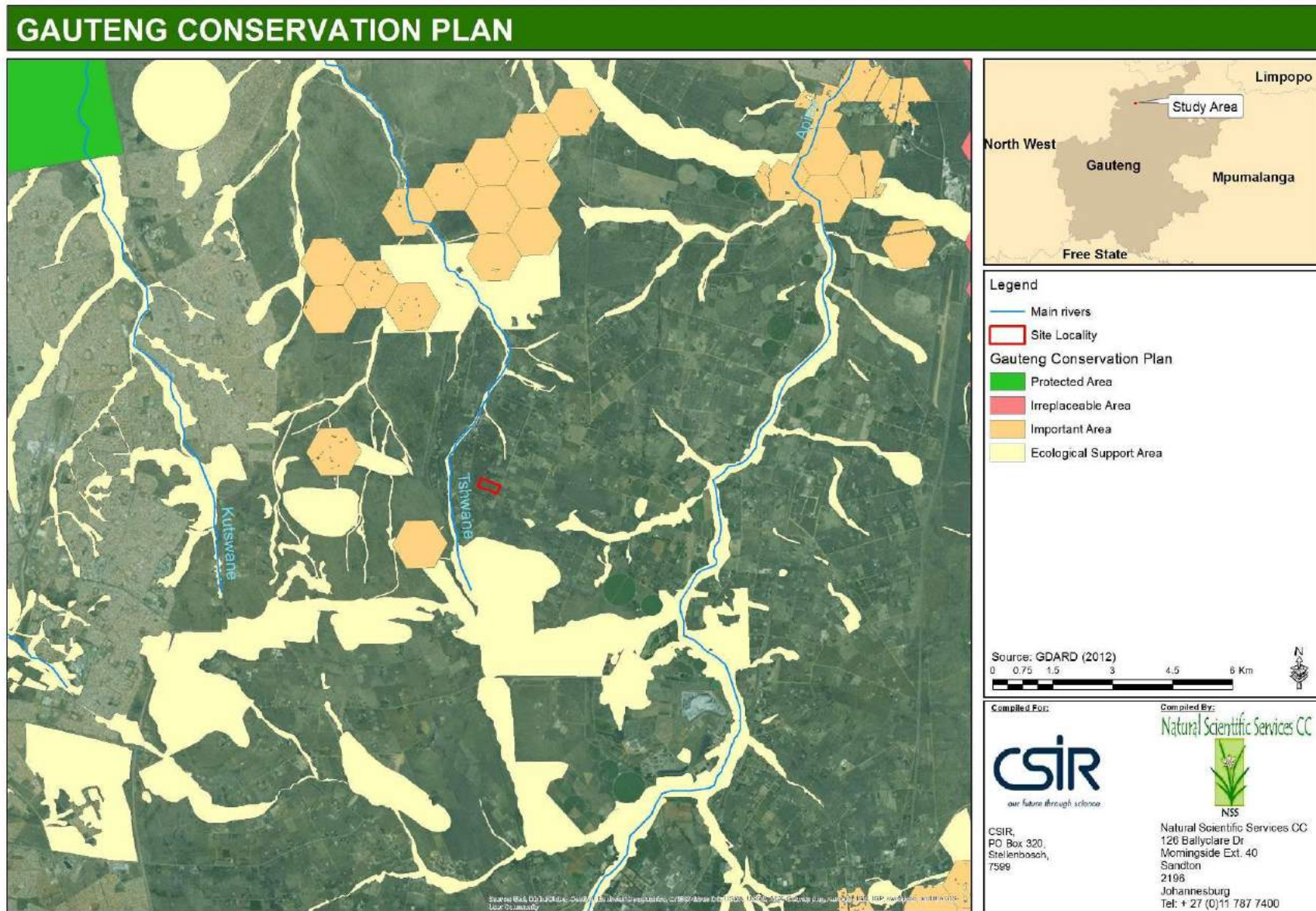


Figure 8-3 Gauteng Conservation Plan Version 3

### 8.3. Local Areas of Conservation Significance

A map was compiled based on the above and the ecological scan undertaken by NSS to depict local Areas of Significance for the conservation of terrestrial flora and fauna (**Figure 8-4**). Areas of significance include areas that have been highlighted because of their:

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

Identified habitat units within the study site were ranked into **High**, **Medium-high**, **Medium**, **Medium-low** or **Low** classes in terms of significance. This was undertaken according to a sensitivity-value analysis (scoring in **Table 8-1**) and included input based on knowledge of the area, on the ground investigations and experience when dealing with ecological systems and processes. A summary overview of scoring the Areas of Local Conservation Significance is presented in **Table 8-2** and illustrated in **Figure 8-4**.

**Table 8-1. Scoring Range for the Areas of Significance**

Category	Scoring Range	
	Upper	Lower
High	15	11
Moderate - High	10.9	7
Moderate	6.9	3
Moderate - Low	2.9	-1
Low	-1.1	-5
Low to None	No Rating (no habitat remains)	

**Table 8-2 Descriptions and ratings of the various Areas of Significance**

Vegetation Type	Ecological Sensitivity (Rating 1-5)	Conservation Value (Rating 1-5)	Presence of CI species* (Rating 1-5)	Level/Extent of Disturbance (Rating -1-5)	Total Score
<b>Woodland Habitats</b>					
<i>Acacia caffra</i> – <i>Combretum apiculatum</i> - <i>Heterpogon contortus</i> Open Woodland	Medium (3)	<ul style="list-style-type: none"> <li>Situated in A SANBI Priority Zone and the Vulnerable Central Sandy Bushveld</li> <li>Moderate Species Richness</li> <li>Unit is approximately 19.4% of the site (3)</li> </ul>	Lower Order Red List Species Present– Fauna & Flora (3)	<ul style="list-style-type: none"> <li>Limited Alien Invasives</li> <li>Some evidence of old buildings present (floor slabs remaining)</li> <li>Two track road bisects the unit (-1)</li> </ul>	<b>Medium-High (8)</b>
<i>Combretum zeyheri</i> Mixed Bushclumps	Medium (3)	<ul style="list-style-type: none"> <li>Situated in A SANBI Priority Zone and the Vulnerable Central Sandy Bushveld</li> <li>Moderate Species Richness</li> <li>Unit is approximately 44.2% of the site (3)</li> </ul>	Possible (1)	<ul style="list-style-type: none"> <li>Alien Invasives including <i>Cereus jamacaru</i> and <i>Lantana camara</i> L.</li> <li>Limited Anthropogenic influences (-2)</li> </ul>	<b>Medium (5)</b>
<i>Combretum apiculatum</i> – <i>Themeda triandra</i> Open Woodland	Medium (3)	<ul style="list-style-type: none"> <li>Situated in A SANBI Priority Zone and the Vulnerable Central Sandy Bushveld</li> <li>Moderate Species Richness</li> <li>Unit is approximately 19.2% of the site (3)</li> </ul>	Lower Order Red List Species Present– Fauna & Flora (2)	<ul style="list-style-type: none"> <li>Alien Invasives including <i>Gomphrena celosioides</i>; <i>Melia azedarach</i> and <i>Campuloclinium macrocephalum</i></li> <li>Limited Anthropogenic influences (-2)</li> </ul>	<b>Medium (6)</b>
<b>Transformed (Habitat In Recovery)</b>					
<i>Acacia-Heterpogon</i> Past Fields	Medium-Low (2)	<ul style="list-style-type: none"> <li>Situated in A SANBI Priority Zone and the Vulnerable Central Sandy Bushveld</li> <li>Moderate-Low Species Richness</li> <li>Unit is approximately 5% of the site (2)</li> </ul>	Possible (1)	<ul style="list-style-type: none"> <li>Limited Alien Invasives</li> <li>Past Fields in recovery (-2)</li> </ul>	<b>Medium (3)</b>
Mixed Buchclumps (including <i>Lantana camara</i> )	Medium-Low (2)	<ul style="list-style-type: none"> <li>Situated in A SANBI Priority Zone and the Vulnerable Central Sandy Bushveld</li> <li>Moderate-Low Species Richness</li> <li>Unit is approximately 2.5% of the site (2)</li> </ul>	Possible (1)	<ul style="list-style-type: none"> <li>Alien Invasives including <i>Agave sisalana</i>; <i>Lantana camara</i> and <i>Zinnia peruviana</i></li> <li>Limited Anthropogenic influences (-3)</li> </ul>	<b>Medium-Low (2)</b>
<b>Transformed</b>					



Vegetation Type	Ecological Sensitivity (Rating 1-5)	Conservation Value (Rating 1-5)	Presence of CI species* (Rating 1-5)	Level/Extent of Disturbance (Rating -1-5)	Total Score
Two-Track Road / Abandoned House/ Alien Patches	Low (1)	Limited Species diversity and Conservation Value (1)	Unlikely (0)	Highly transformed and extensive alien presence (-4)	Low (-2)

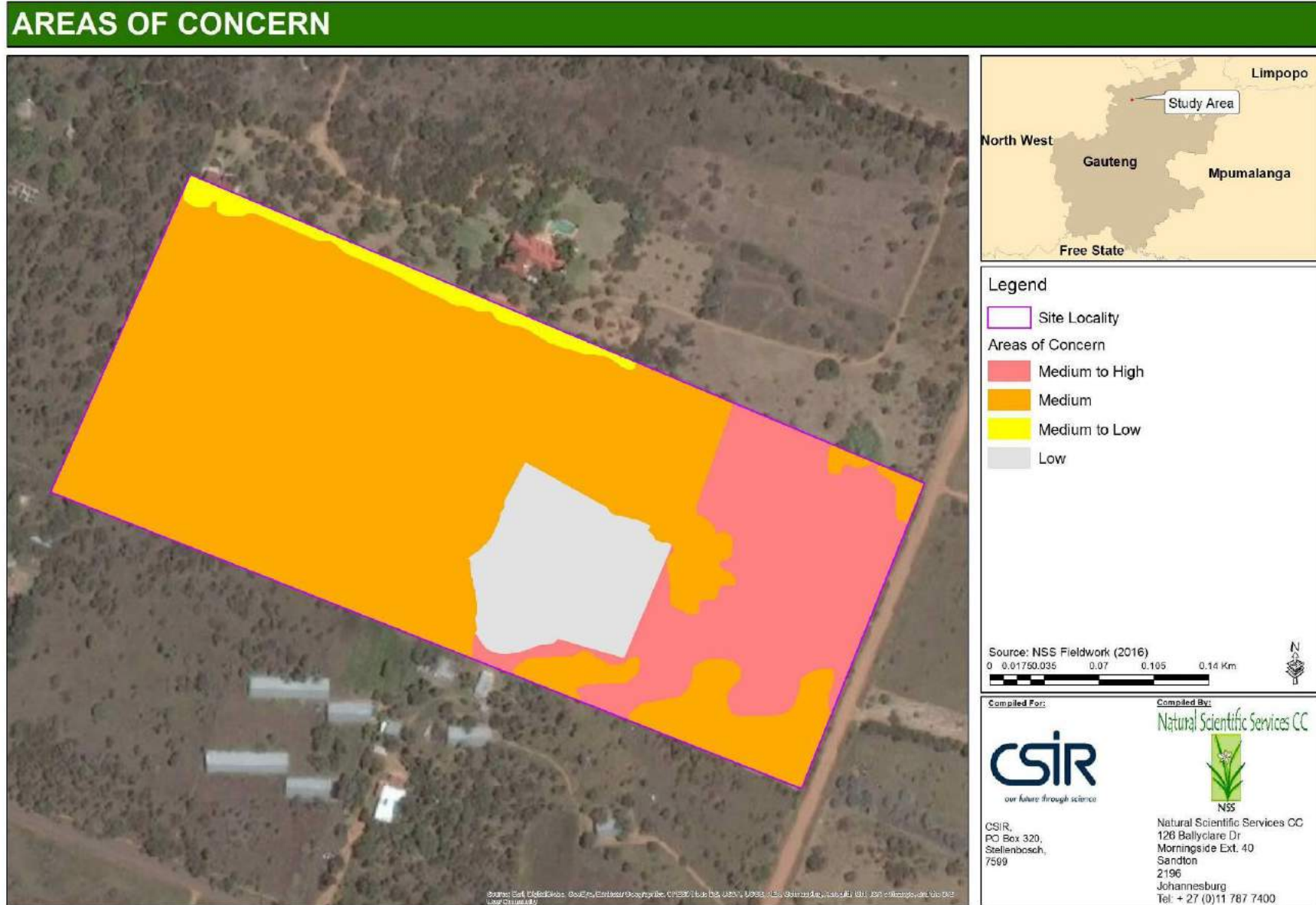


Figure 8-4 Local Areas of Conservation Significance

## 9. Impacts Assessment & Recommendations

Potential impacts of the proposed project on biodiversity are summarized in **Table 10-1**, and briefly discussed below, followed by recommended measures to mitigate these during relevant phases of the development.

### 9.1. Construction & Operation

#### 9.1.1 *Direct loss of terrestrial vegetation and faunal habitat*

Within the boundary of the site there will be a complete loss of Medium-High Significance habitat due to clearing and tilling of the entire site for the pig and vegetable (granadilla and spinach) production facility. Habitats to be lost are:

- *Acacia caffra* – *Combretum* – *Heteropogon* Open Savanna (Medium-High)
- *Combretum* Bushclumps (Medium)
- *Combretum* - *Themeda* Open Woodland (Medium)

Although these habitats will be lost, the overall fragmentation of these habitats as a whole is seen as negligible due to the scale of the development and its location within a peri-urban setting.

#### 9.1.2 *Loss / Reduction of CI or medicinal flora*

Site clearing will destroy CI and medicinally important species found on site such as *Boophone disticha* and *Hypoxis hemerocallidea* specifically in the *Acacia caffra* – *Combretum* – *Heteropogon* Open Savanna. During Operations, CI species individuals may be reduced due to harvesting by those entering the site. The probability, however, is considered to be low.

#### 9.1.3 *Introduction & proliferation of alien species leading to increased competition and change in habitat structure*

During construction the increase in aliens is likely to occur following an increase in vehicles, people and materials, as well as any site disturbance in the absence of any control measures. Species such as *Lantana* are already prolific and *L. camara* invasion has the potential to deplete the soil seed bank of other species (Ruwanzaa, 2016).

During Operation an increase could occur from seeds in excess fodder, pig effluent as well as from influx of vehicles etc, and lack of alien species control.

#### 9.1.4 *Faunal Mortality and Displacement (including CI species)*

Loss or displacement of fossorial and less mobile species is probable as a result of site clearing and continuous movement of vehicle traffic. To a lesser extent, this impact extends to snaring and poaching. An potential example is the Giant Bullfrog (NT). This species is highly likely to occur within the area and therefore aestivating individuals may be unearthed

during construction/operation and dispersing frogs may enter site during the rainy season. if present this species will be prone to persecution.

### **9.1.5 Increase in dust and erosion degrading habitat integrity**

Earth moving activities is during the clearing of vegetation for the piggery and tilling of the land for vegetable production is likely to increase the prevalence of bare ground, increase dust and the land's susceptibility to erosion. Due to the area surrounding the property being relatively natural this impact is seen to have a **Medium** significance.

### **9.1.6 Sensory disturbances**

Sensory Disturbances to fauna such as noise, dust and light pollution generated during construction will cause most species (with the exception of less mobile or fossorial species) to vacate the site.

During Operation, sensory disturbances to fauna on site may be caused by noise from the pigs and vehicles, light pollution and general effluent / waste . These may affect behavioural patterns and interfere with important life history patterns such as breeding, lekking etc. It is likely that medium to large mammals particularly carnivores as well as large terrestrial birds will be the most adversely affected. Although a certain spectrum of common and generally commensal species may be tolerant of (Hadedda, House, Grey-headed and Cape Sparrows) or even attracted to such disturbances (E.g. Cape Serotine and Egyptian Free-tailed Bats).

## **9.2. Specific Operational Impacts**

### **9.2.1 Environmental contamination**

Various contaminants are present in pig effluents 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 and chemicals (herbicides and pesticides) or fertilizers used for vegetable production or any other operational waste will result in the contamination / eutrophication of soils and eventually, by means of groundwater (most likely) or surface flow (less likely), result in the contamination of adjacent watercourses (Tshwane River closest at 640 m west).

### **9.2.2 Poor / Inappropriate control of invertebrate pests**

Substandard animal husbandry / hygiene and waste generation in the form of pig effluent, excess fodder and fertiliser has the potential, if improperly managed, to create ideal breeding and gathering grounds significant numbers of invertebrate pests such as flies, weevils, ants, termites, cockroaches, fleas, lice, mites, ticks, etc.

### **9.2.3 Poor / Inappropriate control of vertebrate pests**

As above poor waste management and pig hygiene practices will result in an influx of vertebrate pests such as rodents (Black Rat, House Mouse), carnivores (Black-backed



Jackal, dogs, cats) and birds (Common Mynah, Pied Crow, Sacred Ibis and Glossy Ibis, Cattle Egret and Black-headed Heron). These species could also outcompete with the fauna of the area.

#### 9.2.4 *Transmission of diseases*

The transmission of disease could either be directly from the pigs and their effluent or indirectly from an increase in the prevalence of the aforementioned pests acting as vectors. This could have an impact on the population dynamics of the surrounding fauna in the area.

#### 9.2.5 *Increased burning - degrading habitat integrity/ Destruction of Species*

Due to more frequent fire break and carcass burning to which poses a risk to human and infrastructure safety, in this peri-urban setting, an increase in species mortalities could occur and well as a change in vegetation and habitat structure within and surrounding the site.

### 9.3. Decommissioning Phase

Two main impacts could occur within the Decommissioning phase. These are highlighted below:

#### 9.3.1 *Introduction & proliferation of alien spp. - Competition and change in structure*

If no rehabilitation and monitoring efforts are implemented, alien species could continue to increase and spread specifically around the fallow croplands and around building remnants.

#### 9.3.2 *Sensory disturbances*

Continued disturbances to fauna could occur during the Decommissioning Phase due to vehicle and human activity, noise and dust. These are considered to be short term and reversible.

### 9.4. Management and Mitigatory Recommendations

Management and Mitigatory Recommendations are highlighted **Table 10-2** below. With Mitigation measures implemented, the significance of most impacts on site from an ecological perspective are reduced to a **Low Significance** as highlighted in below.

**Table 9-1 A Summary of Impacts and Significance with Mitigation**

POTENTIAL IMPACTS	SIGNIFICANCE	SIGNIFICANCE
	RATING	RATING
CONSTRUCTION	With	Without
<i>Direct loss of terrestrial vegetation and faunal habitat</i>	High	Medium
<i>Loss of CI or medicinal flora</i>	Medium	Low
<i>Introduction &amp; proliferation of alien spp.</i>	High	Low
<i>Faunal Mortality and Displacement (including CI species)</i>	Medium	Low

POTENTIAL IMPACTS	SIGNIFICANCE	SIGNIFICANCE
	RATING	RATING
<i>Increase in dust and erosion degrading habitat integrity</i>	Medium	Low
<i>Sensory disturbances</i>	Medium	Low
<b>OPERATION</b>		
<i>Environmental contamination</i>	Medium	Low
<i>Poor / Inappropriate control of invertebrate pests</i>	High	Low
<i>Poor / Inappropriate control of vertebrate pests</i>	Medium	Low
<i>Transmission of diseases</i>	Medium	Low
<i>Reduction in CI Species - Harvesting of CI or medicinal flora</i>	Low	Low
<i>Increased burning - degrading habitat integrity/ Destruction of Species</i>	High	Medium
<i>Introduction &amp; proliferation of alien spp. - Competition and change in structure</i>	High	Low
<i>Sensory disturbances</i>	Medium	Low
<b>DECOMMISSIONING</b>		
<i>Introduction &amp; proliferation of alien spp. - Competition and change in structure</i>	High	Low
<i>Sensory disturbances</i>	Low	Low

## 10. Concluding Remarks

With the implementation of the mitigation measures suggested in this report, the significance of most impacts on site from an ecological perspective are considered to be of **Low Significance**. Based on the information available to date, with the brief field scan of the site, it is NSS's opinion that there are no fatal flaws to the project and that provided the mitigation set out is adhered to and that the developer shows commitment to the sustainable development, NSS have no objections to the project going forward.

**Table 10-1 Impact Assessment**

POTENTIAL IMPACTS	MITIGATION	STATUS	EXTENT		DURATION		INTENSITY		REVERSIBILITY	IRREPLACEABILITY	PROBABILITY		SIGNIFICANCE		CONFIDENCE	
			RATING	SCORE	RATING	SCORE	RATING	SCORE			RATING	SCORE	RATING	SCORE	RATING	SCORE
<b>CONSTRUCTION</b>																
<b>Direct loss of terrestrial vegetation and faunal habitat</b>																
Complete loss of Medium-High Significance habitat due to clearing and tilling of the entire site for a pig and vegetable (granadilla and spinach production facility (CSIR pers comm). Habitats to be lost are: • <i>Acacia caffra</i> – <i>Combretum</i> – <i>Heteropogon</i> Open Savanna (Medium-High) • <i>Combretum</i> Bushclumps (Medium) • <i>Combretum</i> - <i>Themeda</i> Open Woodland	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Moderate reversibility	Low irreplaceability	Definite (>90% chance)	1	<b>High</b>	14	High	3
	The overall loss and/ or fragmentation of these habitats as a whole is seen as negligible due to the scale of the development and its location within a peri-urban setting.	With	Negative	Site specific	1	Long term (>15 years)	4	Medium	4	Moderate reversibility	Low irreplaceability	Definite (>90% chance)	1	<b>Medium</b>	9	Medium
<b>Loss of CI or medicinal flora</b>																
Site clearing will displace CI and medicinally important species such as <i>Boophone disticha</i> and <i>Hyposis hemerocallidea</i> .	Without	Negative	Site specific	1	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	Moderate irreplaceability	Highly probable (50-90% chance)	0.75	<b>Medium</b>	5	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	Moderate reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0.25	<b>Low</b>	1	Medium	2
<b>Introduction &amp; proliferation of alien spp.</b>																
This is likely to occur following an increase in vehicles, people and materials, site disturbance in the absence of any control measures	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Low reversibility	Low irreplaceability	Definite (>90% chance)	1	<b>High</b>	10	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	<b>Low</b>	2	Medium	2
<b>Faunal Mortality and Displacement (including CI species)</b>																
Loss or displacement of fossorial and less mobile species is probable as a result of site clearing, blasting and continuous movement of vehicle traffic. To a lesser extent, this impact extends to snaring and poaching. <b>Present</b> - Short-snouted Elephant-shrew ( <b>DD</b> ), <b>Potential</b> - Southern African Hedgehog ( <b>NT</b> ) and Giant Bullfrog ( <b>NT</b> ). Although not detected during the survey, this species is highly likely to occur within the area and therefore aestivating individuals may be unearthed during construction/operation and dispersing frogs may enter site during the rainy season. If present this species will be prone to persecution.	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Low reversibility	Low irreplaceability	Highly probable (50-90% chance)	0.75	<b>Medium</b>	6	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Low	1	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	<b>Low</b>	3	Medium	2
<b>Increase in dust and erosion degrading habitat integrity</b>																
Earth moving activities is during the clearing of vegetation for the piggery and tilling of the land for vegetable production is likely to increase the prevalence of bare ground and the land's susceptibility to erosion.	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Moderate reversibility	Low irreplaceability	Highly probable (50-90% chance)	0.75	<b>Medium</b>	8	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Low	1	High reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	<b>Low</b>	3	Medium	2
<b>Sensory disturbances</b>																

POTENTIAL IMPACTS	MITIGATION	STATUS	EXTENT		DURATION		INTENSITY		REVERSIBILITY	IRREPLACEABILITY	PROBABILITY		SIGNIFICANCE		CONFIDENCE	
			RATING	SCORE	RATING	SCORE	RATING	SCORE			RATING	SCORE	RATING	SCORE	RATING	SCORE
Sensory Disturbances to fauna such as noise, dust and light pollution generated during construction will cause most species (with the exception of less mobile or fossorial species) to vacate the site.	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Low reversibility	Low irreplaceability	Highly probable (50-90% chance)	0.75	Medium	6	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	Low	2	High	3
<b>OPERATION</b>																
<b>Environmental contamination</b>																
Various contaminants are present in pig effluents including nutrients, pathogens, veterinary pharmaceuticals (including <i>inter alia</i> antibiotics) and naturally excreted hormones. Inappropriate slurry management and improper disposal of carcasses as well as excess fodder and chemicals (herbicides and pesticides) or fertilizers used for vegetable production or any other operational waste will result in the contamination / eutrophication of soils and eventually, by means of groundwater (most likely) or surface flow (less likely), result in the contamination of adjacent watercourses (Tshwane River closest at 640 m west) due to effluent from pigs, carcasses and excess fodder as well as from any chemicals or fertilizers used for vegetable production or any other operational waste	Without	Negative	Regional (within 30km of site)	3	Long term (>15 years)	4	Medium	4	Low reversibility	Moderate irreplaceability	Probable (25-50% chance)	0.5	Medium	6	Low	1
	With	Negative	Local (<2km from site)	2	Short term (2-5 years)	2	Low	1	High reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0.25	Low	1	Medium	2
<b>Poor / Inappropriate control of invertebrate pests</b>																
Substandard animal husbandry / hygiene and waste generation in the form of pig effluent, excess fodder and fertiliser has the potential, if improperly managed, to create ideal breeding and gathering grounds significant numbers of invertebrate pests such as flies, weavils, ants, termites, cockroaches, fleas, lice, mites, ticks, etc.	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Low reversibility	Low irreplaceability	Highly probable (50-90% chance)	0.75	High	11	High	3
	With	Negative	Site specific	1	Medium term (5-15 years)	3	Medium-low	2	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	Low	3	Medium	2
<b>Poor / Inappropriate control of vertebrate pests</b>																
As above poor waste management and pig hygiene practices will result in an influx of vertebrate pests such as rodents (Black Rat, House Mouse), carnivores (Black-backed Jackal, dogs, cats) and birds (Common Mynah, Pied Crow, Sacred Ibis and Glossy Ibis, Cattle Egret and Black-headed Heron)	Without	Positive	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Low reversibility	Low irreplaceability	Highly probable (50-90% chance)	0.75	Medium	8	High	3
	With	Positive	Site specific	1	Medium term (5-15 years)	3	Low	1	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	Low	3	Medium	2
<b>Transmission of diseases</b>																
Either directly from the pigs and their effluent or indirectly from an increase in the prevalence of the afore mentioned pests acting as vectors	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	Medium	7	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	Low	1	Medium	2
<b>Reduction in CI Species - Harvesting of CI or medicinal flora</b>																
Due to increased human activity	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Low reversibility	Moderate irreplaceability	Low probability (10-25% chance)	0.25	Low	3	High	3



POTENTIAL IMPACTS	MITIGATION	STATUS	EXTENT		DURATION		INTENSITY		REVERSIBILITY	IRREPLACEABILITY	PROBABILITY		SIGNIFICANCE		CONFIDENCE	
			RATING	SCORE	RATING	SCORE	RATING	SCORE			RATING	SCORE	RATING	SCORE	RATING	SCORE
	With	Negative	Site specific	1	Short term (2-5 years)	2	Low	1	High reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	Low	1	Medium	2
<b>Increased burning - degrading habitat integrity/ Destruction of Species</b>																
Due to more frequent fire break and carcass burning to which poses a risk to human and infrastructure safety, in this peri-urban setting	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Moderate reversibility	Low irreplaceability	Definite (>90% chance)	1	High	10	High	3
	With	Negative	Site specific	1	Short term (2-5 years)	2	Medium-low	2	Moderate reversibility	Low irreplaceability	Definite (>90% chance)	1	Medium	5	Medium	2
<b>Introduction &amp; proliferation of alien spp. - Competition and change in structure</b>																
From seeds in excess fodder, pig effluent as well as from influx of vehicles, people and materials, site disturbance, and lack of alien species control	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium	4	Low reversibility	Moderate irreplaceability	Definite (>90% chance)	1	High	10	High	3
	With	Negative	Site specific	1	Short term (2-5 years)	2	Medium-low	2	High reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	Low	1	Medium	2
<b>Sensory disturbances</b>																
Sensory Disturbances to fauna on site may be caused by noise from the pigs and vehicles, light pollution and general effluent / waste . These may affect behavioural patterns and interfere with important life history patterns such as breeding, lekking etc. It is likely that medium to large mammals particularly carnivores as well as large terrestrial birds will be the most adversely affected. Although a certain spectrum of common and generally commensal species may be tolerant of (Hadedda, House, Grey-headed and Cape Sparrows) or even attracted to such disturbances (E.g. Cape Serotine and Egyptian Free-tailed Bats)	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	Medium-low	2	Low reversibility	Low irreplaceability	Definite (>90% chance)	1	Medium	8	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Medium-low	2	High reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	Low	4	Medium	2
<b>DECOMMISSIONING</b>																
<b>Introduction &amp; proliferation of alien spp. - Competition and change in structure</b>																
Following decommissioning especially in the fallow croplands and around building remnants	Without	Negative	Local (<2km from site)	2	Long term (>15 years)	4	High	8	Low reversibility	Low irreplaceability	Definite (>90% chance)	1	High	14	High	3
	With	Negative	Site specific	1	Long term (>15 years)	4	Medium-low	2	Moderate reversibility	Low irreplaceability	Probable (25-50% chance)	0.5	Low	4	Medium	2
<b>Sensory disturbances</b>																
During demolition of old buildings due to vehicle and human activity, noise and dust	Without	Negative	Local (<2km from site)	2	Temporary (<2 years)	1	Medium-low	2	Moderate reversibility	Low irreplaceability	Highly probable (50-90% chance)	0.75	Low	4	High	3
	With	Negative	Site specific	1	Temporary (<2 years)	1	Low	1	High reversibility	Low irreplaceability	Low probability (10-25% chance)	0.25	Low	1	Medium	2

Table 10-2 Mitigation Measures

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	MONITORING / METHODOLOGY	FREQUENCY	RESPONSIBILITY
<b>CONSTRUCTION</b>				
<b>Direct loss of terrestrial vegetation and faunal habitat</b>				
Loss of habitat through clearing is inevitable. Preliminary background information provided by the CSIR suggests that most if not all of the site will be complete transformed. The objective therefore is minimise the disturbance footprint and spill over / edge effects on surrounding habitat.	Restrict all habitat loss and disturbances from construction activities to within the proposed and agreed upon site layout.	Revise the planned layout of the facility and all associated infrastructure to avoid all High sensitive areas as far as possible.	During design	CSIR / Pacific Ora (Pty) Ltd management
		Clearly demarcate or fence in the construction site. specimens that are situated in the construction footprint, according to the advice of an appropriate specialist	Pre-construction	CSIR / Pacific Ora (Pty) Ltd management
	Maintain the viability of the indigenous seed bank in excavated soil so that this can be used for subsequent re-vegetation of any disturbed areas. No landscaping should be performed around the facilities.	Commence (and preferably complete) construction during winter, when the risk of disturbing growing plants should be least.	During construction	Pacific Ora (Pty) Ltd management, Construction Crew
		Briefly and effectively stockpile topsoil preferably 1-1.5m in height. Natural vegetation must be allowed to recover in areas of disturbance. 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	Pacific Ora (Pty) Ltd management, Construction Crew, with advice from a floral specialist
Minimise unnecessary loss of large trees.	Identify and mark large trees both on the ground and digitally to facilitate the incorporation of as many large trees into the final project layout as possible. Wherever possible endeavour to conserve large trees in situ.	Design / pre-construction	Pacific Ora (Pty) Ltd management, Construction Crew, with advice from a floral specialist	
<b>Loss of CI or medicinal flora</b>				
To minimise loss of CI or medicinally important plant species in accordance with law and best practice and encourage rehabilitation	Adhere to law and best practice guidelines regarding the displacement of CI and medicinally important floral species.	Submit permits for the removal of CI important species within the study site.	Pre-construction	CSIR / Pacific Ora (Pty) Ltd management
		Prior to construction all CI and medicinally important floral specimens within the site layout footprint should be collected and stored for replanting in surrounding areas or later during rehabilitation of certain areas.	Pre-construction	Botanist / horticulturist
		Guidance from a suitably qualified vegetation specialist or horticulturist regarding the collection, propagation/storage and transplantation of plants is advised.	During construction	Botanist / horticulturist
<b>Faunal Mortality and Displacement (including CI species)</b>				
To reduce mortality rates and continued displacement of fauna in surrounding areas	Adhere to law and best practice guidelines regarding the displacement and relocation of CI fauna	Prior to construction commission a suitably qualified ecologist to remove and relocate species to suitable surrounding habitats. E.g. All termitaria within the project footprint should be carefully searched for Striped Harlequin Snakes. Grass should also be searched for grass lizards and these searches should continue into the night for hedgehogs.	Pre-construction	Zoologist/Ecologist
		Appropriately deal with fauna encountered on site.	All Phases	Pacific Ora (Pty) Ltd management
	Ensure that staff are trained and properly equipped to safely handle fauna (particularly snakes and bullfrogs) or that the services of a trained professional are readily available on call.	All Phases	Pacific Ora (Pty) Ltd management/ External Ecologist	
		Time construction activities to minimise faunal mortality	Construction activities should be timed to start (and preferably end) during winter, when activity levels and the presence of breeding and migratory species are lowest. Bullfrogs are, however a concern in this regard as overwintering individuals may be unearthed during construction activities.	Pre-construction
	Limit indiscriminate killing, persecution or hunting of fauna.	Check open trenches for trapped animals (e.g. bullfrogs, hedgehogs and snakes), which should be carefully caught and relocated according to the specifications of a relevant specialist.	Daily during construction	Pacific Ora (Pty) Ltd management, Construction Crew
			All Phases	Pacific Ora (Pty) Ltd management
		Prohibit the introduction of domestic animals such as dogs and cats.	All Phases	Pacific Ora (Pty) Ltd management/ External Ecologist (Advisory Capacity)
			Routinely walk fence lines to remove snares.	All Phases
<b>Introduction &amp; proliferation of alien spp. - Competition and change in structure</b>				
To minimise the establishment and spread of alien and invasive species	Regulate / limit access by potential vectors of alien plants.	Carefully regulate / limit access by vehicles and materials to the construction site. Demarcate or fence in the construction area.	Prior to and during construction	Pacific Ora (Pty) Ltd management / Farm Management

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	MONITORING /METHODOLOGY	FREQUENCY	RESPONSIBILITY
during construction.		Prohibit the introduction of domestic animals such as dogs and cats.	All Phases	Pacific Ora (Pty) Ltd management
		If any landscaping is to be done -Only plant locally indigenous flora	All Phases	Pacific Ora (Pty) Ltd management / horticulturist
	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	Pacific Ora (Pty) Ltd management, Construction Crew
	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site must require a permit.	Mechanical removal of these species is recommended. However, the removal must be carefully performed so as to not excessively disturb the soil layer	During construction	Pacific Ora (Pty) Ltd management, Construction Crew
<b>Increase in dust and erosion</b>				
To limit dust and erosion	Implement effective measures to control dust and erosion	Limit vehicles, people and materials to the construction site.	During construction	Pacific Ora (Pty) Ltd management, Construction Crew
		Commence (and preferably complete) construction during winter, when the risk of erosion should be least.	During construction	
		Revegetate denude areas with locally indigenous flora a.s.a.p.	During construction	
		Erosion protection measures must be implemented on the site to reduce erosion and sedimentation of the receiving environment. Measures could include bunding around soil stockpiles; and vegetation of areas not to be developed.	Where and when necessary during construction	
		Adequate dust control strategies should be applied to minimise dust deposition, for example: Periodic spraying of the entrance road and environmentally-friendly dust control measures (e.g. mulching and wetting) where and when dust is problematic	Where and when necessary during construction	
<b>Sensory disturbances</b>				
Minimise sensory disturbance surrounding faunal communities	Appropriately time construction activities to minimise sensory disturbance to fauna.	Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	During construction	Pacific Ora (Pty) Ltd management, Construction Crew
	Limit disturbances caused by noise	Noise should also be minimised throughout construction to limit the impact on sensitive fauna such as owls and large terrestrial birds such as korhaans and Secretarybirds.	Prior to and during construction	Pacific Ora (Pty) Ltd management, Construction Crew
	Limit disturbances caused by light	Limit construction activities to day time hours.	Daily	Pacific Ora (Pty) Ltd management, Construction Crew
		Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna.	During construction	Construction Crew
<b>OPERATION</b>				
<b>Environmental contamination</b>				
No 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 that the pig houses and associated drains and slurry facility are designed and lined with impermeable substances (clay-type soils, geosynthetic plastic, or concrete) in accordance with advice from suitably qualified agricultural experts and international best practice norms.	During design	CSIR / Pacific Ora (Pty) Ltd management/ Agricultural experts
		Adhere to best practice pig husbandry and waste disposal norms .	Throughout Operation	CSIR / Pacific Ora (Pty) Ltd management/ Agricultural experts
		Incorporate effective storm water management design aspects into the infrastructure plan	During design	CSIR / Pacific Ora (Pty) Ltd management
		Ensure that if vehicles, equipment or visiting personnel are to be decontaminated make sure this is done in a designated area that can effectively contain excess disinfectants / biocides / surfactants.	Throughout Operation	Farm Manager and Team
		Establish appropriate emergency procedures for accidental contamination of the surroundings. Waste recycling should be incorporated into the facility's operations as far as possible. Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medications.	Prior to operation	Pacific Ora (Pty) Ltd management and Farm Manager.

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	MONITORING / METHODOLOGY	FREQUENCY	RESPONSIBILITY
	Ensure that there are appropriate control measures in place for any contamination event.	Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate contamination and environmental specialists.		Pacific Ora (Pty) Ltd management and Farm Manager / External contamination specialists
		Educate workers regarding the handling of hazardous substances and about waste management and emergency procedures with regular training and notices and talks.	At least annually during operation	Pacific Ora (Pty) Ltd management and Farm Manager.
<b>Management of pest invertebrates</b>				
Highly localized pest invertebrate control that does not affect non-target populations or taxa	Detect and control pest infestations before they become a problem through frequent and careful cleaning, monitoring and control.	<ul style="list-style-type: none"> <li>• Rinse floors regularly</li> <li>• Provide sufficient ventilation and airflow to keep the pig house (floors, bedding, fodder) as dry as possible.</li> <li>• Check to see that fan louvers are properly working and close completely when the fan is not running.</li> <li>• Properly screed concrete floors to effectively seal all cracks and limit the pooling of effluent on site.</li> <li>• Use appropriately sloped and slated floors to facilitate drainage</li> <li>• Clean up excess fodder regularly from under troughs and feed bins</li> <li>• Effectively drain storm water from around pig houses</li> <li>• Keep areas surrounding pig houses free of spilled manure and litter</li> <li>• Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.</li> <li>• Keep grass and weeds mowed to 5cm or less immediately around the facilities, to prevent insect growth</li> <li>• Maintain a high capacity slurry dam and manage it properly.</li> <li>• Regularly empty slurry dam to prevent the accumulation of floating solids for extended periods of time (crust left on top of slurry soon become major breeding ground for flies)</li> <li>• Electrocuting devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.</li> </ul>	When necessary, during operation	Pacific Ora (Pty) Ltd management and Farm Manager and on-site team.
		Ensure that measures to control pest invertebrates 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.	When necessary, during operation	
<b>Management of pest vertebrates</b>				
Minimal and humane control of pest vertebrates that does not affect non-target individuals or taxa	Detect pest infestations before they become a problem through frequent and careful monitoring.	<ul style="list-style-type: none"> <li>• Manage and prevent access to fodder, especially feed wastage around the houses, feeders.</li> <li>• Control rodents through effective sanitation, rodent proofing and killing.</li> <li>• Glue boards and traps can be used in small areas, but in larger areas (over 12,000 sq ft) baits are more practical.</li> <li>• Rodenticides are not advised.</li> <li>• The most effective control for indigenous birds is screening production house air inlets and open windows with 2x2cm wire mesh.</li> </ul>	When necessary, during operation	Pacific Ora (Pty) Ltd management and Farm Manager
<b>Transmission of diseases</b>				
No transmission of diseases to wildlife	Ensure that pests and other potential vectors are unable to enter areas where they might encounter production animals, carcasses, excrement or bedding, by thoroughly sealing these areas using effective, humane and environmentally-friendly means.	Maintain the appropriate pest control measures	Life of operation particularly at the onset of the rainy season	
		Ensure that if vehicles, equipment or visiting personnel are to be decontaminated make sure this is done in a designated area that can effectively contain excess disinfectants / biocides / surfactants.	Throughout Operation	Farm Manager and Team
<b>Harvesting of CI or medicinal flora</b>				
No harvesting of CI flora	Harvesting of indigenous flora for medicine, fire wood, building materials, and other purposes must be prohibited.	Education of the Farm Management and team required prior to operation and with yearly refresher talks	When necessary, during operation	Farm Manager and Team
<b>Increased burning</b>				
No unnatural, annual or uncontrollable fires	Ensure that flammable materials are stored in an appropriate safe house. Ensure that there are appropriate control measures in place for any accidental	Create safe storage on the premises for flammable materials. If artificial burning is considered necessary, establish and implement a fire management plan with emergency fire procedures.	Prior to, and through operation	CSIR /Pacific Ora (Pty) Ltd management and Farm Manager

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	MONITORING / METHODOLOGY	FREQUENCY	RESPONSIBILITY
	fires. If artificial burning is considered necessary to reduce risks to human and infrastructure safety from wild fires, a fire management plan should be compiled with input from an appropriate floral specialist, and diligently implemented. Annual wild fires should be strictly prohibited.	Educate workers about the plan and emergency procedures with regular training and notices.	At least annually during operation	CSIR /Pacific Ora (Pty) Ltd management and Farm Manager
<b>Introduction &amp; proliferation of alien spp.</b>				
To minimise the establishment and spread of alien and invasive species during operation	Regulate / limit access by potential vectors of alien plants.	Carefully regulate / limit access by vehicles and materials to the site	Throughout Operation	Pacific Ora (Pty) Ltd management and Farm Manager
		Prohibit the introduction of domestic animals such as dogs and cats.		
		Only plant locally indigenous flora (if landscaping is to be implement)		
	Maintain a neat and tidy production facility	Employ best practices regarding the tilling of soil and weed management		Farm Management/Agricultural experts
		Minimise the accumulation or dispersal of excess fodder on site.		Farm Management
	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site must require a permit.	Mechanical removal of these species is recommended. However, the removal must be carefully performed so as to not excessively disturb the soil layer. Alien debris could be donated to a local community. Be especially pro-active around the pig effluent slurry dam, fodder loading bays as well as in and around the croplands.		CSIR /Pacific Ora (Pty) Ltd management and Farm Manager, with advice from a floral specialist
<b>Sensory disturbances</b>				
Minimise sensory disturbance surrounding faunal communities	Limit the effects of light pollution on nocturnal fauna (e.g. The potentially occurring Hedgehog and Rusty Pipistrelle but also various invertebrate species)	Ensure lighting is kept to an absolute minimum. All outdoor lights should be fitted with hoods and angled downwards (low beam angle not exceeding 90° above horizontal). Avoid lights with high UV content such as metal halide or mercury light sources (blue-white short wavelength lights). These are very attractive to insects and are known to have a significant negative affect on them (and consequently bats). Instead opt for bulbs emitting warm (long wavelength) yellow-red light. It is also possible to use UV filters or glass housings on lamps to filter out UV.	During design, construction and operation	Pacific Ora (Pty) Ltd management and Farm Manager
	Limit the affects of noise associated disturbances from pigs and operational activities on sensitive fauna such as owls and medium-large mammals (especially carnivores), potentially occurring hedgehogs and large terrestrial birds such as korhaans and Secretarybirds.	Mitigation of noise this situation is difficult but at least some level of success may be achieved by: <ul style="list-style-type: none"> <li>• Conducting regular maintenance of machinery and pig house ventilation systems / fans (if any)</li> <li>• Studies have shown that if feeding could be more automated and / or the stockmen discouraged from entering the houses during the first feed of the day, then daily noise exposure could be reduced by 6 to 8 dB(A).</li> </ul>	Prior to and during construction	Pacific Ora (Pty) Ltd management and Farm Manager/ External Noise Specialists
<b>DECOMMISSIONING</b>				
<b>Introduction &amp; proliferation of alien spp. - Competition and change in structure</b>				
Minimize introduction and effective control of alien species	By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site must require a permit.	Mechanical removal of these species is recommended. However, the removal must be carefully performed so as to not excessively disturb the soil layer.	Throughout decommissioning until all Category 1b and Category 2 alien species have been effectively removed from the site	Pacific Ora (Pty) Ltd management / Farm Management
<b>Sensory disturbances</b>				
Minimise sensory disturbance surrounding faunal communities during decommissioning	Appropriately time demolition / rehabilitation activities to minimise sensory disturbance to fauna.	Commence (and preferably complete) demolition / rehabilitation during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Throughout decommissioning	Project and Construction managers
	Limit disturbances caused by noise	Noise should also be minimised throughout decommissioning to limit the impact on sensitive fauna in surrounding habitats such as owls and large terrestrial birds such as korhaans and Secretarybirds.	Throughout decommissioning	Pacific Ora (Pty) Ltd management / Farm Management
	Limit disturbances caused by light	Limit demolition activities to day time hours.	Throughout decommissioning	Pacific Ora (Pty) Ltd management / Farm Management
		Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal fauna.	Throughout decommissioning	Pacific Ora (Pty) Ltd management / Farm Management

OBJECTIVE / TARGET	MITIGATION / MANAGEMENT ACTION	MONITORING / METHODOLOGY	FREQUENCY	RESPONSIBILITY
	Effectively control dust	Implement environmentally-friendly dust control measures (e.g. mulching and wetting) where and when dust is problematic	When necessary, during decommissioning	Pacific Ora (Pty) Ltd management / Farm Management
		Rehabilitate contaminated areas a.s.a.p. in accordance with advice from appropriate specialists. Implement the selected control measure(s) where dust is problematic. Revegetate denude areas with locally indigenous flora a.s.a.p.	Decommissioning onwards	Pacific Ora (Pty) Ltd management / Farm Management

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## 12. Appendices

### 12.1. Appendix 1 POSA Listed Species (2528AC – Representative Grid adjacent to Site)

Family	Species	Threat status	Growth forms
ACANTHACEAE	<i>Blepharis integrifolia</i> (L.f.) E.Mey. ex Schinz var. <i>integrifolia</i>	LC	Herb
ACANTHACEAE	<i>Blepharis serrulata</i> (Nees) Ficalho & Hiern	LC	Dwarf shrub
ACANTHACEAE	<i>Crabbea ovalifolia</i> Ficalho & Hiern	LC	Herb
ACANTHACEAE	<i>Dyschoriste transvaalensis</i> C.B.Clarke	LC	Dwarf shrub
ACANTHACEAE	<i>Justicia flava</i> (Vahl) Vahl	LC	Dwarf shrub
AMARANTHACEAE	<i>Achyroopsis leptostachya</i> (E.Mey. ex Meisn.) Baker & C.B.Clarke	LC	Herb
AMARANTHACEAE	<i>Aerva leucura</i> Moq.	LC	Herb
AMARANTHACEAE	<i>Pupalia lappacea</i> (L.) A.Juss. var. <i>lappacea</i>	LC	Herb
ANACARDIACEAE	<i>Sclerocarya birrea</i> (A.Rich.) Hochst. subsp. <i>caffra</i> (Sond.) Kokwaro	LC	Tree
ANACARDIACEAE	<i>Searsia leptodictya</i> (Diels) T.S.Yi, A.J.Mill. & J.Wen forma <i>leptodictya</i>	NE	Shrub, tree
ANACARDIACEAE	<i>Searsia pyroides</i> (Burch.) Moffett var. <i>pyroides</i>	LC	Shrub, tree
ANACARDIACEAE	<i>Searsia zeyheri</i> (Sond.) Moffett	LC	Shrub
ANTHERICACEAE	<i>Chlorophytum recurvifolium</i> (Baker) C.Archer & Kativu	LC	Herb
APOCYNACEAE	<i>Asclepias densiflora</i> N.E.Br.	LC	Herb
APOCYNACEAE	<i>Asclepias eminens</i> (Harv.) Schltr.	LC	Herb
APOCYNACEAE	<i>Brachystelma discoideum</i> R.A.Dyer	EN	Geophyte
APOCYNACEAE	<i>Gomphocarpus rivularis</i> Schltr.	LC	Shrub
APOCYNACEAE	<i>Huernia transvaalensis</i> Stent	LC	Succulent
APOCYNACEAE	<i>Sarcostemma viminale</i> (L.) R.Br. subsp. <i>viminale</i>	LC	Succulent
ARCHIDIACEAE	<i>Archidium acanthophyllum</i> Snider		Bryophyte
ASPARAGACEAE	<i>Asparagus exuvialis</i> Burch. forma <i>ecklonii</i> (Baker) Fellingham & N.L.Mey.	NE	Shrub
ASPHODELACEAE	<i>Aloe zebrina</i> Baker	LC	Succulent
ASTERACEAE	* <i>Acanthospermum australe</i> (Loefl.) Kuntze	NE	Herb
ASTERACEAE	* <i>Acanthospermum hispidum</i> DC.	NE	Herb
ASTERACEAE	<i>Artemisia afra</i> Jacq. ex Willd. var. <i>afra</i>	LC	Herb, shrub
ASTERACEAE	<i>Callilepis leptophylla</i> Harv.	DEC	Herb
ASTERACEAE	* <i>Conyza sumatrensis</i> (Retz.) E.Walker var. <i>sumatrensis</i>	NE	Herb
ASTERACEAE	<i>Denekia capensis</i> Thunb.	LC	Herb
ASTERACEAE	<i>Doellia cafra</i> (DC.) Anderb.	LC	Herb
ASTERACEAE	<i>Geigeria burkei</i> Harv. subsp. <i>burkei</i> var. <i>burkei</i>	LC	Herb
ASTERACEAE	<i>Haplocarpha scaposa</i> Harv.	LC	Herb
ASTERACEAE	<i>Helichrysum argyrosphaerum</i> DC.	LC	Herb
ASTERACEAE	<i>Helichrysum dasymallum</i> Hilliard	LC	Herb
ASTERACEAE	<i>Helichrysum setosum</i> Harv.	LC	Shrub
ASTERACEAE	<i>Kleinia fulgens</i> Hook.f.	LC	Succulent
ASTERACEAE	<i>Pentzia lanata</i> Hutch.	LC	Shrub
ASTERACEAE	<i>Pseudognaphalium oligandrum</i> (DC.) Hilliard & B.L.Burtt	LC	Herb
ASTERACEAE	<i>Senecio pleistocephalus</i> S.Moore	LC	Climber

Family	Species	Threat status	Growth forms
ASTERACEAE	<i>Vernonia fastigiata</i> Oliv. & Hiern	LC	Herb
BORAGINACEAE	<i>Ehretia rigida</i> (Thunb.) Druce subsp. <i>nervifolia</i> Retief & A.E.van Wyk	LC	Shrub
BRYACEAE	<i>Bryum pycnophyllum</i> (Dixon) Mohamed		Bryophyte
BUDDLEJACEAE	<i>Nuxia congesta</i> R.Br. ex Fresen.	LC	Shrub, tree
CAMPANULACEAE	<i>Wahlenbergia magaliesbergensis</i> Lammers	LC	Dwarf shrub
CAMPANULACEAE	<i>Wahlenbergia undulata</i> (L.f.) A.DC.	LC	Herb
CAPPARACEAE	<i>Boscia albitrunca</i> (Burch.) Gilg & Gilg-Ben.	LC	Shrub, tree
CAPPARACEAE	<i>Cleome monophylla</i> L.	LC	Herb
CARYOPHYLLACEAE	<i>Pollichia campestris</i> Aiton	LC	Herb
CELASTRACEAE	<i>Gymnosporia buxifolia</i> (L.) Szyszyl.	LC	Shrub, tree
CELASTRACEAE	<i>Gymnosporia tenuispina</i> (Sond.) Szyszyl.	LC	Shrub
CHRYSOBALANACEAE	<i>Parinari capensis</i> Harv. subsp. <i>capensis</i>	LC	Dwarf shrub
COMBRETACEAE	<i>Combretum apiculatum</i> Sond. subsp. <i>apiculatum</i>	LC	Shrub, tree
COMBRETACEAE	<i>Combretum imberbe</i> Wawra	LC	Shrub, tree
COMBRETACEAE	<i>Combretum molle</i> R.Br. ex G.Don	LC	Tree
COMBRETACEAE	<i>Combretum zeyheri</i> Sond.	LC	Shrub, tree
COMBRETACEAE	<i>Terminalia sericea</i> Burch. ex DC.	LC	Tree
COMMELINACEAE	<i>Aneilema hockii</i> De Wild.	LC	Herb
COMMELINACEAE	<i>Commelina africana</i> L. var. <i>lancispatha</i> C.B.Clarke	LC	Herb
COMMELINACEAE	<i>Commelina benghalensis</i> L.	LC	Herb
CONVOLVULACEAE	<i>Evolvulus alsinoides</i> (L.) L.	LC	Herb
CONVOLVULACEAE	<i>Ipomoea gracilispala</i> Rendle	LC	Herb
CONVOLVULACEAE	<i>Ipomoea magnusiana</i> Schinz	LC	Herb
CONVOLVULACEAE	<i>Ipomoea obscura</i> (L.) Ker Gawl. var. <i>obscura</i>	LC	Herb
CONVOLVULACEAE	<i>Seddera suffruticosa</i> (Schinz) Hallier f.	LC	Dwarf shrub
CONVOLVULACEAE	<i>Xenostegia tridentata</i> (L.) D.F.Austin & Staples subsp. <i>angustifolia</i> (Jacq.) Lejoly & Lisowski	LC	Herb
CRASSULACEAE	<i>Crassula lanceolata</i> (Eckl. & Zeyh.) Endl. ex Walp. subsp. <i>transvaalensis</i> (Kuntze) Toelken	LC	Succulent
CUCURBITACEAE	<i>Corallocarpus triangularis</i> Cogn.	LC	Climber
CUCURBITACEAE	<i>Cucumis zeyheri</i> Sond.	LC	Herb
CYPERACEAE	<i>Cyperus decurvatus</i> (C.B.Clarke) C.Archer & Goetgh.	LC	Cyperoid
CYPERACEAE	<i>Cyperus difformis</i> L.	LC	Cyperoid
CYPERACEAE	<i>Cyperus laevigatus</i> L.	LC	Cyperoid
CYPERACEAE	<i>Cyperus rubicundus</i> Vahl	LC	Cyperoid
CYPERACEAE	<i>Cyperus rupestris</i> Kunth var. <i>rupestris</i>	LC	Cyperoid
CYPERACEAE	<i>Cyperus sexangularis</i> Nees	LC	Cyperoid
EBENACEAE	<i>Euclea crispa</i> (Thunb.) Gürke subsp. <i>crispa</i>	LC	Shrub, tree
EUPHORBIACEAE	<i>Acalypha indica</i> L. var. <i>indica</i>	LC	Dwarf shrub
EUPHORBIACEAE	<i>Euphorbia inaequilatera</i> Sond.		Succulent
FABACEAE	<i>Acacia luederitzii</i> Engl. var. <i>retinens</i> (Sim) J.H.Ross & Brenan	LC	Shrub, tree
FABACEAE	<i>Acacia nilotica</i> (L.) Willd. ex Delile subsp. <i>kraussiana</i> (Benth.) Brenan	LC	Tree
FABACEAE	<i>Acacia tortilis</i> (Forssk.) Hayne subsp. <i>heteracantha</i> (Burch.) Brenan	LC	Shrub, tree
FABACEAE	<i>Dichrostachys cinerea</i> (L.) Wight & Arn. subsp. <i>africana</i> Brenan & Brummitt var. <i>setulosa</i> (Welw. ex Oliv.) Brenan & Brummitt	LC	Shrub, tree
FABACEAE	<i>Elephantorrhiza elephantina</i> (Burch.) Skeels	LC	Dwarf shrub
FABACEAE	<i>Indigofera heterotricha</i> DC.	LC	Dwarf shrub
FABACEAE	<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	LC	Shrub, tree
FABACEAE	<i>Peltophorum africanum</i> Sond.	LC	Tree
FABACEAE	<i>Rhynchosia albissima</i> Gand.	LC	Dwarf shrub
FABACEAE	<i>Rhynchosia densiflora</i> (Roth) DC. subsp. <i>chrysadenia</i> (Taub.) Verdc.	LC	Climber
FABACEAE	<i>Rhynchosia monophylla</i> Schltr.	LC	Herb
FABACEAE	<i>Stylosanthes fruticosa</i> (Retz.) Alston	LC	Dwarf shrub



Family	Species	Threat status	Growth forms
FABACEAE	<i>Tephrosia longipes</i> Meisn. subsp. <i>longipes</i> var. <i>longipes</i>	LC	Dwarf shrub
FABACEAE	<i>Tephrosia rhodesica</i> Baker f. var. <i>rhodesica</i>	LC	Dwarf shrub
FISSIDENTACEAE	<i>Fissidens rufescens</i> Homsch.		Bryophyte
GISEKIACEAE	<i>Gisekia africana</i> (Lour.) Kuntze var. <i>africana</i>	LC	Herb
HYACINTHACEAE	<i>Dipcadi viride</i> (L.) Moench	LC	Geophyte
HYDROCHARITACEAE	<i>Lagarosiphon muscoides</i> Harv.	LC	Hydrophyte
HYPOXIDACEAE	<i>Hypoxis iridifolia</i> Baker	LC	Geophyte
JUNCACEAE	<i>Juncus rigidus</i> Desf.	LC	Helophyte
LAMIACEAE	<i>Ocimum americanum</i> L. var. <i>americanum</i>	LC	Herb
LAMIACEAE	<i>Plectranthus neochilus</i> Schltr.	LC	Succulent
LAMIACEAE	<i>Rotheca louwalbertsii</i> (P.P.J.Herman)		
LAMIACEAE	P.P.J.Herman & Retief	LC	Herb
LAMIACEAE	<i>Teucrium trifidum</i> Retz.	LC	Herb
LAMIACEAE	<i>Vitex zeyheri</i> Sond.	LC	Tree
MALVACEAE	<i>Abutilon ramosum</i> (Cav.) Guill. & Perr.	LC	Herb, shrub
MALVACEAE	<i>Corchorus asplenifolius</i> Burch.	LC	Herb
MALVACEAE	<i>Dombeya rotundifolia</i> (Hochst.) Planch. var. <i>rotundifolia</i>	LC	Shrub, tree
MALVACEAE	<i>Grewia flava</i> DC.	LC	Shrub
MALVACEAE	<i>Grewia occidentalis</i> L. var. <i>occidentalis</i>	LC	Shrub, tree
MALVACEAE	<i>Hermannia floribunda</i> Harv.	LC	Dwarf shrub
MALVACEAE	<i>Hermannia grisea</i> Schinz	LC	Dwarf shrub
MALVACEAE	<i>Hermannia parvula</i> Burt & Davy	LC	Dwarf shrub
MALVACEAE	<i>Hermannia quartiniana</i> A.Rich.	LC	Herb
MALVACEAE	<i>Hibiscus sidiformis</i> Baill.	LC	Herb
MALVACEAE	<i>Melhanianthus acuminata</i> Mast. var. <i>acuminata</i>	LC	Dwarf shrub
MALVACEAE	<i>Melhanianthus prostrata</i> DC.	LC	Dwarf shrub
MALVACEAE	<i>Sida cordifolia</i> L. subsp. <i>cordifolia</i>	LC	Dwarf shrub
MALVACEAE	<i>Triumfetta sonderi</i> Ficalho & Hiern	LC	Dwarf shrub
MARSILEACEAE	<i>Marsilea macrocarpa</i> C.Presl	LC	Hydrophyte
NYCTAGINACEAE	<i>Commicarpus plumbagineus</i> (Cav.) Standl. var. <i>plumbagineus</i>	LC	Scrambler
ORCHIDACEAE	<i>Eulophia welwitschii</i> (Rchb.f.) Rolfe	LC	Geophyte
PARMELIACEAE	<i>Bulbothrix isidiza</i> (Nyl.) Hale		Lichen
PEDALIACEAE	<i>Dicerocaryum senecioides</i> (Klotzsch) Abels	LC	Herb
PEDALIACEAE	<i>Pterodiscus speciosus</i> Hook.	LC	Succulent
POACEAE	<i>Andropogon chinensis</i> (Nees) Merr.	LC	Graminoid
POACEAE	<i>Andropogon eucomus</i> Nees	LC	Graminoid
POACEAE	<i>Anthephora pubescens</i> Nees	LC	Graminoid
POACEAE	<i>Aristida adscensionis</i> L.	LC	Graminoid
POACEAE	<i>Aristida canescens</i> Henrard subsp. <i>canescens</i>	LC	Graminoid
POACEAE	<i>Aristida effusa</i> Henrard	LC	Graminoid
POACEAE	<i>Aristida meridionalis</i> Henrard	LC	Graminoid
POACEAE	<i>Aristida stipitata</i> Hack. subsp. <i>graciliflora</i> (Pilg.) Melderis	LC	Graminoid
POACEAE	<i>Bothriochloa inculpta</i> (Hochst. ex A.Rich.) A.Camus	LC	Graminoid
POACEAE	<i>Brachiaria brizantha</i> (A.Rich.) Stapf	LC	Graminoid
POACEAE	<i>Brachiaria deflexa</i> (Schumach.) C.E.Hubb. ex Robyns	LC	Graminoid
POACEAE	<i>Brachiaria nigropedata</i> (Ficalho & Hiern) Stapf	LC	Graminoid
POACEAE	<i>Brachiaria serrata</i> (Thunb.) Stapf	LC	Graminoid
POACEAE	<i>Brachiaria xantholeuca</i> (Schinz) Stapf	LC	Graminoid
POACEAE	<i>Cenchrus ciliaris</i> L.	LC	Graminoid
POACEAE	<i>Chloris gayana</i> Kunth	LC	Graminoid
POACEAE	* <i>Cymbopogon pospischilii</i> (K.Schum.) C.E.Hubb.	NE	Graminoid
POACEAE	<i>Cynodon dactylon</i> (L.) Pers.	LC	Graminoid
POACEAE	<i>Dactyloctenium aegyptium</i> (L.) Willd.	LC	Graminoid
POACEAE	<i>Digitaria argyrograptia</i> (Nees) Stapf	LC	Graminoid
POACEAE	<i>Digitaria eriantha</i> Steud.	LC	Graminoid
POACEAE	<i>Digitaria milaniana</i> (Rendle) Stapf	LC	Graminoid

Family	Species	Threat status	Growth forms
POACEAE	<i>Digitaria seriata</i> Stapf	LC	Graminoid
POACEAE	<i>Diheteropogon amplexens</i> (Nees) Clayton var. <i>amplexens</i>	LC	Graminoid
POACEAE	<i>Echinochloa colona</i> (L.) Link	LC	Graminoid
POACEAE	<i>Echinochloa holubii</i> (Stapf) Stapf	LC	Graminoid
POACEAE	<i>Elionurus muticus</i> (Spreng.) Kunth	LC	Graminoid
POACEAE	<i>Enneapogon cenchroides</i> (Licht. ex Roem. & Schult.) C.E.Hubb.	LC	Graminoid
POACEAE	<i>Enneapogon scoparius</i> Stapf	LC	Graminoid
POACEAE	<i>Eragrostis barbinodis</i> Hack.	LC	Graminoid
POACEAE	<i>Eragrostis biflora</i> Hack. ex Schinz	LC	Graminoid
POACEAE	<i>Eragrostis chloromelas</i> Steud.	LC	Graminoid
POACEAE	<i>Eragrostis cilianensis</i> (All.) Vignolo ex Janch.	LC	Graminoid
POACEAE	<i>Eragrostis curvula</i> (Schrad.) Nees	LC	Graminoid
POACEAE	<i>Eragrostis gummiflua</i> Nees	LC	Graminoid
POACEAE	<i>Eragrostis hierniana</i> Rendle	LC	Graminoid
POACEAE	<i>Eragrostis inamoena</i> K.Schum.	LC	Graminoid
POACEAE	<i>Eragrostis obtusa</i> Munro ex Ficalho & Hiern	LC	Graminoid
POACEAE	<i>Eragrostis plana</i> Nees	LC	Graminoid
POACEAE	<i>Eragrostis racemosa</i> (Thunb.) Steud.	LC	Graminoid
POACEAE	<i>Eragrostis rigidior</i> Pilg.	LC	Graminoid
POACEAE	<i>Eragrostis stapfii</i> De Winter	LC	Graminoid
POACEAE	<i>Eragrostis superba</i> Peyr.	LC	Graminoid
POACEAE	<i>Eragrostis trichophora</i> Coss. & Durieu	LC	Graminoid
POACEAE	<i>Eustachys paspaloides</i> (Vahl) Lanza & Mattei	LC	Graminoid
POACEAE	<i>Heteropogon contortus</i> (L.) Roem. & Schult.	LC	Graminoid
POACEAE	<i>Hyparrhenia anamesa</i> Clayton	LC	Graminoid
POACEAE	<i>Hyparrhenia filipendula</i> (Hochst.) Stapf var. <i>pilosa</i> (Hochst.) Stapf	LC	Graminoid
POACEAE	<i>Loudetia flavida</i> (Stapf) C.E.Hubb.	LC	Graminoid
POACEAE	<i>Loudetia simplex</i> (Nees) C.E.Hubb.	LC	Graminoid
POACEAE	<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	LC	Graminoid
POACEAE	<i>Microchloa caffra</i> Nees	LC	Graminoid
POACEAE	<i>Mosdenia leptostachys</i> (Ficalho & Hiern) Clayton	LC	Graminoid
POACEAE	<i>Panicum coloratum</i> L. var. <i>coloratum</i>	LC	Graminoid
POACEAE	<i>Panicum deustum</i> Thunb.	LC	Graminoid
POACEAE	<i>Panicum maximum</i> Jacq.	LC	Graminoid
POACEAE	<i>Perotis patens</i> Gand.	LC	Graminoid
POACEAE	<i>Pogonarthria squarrosa</i> (Roem. & Schult.) Pilg.	LC	Graminoid
POACEAE	<i>Schizachyrium sanguineum</i> (Retz.) Alston	LC	Graminoid
POACEAE	<i>Schmidtia pappophoroides</i> Steud.	LC	Graminoid
POACEAE	<i>Setaria incrassata</i> (Hochst.) Hack.	LC	Graminoid
POACEAE	<i>Setaria sphacelata</i> (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss var. <i>sphacelata</i>	LC	Graminoid
POACEAE	<i>Setaria sphacelata</i> (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss var. <i>torta</i> (Stapf) Clayton	LC	Graminoid
POACEAE	<i>Setaria verticillata</i> (L.) P.Beauv.	LC	Graminoid
POACEAE	<i>Sporobolus festivus</i> Hochst. ex A.Rich.	LC	Graminoid
POACEAE	<i>Sporobolus fimbriatus</i> (Trin.) Nees	LC	Graminoid
POACEAE	<i>Sporobolus ioclados</i> (Trin.) Nees	LC	Graminoid
POACEAE	<i>Sporobolus nitens</i> Stent	LC	Graminoid
POACEAE	<i>Sporobolus stapfianus</i> Gand.	LC	Graminoid
POACEAE	<i>Themeda triandra</i> Forssk.	LC	Graminoid
POACEAE	<i>Tragus berteronianus</i> Schult.	LC	Graminoid
POACEAE	<i>Tricholaena monachne</i> (Trin.) Stapf & C.E.Hubb.	LC	Graminoid
POACEAE	<i>Trichoneura grandiglumis</i> (Nees) Ekman	LC	Graminoid
POACEAE	<i>Urochloa brachyura</i> (Hack.) Stapf	LC	Graminoid
POACEAE	<i>Urochloa mosambicensis</i> (Hack.) Dandy	LC	Graminoid
POLYGALACEAE	<i>Polygala krumana</i> Burch. ex Ficalho & Hiern	LC	Shrub
POLYGONACEAE	<i>Oxygonum sinuatum</i> (Hochst. & Steud. ex Meisn.) Dammer		Herb

Family	Species	Threat status	Growth forms
POLYGONACEAE	* <i>Persicaria lapathifolia</i> (L.) Gray	NE	Helophyte
PONTERIACEAE	<i>Heteranthera callifolia</i> Rchb. ex Kunth	LC	Hydrophyte
PORTULACACEAE	<i>Portulaca quadrifida</i> L.	LC	Succulent
PORTULACACEAE	<i>Talinum cafrum</i> (Thunb.) Eckl. & Zeyh.	LC	Dwarf shrub
POTTIACEAE	<i>Trichostomum brachydontium</i> Bruch		Bryophyte
POTTIACEAE	<i>Weissia latiuscula</i> Müll.Hal.		Bryophyte
PROTEACEAE	<i>Protea caffra</i> Meisn. subsp. <i>caffra</i>	LC	Shrub, tree
RHAMNACEAE	<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>	LC	Shrub, tree
RUBIACEAE	<i>Kohautia virgata</i> (Willd.) Bremek.	LC	Herb
RUBIACEAE	<i>Pavetta zeyheri</i> Sond. subsp. <i>zeyheri</i>	LC	Shrub, tree
SANTALACEAE	<i>Thesium utile</i> A.W.Hill	LC	Parasite
SAPINDACEAE	<i>Pappea capensis</i> Eckl. & Zeyh.	LC	Shrub, tree
SCROPHULARIACEAE	<i>Craterostigma plantagineum</i> Hochst.	LC	Succulent
SCROPHULARIACEAE	<i>Diclis petiolaris</i> Benth.	LC	Herb
SINOPTERIDACEAE	<i>Pellaea calomelanos</i> (Sw.) Link var. <i>calomelanos</i>	LC	Geophyte
SOLANACEAE	<i>Lycium cinereum</i> Thunb.	LC	Dwarf shrub
STRYCHNACEAE	<i>Strychnos pungens</i> Soler.	LC	Shrub, tree
TELOSCHISTACEAE	<i>Caloplaca ferruginea</i> (Huds.) Th.Fr. forma <i>ferruginea</i>		Lichen
THYMELAEACEAE	<i>Gnidia sericocephala</i> (Meisn.) Gilg ex Engl.	LC	Dwarf shrub
URTICACEAE	<i>Pouzolzia mixta</i> Solms var. <i>mixta</i>	LC	Shrub
VELLOZIACEAE	<i>Xerophyta humilis</i> (Baker) T.Durand & Schinz	LC	Herb
VERBENACEAE	<i>Lantana rugosa</i> Thunb.	LC	Shrub
VERBENACEAE	<i>Lippia javanica</i> (Burm.f.) Spreng.	LC	Shrub
VERBENACEAE	<i>Lippia wilmsii</i> H.Pearson	LC	Shrub
VISCACEAE	<i>Viscum combreticola</i> Engl.	LC	Parasite
VISCACEAE	<i>Viscum verrucosum</i> Harv.	LC	Parasite

(Note: Site falls in 2528CA but is more accurately represented by 2528AC)

## 12.2. Appendix 2 Present and potentially occurring mammal species

ORDER <sup>1</sup> & SPECIES <sup>2,4</sup>	COMMON NAME <sup>2,4</sup>	CONSERVATION STATUS			LO <sup>2,4,6</sup>	ATLAS (N) <sup>2,6</sup>
		GLOBAL IUCN <sup>5</sup>	S.A. RED DATA <sup>2,4</sup>	S.A. NEM:BA <sub>3</sub>		
<b>AFROSORICIDA (Golden moles)</b>						
<i>Chrysospalax villosus</i>	Rough-haired Golden Mole	VU (U)	CR	-	3	
<i>Neamblysomus julianae</i>	Juliana's Golden Mole - Bronberg subpopulation	VU (U)	CR	-	4	
<b>MACROSCELIDEA (Elephant-shrews)</b>						
<i>Elephantulus brachyrhynchus</i>	Short-snouted Elephant-shrew	LC (U)	DD	-	1	
<i>Elephantulus myurus</i>	Rock Elephant-shrew	LC (S)	LC	-	4	3
<b>EULIPOTYPHLA (Hedgehogs &amp; shrews)</b>						
<i>Myosorex varius</i>	Forest Shrew	LC (S)	DD	-	2	
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC (U)	DD	-	2	
<i>Suncus infinitesimus</i>	Least Dwarf Shrew	LC (U)	DD	-	2	
<i>Suncus sp.</i>	Dwarf Shrews	-	-	-	-	2
<i>Crocidura mariquensis</i>	Swamp Musk Shrew	LC (U)	DD	-	4	
<i>Crocidura fuscomurina</i>	Tiny Musk Shrew	LC (U)	DD	-	3	
<i>Crocidura cyanea</i>	Reddish-grey Musk Shrew	LC (S)	DD	-	2	
<i>Crocidura silacea</i>	Lesser Grey-brown Musk Shrew	LC (S)	DD	-	2	
<i>Crocidura hirta</i>	Lesser Red Musk Shrew	LC (U)	DD	-	2	10
<i>Atelerix frontalis</i>	Southern African Hedgehog	LC (S)	NT	-	2	1
<b>CHIROPTERA (Bats)</b>						
<i>Epomophorus wahlbergi</i>	Wahlberg's Epauletted Fruit Bat	LC (S)	LC	-	2	2
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC (U)	NT	-	4	
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC (U)	NT	-	4	
<i>Rhinolophus blasii</i>	Blasius's Horseshoe Bat	LC (D)	NT	-	3	
<i>Rhinolophus simulator</i>	Bushveld Horseshoe Bat	LC (D)	NT	-	4	

ORDER <sup>1</sup> &	COMMON NAME <sup>2,4</sup>	CONSERVATION STATUS			b <sup>4,6</sup>	c <sup>6</sup>
<i>Cloeotis percivali</i>	Percival's Short-eared Trident Bat	LC (U)	VU	-	4	
<i>Taphozous mauritianus</i>	Mauritian Tomb Bat	LC (U)	LC	-	3	
<i>Sauromys petrophilus</i>	Roberts's Flat-headed Bat	LC (S)	LC	-	3	
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC (U)	LC	-	2	6
<i>Miniopterus natalensis</i>	Natal Long-fingered Bat	LC (U)	NT	-	4	
<i>Pipistrellus rusticus</i>	Rusty Pipistrelle	LC (U)	NT	-	2	1
<i>Neoromicia capensis</i>	Cape Serotine	LC (S)	LC	-	2	2
<i>Neoromicia sp.</i>	Vesper bat	-	-	-	-	1
<i>Myotis welwitschii</i>	Welwitsch's Myotis	LC (U)	LC	-	4	
<i>Myotis tricolor</i>	Temminck's Myotis	LC (U)	LC	-	3	
<i>Scotophilus dinganii</i>	Yellow-bellied House Bat	LC (U)	LC	-	2	13
<i>Scotophilus viridis</i>	Green House Bat	LC (U)	-	-	3	
<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	LC (U)	LC	-	2	
<b>PRIMATES (Primates)</b>						
<i>Galago moholi</i>	Southern Lesser Galago	LC (S)	LC	-	2	3
<i>Papio ursinus</i>	Chacma Baboon	LC (S)	LC	-	4	
<i>Cercopithecus pygerythrus</i>	Vervet Monkey	LC (S)	LC	-	2	
<b>LAGOMORPHA (Hares &amp; rabbits)</b>						
<i>Lepus saxatilis</i>	Scrub Hare	LC (D)	LC	-	2	
<i>Pronolagus randensis</i>	Jameson's Red Rock Rabbit	LC (U)	LC	-	4	
<b>RODENTIA (Rodents)</b>						
<i>Cryptomys hottentotus</i>	Common Mole-rat	LC (S)	LC	-	1	1
<i>Hystrix africaeaustralis</i>	Porcupine	LC (S)	LC	-	1	
<i>Pedetes capensis</i>	Springhare	LC (U)	LC	-	2	
<i>Thryonomys swinderianus</i>	Greater Cane Rat	LC (U)	LC	-	2	2
<i>Xerus inauris</i>	Cape Ground Squirrel	LC (S)	LC	-	4	
<i>Paraxerus cepapi</i>	Tree Squirrel	LC (S)	LC	-	4	
<i>Graphiurus murinus</i>	Woodland Dormouse	LC (S)	LC	-	2	
<i>Mystromys albicaudatus</i>	White-tailed Rat	EN (D)	EN	-	2	
<i>Lemniscomys rosalia</i>	Single-striped Mouse	LC (S)	DD	-	2	1
<i>Rhodomys pumilio</i>	Striped Mouse	LC (S)	LC	-	2	5
<i>Dasymys incomtus</i>	Water Rat	LC (U)	NT	-	4	
<i>Mastomys natalensis</i>	Natal Multimammate Mouse	LC (S)	LC	-	2	5
<i>Mastomys coucha</i>	Multimammate Mouse	LC (S)	LC	-	2	13
<i>Mastomys sp.</i>	Multimammate mice	-	-	-	-	2
<i>Thallomys paedulus</i>	Tree Rat	LC (U)	LC	-	3	
<i>Rattus rattus</i>	Roof Rat	-	-	-	2	3
<i>Rattus sp.</i>	Genus Rattus	-	-	-	-	1
<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	LC (S)	LC	-	3	
<i>Aethomys ineptus</i>	Tete Veld Rat	LC (U)	LC	-	2	
<i>Aethomys sp.</i>	Veld rats	-	-	-	-	4
<i>Otomys angoniensis</i>	Angoni Vlei Rat	LC (S)	LC	-	3	4
<i>Otomys irroratus</i>	Vlei Rat	LC (S)	LC	-	3	
<i>Otomys</i>	Vlei Rats	-	-	-	-	2
<i>Tatera leucogaster</i>	Bushveld Gerbil	LC (S)	DD	-	2	
<i>Tatera brantsii</i>	Highveld Gerbil	LC (U)	LC	-	2	
<i>Saccostomus campestris</i>	Pouched Mouse	LC (S)	LC	-	2	
<i>Dendromus melanotis</i>	Grey Climbing Mouse	LC (S)	LC	-	2	
<i>Dendromus mystacalis</i>	Chestnut Climbing Mouse	LC (S)	LC	-	2	
<i>Steatomys pratensis</i>	Fat Mouse	LC (S)	LC	-	2	1
<i>Steatomys krebsii</i>	Krebs's Fat Mouse	LC (S)	LC	-	3	
<b>CARNIVORA (Carnivores)</b>						
<i>Proteles cristatus</i>	Aardwolf	LC (S)	LC	-	3	2
<i>Hyaena brunnea</i>	Brown Hyaena	NT (D)	NT	PS	4	2
<i>Panthera pardus</i>	Leopard	NT (D)	LC	PS	4	
<i>Panthera leo</i>	Lion	VU (D)	VU	VU	5	1
<i>Caracal caracal</i>	Caracal	LC (U)	LC	-	2	

ORDER <sup>1</sup> &	COMMON NAME <sup>2,4</sup>	CONSERVATION STATUS			b <sup>4,6</sup>	c <sup>6</sup>
<i>Felis silvestris</i>	African Wild Cat	LC (D)	LC	-	2	
<i>Felis nigripes</i>	Black-footed Cat	VU (D)	LC	PS	3	
<i>Leptailurus serval</i>	Serval	LC (S)	NT	PS	3	2
<i>Genetta genetta</i>	Small-spotted Genet	LC (S)	LC	-	2	
<i>Genetta tigrina</i>	Large-spotted Genet	LC (U)	LC	-	2	
<i>Suricata suricatta</i>	Suricate	LC (U)	LC	-	4	
<i>Cynictis penicillata</i>	Yellow Mongoose	LC (S)	LC	-	2	3
<i>Galerella sanguinea</i>	Slender Mongoose	LC (S)	LC	-	2	2
<i>Ichneumia albicauda</i>	White-tailed Mongoose	LC (S)	LC	-	2	
<i>Atilax paludinosus</i>	Water Mongoose	LC (D)	LC	-	4	
<i>Mungos mungo</i>	Banded Mongoose	LC (S)	LC	-	2	
<i>Helogale parvula</i>	Dwarf Mongoose	LC (S)	LC	-	3	
<i>Lycaon pictus</i>	African Wild Dog	EN (D)	EN	EN	5	1
<i>Vulpes chama</i>	Cape Fox	LC (S)	LC	PS	2	
<i>Canis mesomelas</i>	Black-backed Jackal	LC (S)	LC	-	2	1
<i>Canis sp.</i>	Canid	-	-	-	-	1
<i>Aonyx capensis</i>	Cape Clawless Otter	LC (S)	LC	-	4	
<i>Lutra maculicollis</i>	Spotted-necked Otter	LC (D)	NT	-	4	
<i>Poecilogale albinucha</i>	African Weasel	LC (U)	DD	-	2	
<i>Ictonyx striatus</i>	Striped Polecat	LC (S)	LC	-	2	
<b>TUBULIDENTATA (Aardvark)</b>						
<i>Orycteropus afer</i>	Aardvark	LC (U)	LC	PS	4	
<b>HYRACOIDEA (Hyaxes)</b>						
<i>Procavia capensis</i>	Rock Hyrax	LC (U)	LC	-	2	1
<b>PERISSODACTYLA (Zebras)</b>						
<i>Equus quagga</i>	Plains Zebra	LC (S)	LC	-	5	
<b>ARTIODACTYLA (Even-toed ungulates)</b>						
<i>Phacochoerus africanus</i>	Warthog	LC (S)	LC	-	4	
<i>Tragelaphus strepsiceros</i>	Kudu	LC (S)	LC	-	4	
<i>Tragelaphus angasii</i>	Nyala	LC (S)	LC	-	5	
<i>Tragelaphus scriptus</i>	Bushbuck	LC (S)	LC	-	4	
<i>Tragelaphus oryx</i>	Eland	LC (S)	LC	-	5	
<i>Connochaetes gnou</i>	Black Wildebeest	LC (I)	LC	PS*	5	
<i>Connochaetes taurinus</i>	Blue Wildebeest	LC (S)	LC	-	5	
<i>Alcelaphus buselaphus</i>	Red Hartebeest	LC (D)	LC	-	5	
<i>Damaliscus pygargus phillipsi</i>	Blesbok	LC (S)*	LC	-	5	
<i>Damaliscus lunatus</i>	Tsessebe	LC (D)	EN	PS*	5	
<i>Hippotragus niger</i>	Sable	LC (S)	VU	VU	5	
<i>Sylvicapra grimmia</i>	Common Duiker	LC (S)	LC	-	1	
<i>Redunca arundinum</i>	Reedbuck	LC (S)	LC	-	5	
<i>Redunca fulvorufula</i>	Mountain Reedbuck	LC (S)	LC	-	4	
<i>Pelea capreolus</i>	Grey Rhebok	LC (S)	LC	-	5	
<i>Antidorcas marsupialis</i>	Springbok	LC (I)	LC	-	5	
<i>Ourebia ourebi</i>	Oribi	LC (D)	EN	EN	5	
<i>Raphicerus campestris</i>	Steenbok	LC (S)	LC	-	2	
<i>Aepyceros melampus</i>	Impala	LC (S)	LC	-	5	
<i>Oreotragus oreotragus</i>	Klipspringer	LC (S)	LC	-	5	
<i>Oryx dammah</i>	Scimitar-horned Oryx	LC (S)	LC	-	5	2
<i>Camelus dromedarius</i>	One-humped Camel	-	-	-	5	1
<b>Key</b>						
<b>Status:</b> CR = Critically Endangered; D = Declining; DD = Data Deficient; EN = Endangered; I = Increasing; LC = Least Concern; NT = Near Threatened; PS = Protected Species; S = Stable; U = Unknown; VU = Vulnerable						
<b>Likelihood of Occurrence (LO):</b> 1 = Present; 2 = High; 3 = Moderate; 4 = Low; 5 = May occur as a managed population						
<b>Sources:</b> <sup>1</sup> Stuart & Stuart (2007); <sup>2</sup> Friedmann & Daly (2004); <sup>3</sup> ToPS List (2015); <sup>4</sup> Monadjem <i>et al.</i> (2010); <sup>5</sup> IUCN (2015-4); <sup>6</sup> MammalMap (2016)						
*Listed on ToPS (2015) as Protected Game						



## 12.3. Appendix 3 Present and potentially occurring bird species

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<b>1. Ocean birds</b>									
<i>Pelecanus rufescens</i>	Pink-backed Pelican	LC (S)	VU/LC	-	4	2.94			
<i>Sterna caspia</i>	Caspian Tern	LC (I)	VU/LC	-	4	1.96			
<b>2. Inland water birds</b>									
<i>Phalacrocorax carbo</i>	White-breasted Cormorant	LC (I)	LC	-	4	50.98	25		x
<i>Phalacrocorax africanus</i>	Reed Cormorant	LC (D)	LC	-	4	58.82	12.5		x
<i>Anhinga rufa</i>	African Darter	LC (D)	LC	-	3	43.14			x
<i>Ardea cinerea</i>	Grey Heron	LC (U)	LC	-	2	14.71	12.5		x
<i>Ardea melanocephala</i>	Black-headed Heron	LC (I)	LC	-	2	63.73	25	x	x
<i>Ardea goliath</i>	Goliath Heron	LC (S)	LC	-	4	2.94			x
<i>Ardea purpurea</i>	Purple Heron	LC (D)	LC	-	2	37.25	12.5		x
<i>Casmerodius albus</i>	Great White Egret	LC (U)	LC	-	4	1.96			x
<i>Egretta garzetta</i>	Little Egret	LC (I)	LC	-	4	21.57	12.5		x
<i>Mesophoyx intermedia</i>	Yellow-billed Egret	LC (D)	LC	-	3	2.94			x
<i>Bubulcus ibis</i>	Cattle Egret	LC (I)	LC	-	2	93.14	37.5	x	x
<i>Ardeola ralloides</i>	Squacco Heron	LC (D)	LC	-	4	60.78	50		x
<i>Butorides striata</i>	Green-backed Heron	LC (D)	LC	-	4	10.78			x
<i>Egretta ardesiaca</i>	Black Heron	LC (S)	LC	-	4	2.94	12.5		x
<i>Ixobrychus sturmii</i>	Dwarf Bittern	LC (U)	LC (B)	-	4				x
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	LC (D)	LC	-	4	0.98			x
<i>Scopus umbretta</i>	Hamerkop	LC (S)	LC	-	3	50	25		x
<i>Leptoptilos crumeniferus</i>	Marabou Stork	LC (I)	NT/LC	-	3			x	x
<i>Mycteria ibis</i>	Yellow-billed Stork	LC (D)	EN/LC	-	4				x
<i>Ciconia abdimii</i>	Abdim's Stork	LC (D)	NT/LC	-	2	4.9	12.5		x
<i>Ciconia nigra</i>	Black Stork	LC (U)	VU/LC	-	3				x
<i>Ciconia ciconia</i>	White Stork	LC (I)	LC (NB)	-	2	0.98			x
<i>Threskiornis aethiopicus</i>	African Sacred Ibis	LC (D)	LC	-	2	86.27	50		x
<i>Plegadis falcinellus</i>	Glossy Ibis	LC (D)	LC	-	3	58.82	37.5		x
<i>Bostrychia hagedash</i>	Hadedda Ibis	LC (I)	LC	-	1	88.24	12.5		x
<i>Platalea alba</i>	African Spoonbill	LC (S)	LC	-	4	1.96			x
<i>Phoenicopterus roseus</i>	Greater Flamingo	LC (I)	NT/LC	-	4	0.98			x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Glareola nordmanni</i>	Black-winged Pratincole	NT (D)	NT/NT	-	4	0.98			
<i>Larus cirrocephalus</i>	Grey-headed Gull	LC (S)	LC	-	4	60.78	37.5	x	x
<i>Chlidonias leucopterus</i>	White-winged Tern	LC (S)	LC (NB)	-	4	44.12	37.5	x	x
<i>Chlidonias hybrida</i>	Whiskered Tern	LC (S)	LC	-	4	22.55	25		x
<b>3. Ducks &amp; wading birds</b>									
<i>Podiceps cristatus</i>	Great Crested Grebe	LC (U)	LC	-	4	0.98			x
<i>Tachybaptus ruficollis</i>	Little Grebe	LC (D)	LC	-	4	74.51	50		x
<i>Plectropterus gambensis</i>	Spur-winged Goose	LC (I)	LC	-	3	21.57	25		x
<i>Alopochen aegyptiaca</i>	Egyptian Goose	LC (D)	LC	-	2	80.39	50		x
<i>Tadorna cana</i>	South African Shelduck	LC (I)	LC	-	4	1.96			x
<i>Sarkidiornis melanotos</i>	Comb Duck	LC (D)	LC	-	4	35.29			x
<i>Anas smithii</i>	Cape Shoveler	LC (I)	LC	-	4	19.61		x	x
<i>Anas sparsa</i>	African Black Duck	LC (D)	LC	-	4	20.59	12.5		x
<i>Anas undulata</i>	Yellow-billed Duck	LC (S)	LC	-	3	76.47	50		x
<i>Anas erythrorhyncha</i>	Red-billed Teal	LC (D)	LC	-	4	71.57	50		x
<i>Anas capensis</i>	Cape Teal	LC (I)	LC	-	4	41.18	25		x
<i>Anas hottentota</i>	Hottentot Teal	LC (D)	LC	-	4	29.41	12.5	x	x
<i>Dendrocygna viduata</i>	White-faced Duck	LC (I)	LC	-	4	87.25	37.5	x	x
<i>Dendrocygna bicolor</i>	Fulvous Duck	LC (D)	LC	-	4	35.29	25		x
<i>Netta erythrophthalma</i>	Southern Pochard	LC (D)	LC	-	4	63.73	37.5	x	x
<i>Oxyura maccoa</i>	Maccoa Duck	NT (D)	NT/NT	-	4	2.94			
<i>Thalassornis leuconotus</i>	White-backed Duck	LC (D)	LC	-	4	1.96			x
<i>Rallus caerulescens</i>	African Rail	LC (U)	LC	-	4	1.96			
<i>Crecopsis egregia</i>	African Crake	LC (S)	LC (B)	-	4				x
<i>Amauornis flavirostris</i>	Black Crake	LC (U)	LC	-	4	23.53	12.5	x	x
<i>Porphyrio porphyrio</i>	African Purple Swamphen	LC (U)	LC	-	4	26.47	12.5	x	x
<i>Gallinula chloropus</i>	Common Moorhen	LC (U)	LC	-	4	60.78	12.5	x	x
<i>Fulica cristata</i>	Red-knobbed Coot	LC (D)	LC	-	4	74.51	37.5		x
<i>Actophilornis africanus</i>	African Jacana	LC (S)	LC	-	4	50	37.5		x
<i>Microparra capensis</i>	Lesser Jacana	LC (U)	NT/LC	-	4	2.94			
<i>Rostratula benghalensis</i>	Greater Painted-snipe	LC (D)	VU/LC	-	4				x
<i>Charadrius pecuarius</i>	Kittlitz's Plover	LC (U)	LC	-	4	0.98			x
<i>Charadrius tricollaris</i>	Three-banded Plover	LC (U)	LC	-	4	55.88	50		x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Vanellus coronatus</i>	Crowned Lapwing	LC (I)	LC	-	2	80.39	25	x	x
<i>Vanellus armatus</i>	Blacksmith Lapwing	LC (I)	LC	-	1	90.2	50		x
<i>Vanellus senegallus</i>	African Wattled Lapwing	LC (S)	LC	-	3	18.63			x
<i>Gallinago nigripennis</i>	African Snipe	LC (U)	LC	-	4	3.92			x
<i>Calidris ferruginea</i>	Curlew Sandpiper	LC (I)	LC (NB)	-	4				x
<i>Calidris minuta</i>	Little Stint	LC (D)	LC (NB)	-	4	10.78	12.5		x
<i>Philomachus pugnax</i>	Ruff	LC (D)	LC (NB)	-	4	55.88	50		x
<i>Actitis hypoleucos</i>	Common Sandpiper	LC (D)	LC (NB)	-	4	25.49	25	x	x
<i>Tringa stagnatilis</i>	Marsh Sandpiper	LC (D)	LC (NB)	-	4	28.43	12.5		x
<i>Tringa nebularia</i>	Common Greenshank	LC (S)	LC (NB)	-	4	19.61	12.5		x
<i>Tringa glareola</i>	Wood Sandpiper	LC (S)	LC (NB)	-	4	58.82	25		x
<i>Recurvirostra avosetta</i>	Pied Avocet	LC (U)	LC	-	4	9.8		x	x
<i>Himantopus himantopus</i>	Black-winged Stilt	LC (I)	LC	-	4	73.53	50		x
<i>Anas querquedula</i>	Garganey	LC (D)	LC (Vag)	-	4			x	
<i>Anas platyrhynchos</i>	Mallard	LC (D)	AL	-	4	0.98			
<i>Anser anser</i>	Goose, Domestic	-	-	-	4	1.96			
<b>4. Large terrestrial birds</b>									
<i>Struthio camelus</i>	Common Ostrich	LC (D)	LC	-	5	1.96			x
<i>Sagittarius serpentarius</i>	Secretarybird	VU (D)	VU/VU	-	3				x
<i>Francolinus coqui</i>	Coqui Francolin	LC (S)	LC	-	2	1.96			x
<i>Francolinus sephaena</i>	Crested Francolin	LC (S)	LC	-	2	2.94			x
<i>Francolinus shelleyi</i>	Shelley's Francolin	LC (D)	LC	-	3				x
<i>Francolinus natalensis</i>	Natal Spurfowl	LC (S)	LC	-	1				x
<i>Francolinus swainsonii</i>	Swainson's Spurfowl	LC (S)	LC	-	2	15.69			x
<i>Coturnix coturnix</i>	Common Quail	LC (D)	LC	-	2				x
<i>Coturnix delegorguei</i>	Harlequin Quail	LC (S)	LC	-	2				x
<i>Numida meleagris</i>	Helmeted Guineafowl	LC (S)	LC	-	2	47.06			x
<i>Anthropoides paradiseus</i>	Blue Crane	VU (S)	NT/VU	PS	4				x
<i>Eupodotis ruficrista</i>	Red-crested Korhaan	LC (S)	LC	-	2	0.98			x
<i>Burhinus capensis</i>	Spotted Thick-knee	LC (S)	LC	-	2	32.35			x
<i>Afrotis afraoides</i>	Northern Black Korhaan	-	LC	-	2	36.27	12.5	x	x
<b>5. Raptors</b>									
<i>Gyps coprotheres</i>	Cape Vulture	VU (D)	EN/VU	EN	3	0.98			x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Falco biarmicus</i>	Lanner Falcon	LC (I)	VU/LC	-	3				x
<i>Falco subbuteo</i>	Eurasian Hobby	LC (D)	LC	-	3				x
<i>Falco amurensis</i>	Amur Falcon	LC (S)	LC (NB)	-	2	28.43	50		x
<i>Falco vespertinus</i>	Red-footed Falcon	NT (D)	NT/NT	-	3	0.98			x
<i>Falco rupicoloides</i>	Greater Kestrel	LC (S)	LC	-	2	0.98			x
<i>Falco rupicolus</i>	Rock Kestrel	-	LC	-	4	1.96			x
<i>Falco naumanni</i>	Lesser Kestrel	LC (S)	-	-	2				x
<i>Aviceda cuculoides</i>	African Cuckoo Hawk	LC (S)	LC	-	3	0.98			
<i>Milvus migrans</i>	Black Kite	LC (U)	LC (NB)	-	2	5.88	12.5		
<i>Milvus aegyptius</i>	Yellow-billed Kite	-	LC	-	2	19.61	25		
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC (S)	LC	-	2	58.82		x	x
<i>Aquila verreauxii</i>	Verreaux's Eagle	LC (S)	VU/LC	-	3	1.96			x
<i>Aquila rapax</i>	Tawny Eagle	LC (S)	EN/LC	EN	3				x
<i>Aquila pomarina</i>	Lesser Spotted Eagle	LC (U)	LC (B)	-	3	0.98			
<i>Aquila wahlbergi</i>	Wahlberg's Eagle	LC (S)	LC (B)	-	3	6.86			x
<i>Lophaetus occipitalis</i>	Long-crested Eagle	LC (I)	LC	-	3	8.82			
<i>Hieraaetus pennatus</i>	Booted Eagle	LC (D)	LC (NB)	-	3				x
<i>Hieraaetus ayresii</i>	Ayres Hawk-eagle	LC (S)	-	-	3				x
<i>Hieraaetus spilogaster</i>	African Hawk Eagle	LC (D)	LC	-	3				x
<i>Kaupifalco monogrammicus</i>	Lizard Buzzard	LC (S)	LC	-	2				x
<i>Circaetus pectoralis</i>	Black-chested Snake-eagle	LC (U)	LC	-	2	2.94			x
<i>Haliaeetus vocifer</i>	African Fish-eagle	LC (S)	LC	-	2	21.57			x
<i>Buteo rufofuscus</i>	Jackal Buzzard	LC (S)	LC (N-End)	-	4				x
<i>Buteo buteo</i>	Steppe Buzzard	LC (I)	LC (NB)	-	2	4.9	12.5		x
<i>Accipiter ovampensis</i>	Ovambo Sparrowhawk	LC (I)	LC	-	3	1.96			x
<i>Accipiter minullus</i>	Little Sparrowhawk	LC (S)	LC	-	3				x
<i>Accipiter melanoleucus</i>	Black Sparrowhawk	LC (D)	LC	-	3				x
<i>Accipiter badius</i>	Shikra	LC (S)	LC	-	3				x
<i>Melierax gabar</i>	Gabar Goshawk	LC (S)	LC	-	3	1.96			x
<i>Melierax canorus</i>	Southern Pale Chanting Goshawk	LC (S)	LC	-	2				x
<i>Circus ranivorus</i>	African Marsh-harrier	LC (D)	EN/LC	-	4				x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Polyboroides typus</i>	African Harrier-hawk	LC (S)	LC	-	2	4.9			x
<b>6. Owls &amp; nightjars</b>									
<i>Tyto alba</i>	Barn Owl	LC (S)	LC	-	2	7.84			x
<i>Tyto capensis</i>	African Grass-owl	LC (D)	VU/LC	-	4	0.98			
<i>Asio capensis</i>	Marsh Owl	LC (S)	LC	-	2	3.92			x
<i>Otus senegalensis</i>	African Scops-owl	LC (S)	LC	-	3				x
<i>Glaucidium perlatum</i>	Pearl-spotted Owlet	LC (S)	LC	-	2	2.94			x
<i>Bubo africanus</i>	Spotted Eagle-owl	LC (S)	LC	-	2				x
<i>Bubo lacteus</i>	Verreaux's Eagle-owl	LC (S)	LC	-	3				x
<i>Caprimulgus pectoralis</i>	Fiery-necked Nightjar	LC (S)	LC	-	2				x
<i>Caprimulgus tristigma</i>	Freckled Nightjar	LC (S)	LC	-	2				x
<b>7. Sandgrouse, doves etc</b>									
<i>Pterocles bicinctus</i>	Double-banded Sandgrouse	LC (D)	LC	-	3				x
<i>Columba guinea</i>	Speckled Pigeon	LC (S)	LC	-	1	34.31	12.5		x
<i>Columba arquatrix</i>	African Olive-pigeon	LC (D)	LC	-	2	0.98			x
<i>Streptopelia semitorquata</i>	Red-eyed Dove	LC (I)	LC	-	1	68.63			x
<i>Streptopelia capicola</i>	Cape Turtle Dove	LC (I)	LC	-	2	39.22			x
<i>Streptopelia senegalensis</i>	Laughing Dove	LC (S)	LC	-	1	89.22	37.5		x
<i>Oena capensis</i>	Namaqua Dove	LC (I)	LC	-	2	3.92			x
<i>Turtur chalcospilos</i>	Emerald-spotted Wood-dove	LC (S)	LC	-	2				x
<i>Treron calvus</i>	African Green-pigeon	LC (D)	LC	-	2	2.94			x
<i>Poicephalus meyeri</i>	Meyer's Parrot	LC (S)	LC	-	3				x
<i>Corythaixoides concolor</i>	Grey Go-away-bird	LC (S)	LC	-	1	22.55	25		x
<i>Cuculus gularis</i>	African Cuckoo	LC (S)	LC (B)	-	3				x
<i>Cuculus solitarius</i>	Red-chested Cuckoo	LC (S)	LC (B)	-	2	5.88			x
<i>Cuculus clamosus</i>	Black Cuckoo	LC (S)	LC (B)	-	2	1.96			x
<i>Clamator glandarius</i>	Great Spotted Cuckoo	LC (S)	LC (B)	-	2	1.96			x
<i>Clamator levaillantii</i>	Levaillant's Cuckoo	LC (S)	LC (B)	-	2	0.98			x
<i>Clamator jacobinus</i>	Jacobin Cuckoo	LC (S)	LC (B)	-	2	0.98			x
<i>Chrysococcyx klaas</i>	Klaas's Cuckoo	LC (S)	LC	-	2	2.94			x
<i>Chrysococcyx caprius</i>	Dideric Cuckoo	LC (S)	LC (B)	-	2	28.43			x
<i>Columba livia</i>	Rock Dove	LC (D)	AL	-	2	19.61			x
<i>Psittacula krameri</i>	Rose-ringed Parakeet	LC (I)	AL	-	3				x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Centropus superciliosus</i>	White-browed Coucal	LC (S)	LC	-	4				x
<i>Centropus burchelli</i>	Burchell's Coucal	LC (S)	LC	-	2	41.18	12.5		x
<b>8. Aerial feeders, etc</b>									
<i>Apus apus</i>	Common Swift	LC (D)	LC (NB)	-	2				x
<i>Apus barbatus</i>	African Black Swift	LC (S)	LC	-	2				x
<i>Apus caffer</i>	White-rumped Swift	LC (I)	LC (B)	-	2	28.43			x
<i>Apus horus</i>	Horus Swift	LC (I)	LC	-	2	0.98			x
<i>Apus affinis</i>	Little Swift	LC (I)	LC	-	2	61.76	12.5		x
<i>Tachymarpis melba</i>	Alpine Swift	LC (S)	LC (B)	-	2	0.98			x
<i>Cypsiurus parvus</i>	Palm Swift	LC (I)	LC	-	2	43.14	12.5		x
<i>Colius striatus</i>	Speckled Mousebird	LC (I)	LC	-	1	34.31			x
<i>Colius colius</i>	White-backed Mousebird	LC (I)	LC	-	2				x
<i>Urocolius indicus</i>	Red-faced Mousebird	LC (U)	LC	-	2	18.63	12.5		x
<i>Ceryle rudis</i>	Pied Kingfisher	LC (U)	LC	-	4	12.75			x
<i>Megaceryle maxima</i>	Giant Kingfisher	LC (D)	LC	-	4	7.84			x
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	LC (D)	NT/LC	-	4				x
<i>Alcedo cristata</i>	Malachite Kingfisher	LC (S)	LC	-	4	4.9			x
<i>Ispidina picta</i>	African Pygmy-kingfisher	LC (S)	LC	-	4			x	x
<i>Halcyon senegalensis</i>	Woodland Kingfisher	LC (S)	LC (B)	-	4	12.75	12.5		x
<i>Halcyon albiventris</i>	Brown-hooded Kingfisher	LC (S)	LC	-	2	20.59	25		x
<i>Halcyon chelicuti</i>	Striped Kingfisher	LC (S)	LC	-	4				x
<i>Merops apiaster</i>	European Bee-eater	LC (D)	LC (B/NB)	-	2	35.29	25		x
<i>Merops persicus</i>	Blue-cheeked Bee-eater	LC (S)	LC	-	2		12.5		x
<i>Merops nubicoides</i>	Southern Carmine Bee-eater	LC (D)	LC	-	3				x
<i>Merops bullockoides</i>	White-fronted Bee-eater	LC (I)	LC	-	2	41.18	25		x
<i>Merops pusillus</i>	Little Bee-eater	LC (D)	LC	-	2	1.96			x
<i>Coracias garrulus</i>	European Roller	NT (D)	NT/NT	-	2				x
<i>Coracias caudatus</i>	Lilac-breasted Roller	LC (S)	LC	-	2	4.9	12.5		x
<i>Coracias naevia</i>	Purple Roller	LC (D)	LC	-	3	0.98			x
<i>Upupa africana</i>	African Hoopoe	-	LC	-	2	31.37			x
<i>Phoeniculus purpureus</i>	Green Wood-hoopoe	LC (D)	LC	-	2	21.57			x
<i>Rhinopomastus cyanomelas</i>	Common Scimitarbill	LC (D)	LC	-	3	1.96			x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Tockus nasutus</i>	African Grey Hornbill	LC (S)	LC	-	1	10.78			x
<i>Tockus leucomelas</i>	Southern Yellow-billed Hornbill	LC (D)	LC	-	3	0.98			x
<i>Lybius torquatus</i>	Black-collared Barbet	LC (D)	LC	-	2	18.63			x
<i>Tricholaema leucomelas</i>	Acacia Pied Barbet	LC (I)	LC	-	2	6.86			x
<i>Pogoniulus chrysoconus</i>	Yellow-fronted Tinkerbird	LC (S)	LC	-	2	0.98			x
<i>Trachyphonus vaillantii</i>	Crested Barbet	LC (D)	LC	-	1	42.16	12.5		x
<i>Indicator indicator</i>	Greater Honeyguide	LC (I)	LC	-	2				x
<i>Indicator minor</i>	Lesser Honeyguide	LC (S)	LC	-	2	1.96			x
<i>Prodotiscus regulus</i>	Brown-backed Honeybird	LC (I)	LC	-	3	0.98			x
<i>Campethera abingoni</i>	Golden-tailed Woodpecker	LC (S)	LC	-	2	4.9			x
<i>Dendropicos fuscescens</i>	Cardinal Woodpecker	LC (S)	LC	-	2	0.98			x
<i>Dendropicos namaquus</i>	Bearded Woodpecker	LC (S)	LC	-	2	0.98			x
<i>Jynx ruficollis</i>	Red-throated Wryneck	LC (I)	LC	-	2				x
<i>Hirundo rustica</i>	Barn Swallow	LC (D)	LC (NB)	-	2	59.8	37.5		x
<i>Hirundo albigularis</i>	White-throated Swallow	LC (I)	LC	-	2	56.86	12.5		x
<i>Hirundo dimidiata</i>	Pearl-breasted Swallow	LC (S)	LC	-	2	5.88			x
<i>Hirundo semirufa</i>	Red-breasted Swallow	LC (I)	LC	-	2	17.65			x
<i>Hirundo cucullata</i>	Greater Striped-swallow	LC (I)	LC	-	1	45.1			x
<i>Hirundo abyssinica</i>	Lesser Striped-swallow	LC (I)	LC	-	2	45.1	12.5		x
<i>Hirundo spilodera</i>	South African Cliff-swallow	LC (I)	LC (B, N-End)	-	2	9.8			x
<i>Hirundo fuligula</i>	Rock Martin	LC (S)	LC	-	4	12.75			x
<i>Delichon urbicum</i>	Common House-martin	LC (D)	LC	-	2	7.84			x
<i>Riparia riparia</i>	Sand Martin	LC (D)	LC (NB)	-	2	0.98			x
<i>Riparia paludicola</i>	Brown-throated Martin	LC (D)	LC	-	2	42.16	25		x
<i>Riparia cincta</i>	Banded Martin	LC (I)	LC	-	2				x
<i>Tockus damarensis</i>	Damara Hornbill	-	LC	-	3				x
<i>Tockus erythrorhynchus</i>	Red-billed Hornbill	LC (S)	LC	-	3				x
<i>Tockus damarensis/erythrorhynchus</i>	Hornbill, Hybrid Damara/Red-billed	-	-	-	4				x
<b>9. Cryptic &amp; elusive insect-eaters</b>									
<i>Mirafra africana</i>	Rufous-naped Lark	LC (D)	LC	-	2	13.73			x
<i>Mirafa africanoides</i>	Fawn-coloured Lark	LC (S)	LC	-	2				x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Mirafra sabota</i>	Sabota Lark	LC (I)	LC	-	2	0.98			x
<i>Mirafra rufocinnamomea</i>	Flappet Lark	LC (D)	LC	-	2				x
<i>Chersomanes albofasciata</i>	Spike-heeled Lark	LC (D)	LC	-	2	1.96			x
<i>Eremopterix leucotis</i>	Chestnut-backed Sparrowlark	LC (S)	LC	-	2				x
<i>Eremopterix verticalis</i>	Grey-backed Sparrowlark	LC (S)	LC	-	4				x
<i>Calandrella cinerea</i>	Red-capped Lark	LC (I)	LC	-	2	0.98			x
<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul	LC (I)	LC	-	4				x
<i>Pycnonotus tricolor</i>	Dark-capped Bulbul	-	LC	-	1	75.49			x
<i>Sylvia borin</i>	Garden Warbler	LC (D)	LC	-	2	0.98			x
<i>Hippolais icterina</i>	Icterine Warbler	LC (D)	LC (NB)	-	4				x
<i>Phylloscopus trochilus</i>	Willow Warbler	LC (D)	LC (NB)	-	2	20.59			x
<i>Eremomela icteropygialis</i>	Yellow-bellied Eremomela	LC (S)	LC	-	3				x
<i>Eremomela usticollis</i>	Burnt-necked Eremomela	LC (S)	LC	-	2	1.96			x
<i>Acrocephalus arundinaceus</i>	Great Reed-warbler	LC (D)	LC (NB)	-	4	5.88			x
<i>Acrocephalus gracilirostris</i>	Lesser Swamp-warbler	LC (S)	LC	-	4	41.18	12.5	x	x
<i>Acrocephalus baeticatus</i>	African Reed-warbler	-	LC (B)	-	2	27.45			x
<i>Acrocephalus palustris</i>	Marsh Warbler	LC (I)	LC (NB)	-	4	10.78			x
<i>Acrocephalus schoenobaenus</i>	Sedge Warbler	LC (D)	LC (NB)	-	4	6.86			x
<i>Bradypterus baboecala</i>	Little Rush-warbler	LC (S)	LC	-	4	38.24			x
<i>Calamonastes fasciolatus</i>	Barred Wren-warbler	LC (S)	LC	-	2				x
<i>Sphenoeacus afer</i>	Cape Grassbird	LC (D)	LC (N-End)	-	3				x
<i>Sylvietta rufescens</i>	Long-billed Crombec	LC (S)	LC	-	1	2.94			x
<i>Apalis thoracica</i>	Bar-throated Apalis	LC (S)	LC	-	2	2.94			x
<i>Camaroptera brachyura</i>	Green-backed Camaroptera	LC (I)	LC	-	4				x
<i>Camaroptera brevicaudata</i>	Grey-backed Camaroptera	-	LC	-	2	2.94			x
<i>Cisticola juncidis</i>	Zitting Cisticola	LC (I)	LC	-	2	50	25		x
<i>Cisticola aridulus</i>	Desert Cisticola	LC (I)	LC	-	2	6.86			x
<i>Cisticola textrix</i>	Cloud Cisticola	LC (D)	LC (N-End)	-	2	2.94			x
<i>Cisticola ayresii</i>	Wing-snapping Cisticola	LC (D)	LC	-	2	1.96			x
<i>Cisticola fulvicapilla</i>	Neddicky	LC (S)	LC	-	1	10.78			x
<i>Cisticola lais</i>	Wailing Cisticola	LC (S)	LC	-	2				x



CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Cisticola chiniana</i>	Rattling Cisticola	LC (S)	LC	-	2	35.29			x
<i>Cisticola tinniens</i>	Le Vaillant's Cisticola	LC (S)	LC	-	4	48.04	12.5		x
<i>Cisticola aberrans</i>	Lazy Cisticola	LC (S)	LC	-	3				x
<i>Prinia subflava</i>	Tawny-flanked Prinia	LC (S)	LC	-	2	73.53	25		x
<i>Prinia flavicans</i>	Black-chested Prinia	LC (S)	LC	-	1	24.51			x
<i>Motacilla aguimp</i>	African Pied Wagtail	LC (S)	LC	-	3	44.12	12.5	x	x
<i>Motacilla capensis</i>	Cape Wagtail	LC (S)	LC	-	2	67.65	37.5		x
<i>Motacilla flava</i>	Yellow Wagtail	LC (D)	LC	-	4	14.71	12.5		x
<i>Anthus cinnamomeus</i>	African Pipit	LC (S)	LC	-	2	56.86	12.5		x
<i>Anthus similis</i>	Long-billed Pipit	LC (S)	LC	-	2	3.92			x
<i>Anthus leucophrys</i>	Plain-backed Pipit	LC (S)	LC	-	2	0.98			x
<i>Anthus vaalensis</i>	Buffy Pipit	LC (I)	LC	-	2	1.96	12.5		x
<i>Anthus lineiventris</i>	Striped Pipit	LC (S)	LC	-	4				x
<i>Macronyx capensis</i>	Cape Longclaw	LC (S)	LC	-	2	10.78			x
<i>Mirafra fasciolata</i>	Eastern Clapper Lark	-	LC	-	2	1.96			
<i>Certhilauda semitorquata</i>	Eastern Long-billed Lark	LC (D)	LC (N-End)	-	4				x
<b>10. Regular insect-eaters</b>									
<i>Campephaga flava</i>	Black Cuckooshrike	LC (S)	LC	-	2				x
<i>Parus cinerascens</i>	Ashy Tit	LC (S)	LC	-	2				x
<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	LC (S)	LC	-	1	36.27			x
<i>Oriolus oriolus</i>	Eurasian Golden-oriole	LC (S)	LC	-	3				x
<i>Oriolus larvatus</i>	Black-headed Oriole	LC (I)	LC	-	2	10.78			x
<i>Corvus albus</i>	Pied Crow	LC (S)	LC	-	1	40.2	12.5		x
<i>Corvus capensis</i>	Cape Crow	LC (I)	LC	-	2				x
<i>Parus niger</i>	Southern Black Tit	LC (S)	LC	-	2				x
<i>Anthoscopus caroli</i>	Grey Penduline-tit	LC (D)	LC	-	4				x
<i>Anthoscopus minutus</i>	Cape Penduline-tit	LC (S)	LC	-	2				x
<i>Turdoides jardineii</i>	Arrow-marked Babbler	LC (S)	LC	-	1	10.78			x
<i>Turdus libonyanus</i>	Kurrichane Thrush	LC (U)	LC	-	2	15.69			x
<i>Psophocichla litsipsirupa</i>	Groundscraper Thrush	LC (U)	LC	-	2	19.61	12.5		x
<i>Monticola rupestris</i>	Cape Rock-thrush	LC (S)	LC (N-End)	-	4				x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Oenanthe monticola</i>	Mountain Wheatear	LC (S)	LC	-	4				x
<i>Cercomela familiaris</i>	Familiar Chat	LC (S)	LC	-	4	0.98			x
<i>Thamnotaea cinnamomeiventris</i>	Mocking Cliff-chat	LC (S)	LC	-	4				x
<i>Myrmecocichla formicivora</i>	Anteater Chat	LC (S)	LC	-	4				x
<i>Saxicola torquatus</i>	African Stonechat	LC (S)	LC	-	2	52.94	25		x
<i>Cossypha caffra</i>	Cape Robin-chat	LC (S)	LC	-	2	22.55			x
<i>Cossypha humeralis</i>	White-throated Robin-chat	LC (S)	LC	-	3	0.98			x
<i>Erythropygia paena</i>	Kalahari Scrub-robin	LC (S)	LC	-	2				x
<i>Erythropygia leucophrys</i>	White-browed Scrub-robin	LC (S)	LC	-	2	3.92			x
<i>Sylvia communis</i>	Common Whitethroat	LC (D)	LC (NB)	-	4				x
<i>Muscicapa striata</i>	Spotted Flycatcher	LC (D)	LC (NB)	-	2	11.76		x	x
<i>Parisoma subcaeruleum</i>	Chestnut-vented Tit-babbler	-	LC	-	1	3.92			x
<i>Bradornis mariquensis</i>	Marico Flycatcher	LC (S)	LC	-	2	0.98			x
<i>Bradornis pallidus</i>	Pale Flycatcher	LC (S)	LC	-	2				x
<i>Melaenornis pammelaina</i>	Southern Black-flycatcher	LC (S)	LC	-	2		12.5		x
<i>Sigelus silens</i>	Fiscal Flycatcher	LC (S)	LC (N-End)	-	2	7.84			x
<i>Batis molitor</i>	Chin-spot Batis	LC (S)	LC	-	2	3.92			x
<i>Stenostira scita</i>	Fairy Flycatcher	LC (S)	LC (N-End)	-	2				x
<i>Terpsiphone viridis</i>	African Paradise-flycatcher	LC (S)	LC	-	2	19.61	12.5		x
<i>Lanius minor</i>	Lesser Grey Shrike	LC (D)	LC (NB)	-	2	0.98			x
<i>Lanius collaris</i>	Common Fiscal	LC (I)	LC	-	2	87.25	50	x	x
<i>Lanius collurio</i>	Red-backed Shrike	LC (D)	LC (NB)	-	2	0.98			x
<i>Laniarius ferrugineus</i>	Southern Boubou	LC (S)	LC	-	1	20.59			x
<i>Laniarius atrococcineus</i>	Crimson-breasted Shrike	LC (I)	LC	-	2	3.92			x
<i>Dryoscopus cubla</i>	Black-backed Puffback	LC (D)	LC	-	1	4.9			x
<i>Tchagra australis</i>	Brown-crowned Tchagra	LC (S)	LC	-	2	3.92			x
<i>Tchagra senegalus</i>	Black-crowned Tchagra	LC (S)	LC	-	2	1.96			x
<i>Telophorus sulfureopectus</i>	Orange-breasted Bush-shrike	LC (S)	LC	-	3	0.98			x
<i>Telophorus zeylonus</i>	Bokmakierie	LC (S)	LC	-	1	0.98			x
<i>Malaconotus blanchoti</i>	Grey-headed Bush-shrike	LC (I)	LC	-	1	3.92			x
<i>Corvinella melanoleuca</i>	Magpie Shrike	LC (D)	LC	-	2	22.55			x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Prionops plumatus</i>	White-crested Helmet-shrike	LC (S)	LC	-	3				x
<i>Nilaus afer</i>	Brubru	LC (S)	LC	-	2	0.98			x
<i>Acridotheres tristis</i>	Common Myna	LC (I)	AL	-	1	91.18	37.5		x
<i>Creatophora cinerea</i>	Wattled Starling	LC (S)	LC	-	2	16.67			x
<i>Cinnyricinclus leucogaster</i>	Violet-backed Starling	LC (D)	LC	-	3				x
<i>Lamprotornis nitens</i>	Cape Glossy Starling	LC (S)	LC	-	1	32.35			x
<i>Onychognathus morio</i>	Red-winged Starling	LC (I)	LC	-	2	23.53			x
<i>Spreo bicolor</i>	Pied Starling	LC (S)	LC (N-End)	-	3				x
<i>Turdus smithi</i>	Karoo Thrush	-	LC (N-End)	-	2	19.61			x
<i>Turdus olivaceus</i>	Olive Thrush	LC (U)	LC	-	2				x
<b>11. Oxpeckers &amp; nectar feeders</b>									
<i>Nectarinia famosa</i>	Malachite Sunbird	LC (S)	LC	-	4				x
<i>Nectarinia mariquensis</i>	Marico Sunbird	LC (S)	LC	-	2	2.94			x
<i>Nectarinia afer</i>	Greater Double-collared Sunbird	LC (S)	LC (N-End)	-	2				x
<i>Nectarinia talatala</i>	White-bellied Sunbird	LC (S)	LC	-	1	32.35			x
<i>Nectarinia amethystina</i>	Amethyst Sunbird	LC (S)	LC	-	2	24.51			x
<i>Zosterops pallidus</i>	Orange River White-eye	LC (U)	LC	-	2				x
<i>Zosterops capensis</i>	Cape White-eye	-	LC (N-End)	-	1	23.53			x
<b>12. Seed-eaters</b>									
<i>Bubalornis niger</i>	Red-billed Buffalo-weaver	LC (S)	LC	-	2				x
<i>Plocepasser mahali</i>	White-browed Sparrow-weaver	LC (S)	LC	-	2	9.8	12.5		x
<i>Passer domesticus</i>	House Sparrow	LC (D)	AL	-	2	40.2			x
<i>Passer motitensis</i>	Great Sparrow	LC (S)	LC	-	2	0.98			x
<i>Passer melanurus</i>	Cape Sparrow	LC (S)	LC	-	2	81.37	50		x
<i>Petronia supercilialis</i>	Yellow-throated Petronia	LC (S)	LC	-	3				x
<i>Sporopipes squamifrons</i>	Scaly-feathered Finch	LC (S)	LC	-	2	0.98			x
<i>Ploceus intermedius</i>	Lesser Masked Weaver	LC (S)	LC	-	2	0.98			x
<i>Ploceus cucullatus</i>	Village Weaver	LC (S)	LC	-	2	15.69			x
<i>Ploceus capensis</i>	Cape Weaver	LC (S)	LC (N-End)	-	2	4.9			x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Ploceus velatus</i>	Southern Masked-weaver	LC (S)	LC	-	1	90.2	12.5		x
<i>Amblyospiza albifrons</i>	Thick-billed Weaver	LC (S)	LC	-	4	17.65			x
<i>Quelea quelea</i>	Red-billed Quelea	LC (S)	LC	-	2	26.47	37.5		x
<i>Euplectes orix</i>	Southern Red Bishop	LC (S)	LC	-	3	81.37	62.5		x
<i>Euplectes capensis</i>	Yellow Bishop	LC (S)	LC	-	4	0.98			x
<i>Euplectes afer</i>	Yellow-crowned Bishop	LC (S)	LC	-	3	8.82	25	x	x
<i>Euplectes ardens</i>	Red-collared Widowbird	LC (S)	LC	-	4	19.61	12.5		x
<i>Euplectes albonotatus</i>	White-winged Widowbird	LC (S)	LC	-	4	46.08	37.5		x
<i>Euplectes progne</i>	Long-tailed Widowbird	LC (S)	LC	-	2	5.88			x
<i>Amadina erythrocephala</i>	Red-headed Finch	LC (S)	LC	-	2				x
<i>Amadina fasciata</i>	Cut-throat Finch	LC (S)	LC	-	3				x
<i>Spermestes cucullatus</i>	Bronze Mannikin	LC (S)	LC	-	1	10.78			x
<i>Pytilia melba</i>	Green-winged Pytilia	LC (S)	LC	-	2				x
<i>Lagonosticta rubricata</i>	African Firefinch	LC (S)	LC	-	3				x
<i>Lagonosticta rhodopareia</i>	Jameson's Firefinch	LC (S)	LC	-	2	2.94			x
<i>Lagonosticta senegala</i>	Red-billed Firefinch	LC (S)	LC	-	1	8.82			x
<i>Amandava subflava</i>	Orange-breasted Waxbill	LC (S)	LC	-	2	4.9			x
<i>Uraeginthus angolensis</i>	Blue Waxbill	LC (S)	LC	-	1	13.73			x
<i>Granatina granatina</i>	Violet-eared Waxbill	LC (S)	LC	-	2				x
<i>Estrilda erythronotos</i>	Black-faced Waxbill	LC (S)	LC	-	3				x
<i>Estrilda astrild</i>	Common Waxbill	LC (S)	LC	-	2	29.41	12.5		x
<i>Ortygospiza atricollis</i>	African Quailfinch	LC (S)	LC	-	2	1.96			x
<i>Vidua macroura</i>	Pin-tailed Whydah	LC (S)	LC	-	2	48.04	25		x
<i>Vidua regia</i>	Shaft-tailed Whydah	LC (S)	LC	-	2				x
<i>Vidua funerea</i>	Dusky Indigobird	LC (S)	LC	-	2				x
<i>Vidua chalybeata</i>	Village Indigobird	LC (S)	LC	-	2				x
<i>Vidua paradisaea</i>	Long-tailed Paradise-whydah	LC (S)	LC	-	2				x
<i>Anomalospiza imberbis</i>	Cuckoo Finch	LC (S)	LC	-	2				x
<i>Crithagra mozambicus</i>	Yellow-fronted Canary	LC (D)	LC	-	2	7.84			x
<i>Crithagra atrogularis</i>	Black-throated Canary	LC (S)	LC	-	2	36.27	25		x
<i>Crithagra gularis</i>	Streaky-headed Seedeater	LC (S)	LC	-	2	0.98			x
<i>Emberiza tahapisi</i>	Cinnamon-breasted Bunting	LC (S)	LC	-	3	0.98			x
<i>Emberiza capensis</i>	Cape Bunting	LC (S)	LC	-	3				x

CATEGORY <sup>1</sup> & SPECIES <sup>4</sup>	COMMON NAME <sup>4</sup>	CONSERVATION STATUS			LO <sup>4</sup>	ATLAS <sup>4</sup>			
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>5</sup>	S.A. NEM:BA <sup>2</sup>		PENTAD DATA (SABAP 2)			SABAP1
						FP (RR%)	AP (RR%)	IR	
<i>Emberiza flaviventris</i>	Golden-breasted Bunting	LC (S)	LC	-	2				x
<i>Passer griseus</i>	Northern Grey-headed Sparrow	LC (S)	LC	-	3				x
<i>Passer diffusus</i>	Southern Greyheaded Sparrow	LC (S)	LC	-	1	40.2			x
<b>Key</b>									
<b>Status:</b> D = Declining; EN = Endangered; I = Increasing; LC = Least Concern; NB = Non-breeding; NR = Not Recognised by Birdlife International; NT = Near Threatened; PS = Protected Species; S = Stable; U = Unknown population trend; VU = Vulnerable									
<b>Likelihood of Occurrence (LO):</b> 1 = Present; 2 = High; 3 = Moderate; 4 = Low; 5 = Restricted to managed populations									
<b>Sources:</b> <sup>1</sup> Newman (2002); <sup>2</sup> ToPS List (2015); <sup>3</sup> IUCN (2015-4); <sup>4</sup> SABAP(2016); <sup>5</sup> Taylor (2015)									

## 12.4. Appendix 4 Present and potentially occurring reptile species

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	CONSERVATION STATUS			LO <sup>1,4</sup>	ATLAS (N) <sup>4</sup>
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>1</sup>	S.A. NEM:BA <sup>2</sup>		
<b>PELOMEDUSIDAE (Terrapins)</b>						
<i>Pelomedusa subrufa</i>	Marsh Terrapin	-	2LC	-	3	1
<i>Pelusios sinuatus</i>	Serrated Hinged Terrapin	-	2LC	-	3	
<b>TESTUDINIDAE (Tortoises)</b>						
<i>Kinixys lobatsiana</i>	Lobatse Hinged Tortoise	-	1LC	-	2	1
<i>Kinixys spekii</i>	Speke's Hinged-back Tortoise	-	2LC	-	2	1
<i>Stigmochelys pardalis</i>	Leopard Tortoise	-	1LC	-	2	
<b>GEKKONIDAE (Geckos)</b>						
<i>Chondrodactylus turneri</i>	Turner's Gecko	-	1LC	-	2	
<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	-	2LC	-	1	5
<i>Lygodactylus capensis capensis</i>	Common Dwarf Gecko	-	1LC	-	2	6
<i>Pachydactylus affinis</i>	Transvaal Gecko	-	1LC (End)	-	2	1
<i>Pachydactylus capensis</i>	Cape Gecko	-	2LC	-	2	1
<b>AMPHISBAENIDAE (Worm lizards)</b>						
<i>Monopeltis infusca</i>	Dusky Worm Lizard	-	2LC	-	3	
<b>LACERTIDAE (Typical lizards)</b>						
<i>Ichnotropis capensis</i>	Ornate Rough-scaled Lizard	-	1LC	-	2	
<i>Meroles squamulosus</i>	Savanna Lizard	-	1LC	-	2	
<i>Nucras holubi</i>	Holub's Sandveld Lizard	-	2LC	-	2	2
<i>Nucras lalandii</i>	Delalande's Sandveld Lizard	-	1LC (End)	-	2	
<i>Nucras ornata</i>	Ornate Sandveld Lizard	-	2LC	-	3	
<i>Pedioplanis lineoocellata lineoocellata</i>	Spotted Sand Lizard	-	2LC	-	2	
<i>Pedioplanis lineoocellata pulchella</i>	Spotted Sand lizard	-	1LC	-	2	
<b>CORDYLIDAE (Girdled lizards &amp; relatives)</b>						
<i>Chamaesaura aenea</i>	Coppery Grass Lizard	-	1NT (End)	-	4	
<i>Chamaesaura anguina anguina</i>	Cape Grass Lizard	-	1LC (End)	-	4	
<i>Cordylus jonesii</i>	Jones' Girdled Lizard	-	1LC	-	2	1
<i>Cordylus vittifer</i>	Common Girdled Lizard	-	1LC	-	4	1
<b>GERRHOSAURIDAE (Plated lizards &amp; relatives)</b>						
<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	-	2LC	-	2	2
<b>SCINCIDAE (Skinks)</b>						
<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink	LC (U)	1LC (End)	-	2	
<i>Acontias occidentalis</i>	Savanna Legless Skink	-	1LC	-	3	
<i>Afroablepharus wahlbergii</i>	Wahlberg's Snake-eyed Skink	-	2LC	-	3	
<i>Mochlus sundevallii sundevallii</i>	Sundevall's Writhing Skink	LC (S)	2LC	-	4	1
<i>Trachylepis capensis</i>	Cape Skink	-	2LC	-	2	1
<i>Trachylepis margaritifer</i>	Rainbow Skink	LC (U)	2LC	-	4	
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	LC (S)	2LC	-	1	3
<i>Trachylepis varia</i>	Variable Skink	-	2LC	-	2	9
<i>Scelotes vestigifer</i>	Coastal Dwarf Burrowing Skink	-	1LC	-	3	
<b>VARANIDAE (Monitors)</b>						
<i>Varanus niloticus</i>	Nile Monitor	-	2LC	-	3	
<i>Varanus albigularis albigularis</i>	Southern Rock Monitor	-	2LC	-	3	1
<b>CHAMAELEONIDAE (Chamaeleons)</b>						

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	CONSERVATION STATUS			LO <sup>1,4</sup>	ATLAS (N) <sup>4</sup>
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>1</sup>	S.A. NEM:BA <sup>2</sup>		
<i>Chamaeleo dilepis dilepis</i>	Common Flap-neck Chameleon	LC (S)*	2LC	-	2	3
<b>AGAMIDAE (Agamas)</b>						
<i>Agama aculeata distanti</i>	Eastern Ground Agama	-	1LC (End)	-	2	
<i>Agama atra</i>	Southern Rock Agama	-	1LC	-	4	15
<i>Acanthocercus atricollis atricollis</i>	Southern Tree Agama	LC (S)*	1LC	-	2	4
<b>TYPHLOPIDAE (Blind snakes)</b>						
<i>Afrotrophops bibronii</i>	Bibron's Blind Snake	-	1LC	-	2	7
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	-	2LC	-	2	1
<b>LEPTOTYPHLOPIDAE (Thread snakes)</b>						
<i>Leptotyphlops distanti</i>	Distant's Thread Snake	-	1LC	-	2	
<i>Leptotyphlops scutifrons scutifrons</i>	Peters' Thread Snake	-	1LC	-	2	1
<i>Leptotyphlops scutifrons conjunctus</i>	Peters' Thread Snake	-	1LC	-	2	1
<b>PYTHONIDAE (Python)</b>						
<i>Python natalensis</i>	Southern African Python	-	2LC	PS	4	
<b>VIPERIDAE (Adders)</b>						
<i>Bitis arietans arietans</i>	Puff Adder	-	2LC	-	2	29
<i>Bitis caudalis</i>	Horned Adder	-	2LC	-	4	
<i>Causus rhombeatus</i>	Rhombic Night Adder	-	2LC	-	2	3
<b>LAMPROPHIIDAE (Advanced snakes)</b>						
<i>Amblyodipsas polylepis polylepis</i>	Common Purple-glossed Snake	-	1LC	-	2	1
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	LC (S)	2LC	-	2	4
<i>Atractaspis bibronii</i>	Bibron's Stiletto Snake	-	2LC	-	2	6
<i>Atractaspis duerdeni</i>	Duerden's Stiletto Snake	-	2LC	-	2	
<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake	NT	1LC (End)	-	4	
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	-	1LC	-	4	
<i>Boaedon capensis</i>	Common House Snake	-	2LC	-	2	19
<i>Gonionotophis capensis capensis</i>	Common File Snake	LC (U)*	2LC	-	2	
<i>Lamprophis aurora</i>	Aurora Snake	LC (D)	1LC (End)	-	2	2
<i>Lycodonomorphus inornatus</i>	Olive Ground Snake	LC (U)	1LC (End)	-	2	
<i>Lycodonomorphus rufulus</i>	Brown Water Snake	-	1LC	-	4	
<i>Lycophidion capense capense</i>	Cape Wolf Snake	-	2LC	-	3	3
<i>Psammophis angolensis</i>	Dwarf Sand Snake	-	2LC	-	4	
<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	-	1LC	-	2	7
<i>Psammophis crucifer</i>	Cross-marked Grass Snake	-	1LC	-	2	
<i>Psammophis trinasalis</i>	Fork-marked Sand Snake	-	2LC	-	2	
<i>Psammophylax rhombeatus rhombeatus</i>	Spotted Grass Snake	-	2LC	-	2	2
<i>Psammophylax tritaeniatus</i>	Striped Grass Snake	LC (S)	2LC	-	2	
<i>Duberria lutrix lutrix</i>	South African Slug-eater	LC (S)	1LC (End)	-	2	
<i>Prosymna bivittata</i>	Two-striped Shovel-snout	-	1LC	-	4	
<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout	-	1LC	-	2	1
<i>Pseudaspis cana</i>	Mole Snake	-	2LC	-	2	
<b>ELAPIDAE (Cobras &amp; relatives)</b>						
<i>Aspidelaps scutatus scutatus</i>	Common Shield Cobra	-	1LC	-	4	

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	CONSERVATION STATUS			LO <sup>1,4</sup>	ATLAS (N) <sup>4</sup>
		GLOBAL IUCN <sup>3</sup>	S.A. RED DATA <sup>1</sup>	S.A. NEM:BA <sup>2</sup>		
<i>Elapsoidea sundevallii media</i>	Sundevall's Garter Snake	-	1LC	-	2	3
<i>Hemachatus haemachatus</i>	Rinkhals	LC (S)	1LC	-	2	
<i>Naja annulifera</i>	Snouted Cobra	-	2LC	-	2	13
<i>Naja mossambica</i>	Mozambique Spitting Cobra	-	2LC	-	2	3
<b>COLUBRIDAE (Typical snakes)</b>						
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	-	2LC	-	2	2
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	LC (U)	2LC	-	2	6
<i>Dispholidus typus typus</i>	Boomslang	-	2LC	-	2	6
<i>Philothamnus hoplogaster</i>	South-eastern Green Snake	-	2LC	-	4	1
<i>Philothamnus natalensis occidentalis</i>	Western Natal Green Snake	-	1LC (End)	-	4	
<i>Philothamnus semivariiegatus</i>	Spotted Bush Snake	-	2LC	-	2	2
<i>Telescopus semiannulatus semiannulatus</i>	Eastern Tiger Snake	-	2LC	-	3	4
<i>Thelotornis capensis capensis</i>	Southern Twig Snake	-	1LC	-	3	
<b>Key</b>						
<b>Status:</b> 1 = Global; 2 = Regional; LC = Least Concern; PS = Protected Species; VU = Vulnerable						
<b>Likelihood of Occurrence (LO):</b> 1 = Present; 2 = High; 3 = Moderate; 4: Low; 5 = May occur as a managed population						
<b>Sources:</b> <sup>1</sup> Bates <i>et al.</i> (2014); <sup>2</sup> ToPS List (2015); <sup>3</sup> IUCN (2015-4); <sup>4</sup> ReptileMap (2016)						

## 12.5. Appendix 5 Present and potentially occurring frog species

FAMILY <sup>5</sup> & SPECIES <sup>5</sup>	COMMON NAME <sup>3</sup>	CONSERVATION STATUS			Lo <sup>3,5</sup>	ATLAS (N) <sup>3,5</sup>
		GLOBAL IUCN <sup>2</sup>	S.A. RED DATA <sup>3</sup>	S.A. NEM:BA <sup>1</sup>		
<b>BREVICIPITIDAE (Rain frogs)</b>						
<i>Breviceps adspersus adspersus</i>	Bushveld Rain Frog	LC (U)*	LC	-	3	
<i>Sclerophrys garmani</i>	Eastern Olive Toad	LC (U)	LC	-	2	3
<i>Sclerophrys gutturalis</i>	Guttural Toad	LC (I)	LC	-	2	12
<i>Amietophrynus rangeri</i>	Raucous Toad	LC (D)	LC	-	3	
<i>Poyntonophrynus fenoulheti</i>	Northern Pygmy Toad	LC (U)	LC	-	3	
<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad	LC (U)	LC	-	4	1
<i>Schismaderma carens</i>	Red Toad	LC (U)	LC	-	2	3
<b>HEMISOTIDAE (Shovel-nosed frogs)</b>						
<i>Hemisus marmoratus</i>	Mottled Shovel-nosed Frog	LC (U)	LC	-	4	
<b>HYPEROLIIDAE (Leaf-folding &amp; reed frogs)</b>						
<i>Kassina senegalensis</i>	Bubbling Kassina	LC (U)	LC	-	4	3
<i>Semnodactylus wealii</i>	Rattling Frog	LC (U)	LC	-	4	
<b>MICROHYLIDAE (Rubber frogs)</b>						
<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	LC (U)	LC	-	4	3
<b>PHRYNOBATRACHIDAE (Puddle frogs)</b>						
<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	LC (S)	LC	-	4	
<b>PIPIDAE (African clawed frogs)</b>						
<i>Xenopus laevis</i>	Common Platanna	LC (I)	LC	-	4	2
<b>PTYCHADENIDAE (Grass frogs)</b>						
<i>Ptychadena anchietae</i>	Plain Grass Frog	LC (U)	LC	-	4	



FAMILY <sup>5</sup> & SPECIES <sup>5</sup>	COMMON NAME <sup>3</sup>	CONSERVATION STATUS			LoO <sup>3,5</sup>	ATLAS (N) <sup>3,5</sup>
		GLOBAL IUCN <sup>2</sup>	S.A. RED DATA <sup>3</sup>	S.A. NEM:BA <sup>1</sup>		
<b>PYXICEPHALIDAE (River, stream, moss &amp; sand frogs)</b>						
<i>Ptychadena porosissima</i>	Striped Grass Frog	LC (U)	LC	-	4	1
<i>Cacosternum boettgeri</i>	Boettger's Caco	LC (U)	LC	-	2	3
<i>Amietia queketti</i>	Common River Frog	LC (S)	LC	-	4	8
<i>Amietia</i> sp.	River frog	-	-	-	-	1
<i>Amietia fuscigula</i>	Cape River Frog	LC (S)	LC	-	4	
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC (D)	NT	PS	2	5
<i>Pyxicephalus edulis</i>	African Bullfrog	LC (U)	LC	PS	4	1
<i>Tomopterna cryptotis</i>	Tremolo Sand Frog	LC (S)	LC	-	2	4
<i>Tomopterna natalensis</i>	Natal Sand Frog	LC (U)	LC	-	2	1
<i>Tomopterna tandyi</i>	Tandy's Sand Frog	LC (U)	LC	-	2	
<b>Key</b>						
<b>Status:</b> LC = Least Concern; NT = Near Threatened; PS = Protected Species						
<b>Likelihood of Occurrence (LO):</b> 1 = Present; 2 = High; 4 = Low						
<b>Sources:</b> <sup>1</sup> ToPS List (2007); <sup>2</sup> IUCN (2015-4); <sup>3</sup> Minter et al. (2004); <sup>4</sup> Du Preez & Carruthers (2009); <sup>5</sup> FrogMap (2016)						

## 12.6. Appendix 6 Present and potentially occurring butterfly species

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	STATUS <sup>1</sup>	Lo <sup>1,2</sup>	ATLAS <sup>2</sup>
<b>HESPERIIDAE (Sandmen, skippers, policemen &amp; sylphs)</b>				
<i>Abantis tettensis</i>	Spotted Paradise Skipper	1LC	2	6
<i>Borbo fallax</i>	False Swift	1LC	3	
<i>Borbo gemella</i>	Twin Swift	1LC	2	2
<i>Caprona pillaana</i>	Ragged Skipper	1LC	2	
<i>Coeliades forestan forestan</i>	Striped Policeman	1LC	2	4
<i>Coeliades pisistratus</i>	Two-pip Policeman	1LC	2	3
<i>Eretis djaelaelae</i>	Marbled Elf	1LC	2	
<i>Eretis umbra umbra</i>	Small Marbled Elf	1LC	2	3
<i>Gegenes hottentota</i>	Marsh Hottentot Skipper	1LC	2	1
<i>Gegenes niso niso</i>	Common Hottentot Skipper	1LC	2	3
<i>Gegenes pumilio gambica</i>	Dark Hottentot	1LC	1	4
<i>Gomalia elma elma</i>	Green-marbled Skipper	1LC	2	
<i>Kedestes barberae barberae</i>	Barber's Ranger	1LC	2	2
<i>Kedestes callicles</i>	Pale Ranger	1LC	2	
<i>Kedestes lepenula</i>	Chequered ranger	1LC	2	7
<i>Kedestes macomo</i>	Macomo Ranger	1LC	2	1
<i>Kedestes nerva nerva</i>	Scarce Ranger	1LC	2	1
<i>Kedestes wallengrenii wallengrenii</i>	Wallengren's ranger	1LC	2	
<i>Leucochitonea levubu</i>	White-cloaked Skipper	1LC	2	
<i>Metisella malgacha malgacha</i>	Grassveld Sylph	1LC	2	
<i>Metisella meninx</i>	Marsh Sylph	1LC (RHS)	4	
<i>Metisella willemi</i>	Netted Sylph	1LC	3	12
<i>Pelopidas mathias</i>	Black-banded Swift	1LC	2	1
<i>Pelopidas thrax</i>	White-banded Swift	1LC	2	1
<i>Platylesches dolomitica</i>	Hilltop Hopper	1LC (RLD)	4	
<i>Platylesches moritili</i>	Honey Hopper	1LC	3	
<i>Platylesches neba</i>	Flower-girl Hopper	1LC	2	3
<i>Sarangesa motozi</i>	Forest Elfin	1LC	3	

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	STATUS <sup>1</sup>	LO <sup>1,2</sup>	ATLAS <sup>2</sup>
<i>Sarangesa phidyle</i>	Small Elfin	1LC	2	1
<i>Sarangesa seineri seineri</i>	Northern Dark Elfin	1LC	2	3
<i>Spialia agylla agylla</i>	Grassveld Sandman	1LC	4	
<i>Spialia asterodia</i>	Star Sandman	1LC	2	1
<i>Spialia colotes transvaaliae</i>	Bushveld Sandman	1LC	2	
<i>Spialia delagoae</i>	Delagoa Sandman	1LC	2	
<i>Spialia depauperata australis</i>	Wandering sandman	1LC	2	
<i>Spialia diomus ferax</i>	Common Sandman	1LC	2	5
<i>Spialia dromus</i>	Forest Sandman	1LC	2	
<i>Spialia mafa mafa</i>	Mafa sandman	1LC	2	4
<i>Spialia paula</i>	Mite sandman	1LC	2	
<i>Spialia spio</i>	Mountain sandman	1LC	2	5
<i>Tsitana tsita</i>	Dismal Sylph	1LC	2	1
<i>Zenonia zeno</i>	Orange-spotted hopper	1LC	4	
<b>PAPILIONIDAE (Swallowtails, swordtails &amp; handkerchiefs)</b>				
<i>Graphium angolanus angolanus</i>	Angola white-Lady	1LC	2	1
<i>Graphium antheus</i>	Large Striped Swordtail	1LC	3	
<i>Graphium morania</i>	White lady	1LC	2	2
<i>Papilio constantinus constantinus</i>	Constantine's swallowtail	1LC	4	
<i>Papilio demodocus demodocus</i>	Citrus swallowtail	1LC	1	13
<i>Papilio nireus lyaeus</i>	Green-banded swallowtail	1LC	2	
<b>PIERIDAE (Whites, tips &amp; travellers)</b>				
<i>Afrodryas leda</i>	Autumn leaf vagrant	1LC	4	
<i>Belenois aurota</i>	Brown-veined white	1LC	1	12
<i>Belenois creona severina</i>	African common white	1LC	2	3
<i>Belenois zochalia zochalia</i>	Forest White	1LC	2	3
<i>Catopsilia florella</i>	African migrant	1LC	1	14
<i>Colias electo electo</i>	African clouded yellow	1LC	2	1
<i>Colotis annae annae</i>	Scarlet tip	1LC	2	
<i>Colotis antevippe gavisa</i>	Red tip	1LC	2	
<i>Colotis euipe omphale</i>	Smoky orange tip	1LC	2	
<i>Colotis evagore antigone</i>	Small orange tip	1LC	2	2
<i>Colotis evenina sipylus</i>	Orange tip	1LC	2	2
<i>Colotis ione</i>	Bushveld purple tip	1LC	3	
<i>Colotis pallene</i>	Bushveld orange tip	1LC	3	
<i>Colotis regina</i>	Queen purple tip	1LC	2	1
<i>Colotis vesta argillaceus</i>	Veined Arab	1LC	3	
<i>Eurema brigitta brigitta</i>	Broad-bordered grass yellow	1LC	2	21
<i>Eurema hecabe solifera</i>	Common Grass Yellow	1LC	2	
<i>Leptosia alcesta inalcesta</i>	African wood white	1LC	4	
<i>Mylothris agathina agathina</i>	Common dotted border	1LC	2	5
<i>Mylothris rueppellii haemus</i>	Twin dotted border	1LC	2	1
<i>Pinacopteryx eriphia eriphia</i>	Zebra white	1LC	2	
<i>Pontia helice helice</i>	Common meadow white	1LC	2	5
<i>Teracolus agoye agoye</i>	Speckled sulphur tip	1LC	2	2
<i>Teracolus eris eris</i>	Banded gold tip	1LC	2	
<i>Teracolus subfasciatus</i>	Lemon traveller	1LC	2	3
<b>NYMPHALIDAE (Acraeas, monarchs, pansies, browns, ringlets &amp; charaxes)</b>				
<i>Acraea aglaonice</i>	Window Acraea	1LC	2	2
<i>Acraea anemosa</i>	Broad-bordered acraea	1LC	2	4
<i>Acraea axina</i>	Little acraea	1LC	2	
<i>Acraea barberi</i>	Barber's acraea	1LC	2	7
<i>Acraea caldarena caldarena</i>	Black-tipped acraea	1LC	2	



SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	STATUS <sup>1</sup>	LO <sup>1,2</sup>	ATLAS <sup>2</sup>
<i>Acraea horta</i>	Garden acraea	1LC	2	1
<i>Acraea lygus</i>	Lygus acraea	1LC	3	
<i>Acraea natalica</i>	Natal acraea	1LC	2	
<i>Acraea neobule neobule</i>	Wandering donkey acraea	1LC	1	17
<i>Acraea nohara nohara</i>	Light red acraea	1LC	3	
<i>Acraea oncaea</i>	Rooibok Acraea	1LC	3	
<i>Acraea rabbaiae perlucida</i>	Clear-wing acraea	1LC	4	
<i>Acraea violarum</i>	Speckled red acraea	1LC	3	
<i>Aerpetes tulbaghia</i>	Table mountain beauty	1LC	2	
<i>Amauris albimaculata albimaculata</i>	Layman	1LC	3	3
<i>Byblia anvataracheloia</i>	Joker	1LC	2	2
<i>Byblia ilithyia</i>	Spotted joker	1LC	1	10
<i>Catacroptera cloanthe cloanthe</i>	Pirate	1LC	2	10
<i>Charaxes achaemenes achaemenes</i>	Bushveld charaxes	1LC	2	2
<i>Charaxes brutus natalensis</i>	White-barred charaxes	1LC	2	
<i>Charaxes candiope</i>	Green-veined charaxes	1LC	2	9
<i>Charaxes jahlusa argynnides</i>	Zululand Pearl-spotted charaxes	1LC	2	
<i>Charaxes jahlusa jahlusa</i>	Pearl-spotted charaxes	1LC	3	
<i>Charaxes jahlusa rex</i>	Pearl-spotted charaxes	1LC	2	5
<i>Charaxes jasius saturnus</i>	Foxy charaxes	1LC	2	4
<i>Charaxes vansoni</i>	Van Son's charaxes	1LC	2	
<i>Coenyropsis natalii natalii</i>	Natal brown	1LC	3	
<i>Danaus chrysippus orientis</i>	African monarch	1LC	1	15
<i>Eurytela dryope angulata</i>	Golden piper	1LC	2	
<i>Hamanumida daedalus</i>	Guinea-fowl butterfly	1LC	2	
<i>Heteropsis perspicua perspicua</i>	Eyed bush brown	1LC	2	3
<i>Hypolimnas misippus</i>	Common diadem	1LC	1	8
<i>Junonia hierta cebrene</i>	Yellow pansy	1LC	1	22
<i>Junonia oenone oenone</i>	Blue pansy	1LC	1	11
<i>Junonia orithya madagascariensis</i>	Eyed pansy	1LC	2	3
<i>Melanitis leda</i>	Twilight brown	1LC	2	
<i>Neptis saclava marpessa</i>	Spotted sailer	1LC	2	
<i>Paternympha narycia</i>	Spotted-eye brown	1LC	2	29
<i>Phalanta phalantha aethiopica</i>	African Leopard	1LC	2	3
<i>Physcaeneura panda</i>	Dark-webbed ringlet	1LC	2	1
<i>Precis antilope</i>	Darker commodore	1LC	3	
<i>Precis archesia archesia</i>	Garden commodore	1LC	2	49
<i>Precis ceryne ceryne</i>	Marsh commodore	1LC	4	
<i>Precis octavia sesamus</i>	Gaudy Commodore	1LC	4	3
<i>Stygionympha wichgrafi wichgrafi</i>	Wichgraf's hillside brown	1LC	2	1
<i>Telchinia burni</i>	Pale-yellow acraea	1LC	2	1
<i>Telchinia encendon encendon</i>	White-barred acraea	1LC	3	
<i>Telchinia rahira rahira</i>	Marsh acraea	1LC	2	1
<i>Telchinia serena</i>	Dancing acraea	1LC	2	7
<i>Vanessa cardui</i>	Painted lady	1LC	1	6
<i>Ypthima asterope asterope</i>	African ringlet	1LC	2	1
<i>Ypthima impura paupera</i>	Impure ringlet	1LC	2	1
<b>LYCAENIDAE (Coppers, blues &amp; relatives)</b>				
<i>Actizera lucida</i>	Rayed blue	1LC	2	7
<i>Alaena amazoula ochroma</i>	Yellow Zulu	1LC	2	7
<i>Aloeides aranda</i>	Aranda copper	1LC	2	5
<i>Aloeides henningi</i>	Henning's copper	1LC	3	
<i>Aloeides molomo molomo</i>	Molomo copper	1LC	3	
<i>Aloeides taikosama</i>	Dusky copper	1LC	2	11

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	STATUS <sup>1</sup>	LO <sup>1,2</sup>	ATLAS <sup>2</sup>
<i>Aloeides trimeni trimeni</i>	Trimen's copper	1LC	2	1
<i>Anthene amarah amarah</i>	Black striped hairtail	1LC	2	11
<i>Anthene definita definita</i>	Common hairtail	1LC	2	3
<i>Anthene dulcis dulcis</i>	Mashuna hairtail	1LC	2	
<i>Anthene livida livida</i>	Pale hairtail	1LC	2	20
<i>Anthene millari</i>	Millar's hairtail	1LC	3	5
<i>Anthene princeps</i>	Lebombo hairtail	1LC	3	1
<i>Anthene talboti</i>	Talbot's hairtail	1LC	3	
<i>Aphnaeus hutchinsonii</i>	Hutchinson's highflier	1LC	2	39
<i>Axiocerses amanga amanga</i>	Bush scarlet	1LC	2	7
<i>Axiocerses coalescens</i>	Black-tipped scarlet	1LC	3	
<i>Axiocerses tjoane tjoane</i>	Eastern scarlet	1LC	2	12
<i>Azanus jesous</i>	Topaz babul blue	1LC	2	14
<i>Azanus mirza</i>	Mirza babul blue	1LC	3	2
<i>Azanus moriqua</i>	Thorn-tree babul blue	1LC	2	11
<i>Azanus natalensis</i>	Natal babul blue	1LC	3	
<i>Azanus ubaldus</i>	Velvet-spotted babul blue	1LC	2	5
<i>Cacyreus lingeus</i>	Bush bronze	1LC	2	
<i>Cacyreus marshalli</i>	Common geranium bronze	1LC	2	6
<i>Cacyreus virilis</i>	Mocker bronze	1LC	2	8
<i>Capys disjunctus</i>	Russet protea	1LC	2	13
<i>Chilades trochylus</i>	Grass jewel	1LC	2	6
<i>Cigaritis ella</i>	Ella's bar	1LC	2	14
<i>Cigaritis mozambica</i>	Mozambique bar	1LC	2	11
<i>Cigaritis natalensis</i>	Natal bar	1LC	2	15
<i>Cigaritis phanes</i>	Silvery bar	1LC	3	
<i>Cnodontes penningtoni</i>	Pennington's buff	1LC	2	
<i>Crudaria leroma</i>	Silver spotted grey	1LC	2	6
<i>Cupidopsis cissus cissus</i>	Common meadow blue	1LC	2	3
<i>Cupidopsis jobates jobates</i>	Tailed meadow blue	1LC	2	10
<i>Eicochrysops messapus mahallakoena</i>	Cupreous blue	1LC	2	11
<i>Euchrysops barkeri</i>	Barker's smoky blue	1LC	3	1
<i>Euchrysops dolorosa</i>	Sabie smoky blue	1LC	2	7
<i>Euchrysops malathana</i>	Common smoky blue	1LC	2	4
<i>Euchrysops osiris</i>	Osiris smoky blue	1LC	2	1
<i>Euchrysops subpallida</i>	Ashen smoky blue	1LC	2	3
<i>Hypolycaena philippus philippus</i>	Purplebrown hairstreak	1LC	2	
<i>Iolais alienus alienus</i>	Brown-line sapphire	1LC	2	14
<i>Iolais mimosae rhodosense</i>	Mimosa sapphire	1LC	2	28
<i>Iolais pallene</i>	Saffron sapphire	1LC	3	
<i>Iolais silarus silarus</i>	Straight-line sapphire	1LC	3	
<i>Iolais trimeni</i>	Trimen's sapphire	1LC	2	59
<i>Lachnocnema bibulus</i>	Common woolly legs	1LC	2	2
<i>Lachnocnema durbani</i>	D'Urban's woolly legs	1LC	2	2
<i>Lachnocnema laches</i>	Southern pied woolly legs	1LC	3	
<i>Lampides boeticus</i>	Pea blue	1LC	2	15
<i>Lepidochrysops glauca</i>	Silvery blue	1LC	2	21
<i>Lepidochrysops ignota</i>	Zulu blue	1LC	2	2
<i>Lepidochrysops letsea</i>	Free State blue	1LC	3	41
<i>Lepidochrysops patricia</i>	Patricia blue	1LC	2	3
<i>Lepidochrysops plebeia plebeia</i>	Twin-spot blue	1LC	2	19
<i>Lepidochrysops procera</i>	Potchefstroom blue	1LC (RHS)	3	2
<i>Leptomyrina gorgias gorgias</i>	Common black-eye	1LC	3	

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	STATUS <sup>1</sup>	LO <sup>1,2</sup>	ATLAS <sup>2</sup>
<i>Leptomyrina henningi henningi</i>	Henning's black-eye	1LC	2	23
<i>Leptotes brevidentatus</i>	Short-toothed zebra blue	1LC	3	
<i>Leptotes pirthous pirthous</i>	Common zebra blue	1LC	1*	10
<i>Myrina silenus ficedula</i>	Common fig tree blue	1LC	2	17
<i>Oraidium barberae</i>	Dwarf blue	1LC	2	1
<i>Pseudonacaduba sichela sichela</i>	Dusky blue	1LC	2	3
<i>Stugeta bowkeri tearei</i>	Bowker's marbled sapphire	1LC	2	16
<i>Tarucus sybaris sybaris</i>	Dotted blue	1LC	2	5
<i>Thestor basutus capeneri</i>	Basuto skolly	1LC	3	
<i>Tuxentius calice</i>	White pie	1LC	2	
<i>Tuxentius melaena melaena</i>	Black pie	1LC	2	8
<i>Uranothauma nubifer nubifer</i>	Black heart	1LC	2	2
<i>Virachola antalus</i>	Brown playboy	1LC	1	10
<i>Virachola dinochares</i>	Apricot playboy	1LC	2	11
<i>Zintha hintza hintza</i>	Hintza pierrot	1LC	2	5
<i>Zizeeria knysna knysna</i>	Sooty blue	1LC	2	14
<i>Zizula hylax</i>	Gaika blue	1LC	2	6

**Key**

**Status:** LC = Least Concern; RHS = Rare Habitat Specialist; RLD = Rare Low Density; 1 = Global

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

**Sources:** <sup>1</sup>Mecenero *et al.* (2013); <sup>2</sup>LepiMap (2016)

## 12.7. Appendix 7 Present and potentially occurring odonata species

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	DBI <sup>1</sup>	LO <sup>1</sup>	ATLAS <sup>2</sup>
<b>COENAGRIONIDAE (Pond damselfly)</b>				
<i>Ceragrion glabrum</i>	Common Citril	0	3	
<i>Pseudagrion salisburyense</i>	Slate Sprite	1	4	1
<b>AESHNIDAE (Hawkers)</b>				
<i>Anax ephippiger</i>	Vagrant Emperor	2	2	
<b>GOMPHIDAE (Clubtails)</b>				
<i>Ictinogomphus ferox</i>	Common Tigertail	2	3	
<i>Ceratogomphus pictus</i>	Common Thorntail	2	3	
<b>LIBELLULIDAE (Skimmers &amp; relatives)</b>				
<i>Orthetrum julia</i>	Julia Skimmer	1	3	1
<i>Palpopleura lucia</i>	Lucia Widow	2	3	
<i>Crocothemis sanguinolenta</i>	Little Scarlet	3	3	
<i>Brachythemis leucosticta</i>	Banded Groundling	2	2	
<i>Sympetrum fonscolombii</i>	Nomad	0	2	
<i>Trithemis annulata</i>	Violet Dropwing	1	3	
<i>Trithemis arteriosa</i>	Red-veined Dropwing	0	3	
<i>Trithemis furva</i>	Navy Dropwing	0	3	1
<i>Trithemis kirbyi</i>	Kirby's Dropwing	0	3	1
<i>Trithemis stictica</i>	Jaunty Dropwing	1	3	
<i>Rhyothemis semihyalina</i>	Phantom Flutterer	1	3	
<i>Pantala flavescens</i>	Pantala	0	3	
<i>Tamea basilaris</i>	Keyhole Glider	0	2	

**Key**

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

**Dragonfly Biotic Index (DBI):** An index developed by Samways (2008) based on three criteria: geographical distribution, conservation status and sensitivity to change in habitat and ranges from a minimum of 0 (very common, widespread species which is highly tolerant of human disturbance) to 9 (range-restricted, threatened and sensitive endemic).

SPECIES <sup>1</sup>	COMMON NAME <sup>1</sup>	DBI <sup>1</sup>	LO <sup>1</sup>	ATLAS <sup>2</sup>
<b>Sources:</b> <sup>1</sup> Samways (2008); <sup>2</sup> OdonataMap (2016)				

## 12.8. Appendix 8 Selected present and potentially occurring arachnid species

SPECIES & FAMILY <sup>2,3</sup>	COMMON NAME <sup>2,3</sup>	STATUS <sup>1</sup>	LO <sup>2,3</sup>
<b>BUTHIDAE</b>			
<i>Parabuthus mossambicensis</i>	Thick-tailed scorpions	-	4
<i>Parabuthus transvaalicus</i>	Thick-tailed scorpions	-	4
<i>Pseudolychas pegleri</i>	-	-	3
<i>Uroplectes carinatus</i>	Stinger scorpions	-	3
<i>Uroplectes vittatus</i>	Stinger scorpions	-	2
<i>Uroplectes triangulifer</i>	Stinger scorpions	-	2
<b>SCORPIONIDAE</b>			
<i>Opisththalmus pugnax</i>	Burrowing scorpions	PS*	2
<i>Opisththalmus glabifrons</i>	Burrowing scorpions	PS*	3
<b>THERAPHOSIDAE</b>			
<i>Harpactirella flavipilosa</i>	Botswana Lesser Baboon Spider	-	3
<i>Brachionopus pretoriae</i>	Pretoria Lesser Baboon Spider	-	3
<i>Harpactira hamiltoni</i>	Golden Starbust Baboon Spider	PS*	3
<i>Pterinochilus junodi</i>	Soutpansberg Starburst Baboon Spider	PS*	3
<b>Key</b>			
<b>Status:</b> NT = Near-threatened; PS = Protected Species; VU = Vulnerable			
<b>Likelihood of Occurrence (LoO):</b> 2 = High; 3 = Moderate; 4 = Low			
<b>Sources:</b> <sup>1</sup> ToPS (2007); <sup>2</sup> Leeming (2003); <sup>3</sup> Dippenaar-Schoeman (2002)			
*Old ToPS (2007) list status, ToPS (2015) no longer lists these species as Protected.			

## 12.9. Appendix 9 Main CVs

### CURRICULUM VITAE

*Name:* **SUSAN ABELL (néé BRADLEY)**  
*Position:* Senior Ecologist and Co-Owner of Natural Scientific Services  
*Date of Birth:* 29 March 1976  
*Nationality:* South African  
*Languages:* English (mother tongue), Afrikaans

#### **EDUCATIONAL QUALIFICATIONS**

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- ✚ MSc Resource Conservation Biology (Ecology) (2000 – 2001)
- ✚ B Sc Hons University of the Witwatersrand, Johannesburg (1999)
- ✚ B Sc University of the Witwatersrand, Johannesburg (1998)

#### **KEY QUALIFICATIONS**

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##### ✚ **Environmental Impact Assessment:**

Compiled numerous Environmental Impact Assessments, Scoping Reports and Environmental Management Programmes as required by the Environment Conservation Act (Act No. 73 of 1989) and the National Environmental Management Act (Act 107 of 1998).

##### ✚ **Specialist Assessments:**

Over 14 years performing ecological and vegetation surveys within Southern Africa. Expertises are strong in the Savanna and Grasslands within Gauteng, North West, Limpopo, Mpumalanga, KwaZulu Natal, Lesotho and Botswana. Further experience within the Karoid Shrub, Kalahari and Fynbos Areas.

GIS Mapping, Database management, GIS Modelling undertaken within specialist projects

##### ✚ **Strategic / Spatial Planning:**

Co-ordinated and managed strategic spatial planning projects in Gauteng, North West Province and Mpumalanga including the:

- State of Environment Reporting
- Gauteng Agricultural Potential Atlas (GAPA)
- North West Biodiversity Site Inventory and Database Development Atlas
- Tshwane Macro Open Space Policy
- Biodiversity Database for Optimum Collieries (BHP Billiton)

### ☒ **Conference Presentations:**

Undertaken numerous presentations at conferences (SAAB; IAIA)

### ☒ **Educational Training:**

Education training for organisations such as Wits University and Induction Training in Biodiversity Conservation for Mining Operations

## **EMPLOYMENT EXPERIENCE**

### ☒ **Member & Senior Ecologist: Natural Scientific Services. Johannesburg (November 2004-Present)**

- Project management and administration
- Project management and compilation of biodiversity assessments within savanna, karoid, fynbos and grassland systems including:
  - Ecological assessments
  - Vegetation/Habitat assessments;
  - Red Data Scans;
  - Ecological Screening, Opinions & Statements;
  - Wetland Assessments.
- Ecological Sensitivity Mapping;
- Project management and compilation of Biodiversity Management & Action Plans (BMAPS);
- Reserve Management Plans (examples below):
  - Blyde River Reserve Strategic Management Plan
  - Monate Reserve Management Plan
- Alien Invasive Management Plans;
- Project Management for Rehabilitation and Land-Use Plans;
- Management and specialist input into Green Star Rating Projects (Ecological Component);
- Environmental Impact Assessments and Scoping Reports;
- Project management and compilation of a number of Environmental Impact Control Reports (EICR) for waste management projects;
- Compilation of Conceptual Closure Plans for a number of mining operations;
- Tender and proposal compilation;
- Marketing;
- Liaison with clients and government officials; and
- Involvement in Specific GIS-related projects (examples below):
  - Blyde Strategic Management Plan
  - Visual Assessment for Natalspruit Hospital
  - Biodiversity Database – Optimum Collieries

### ☒ **Project Manager: Strategic Environmental Focus (SEF) (November 2003-October 2004)**

- Project management and administration
- Project Management of and input into Ecological Assessments
- Tender and proposal compilation
- Marketing
- Liaison with clients and government officials
- Involvement in GIS-related projects.
  - Tshwane Open Space Project
  - Numerous State of the Environment Reports

### ☒ **Environmental Manager: SEF, Pretoria (April 2001- November 2003)**

- Project management and administration
- Compilation of environmental assessments and scoping reports including:





- Tourism & Recreational developments
- Residential developments
- Commercial and industrial developments
- Liaison with government officials
- Management and input into GIS-related projects:
  - Gauteng Agricultural Potential Atlas (GAPA )
  - Gauteng Open Space Plan (GOSP)
  - North West Biodiversity Database Development
- Ecological Assessments / vegetation surveys / opinions/ Red Data Scans for various industries – mining, industrial, business, residential and sampling
- Sensitivity mapping

#### **University of the Witwatersrand (Wits) 1999 – 2001**

- Teaching Assistant:
- Mammalian surveys within Wits Rural Facility, Mpumalanga
- Vegetation sampling for SAFARI 2000- Kruger National Park
  - Scientific Paper: Koedoe Journal 44/1 2001
- Vegetation sampling Nylsvley Nature Reserve (2000)
- Monitoring and growth experiments (1998-1999) Electron and Transmission microscopy



#### **MEMBERSHIPS IN PROFESSIONAL SOCIETY**

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-  South African Council for Natural Scientific Professions (*Pr.Sci.Nat*)
-  Botanical Society of South Africa
-  International Association for Impact Assessment (IAIA)




#### **PAPERS PUBLISHED**

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-  Koedoe Journal 44/1 2001
-  Proceedings: Microscopy Society of South Africa, 1999

#### **PAPERS PRESENTED**

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-  Proceedings of the Microscopy Society of Southern Africa, 1999
-  Population dynamics and regeneration ecology of *Acacia nilotica* and *Acacia tortilis* in Nylsvley Nature Reserve, SAAB Conference 2000
-  Tools for Cooperative Governance: North West Biodiversity Site Inventory And Database Development, IAIA Conference 2003

## CURRICULUM VITAE

**Name:** TYRON KEN CLARK

**Name of Firm:** Natural Scientific Services CC

**Position:** Terrestrial Ecologist

**Date of Birth:** 30 January 1987

**Nationality:** South African

**Languages:** English (first language), Afrikaans

### **EDUCATIONAL QUALIFICATIONS**

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- ✚ BSc Honours Zoology (2014). Zoology (University of the Witwatersrand, Johannesburg).
- ✚ BSc Botany and Zoology (2010). (University of South Africa, Pretoria).

### **KEY EXPERIENCE**

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#### ✚ **Specialist Assessments:**

Five years specialist consulting experience on over 70 projects in six countries (South Africa, Botswana, Lesotho, Mozambique, Sao-tome & Principe and Sierra Leone) and all provinces in RSA conducting and / or managing the following:

- Faunal assessments.
- Wetland assessments.
- Landscape Function Analysis.
- Floral assessments (assisting).
- Aquatic biomonitoring (assisting) and water sampling.
- Public participation meetings.
- Green Star ratings, Green Building Council.
- Biodiversity management and action plans.
- Impact assessments.

#### ✚ **Research**

- The potential application of ground-penetrating radar for faunal research in South Africa (current)
- Climatic niche modelling; investigating the susceptibility of South Africa to invasion by exotic reptiles using Maxent (2014).
- Geographic Information Systems, ArcGIS and Diva GIS (2014).
- Statistical analysis, R statistical computing program (2013).
- Time-activity budgets of Rock Hyrax (2010).
- Vegetation sampling, analysis and classification (2009-2010).
- Preparation of samples for DNA sequencing and analysis (2009).
- Amphibian acoustic recordings and analysis (2009).

#### ✚ **Environmental Tutoring:**

Four years at Happy Acres environmental centre actively educating youth on biological topics in a practical setting.

#### ✚ **Courses Completed:**



- 2015: Wetland Management: Introduction and Delineation (University of the Free State)
- 2013: First aid Level 1 and 2 (Wilcare Safety Solutions)
- 2013: Off Road Driving (Proactive Driving for Sasol Botswana)
- 2010: Snake identification course (African Reptiles and Venom)
- 2010: Venomous snake handling course (African Reptiles and Venom)
- 2010: Snakebite treatment and IV course (African Reptiles and Venom)

## EMPLOYMENT EXPERIENCE

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### ✚ **Natural Scientific Services, Johannesburg (November 2010-Present)**

Position Title: Terrestrial Ecologist

Key Focus Area: Ecological surveys, expanded below:

- Project Management
- Fieldwork, validating data and interpreting field findings
- Report writing for EIA's, EMPR's and water use Licences
- Administrative activities including: Presentations, meetings, desktop research, general project management and support to other staff members in implementing specific projects.
- Research activities

### ✚ **Happy Acres Environmental Education Centre 2007**

Teaching school groups about the environment with emphasis on biology in a practical setting.

### ✚ **Holly Brooke Horse Farms 2006**

Guiding horse trails around the Magaliesberg area, part time (ongoing).

### ✚ **London Equestrian Centre 2005**

Employee at the LEC in London, England:

- General care of horses including all stabling, livery and day to day duties.
- Education attained several British Horse Society qualifications.

### ✚ **RVS enterprises invoicing and sales, for DOMESTI hardware fixtures 2004-2005**

- Invoicing
- Orders
- Sales
- Admin

## MEMBERSHIPS

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- ✚ Herpetological Association of Africa
- ✚ Magaliesberg Biosphere Project

**FINAL BA REPORT:**  
Basic Assessment for the  
proposed Pacific Ora Projects  
(Pty) Ltd Pig and Vegetable  
Production facility on farm  
Bultfontein 107-JR, Gauteng

**Appendix H:**  
Environmental  
Management  
Programme (EMPr)

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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## SECTION F: APPENDICES

### 1 INTRODUCTION

This Environmental Management Programme (EMPr) is prepared as part of the requirements of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 983, 984 and 985 on the 4 December 2014 Government Gazette Number 38282, and NEM:WA Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 3708. The EMPr is to be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) as part of the Application for Environmental Authorisation for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Rooiwal, Gauteng.

This EMPr is being made available for a 30-day review period, as part of the Final Basic Assessment (BA) Report. Comments received from stakeholders during the aforementioned review period will be incorporated into the EMPr, where applicable. Following the incorporation of comments from stakeholders, this EMPr is intended as a “living” document and should continue to be updated regularly, as needed.

#### 1.1 Project Description

Pacific Ora Projects (Pty) Ltd is proposing a small-scale pig and vegetable production endeavour on 8 hectares of the farm 120 Bultfontein 107-JR, located in the Rooiwal/Onderstepoort area of Pretoria North, Gauteng Province. This area falls under the Tshwane Metropolitan Municipality, and is approximately 35 km north of Pretoria.

The proposed project will include the following components:

- Office building and employee facilities;
- 40 cubic metre slurry dam to store pig waste for use as fertilizer;
- Approximately 5 hectares of granadilla and spinach crop;
- Approximately 12 pig houses holding a total of 910 pigs; and
- 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 Pacific Ora project will seek to boost local economic development in the area and provide opportunities to decrease poverty and unemployment. Pacific Ora Projects (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 obtaining Environmental Authorization in order to enhance local economic development.

Authors of the EMPr

This EMPr has been compiled by the Environmental Assessment Practitioners and the various specialists on the team (as indicated in Table 1). The details and expertise of the Environmental Assessment Practitioner and the specialists are provided in Appendices I of the Draft BA Report, respectively.

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

**Table 1: EIA Team**

Environmental Assessment Practitioner			
Name	Organisation	Role	Qualification/Expertise
Paul Lochner	CSIR	Reviewer	BSc Civil Engineering MPhil Environmental Science
Minnelise Levendal	CSIR	Project Leader	MSc Environmental Science
Kelly Stroebel	CSIR	Project Manager	BSc Hons (Environmental Science)
Specialist Team			
Name	Organisation	Role/Specialist Study	Qualification/Expertise
Susan Abell	NSS	Ecological Specialist Study	M.Sc. Resource Conservation Biology (WITS). PrSciNat Registered (400116/05) – Ecology & Environmental Science.

## 2 APPROACH TO PREPARING THE EMPr

### 2.1 Compliance with Relevant Legislation

In terms of legal requirements, a crucial objective of the EMPr is to satisfy the requirements of National Environmental Management Act (NEMA) EIA Regulations published in GNR 983, 984 and 985 on the 4 December 2014 Government Gazette Number 38282, and NEM:WA Regulations published in GNR 921 on the 29 November 2013 Government Gazette No 3708. These regulations regulate and prescribe the content of the EMPr and specify the type of supporting information that must accompany the submission of the report to the authorities. An overview of where the requirements are addressed in this EMPr is presented in Table 2.

**Table 2: Compliance with Section 33 of the EIA Regulations 2014 and Section 24N of the National Environmental Management Act (Act No. 107 of 1998)**

Requirements of Section 24N of NEMA	Where it is included in this EMPr?
2) The environmental management programme must contain- a) information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of: (i) planning and design; (ii) pre-construction and construction activities; (iii) the operation or undertaking of the activity in question; (iv) the rehabilitation of the environment; and (v) closure, if applicable;	Section 4 to 7 and the columns detailing the impact description, mitigation and management objectives, and mitigation and management actions.
b) details of- (i) the person who prepared the environmental management programme; and (ii) the expertise of that person to prepare an environmental management programme;	Appendices I of the Draft BA Report to which this EMPr is attached.
c) a detailed description of the aspects of the activity that are	Section 1

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Requirements of Section 24N of NEMA	Where it is included in this EMPr?
covered by the environmental management programme;	
d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);	Columns in Section 4 to 7 of the EMPr regarding the monitoring responsibility, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3.
e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 7 of this EMPr.
f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and	Sections 4 to 7 of this EMPr, as applicable to the post-construction, rehabilitation phase and the decommissioning phase.
g) a description of the manner in which it intends to- (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; and (iii) comply with any prescribed environmental management standards or practices.	The columns detailing the mitigation and management objectives, mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 7 of this EMPr.
3) The environmental management programme must, where appropriate- a) set out time periods within which the measures contemplated in the environmental management programme must be implemented; b) contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation which may occur inside and outside the boundaries of the operations in question; and c) develop 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.	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 7 of this EMPr.
5) The Minister, the Minister responsible for mineral resources or an MEC may call for additional information and may direct that the environmental management programme in question must be adjusted in such a way as the Minister, the Minister responsible for mineral resources or the MEC may require.	Not applicable at this stage.
6) The Minister, the Minister responsible for mineral resources or an MEC may at any time after he or she has approved an application for an environmental authorisation approve an amended environmental management programme.	Not applicable at this stage.



## SECTION F: APPENDICES

Requirements of Section 24N of NEMA	Where it is included in this EMPr?
<p>7) The holder and any person issued with an environmental authorisation-</p> <p>a) must at all times give effect to the general objectives of integrated environmental management laid down in section 23;</p> <p>b) must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment;</p> <p>c) must manage all environmental impacts</p> <p style="padding-left: 20px;">(i) in accordance with his or her approved environmental management programme, where appropriate; and</p> <p style="padding-left: 20px;">(ii) as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise;</p> <p>d) must monitor and audit compliance with the requirements of the environmental management programme;</p> <p>e) must, as far as is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and</p> <p>f) is responsible for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation as a result of his or her operations to which such right, permit or environmental authorisation relates.</p>	Throughout the EMPr
<p>8) Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution.</p>	Section 3 details the responsibility of the Project Applicant.

### 2.2 Content of the Draft EMPr

The EMPr includes the findings and recommendations of the BA Process and specialist studies. However, the EMPr is considered a “live” document and must be updated with additional information or actions during the design, construction, operational and decommissioning phases if applicable.

The EMPr follows an approach of identifying over-arching objectives, accompanied by management actions that are aimed at achieving these objectives. The management actions are presented in a table format in order to show the links between associated objectives, actions, responsibilities and monitoring requirements.

The management plans for the design, construction, operation and decommissioning phases 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.

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- **Monitoring:** The key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

### 2.3 Goal of Environmental Management

The overall goal for environmental management for the proposed Pacific Ora project is to construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Facilitates harmonious co-existence between the project and other land uses in the area; and
- Contributes to the environmental baseline and understanding of environmental impacts of piggeries in a South African context.

## 3 ROLES AND RESPONSIBILITIES

For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Project Developer;
- Environmental Control Officer;
- Environmental Health and Safety (EHS) Manager;
- Construction Manager (Lead Contractor or Engineering Consultant); and

It is acknowledged that the specific titles for these functions will vary from project to project. The intent of this section is to give a generic outline of what these roles typically require. It is expected that this will be appropriately defined at a later stage.

### 3.1 Project Developer

The Project Developer (i.e. Pacific Ora) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation issued in terms of NEMA (should the project receive such authorisation) are fully satisfied, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that the Project Developer will appoint the Environmental Control Officer, EHS Manager and Construction Manager

### 3.2 Environmental Control Officer

An independent Environmental Control Officer (ECO) must be appointed to monitor the compliance of the proposed project with the conditions of Environmental Authorisation (should such authorisation be granted by GDARD) during the construction phase (and possibly the operational phase, depending on the requirements of GDARD). The ECO must also monitor compliance of the proposed project with environmental legislation and recommendations of the EMPr.

The ECO will be responsible for preparing the Final EMPr based on the Draft EMPr, as well as updating the EMPr as and when necessary, and compiling a monitoring checklist based on the EMPr. The roles and responsibilities of the ECO should include the following:

- The ECO must undertake periodic environmental audits during the relevant phases of the proposed project in order to monitor and record environmental impacts and non-conformances. It is recommended that weekly or bi-weekly environmental audits be undertaken by the ECO during the construction phase.

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- Environmental compliance reports must be submitted by the ECO to the Competent Authority (i.e.GDARD) on a regular basis (i.e. monthly during the construction phase or as stipulated by the GDARD).
- The ECO must maintain a diary of site visits and audits, a copy of the Environmental Authorisation (should such authorisation be granted by GDARD) and relevant permits for reference purposes, a non-conformance register, a public complaint register, and a copy of previous environmental audits undertaken.
- Prior to the commencement of construction, the ECO must meet on site with the Construction Manager to confirm the construction procedure and designated construction areas.

### 3.3 EHS Manager

It is important to note that the EHS Manager will be appointed to fulfill the roles of the Environmental Officer during the construction phase and 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 include 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 Pacific Ora Projects.

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.

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At the time of preparing this EMPr, the EHS Manager appointment is still to be made by the proponent. The appointment is dependent upon the project proceeding to the construction phase.

Construction Manager (Lead Contractor or Engineering Consultant)

The lead contractor 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 sub-contractors 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 employ 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 EMPr, the appointment of a lead contractor has not been made and will depend on the project proceeding to the construction phase.

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### 4 MANAGEMENT PLAN FOR DESIGN PHASE

Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<b>A. Alien Vegetation Management</b>					
4.1. Removal of alien invasive vegetation from the proposed project area.	Ensure the correct removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	4.1.1. Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species.  4.1.2. Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site.	Appoint a suitable specialist/ Contractor or contact the relevant authorities to seek guidance on the removal of the planted alien invasive species. All Alien invasive plant species should be eradicated on the study area and within the water course system according to the Conservation of Agricultural Resources Act (Act no. 43 of 1983).	Once-off during the design phase.	Project Developer
<b>B. Indigenous Vegetation Management</b>					
4.2. Loss of CI or medicinally important plant species	To minimise loss of CI or medicinally important plant species in accordance with law and best practice and encourage rehabilitation	4.2.1. Adhere to law and best practice guidelines regarding the displacement of CI and medicinally important floral species.	Submit permits for the removal of CI important species within the study site.  Prior to construction all CI and medicinally important floral specimens within the site layout footprint should be collected and stored for replanting in surrounding areas or later during rehabilitation of certain areas.	Once-off prior to construction.	Contractor or Specialist
4.3. Loss of habitat through clearing	Minimise the disturbance footprint and spill over / edge effects on surrounding habitat.	4.3.1. Restrict all habitat loss and disturbances from construction activities to within the proposed and agreed upon site layout.	Revise the planned layout of the facility and all associated infrastructure to avoid all High sensitive areas as far as possible.  Clearly demarcate or fence in the construction site. Specimens that are	Once-off during the design phase.	Contractor or Specialist

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			<p>situated in the construction footprint, according to the advice of an appropriate specialist.</p> <p>Identify and mark large trees both on the ground and digitally to facilitate the incorporation of as many large trees into the final project layout as possible. Wherever possible endeavour to conserve large trees in situ.</p>		
4.4. Mortality of fauna in surrounding areas	To reduce mortality rates and continued displacement of fauna in surrounding areas	<p>4.4.1. Adhere to law and best practice guidelines regarding the displacement and relocation of CI fauna</p> <p>4.4.2. Appropriately deal with fauna encountered on site.</p> <p>4.4.3. Time construction activities to minimise faunal mortality</p> <p>4.4.4. Limit indiscriminate killing, persecution or hunting of fauna.</p>	<ul style="list-style-type: none"> <li>• Prior to construction commission a suitably qualified ecologist to remove and relocate species to suitable surrounding habitats. E.g. All termitaria within the project footprint should be carefully searched for Striped Harlequin Snakes. Grass should also be searched for grass lizards and these searches should continue into the night for hedgehogs.</li> <li>• Construction activities should be timed to start (and preferably end) during winter, when activity levels and the presence of breeding and migratory species are lowest. Bullfrogs are, however a concern in this regard as overwintering individuals may be unearthed during construction activities.</li> <li>• Ensure policies and procedures are in place regarding the handling and removal of fauna encountered on site.</li> </ul>	Weekly	Project Developer and Specialist

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			<ul style="list-style-type: none"> <li>• Ensure that staff are trained and properly equipped to safely handle fauna (particularly snakes and bullfrogs) or that the services of a trained professional are readily available on call.</li> <li>• Construction activities should be timed to start (and preferably end) during winter, when activity levels and the presence of breeding and migratory species are lowest. Bullfrogs are, however a concern in this regard as overwintering individuals may be unearthed during construction activities.</li> <li>• Check open trenches for trapped animals (e.g. bullfrogs, hedgehogs and snakes), which should be carefully caught and relocated according to the specifications of a relevant specialist.</li> <li>• Prohibit the introduction of domestic animals such as dogs and cats.</li> <li>• Educate staff on prohibited actions involving the utilisation of wildlife (i.e. poaching / harvesting) through training and notices.</li> <li>• Routinely walk fence lines to remove snares.</li> </ul>		
C. Design of the facility					
4.5. Impact on and disturbance to	Reduce unnecessary impacts on existing service	4.5.1. Consult with the relevant municipal departments	Ensure that this is taken into consideration during the design phase.	Once-off during the	Project Developer

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
existing infrastructure (roads, stormwater pipelines) during construction.	infrastructure surrounding the proposed site and avoid potential planning impacts within the area.	during the detailed engineering phase to discuss the impact of the proposed project on existing service infrastructure.		design phase.	
		4.5.2. Ensure that all Building Plans and associated documents have been approved by Municipality prior to construction.			
		4.5.3. Assess the risks of excavation work by reviewing cable and pipe routings.			
4.6. Risks of accidents and hazards during the construction and operational phases.	Reduce potential accidents and hazards during the construction and operational phases. The design must comply with all applicable legislative requirements, specifically as prescribed in the Occupational Health and Safety Act (Act 85 of 1993) under the Construction Regulations.	4.6.1. Compile an Emergency Response Action Plan (ERAP) prior to the commissioning of the proposed project.	Ensure that the recommendations from the Emergency Response Action Plan (ERAP) are taken into consideration during the design phase.	Once-off during the design phase.	Project Developer
4.7. Environmental Contamination	Reduce any environmental contamination	4.7.1. Ensure that excrement, carcasses, feed, and other operational waste and hazardous materials are appropriately and	Ensure that that the pig houses and associated drains and slurry facility are designed and lined with impermeable substances (clay-type soils, geosynthetic plastic, or concrete) in accordance with		



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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		effectively contained and disposed of without detriment to the environment.	advice from suitably qualified agricultural experts and international best practice norms.		

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### 5 MANAGEMENT PLAN FOR CONSTRUCTION PHASE

Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. Alien Vegetation Management					
5.1. Removal of alien invasive vegetation from the proposed project area.	Ensure the correct removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	5.1.1. The planted alien invasive vegetation should be removed immediately (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a licenced waste disposal facility.	Monitor the removal of the alien invasive vegetation.	During the removal process	ECO
5.2. Increased Risk of Alien Plant Invasion	Reduce the establishment and spread of alien invasive plants due to the project activities.	5.2.1. Ensure compliance with relevant Environmental Specifications for the control and removal of these species.	Monitor the presence of alien invasive plants during the construction phase.	Weekly	ECO
		5.2.2. All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods.			
B. Indigenous Vegetation and Faunal Management					

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
5.3. Loss of CI or medicinally important plant species	To minimise loss of CI or medicinally important plant species in accordance with law and best practice and encourage rehabilitation	5.3.1. Adhere to law and best practice guidelines regarding the displacement of CI and medicinally important floral species.	Guidance from a suitably qualified vegetation specialist or horticulturist regarding the collection, propagation/storage and transplantation of plants is advised.	During construction.	Contractor or Specialist
4.8. Mortality of fauna in surrounding areas	To reduce mortality rates and continued displacement of fauna in surrounding areas	<p>4.8.1. Adhere to law and best practice guidelines regarding the displacement and relocation of CI fauna</p> <p>4.8.2. Appropriately deal with fauna encountered on site.</p> <p>4.8.3. Time construction activities to minimise faunal mortality</p> <p>4.8.4. Limit indiscriminate killing, persecution or hunting of fauna.</p>	<ul style="list-style-type: none"> <li>• Prior to construction commission a suitably qualified ecologist to remove and relocate species to suitable surrounding habitats. E.g. All termitaria within the project footprint should be carefully searched for Striped Harlequin Snakes. Grass should also be searched for grass lizards and these searches should continue into the night for hedgehogs.</li> <li>• Construction activities should be timed to start (and preferably end) during winter, when activity levels and the presence of breeding and migratory species are lowest. Bullfrogs are, however a concern in this regard as overwintering individuals may be unearthed during construction activities.</li> <li>• Ensure policies and procedures are in place regarding the handling and removal of fauna encountered on site.</li> <li>• Ensure that staff are trained and properly equipped to safely handle fauna (particularly snakes and bullfrogs) or that the services of a</li> </ul>	Weekly	Project Developer and Specialist

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			<p>trained professional are readily available on call.</p> <ul style="list-style-type: none"> <li>Construction activities should be timed to start (and preferably end) during winter, when activity levels and the presence of breeding and migratory species are lowest. Bullfrogs are, however a concern in this regard as overwintering individuals may be unearthed during construction activities.</li> <li>Check open trenches for trapped animals (e.g. bullfrogs, hedgehogs and snakes), which should be carefully caught and relocated according to the specifications of a relevant specialist.</li> <li>Prohibit the introduction of domestic animals such as dogs and cats.</li> <li>Educate staff on prohibited actions involving the utilisation of wildlife (i.e. poaching / harvesting) through training and notices.</li> <li>Routinely walk fence lines to remove snares.</li> </ul>		
4.9. Sensory disturbance of faunal communities	Minimise sensory disturbance surrounding faunal communities	4.9.1. Appropriately time construction activities to minimise sensory disturbance to fauna.	Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Daily	Project Developer EHS Manager
		4.9.2. Limit disturbances caused by noise	Noise should also be minimised throughout construction to limit the impact on sensitive fauna such as owls and large terrestrial birds such as korhaans and Secretarybirds.	Daily	Project Developer EHS Manager
		4.9.3. Limit disturbances caused by light	Limit construction activities to day time hours and Minimize or eliminate security and construction lighting, to reduce the disturbance of nocturnal	Daily	Project Developer EHS Manager

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			fauna.		
<b>C. Noise Impacts</b>					
5.4. Potential noise impact from operations during the construction phase.	Prevent unnecessary impacts on the surrounding environment by ensuring that the piling noise is mitigated.	5.4.1. All operations should be conducted during daytime only (i.e. 06:00 – 22:00, as defined in South African National Standards (SANS) 10103).	Construction times to be monitored and managed (as well as included in the tender contract).	Daily	Contractor and EHS Manager
<b>D. Visual Impacts</b>					
5.5. Potential visual intrusion of construction/demo lition activities on the views of sensitive visual receptors.	Prevent unnecessary visual clutter from focusing attention of surrounding visual receptors on the proposed development.	5.5.1. The Contractor should maintain good housekeeping on site to avoid litter and minimise waste. Ensure that rubble and litter are appropriately stored and regularly removed from site to a licenced waste disposal facility. 5.5.2. Dust generation must be kept at a minimum. 5.5.3. Night lighting of construction sites must be minimised within requirements of safety and efficiency.	Rubble/litter/waste removal and disposal to be monitored throughout construction.  Complaints about night lights should be investigated and documented in a register.	Weekly or bi-weekly	Contractor and ECO
<b>E. Traffic Impacts</b>					

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			Methodology	Frequency	Responsibility
5.6. Impact of construction vehicles on the road network and parking of construction vehicles on public roads when not in use.	Prevent unnecessary impacts on the surrounding road network by supplying parking for construction vehicles on site.	5.6.1. Accommodate all construction vehicles on site during the construction phase.	Monitor that no construction vehicles park on the outlying roads (Maroela Road).  Record and report non-compliance.	Daily during construction.	Contractor and EHS Manager
F. Safety, Health and Environment					
5.7. Noise generation from demolition and construction work (e.g. grinding and use of angle grinders), as well as from the removal of waste material (e.g. crane and truck engines).	Reduce the potential noise impacts on the construction workers.	5.7.1. Construction personnel must wear proper hearing protection, which should be specified as part of the Construction Phase Risk Assessment carried out by the Contractor.  5.7.2. The Contractor must ensure that all construction personnel are provided with adequate Personal Protective Equipment (PPE) for use where appropriate.	Inspections to be carried out during the construction phase to enforce the use of hearing protection by construction personnel. This must also be written into the safety requirements of the Contract.	Throughout the construction phase (i.e. weekly).	ECO and Contractor
5.8. Potential health injuries to construction personnel as a result of construction work	Prevent respiratory illnesses caused to the construction personnel.	5.8.1. The Contractor must ensure that all construction personnel are provided with adequate PPE (such as dust masks) for use	<ul style="list-style-type: none"> <li>Inspections to be carried out during the construction phase to enforce the use of respiratory protection by construction personnel. This must also be written into the safety requirements of the Contract.</li> </ul>	Throughout the construction phase (i.e. weekly).	ECO and Contractor

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			Methodology	Frequency	Responsibility
(i.e. welding fumes, dust and smoke etc.).		where appropriate.	•		
5.9. Potential impact on the safety of construction workers due to construction activities (such as welding, cutting, use of hot metals, working at heights, lifting of heavy items etc.).	Prevention of injuries to and fatalities of construction personnel during the construction phase.	<p>5.9.1. Ensure that skilled, licenced and competent Contractors, riggers and crane operators are appointed during the construction phase, along with the use of certified equipment and scaffolding.</p> <p>5.9.2. Ensure that roads are not closed during construction, which may restrict access for emergency services.</p>	Monitor activities and record and report non-compliance by undertaking inspections.	Throughout the construction phase (i.e. weekly).	Project Developer, ECO and Contractor
5.10. Pollution of water and ground as a result of spillages, generation of building rubble and waste scrap material.	Prevent unnecessary pollution impacts on the surrounding environment.	5.10.1. The construction site should be cleaned regularly and all construction waste (i.e. concrete, steel, rubble, packaging material etc.) must be removed from site and disposed at a licenced waste disposal facility by an approved waste Contractor. Waste disposal slips or waybills should be kept on file for auditing purposes as proof of	Monitor activities and record and report non-compliance by undertaking inspections.	Throughout the construction phase.	Project Developer, ECO and Contractor

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			Methodology	Frequency	Responsibility
		disposal.			
G. Heritage Resources (Archaeology and Palaeontology)					
5.11. Impact on Archaeology and Palaeontology	Prevent damage and destruction to fossils, artefacts and materials of heritage significance.	5.11.1. Carry out general monitoring of excavations for potential fossil heritage, artefacts and material of heritage importance.	Monitor excavations and construction activities for archaeological and palaeontological materials.	Daily during excavation work.	Contractor and ECO
		5.11.2. All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/palaeontologist and to the PHRAG (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time should be allowed to remove/collect such material before construction re-commences.	Monitor excavations and construction activities for archaeological and palaeontological materials and report the finds accordingly.  Contact PHRAG/SAHRA and the identified palaeontologist/ archaeologist if any heritage features are uncovered.	As required/necessary during construction.	Contractor and ECO



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			Methodology	Frequency	Responsibility
<b>H. Water Conservation</b>					
5.12. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during construction.	5.12.1. Water conservation to be practiced in line with Energy Saving Policies as follows: <ul style="list-style-type: none"> <li>Cleaning methods utilised for cleaning vehicles, floors, etc. should aim to minimise water use (e.g. sweep before wash-down).</li> <li>Ensure that regular audits of water systems are conducted to identify possible water leakages.</li> </ul>	Monitor via site audits and record non-compliance and incidents.	Monthly	EHS Manager and ECO
		5.12.2. Carry out environmental awareness training with a discussion on water usage and conservation.	Conduct training for all construction personnel.	<ul style="list-style-type: none"> <li>Once-off during construction and ensure that all new staff are inducted.</li> </ul>	EHS Manager, ECO and Contractor
<b>I. Spill Contingency, Management and Handling of Chemicals/Dangerous Goods</b>					
5.13. Potential spillage of effluent (from portable sanitation facilities for construction personnel).	Reduce the spillage of domestic effluent and the impact thereof on the environment.	5.13.1. Ensure that normal sewage management practices are implemented during construction such as regularly emptying toilets and ensuring safe transport and disposal of sewage.	Monitor via site audits and record non-compliance and incidents (including incidents that nearly occur).	Monthly	EHS Manager and ECO

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			Methodology	Frequency	Responsibility
		5.13.2. Ensure that all domestic effluent/waste water is disposed safely at an appropriate, licenced facility by an appointed (suitable) service provider. Ensure that no discharge of waste water to the land surface is permitted. Proof of disposal (i.e. waybills) must be kept on file.	Monitor via site audits and record non-compliance and incidents.  EHS Manager to audit disposal slips.	Monthly	EHS Manager and ECO
		5.13.3. Ensure that the toilet/sanitation facilities are maintained in a clean, orderly and sanitary condition.	Monitor via site audits and record non-compliance and incidents.	Daily	EHS Manager and Contractor
5.14. Contamination of soil and groundwater through spillage of concrete and cement.	To control concrete and cement batching activities in order to prevent spillages and concomitant contamination of soil, groundwater and the marine environment.	5.14.1. If any concrete mixing takes placed on site, this must be carried out on an impermeable surface (such as on boards or plastic sheeting and/or within a bunded area with an impermeable surface).  5.14.2. Concrete mixing areas must be fitted with a containment facility for the collection of cement-laden water.	Monitor the handling and storage of sand, stone and cement as instructed.	Daily	Project Developer, Contractor and EHS Manager

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			Methodology	Frequency	Responsibility
		<p>This facility must be impervious to prevent soil and groundwater contamination.</p> <p>5.14.3. Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains.</p> <p>5.14.4. A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted.</p> <p>5.14.5. Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility.</p> <p>5.14.6. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site. Sand and aggregates containing cement must be kept damp to prevent the</p>			

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			Methodology	Frequency	Responsibility
		generation of dust. 5.14.7. Any excess sand, stone and cement must be removed from site at the completion of the construction period and disposed at a registered disposal facility.			
<b>J. Waste Water Management</b>					
5.15. Pollution caused by spillage or discharge of construction waste water into the surrounding environment.	Reduce construction waste water discharge into the environment and the resulting impact.	5.15.1. Implement proper construction site management actions such as the installation of containment structures, good on-site housekeeping (regular sweeping of roadways and work areas, reporting systems and environmental awareness training), and spillage management.	Monitor via site audits and record non-compliance and incidents.	Monthly	EHS Manager
<b>K. Stormwater Management</b>					
5.16. Pollution of the surrounding environment as a result of contamination of stormwater. Contamination	Reduce the contamination of stormwater.	5.16.1. The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	Compile Method Statement	Once off (and thereafter updated as required).	Contractor

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
could result from chemicals, oils, fuels, sewage, solid waste, litter etc.		5.16.2. Provide secure storage for oil, chemicals and other waste materials in order to prevent contamination of stormwater runoff.	Monitor the bunding and containment structures.	Weekly	EHS Manager
		5.16.3. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	Monitor via site audits and record non-compliance and incidents (i.e. by implementing walk through inspections).	Weekly	Contractor, EHS Manager and ECO
<b>L. Waste Management</b>					
5.17. Pollution of the surrounding environment as a result of the handling, temporary storage and disposal of solid waste (general and hazardous).	Reduce soil and groundwater contamination as a result of incorrect storage, handling and disposal of general and hazardous waste.	5.17.1. General waste and hazardous waste should be stored temporarily on site in suitable (and correctly labelled) waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate.	Inspection of the temporary waste storage area.	Daily	EHS Manager
		5.17.2. Should the on-site storage of general waste and hazardous waste exceed 100 m <sup>3</sup> and 80 m <sup>3</sup> respectively, then the National Norms and Standards			

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			Methodology	Frequency	Responsibility
		for the Storage of Waste (published on 29 November 2013 under Government Notice 926) must be adhered to.			
		5.17.3. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods.	Conduct training for all construction personnel.	<ul style="list-style-type: none"> <li>Once-off during construction and ensure that all new staff are inducted.</li> <li>Discuss weekly during HSSE meetings.</li> </ul>	EHS Manager, ECO and Contractor
		5.17.4. Ensure that sufficient general waste disposal bins are provided for all construction personnel throughout the site. These bins must be emptied on a regular basis.	Monitor waste generation and collection throughout the construction phase.	Daily	EHS Manager and Contractor
		5.17.5. No solid waste may be burned or buried on site.	Monitor via site audits and record non-compliance and incidents.	Daily	EHS Manager
		5.17.6. Segregation of hazardous waste from general waste to be in place.	On-site inspection of waste segregation.	Weekly	EHS Manager
M. Air Quality Management					
5.18. Air Quality	Reduce dust	5.18.1. Ensure that cleared	<ul style="list-style-type: none"> <li>Monitor dust suppression mechanisms and</li> </ul>	<ul style="list-style-type: none"> <li>During</li> </ul>	EHS Manager,

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Impact: Emissions from construction vehicles and generation of dust as a result of earthworks, demolition, as well as the delivery and mixing of construction materials.	emissions during construction activities.	(excavated) areas and unpaved surfaces are sprayed with water (obtained from an approved source) to minimise dust generation. Approved soil stabilisers may be utilised to limit dust generation.	record non-compliances.	complaints/incidents	ECO and Contractor
<b>N. Socio-Economic Management</b>					
5.19. Employment creation and skills development opportunities during the construction phase.	Maximise local employment and local business opportunities to promote and improve the local economy.	5.19.1. Enhance the use of local labour and local skills as far as reasonably possible.	Maximise local employment for unskilled labour and provincial/ national skilled labour.	During the construction phase.	Contractor and ECO
		5.19.2. Where the required skills do not occur locally, and where appropriate and applicable, ensure that relevant local individuals are trained.			
		5.19.3. Ensure that goods and services are sourced from the local and regional economy as far as reasonably possible.			
<b>O. Environmental Awareness and Site Camp Establishment</b>					
5.20. Increased	Reduce energy	5.20.1. Encourage the use of	• Contractor to monitor energy usage via site	• Monthly	• Contractor

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
energy consumption during the construction phase.	consumption where possible.	energy saving equipment at the construction camp site (such as low voltage lights and low pressure taps) and promote recycling. Construction personnel must be made aware of energy conservation practices as part of the environmental awareness training programme.	investigations. • Conduct training for all construction personnel.		• EHS Manager, ECO and Contractor
5.21. Inappropriate planning of site camp establishment.	Ensure that environmental issues are taken into consideration in the planning for site establishment.	5.21.1. Ensure that the site establishment is designed and carried out in line with the requirements of relevant specifications and the landowner.	Monitor compliance and record non-compliance and incidents.	Before construction	EHS Manager
5.22. Soil erosion in the surrounding environment	To limit dust and erosion	5.22.1. Implement effective measures to control dust and erosion	• Commence (and preferably complete) construction during winter, when the risk of erosion should be least. • Erosion protection measures must be implemented on the site to reduce erosion and sedimentation of the receiving environment. Measures could include bunding around soil stockpiles; and vegetation of areas not to be developed.	During construction	EHS Manager and Project Developer



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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			<ul style="list-style-type: none"> <li>Adequate dust control strategies should be applied to minimise dust deposition, for example: Periodic spraying of the entrance road and environmentally-friendly dust control measures (e.g. mulching and wetting) where and when dust is problematic</li> </ul>		

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### 6 MANAGEMENT PLAN FOR OPERATIONAL PHASE

Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<b>A. Alien Vegetation Management</b>					
6.1. Potential re-establishment of alien plants on site.	Ensure the correct removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants.	6.1.1. Alien invasive vegetation should be removed immediately (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a licenced waste disposal facility.	Monitor the removal of the alien invasive vegetation. An Invasive species control plan should be actively implemented within the study area and Open Space system for at least 12 months (every 3 months).	During the removal process and for at least 12 months (every 3 months).	EHS Manager
<b>B. Noise Impacts</b>					
6.2. Potential noise impact from road transport of products during the operational phase (i.e. increased road traffic).	Prevent unnecessary impacts on the surrounding environment by ensuring that the drivers of road tankers minimise the use of air brakes.	6.2.1. All drivers of the road tankers should receive training regarding the use of air brakes.	Training of drivers	During induction of drivers to site rules.	Project Developer
<b>C. Visual Impacts</b>					
6.3. Potential impact of night lighting of the development on the nightscape of the surrounding landscape.	Prevent night lights from impacting on surrounding visual receptors by minimizing glare and light spill.	6.3.1. Outside and security lights must use light fixtures that shield the light and focus illumination onto specific areas as required.  6.3.2. Elevated lights should be avoided, or carefully shielded to minimise glare.	Complaints referring to lighting at night should be documented, investigated and resolved.	When complaints are received.	Project Developer

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<b>D. Traffic Impacts</b>					
6.4. Impact of extra vehicles during the operational phase.	Prevent unnecessary or excessive heavy vehicles.	6.4.1. Implement good logistics planning during the operational phase.	Compile a scheduled loading time programme to minimise potential delay in loading.	Permanent over the lifespan of terminal.	Project Developer
<b>E. Safety, Health and Environment</b>					
6.5. Pollution of water and the ground as a result of potential spills of the stored product.	Prevent unnecessary pollution impacts on the surrounding environment.	6.5.1. Scheduled inspections should be implemented in order to assure and verify the integrity of hoses, piping and storage and septic tanks.	Carry out thorough inspections of piping, loading hoses, and bunding for leaks, using a checklist.	Daily	Project Developer
		6.5.2. The operating personnel should undergo proper training to prevent pollution incidents.	Proof of attendance to training sessions to be kept on file at the terminal.	Once off (and thereafter as required for new operating personnel).	Project Developer.
		6.5.3. 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.	Adhere to best practice pig husbandry and waste disposal norms. Ensure that if vehicles, equipment or visiting personnel are to be decontaminated make sure this is done in a designated area that can effectively contain excess disinfectants / biocides / surfactants.	Throughout Operation	Project Developer
6.6. Atmospheric pollution due to fumes	Prevent unnecessary air pollution impacts as a result of the operational procedures.	6.6.1. Portable fire extinguishers and fire water hydrants (i.e. appropriate fire-fighting equipment) should be provided at the terminal as required.	<ul style="list-style-type: none"> <li>Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service</li> </ul>	Annually	Project Developer

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			Methodology	Frequency	Responsibility
			company. • Comply with the permit to work system.		
6.7. Potential impact on the health of operating personnel resulting in potential health injuries.	To ensure that there are no adverse effects on the health of operating personnel.	6.7.1. Operational personnel must wear basic PPE (i.e. gloves) as necessary during the operational phase.	• Medical investigations or surveillance to be undertaken for the operating personnel. • Keep a register of the medical records for the operating personnel.	• Once-off for every operating person. • Once every five years for the life of the installation.	Project Developer
6.8. Minor accidents to the public and moderate accidents to operational staff (e.g. fires).	Ensure operating personnel or the public are not affected or injured by heat from possible fires.	6.8.1. Portable fire extinguishers and fire water hydrants (i.e. appropriate fire-fighting equipment) should be provided at the terminal as required.	• Draw up a schedule for inspections and maintenance. • Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company. • Draw up a schedule of safety audits.	• Once initially and revise as reliability of equipment is assessed. • Annually • Annually • Annually	Project Developer
6.9. Increase in pest invertebrates, spread of disease and mortality of pigs.	Highly localized pest invertebrate control that does not affect non-target populations or taxa	6.9.1. Detect and control pest infestations before they become a problem through frequent and careful cleaning, monitoring and control.	• Rinse floors regularly • Provide sufficient ventilation and airflow to keep the pig house (floors, bedding, fodder) as dry as possible. • Check to see that fan louvers are properly	As necessary	EHS Manager and Project Developer

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			Methodology	Frequency	Responsibility
			<p>working and close completely when the fan is not running.</p> <ul style="list-style-type: none"> <li>• Properly screed concrete floors to effectively seal all cracks and limit the pooling of effluent on site.</li> <li>• Use appropriately sloped and slated floors to facilitate drainage</li> <li>• Clean up excess fodder regularly from under troughs and feed bins</li> <li>• Effectively drain storm water from around pig houses</li> <li>• Keep areas surrounding pig houses free of spilled manure and litter</li> <li>• Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.</li> <li>• Keep grass and weeds mowed to 5cm or less immediately around the facilities, to prevent insect growth</li> <li>• Maintain a high capacity</li> </ul>		

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			Methodology	Frequency	Responsibility
			slurry dam and manage it properly. <ul style="list-style-type: none"> <li>Regularly empty slurry dam to prevent the accumulation of floating solids for extended periods of time (crust left on top of slurry soon become major breeding ground for flies)</li> <li>Electrocution devices are available to kill flies, while other mechanical devices include traps, sticky tapes or baited traps.</li> </ul>		
		6.9.2. Detect pest infestations before they become a problem through frequent and careful monitoring.	<ul style="list-style-type: none"> <li>Manage and prevent access to fodder, especially feed wastage around the houses, feeders.</li> <li>Control rodents through effective sanitation, rodent proofing and killing.</li> <li>Glue boards and traps can be used in small areas, but in larger areas (over 12,000 sq ft) baits are more practical.</li> <li>Rodenticides are not</li> </ul>	As necessary	EHS Manager and Project Developer

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			Methodology	Frequency	Responsibility
			advised. • The most effective control for indigenous birds is screening production house air inlets and open windows with 2x2cm wire mesh.		
6.10 Increase in odour to surrounding residents from piggery	Ensure the odours from the facility to not have a detrimental effect on nearby residents/operations.	6.9.3. Maintain good waste management practices. 6.9.4. Ensure the design of the facility compensates for good ventilation and cleanliness. 6.9.5. Monitor odours regularly by conducting assessments.	• Rinse floors regularly • Provide sufficient ventilation and airflow to keep the pig house (floors, bedding, fodder) as dry as possible. • Check to see that fan louvers are properly working and close completely when the fan is not running. • Properly screed concrete floors to effectively seal all cracks and limit the pooling of effluent on site. • Use appropriately sloped and slated floors to facilitate drainage • Clean up excess fodder regularly from under troughs and feed bins • Effectively drain storm	As necessary	EHS Manager and Project Developer

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			Methodology	Frequency	Responsibility
			water from around pig houses <ul style="list-style-type: none"> <li>• Keep areas surrounding pig houses free of spilled manure and litter</li> <li>• Remove all trash, and sources of feed and water for pests from the outside perimeter of the facilities.</li> <li>• Maintain the cleanliness of the facility by removing waste efficiently and effectively.</li> </ul>		
6.11 Increase in nuisance flies	Ensure the fly increase is managed and kept to an acceptable level	6.9.6. Maintain good waste management practices. 6.9.7. Ensure the design of the facility compensates for good ventilation and cleanliness. 6.9.8. Monitor odours regularly by conducting assessments.	<ul style="list-style-type: none"> <li>• Manage and prevent access to fodder, especially feed wastage around the houses, feeders.</li> <li>• Keep areas surrounding pig houses free of spilled manure and litter .</li> <li>• Rinse floors regularly</li> <li>• Provide sufficient ventilation and airflow.</li> <li>• Ensure odours are managed (6.10).</li> </ul>	As necessary	EHS Manager and Project Developer



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
BASIC ASSESSMENT REPORT

Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<b>F. Water Conservation</b>					
6.10. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during operations.	6.10.1. Water conservation to be practiced in line with Energy Saving Policies as follows: <ul style="list-style-type: none"> <li>• Cleaning methods utilised for cleaning vehicles, floors, the pig houses etc. should aim to minimise water use (e.g. sweep before wash-down).</li> <li>• Ensure that regular audits of water systems are conducted to identify possible water leakages.</li> </ul>	Record water usage, conduct audits and record non-compliance and incidents.	Monthly	Project Developer
<b>G. Spill Contingency, Management and Handling of Chemicals/Dangerous Goods</b>					
6.11. Potential spillage of domestic effluent from the sewer as a result of the operation.	Reduce the spillage of domestic effluent and the impact thereof on the environment.	6.11.1. A maintenance plan for the management of the sewer pipes in cases of emergency should be developed.	Compile sewer maintenance plan.	Once off (and thereafter updated as required during the operational phase).	Project Developer
6.12. Potential spillage of pig effluent.	Reduce likelihood of spillage of pig effluent.	6.12.1. Proper management of fertilizer separation and transportation of waste should be maintained.	Adhere to waste removal from pig houses and effluent separation best practice.	Once off (and thereafter updated as required during the operational phase).	Project Developer
6.13. Human Health effects due to emergency on site	Reduce effects on human health and/or death by having a thorough	6.13.1. Develop a sound evacuation and emergency preparedness plan in the	Compile plan and train personnel to execute this plan in the event of an	Once off (and thereafter updated as required during the	Project Developer

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
BASIC ASSESSMENT REPORT

Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	emergency preparedness plan in place and trained staff to execute this plan.	event of explosions, fire etc.	emergency. Actions in plan could include: <ul style="list-style-type: none"> <li>- Proper escape routes according to the design on the facility once it is operational.</li> <li>- Proper use of fire extinguishers etc.</li> <li>- Protocol to be followed in the event of explosions etc.</li> <li>- Protocol to be followed in the event of a death or injury to an employee.</li> </ul>	operational phase).	
<b>H. Stormwater Management</b>					
6.14. Increased stormwater discharge into the surrounding environment.	Reduce the impact of increased stormwater discharge to the environment.	6.14.1. A suitable stormwater/surface water quality monitoring programme should be established and implemented.	Implement surface water quality monitoring programme, based on consultation with the landowner	As agreed during the operational phase.	Project Developer
		6.14.2. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	Undertake regular inspections of the stormwater infrastructure (i.e. by implementing walk through inspections).	Weekly/Monthly	Terminal Manager and EHS Manager
<b>I. Waste Management</b>					

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
6.15. Pollution of the surrounding environment as a result of the handling, temporary storage and disposal of solid waste (general and hazardous).	Reduce soil and groundwater contamination as a result of incorrect storage, handling and disposal of general and hazardous waste.	6.15.1. Sufficient waste collection bins and skips (or similar) should be provided. Waste collection bins and skips should be covered with suitable material and correctly labelled.	Monitor waste generation and collection throughout the operational phase.	Weekly	EHS Manager
		6.15.2. Segregation of hazardous waste from general waste to be in place.	On-site inspection of waste segregation.	Weekly	EHS Manager
		6.15.3. Ensure that the terminal is kept clean at all times and that operational personnel are made aware of correct waste disposal methods.	<ul style="list-style-type: none"> <li>• Conduct training for all operational personnel.</li> <li>• Monitor the state of terminal via site audits and record non-compliance and incidents.</li> </ul>	<ul style="list-style-type: none"> <li>• Once-off during operations and ensure that all new staff are inducted. Carry out discussions during HSSE meetings as well.</li> <li>• Daily</li> </ul>	EHS Manager
		6.15.4. No solid waste may be burned or buried on site.	Monitor via site audits and record non-compliance and incidents.	Daily	EHS Manager
		6.15.5. Waste amounts shall be recorded on a monthly basis.	Waste amounts to be documented.	Monthly	EHS Manager/ Terminal Manager
<b>J. Air Quality Management</b>					
6.16. Emissions from staff vehicles and road tankers	Reduce odours during the operational phase.	6.16.1. Ensure that the proposed project is operated in such a manner whereby potential odours are minimised.	<ul style="list-style-type: none"> <li>• Monitor via site audits and record non-compliance and incidents.</li> <li>• Complaints about odours should be</li> </ul>	<ul style="list-style-type: none"> <li>• Daily</li> <li>• When complaints are made.</li> </ul>	EHS Manager

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			investigated and documented in a register.		
<b>K. Socio-Economic Management</b>					
6.17. Employment creation and skills development opportunities during the operational phase.	Maximise local employment and local business opportunities to promote and improve the local economy.	6.17.1. Enhance the use of local labour and local skills as far as reasonably possible. 6.17.2. Where the required skills do not occur locally, and where appropriate and applicable, ensure that relevant local individuals are trained. 6.17.3. Ensure that goods and services are sourced from the local and regional economy as far as reasonably possible.	Maximise local employment for unskilled labour and provincial/ national skilled labour.	During the operational phase.	Project Developer
6.18. Increase in pork and fresh produce in the local Rooiwal/Onderstepoort area	Maximise positive impacts through ensuring produce is sold to local markets	6.18.1. Ensure that the proposed project has secured local buyers.	Seek out local markets & secure formal trade agreements.	Monthly	Project developer
<b>L. Environmental Awareness and Terminal Management</b>					
6.19. Increased energy consumption during the operational phase.	Reduce energy consumption where possible.	6.19.1. Encourage the use of energy saving equipment (such as low voltage lights and low pressure taps) and promote recycling. Operational personnel must be made aware of energy conservation practices as	<ul style="list-style-type: none"> <li>Monitor energy usage via site investigations.</li> <li>Conduct training for all operational personnel.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>	<ul style="list-style-type: none"> <li>EHS Manager</li> </ul>

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		part of the environmental awareness training programme.			
6.20. Inappropriate behaviour of terminal staff during the operational phase.	Prevent unnecessary impacts on the surrounding environment by ensuring that staff are aware of the requirements of the EMPr.	6.20.1. Designate smoking areas where the fire hazard could be regarded as insignificant.	Adhoc checks to ensure workers are smoking only in designated areas.	Daily	EHS Manager
		6.20.2. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the operational phase.			
		6.20.3. Fire-fighting equipment must be made available at various appropriate locations.			

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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### 7 MANAGEMENT PLAN FOR DECOMMISSIONING PHASE

Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<b>A. Visual Impacts</b>					
7.1. Potential visual intrusion of decommissioning activities on the existing views of sensitive visual receptors.	Prevent unnecessary visual clutter from focusing attention of surrounding visual receptors on the proposed development.	7.1.1. Ensure that rubble and litter are appropriately stored and regularly removed from site to a licenced waste disposal facility. 7.1.2. Dust generation must be kept at a minimum. 7.1.3. Night lighting of work (decommissioning) sites must be minimized within requirements of safety and efficiency.	Rubble/litter/waste removal and disposal to be monitored throughout decommissioning.  Complaints about night lights should be investigated and documented in a register.	Weekly or bi-weekly	Contractor and ECO
<b>B. Safety, Health and Environment</b>					
7.2. Noise generation from demolition activities (e.g. grinding, steel falling, use of angle grinders) during the decommissioning phase.	Reduce the potential noise impacts on the decommissioning personnel.	7.2.1. Decommissioning personnel must wear proper hearing protection, which should be specified as part of the Decommissioning Phase Risk Assessment carried out by the Contractor. 7.2.2. The Contractor must ensure that all decommissioning personnel are provided with adequate PPE for use where appropriate.	Inspections to be carried out during the decommissioning phase to enforce the use of hearing protection by decommissioning personnel. A checklist should be generated in this regard to ensure adherence to the safety requirements. This must also be written into the safety requirements of the Contract.	Throughout the decommissioning phase.	ECO and Contractor

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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
7.3. Potential health injuries to demolition staff during the decommissioning phase.	Prevent respiratory illnesses caused to the decommissioning personnel.	<p>7.3.1. The Contractor must ensure that all decommissioning personnel are provided with adequate PPE (such as dust masks) for use where appropriate.</p> <p>7.3.2. The Contractor must prescribe, to decommissioning personnel, what is required by the OTGC permit to work system.</p>	Inspections to be carried out during the decommissioning phase to enforce the use of respiratory protection by decommissioning personnel. This must also be written into the safety requirements of the Contract.	Throughout the decommissioning phase.	ECO and Contractor
7.4. Heavy traffic, congestion and potential for collisions.	Prevention of injuries, fatalities, and damage to equipment and vehicles during the decommissioning phase.	<p>7.4.1. Suitable parking areas should be created and designated for trucks and vehicles.</p> <p>7.4.2. A supervisor should be appointed to co-ordinate the traffic during the decommissioning phase.</p> <p>7.4.3. Road barricading should be undertaken where required and road safety signs should be adequately installed at strategic points within the site.</p>	Monitor activities and record and report non-compliance by undertaking inspections.	Throughout the decommissioning phase.	Project Developer ECO and Contractor
7.5. Pollution of the surrounding groundwater as a result of spillages, generation of building rubble and waste scrap material.	Prevent unnecessary pollution impacts on the surrounding environment.	7.5.1. The site should be cleaned regularly and all demolition waste (i.e. concrete, steel, rubble, packaging material etc.) must be removed from site and disposed at a licenced waste disposal facility by an approved Contractor. Waste	Monitor activities and record and report non-compliance by undertaking inspections.	Throughout the decommissioning phase.	Project Developer, ECO and Contractor

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			Methodology	Frequency	Responsibility
		<p>disposal slips or waybills should be kept on file for auditing purposes as proof of disposal.</p> <p>7.5.2. All liquid wastes (i.e. used oil, paints, lubricating compounds and grease etc.) must be removed from site and disposed at a licenced hazardous waste disposal facility by an approved waste Contractor. Waste disposal slips or waybills should be kept on file for auditing purposes as proof of disposal.</p>			
<b>C. Water Conservation</b>					
7.6. Increased water usage during the decommissioning phase.	Reduce water usage during decommissioning processes.	<p>7.6.1. Water conservation to be practiced in line with Energy Saving Policies as follows:</p> <ul style="list-style-type: none"> <li>• Cleaning methods utilised for cleaning vehicles, floors, etc. should aim to minimise water use (e.g. sweep before wash-down).</li> <li>• Ensure that regular audits of water systems are conducted to identify possible water leakages.</li> </ul>	Monitor via site audits and record non-compliance and incidents.	Monthly	EHS Manager and ECO
		<p>7.6.2. Carry out environmental awareness training with a discussion on water usage and conservation.</p>	Conduct training for all decommissioning personnel.	<ul style="list-style-type: none"> <li>• As and when necessary during decommissioning and ensure</li> </ul>	EHS Manager, ECO and Contractor



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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL  
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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
				that all new staff are inducted.	
<b>D. Spill Contingency, Management and Handling of Chemicals/Dangerous Goods</b>					
7.7. Potential spillage of effluent to the surrounding environment (from portable sanitation facilities for decommissioning personnel).	Reduce the spillage of domestic effluent and the impact thereof on the environment.	7.7.1. Ensure that normal sewage management practices are implemented during decommissioning such as regularly emptying toilets and ensuring safe transport and disposal of sewage.	EHS Manager to monitor via site audits and record non-compliance and incidents (including incidents that nearly occur).	Monthly	EHS Manager and ECO
		7.7.2. Ensure that the toilet/sanitation facilities are maintained in a clean, orderly and sanitary condition.	Monitor via site audits and record non-compliance and incidents.	Daily	EHS Manager and Contractor
<b>E. Stormwater Management</b>					
7.8. Discharge of contaminated stormwater into the surrounding environment. Contamination could result from chemicals, oils, fuels, sewage, solid waste, litter etc.	Reduce the contamination of stormwater.	7.8.1. The appointed Contractor should compile a Method Statement for Stormwater Management during the decommissioning phase.	Compile Method Statement	Once off (and thereafter updated as required).	Contractor
		7.8.2. Provide secure storage for oil, chemicals and other waste materials in order to prevent contamination of stormwater runoff.	Monitor the bunding and containment structures.	Weekly	EHS Manager
<b>F. Waste Management</b>					
7.9. Pollution of the surrounding environment as a result of the handling,	Reduce soil and groundwater contamination as a result of incorrect storage, handling and disposal of general and	7.9.1. Carry out management actions for the decommissioning phase.	Carry out monitoring for the decommissioning phase.	Carry out monitoring for the decommissioning phase.	Project Developer and EHS Manager

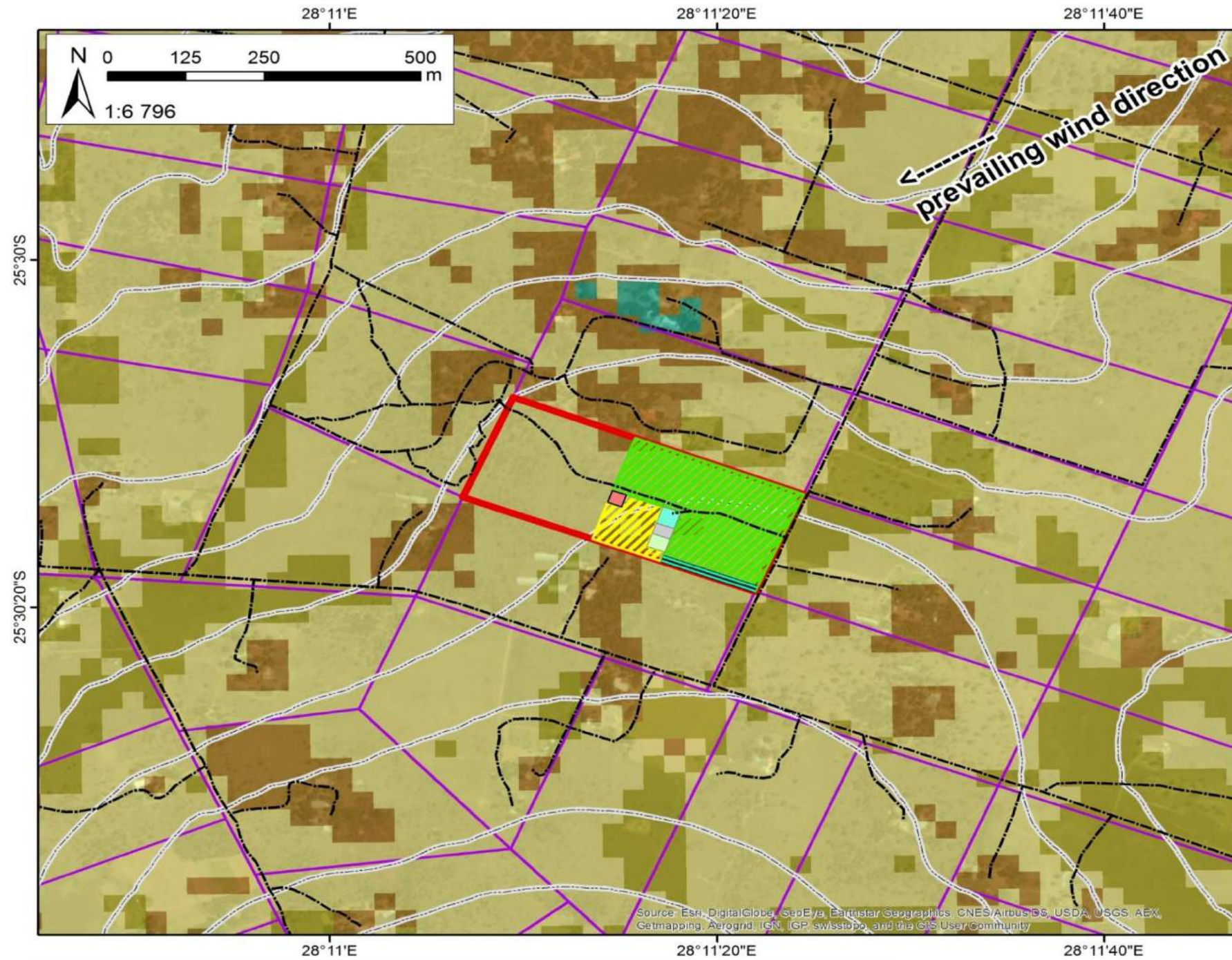
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Impact	Management Objectives	Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
temporary storage and disposal of solid waste.	hazardous waste.				
<b>G. Air Quality Management</b>					
7.10. Air Quality Impact: Emissions from decommissioning vehicles and generation of dust as a result of earthworks and demolition	Reduce dust emissions during decommissioning activities.	7.10.1. Carry out management actions for the decommissioning phase.	Carry out monitoring for the decommissioning phase.	Carry out monitoring for the decommissioning phase.	Project Developer and EHS Manager
<b>H. Fauna and Flora</b>					
7.11. Introduction and proliferation of alien species	Minimize introduction and effective control of alien species	7.11.1. By law, remove and dispose of Category 1b alien species on site. All Category 2 species that remain on site must require a permit.	Mechanical removal of these species is recommended. However, the removal must be carefully performed so as to not excessively disturb the soil layer.	Throughout the decommissioning phase.	Project Developer and EHS Manager
7.12. Sensory disturbances on Fauna	Minimise sensory disturbance surrounding faunal communities during decommissioning	7.12.1. Appropriately time demolition / rehabilitation activities to minimise sensory disturbance to fauna.	Commence (and preferably complete) demolition / rehabilitation during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least.	Throughout the decommissioning phase.	Project Developer and EHS Manager

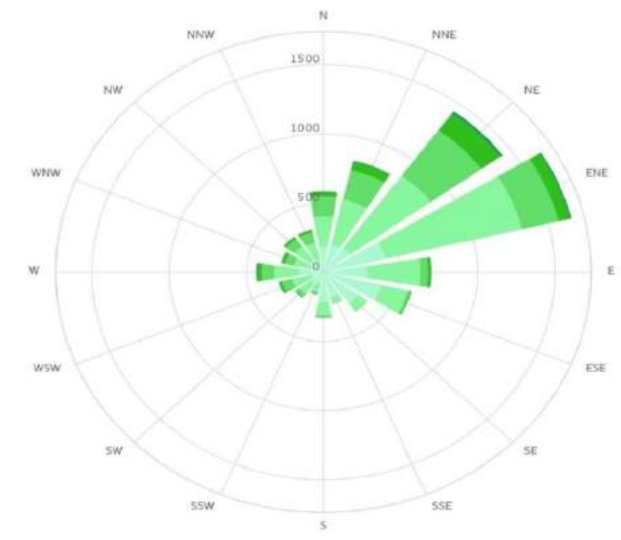
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8 APPENDIX A – PROPOSED LAYOUT OF PROPOSED PROJECT



Legend

- Land portions
- Existing roads
- Site locality
- Pacific Ora Piggery proposed layout**
- Food storage
- Office
- Piggery
- Sewer pond
- Single quarters
- Vegetables under irrigation
- Access road
- Land cover (2015)**
- Plantations / Woodlots mature
- Urban smallholding (dense trees / bush)
- Urban smallholding (low veg / grass)
- Urban smallholding (open trees / bush)
- 5 m contours



- 0
- >1
- >5
- >12
- >19
- >28
- >38
- >50
- >61 km/h

\*Wind rose shows how many hours per year the wind blows from the indicated direction.

Additional information	
Vegetation (Mucina & Rutherford, 2006)	Transformed Central Sandy Bushveld
Land use (DEA, 2015)	Agriculture (smallholdings)
Prevailing wind direction (Meteoblue, 2016)	East-North-East; North-East

DEA, 2015. 2013-2014 South African National Land-Cover Dataset. DEA: Pretoria.  
 Meteoblue, 2016. Climate Soshanguve Gauteng, South Africa. [Url] [https://www.meteoblue.com/en/weather/forecast/modelclimate/soshanguve\\_south-africa\\_954013](https://www.meteoblue.com/en/weather/forecast/modelclimate/soshanguve_south-africa_954013). Date accessed: 30 Jul, 2016  
 Mucina, L. & Rutherford, M.C., eds. 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. Pretoria: South African National Biodiversity Institute.

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: DRAFT BASIC ASSESSMENT REPORT

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# BASIC ASSESSMENT REPORT

## APPENDIX I: CURRICULUM VITAE of the PROJECT TEAM

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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### I1: CV's of the project team: Minnelise Levendal (Project Leader)



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July 2016

#### **CURRICULUM VITAE OF MINNELISE LEVENDAL – PROJECT LEADER**

<b>Name of firm</b>	CSIR
<b>Name of staff</b>	Minnelise Levendal
<b>Profession</b>	Environmental Assessment and Management
<b>Position in firm</b>	Project Manager
<b>Years' experience</b>	8 years
<b>Nationality</b>	South African
<b>Languages</b>	Afrikaans and English

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#### **CONTACT DETAILS:**

**Postal Address:** P O Box 320, Stellenbosch, 7599  
**Telephone Number:** 021-888 2495/2661  
**Cell:** 0833098159  
**Fax:** 0865051341  
**e-mail:** mlevendal@csir.co.za

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#### **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.

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

### 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 <i>(in progress)</i>	EIA for the proposed Electrawinds Swartberg wind energy project near Moorreesburg in the Western Cape	Project Manager	Electrawinds
2010-2011 <i>(in progress)</i>	EIA for the proposed Ubuntu wind energy project, Eastern Cape	Project Manager	WKN Windkraft SA
2010-2011 <i>(in progress)</i>	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 <i>(Environmental Authorisation granted in September 2011)</i>	EIA for a proposed wind farm near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd)
2010 <i>(complete)</i>	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 <i>(complete)</i>	Basic Assessment for the erection of two wind monitoring masts near Jeffrey's Bay in the Eastern Cape	Project Manager	Windcurrent (Pty Ltd)

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Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

Completion Date	Project description	Role	Client
2009-2010 ( <i>Environmental Authorisations granted during 2010</i> )	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 ( <i>Environmental Authorisation granted in 2009</i> )	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.** (née 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.

Ward, S.J.E., Esler, K.J. and **Bowie, M.R** (2001). Seasonal photosynthetic temperature responses and changes in <sup>13</sup>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

<b>Language</b>	<b>Speaking</b>	<b>Reading</b>	<b>Writing</b>
<i>English</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>
<i>Afrikaans</i>	<i>Excellent</i>	<i>Excellent</i>	<i>Excellent</i>

Minnelise Levendal



July 2016

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

### I2: Kelly Stroebel (Project Manager



#### CURRICULUM VITAE – KELLY FAYE STROEBEL (Cand.Sci.Nat)

July 2016

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**Position in Firm:** Environmental Assessment Practitioner (Intern)  
**Full Name:** Kelly Faye Stroebel  
**Professional Registration:** Cand.Sci.Nat Environmental Sciences  
**Date of Birth:** 11/01/1991  
**Nationality:** South African  
**Marital Status:** Single  
**Language Proficiency:** English (Fluent), Afrikaans (Moderate)

#### BIOSKETCH:

Kelly holds a Bachelor of Science with Honours in Environmental Science from Rhodes University in Grahamstown. Her undergraduate degree was a Bachelor of Science with majors in Environmental Science and Zoology. She is currently working as an environmental assessment practitioner intern at the Council for Scientific and Industrial Research (CSIR). Kelly has been the Project Manager of a Basic Assessment for the development of a sugarcane farm for a rural community trust in KZN as part of the Special Needs and Skills Development [Programme. She has assisted in the SIP projects including the National Wind & Solar Strategic Environmental Assessment (SEA) and Electricity Grid Infrastructure SEA as SEA which were commissioned by the national Department of Environmental Affairs. On a personal level, Kelly enjoys the outdoors, traveling and SCUBA diving and is passionate about the field of environmental science and management.

#### EMPLOYMENT TRACK RECORD:

The following table presents a list of projects that Kelly Stroebel has been involved in to this date:

Completion Date	Project description	Role	Client
In progress	<b>Special Needs and Skills Development Programme (DEA-CSIR)</b>	Project Manager conducting Environmental services such as basic Assessments and Environmental Screening Studies.	Various SMME's and Community Trusts
In progress	<b>Strategic Environmental Assessment (SEA) for Electricity Grid Infrastructure</b>	Project member-stakeholder engagement and project support.	National Department of Environmental Affairs
In Progress	<b>EIA for two proposed Desalination plants on the</b>	Project member- Public Participation Process, stakeholder engagement and	Umgeni Water



## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

Completion Date	Project description	Role	Client
	<b>KZN coast.</b>	project support.	
August 2014	<b>National Strategy for Sustainable Development Review (NSSD1)</b>	Project member- research and report development.	National Department of Environmental Affairs
2013-2014	<b>Strategic Environmental Assessment (SEA)</b> for roll out of photovoltaic solar and wind energy in South Africa.	Project member- Stakeholder engagement and project support	National Department of Environmental Affairs

### EMPLOYMENT RECORD:

- **2014** Environmental Scientist and Assessment Practitioner (Intern). Council for Scientific and Industrial Research – Consulting and Analytical Services (CAS) - Stellenbosch
- **2013** Environmental Education Counselor: Fernwood Cove Summer Camp, USA.
- **2012** Graduate Assistant: Rhodes University Department of Environmental Science.
- **2011** Vacation Internship: Environmental Management Department of Mittal Steel, Newcastle.
- **2011** Vacation Internship: Northern Kwa-Zulu Natal branch of WWF.

### QUALIFICATIONS/EDUCATION:

- BSc Hons. Environmental Science (Rhodes University, Grahamstown, South Africa)
  - Honours modules including Environmental Impact Assessment, Statistics, Climate Change Adaptation, Urban Ecology and Environmental Water Quality.
  - Honours thesis: "Water use and conservation by households of different economic status in King William's Town"
- Bachelor of Science with Distinction (Rhodes University, Grahamstown, South Africa)
  - Undergraduate courses including Environmental Science, Zoology, Ichthyology, Chemistry, Earth Science, Botany and Computer Science.
- IEB Matric Certificate, 5 Distinctions (St Dominic's Academy, Newcastle)

### TRAINING, CONFERENCES AND PROFESSIONAL REGISTRATIONS:

- Conflict Management Accredited through Conflict Dynamics (2015)
- Media and Science Training Accreditation through Jive Media Africa (2015)
- IAIA WC Workshop for Integrating Climate Change into EIA practice (2015)
- Presented on the DEA-CSIR "Special Needs and Skills Development Programme" at the 2014 Annual IAIA (International Association for Impact Assessment) South Africa Conference.
- Project Management accreditation through the CSIRs Innovation, Leadership and Learning Academy Project Management Course (2014)
- Attended the IAIA Air Quality Management Workshop for EAPs (2014)
- Attended the WRC's Seminar on Desalination in South Africa (2014)
- Environmental Impact Assessment Training Course accreditation through Coastal and Environmental Services, Grahamstown (2012)
- Participated in the ACCESS Student Energy Summit (2014)
- DEA&DP Training on the EIA Regulations (2014)
- Registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP) (Reg #: 100151/14)
- Member of the South African Affiliate of the International Association for Impact Assessment (Membership no: 3588 )

## SECTION F: APPENDICES

Basic Assessment for the proposed Pacific Ora Projects (Pty) Ltd Pig and Vegetable Production facility on farm Bultfontein 107-JR, Gauteng: FINAL BASIC ASSESSMENT REPORT

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### I2: EAP Declaration

#### THE INDEPENDENT ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

I, **Kelly Stroebel**, as the appointed independent environmental practitioner ("EAP") hereby declare that I:

- act/ed as the independent EAP in this application;
- regard the information contained in this report 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;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 49B of the Act) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the application 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;
- have ensured that the comments of all interested and affected parties were considered, recorded and submitted to the competent authority in respect of the application;
- have kept a register of all interested and affected parties that participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 49B of the Act.

Kelly Stroebel



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Signature of the environmental assessment practitioner:

Council for Scientific and Industrial Research (CSIR)

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Name of company:

31<sup>st</sup> October 2016

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Date: