



# **DRAFT** ENVIRONMENTAL MANAGEMENT PROGRAMME



ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES



# PROPOSED TWFT PIGGERY NEAR TSITSIKAMMA, KOUKAMMA LOCAL MUNICIPALITY IN THE EASTERN CAPE PROVINCE

## DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

DEDEAT Ref No.: EC09/C/LN1&3/M/38-2021

**Prepared for:**



Westend Office Park, Building B, Second Floor,  
Cnr West Ave & Hall Street, Die Hoewes,  
Centurion, 0049, South Africa

**Prepared by:**



GRAHAMSTOWN

67 African Street  
PO BOX 934  
Grahamstown, 6140  
046 622 2364

*Also in Cape Town, East London, Johannesburg, Port Elizabeth, Maputo (Mozambique) and Romsey (UK)*

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

AUGUST 2021



## REVISIONS TRACKING TABLE

### *CES Report Revision and Tracking Schedule*

<b>Document Title:</b>	Draft Environmental Management Plan for the proposed TWFT Piggery near Tsitsikamma, Koukama Local Municipality, Eastern Cape Province.		
<b>Client Name &amp; Address:</b>	<b>Tsitsikamma Wind Farm Trust</b> Westend Office Park, Building B, Second Floor, Cnr West Ave & Hall Street, Die Hoewes, Centurion, 0049, South Africa		
<b>Status:</b>	<b>Draft</b> Environmental Management Plan		
<b>Issue Date:</b>	August 2021		
<b>Lead Author:</b>	Mr Justin Green		
<b>Reviewer:</b>	Mr Gregory Shaw		
<b>Study Leader/ Registered Environmental Assessment Practitioner – Approval:</b>	Dr Alan Carter		
<b>Report Distribution</b>	<i>Circulated to</i>	<i>No. of hard copies</i>	<i>No. electronic copies</i>
	DEDEAT	1	One (1)
<b>Report Version</b>	DRAFT ENVIRONMENTAL MANAGEMENT PLAN		

This document has been prepared in accordance with the scope of CES's appointment and contains intellectual property and proprietary information that is protected by copyright in favour of CES. The document may therefore not be reproduced, used or distributed to any third party without the prior written consent of CES. This document is prepared exclusively for use by CES's client. CES accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared. No person other than the client may copy (in whole or in part), use or rely on the contents of this document, without the prior written permission of CES. The document is subject to all confidentiality, copyright, trade secrets rules and intellectual property law and practices of South Africa.



ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

[Info@cesnet.co.za](mailto:Info@cesnet.co.za)  
[www.cesnet.co.za](http://www.cesnet.co.za)



**Contact Details: Report Reviewer and Quality Control**

**Name** Mr Gregory Shaw  
**Designation** Principal Environmental Consultant  
**E-mail** [g.shaw@cesnet.co.za](mailto:g.shaw@cesnet.co.za)

**Contact Details: Project Manager / Wetland Specialist**

**Name** Mr Justin Green  
**Designation** Senior Environmental Consultant  
**E-mail** [j.green@cesnet.co.za](mailto:j.green@cesnet.co.za)

**Contact Details: EAP/Study Leader**

**Name** Dr Alan Carter  
**Designation** Executive and Principal Environmental Consultant  
**E-mail** [a.carter@cesnet.co.za](mailto:a.carter@cesnet.co.za)

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



## TABLE OF CONTENTS

<b>1</b>	<b><u>INTRODUCTION.....</u></b>	<b><u>7</u></b>
1.1	Objectives of the EMPr .....	7
1.2	Structure and Function of the EMPr .....	7
1.3	Legal Requirements.....	8
<b>2</b>	<b><u>DETAILS OF THE ENVIRONMENTAL ASSESSMENT TEAM.....</u></b>	<b><u>10</u></b>
2.1	2.1 Expertise of the Environmental Assessment Team.....	10
2.2	2.2 Company Profile.....	11
<b>3</b>	<b><u>BACKGROUND INFORMATION.....</u></b>	<b><u>13</u></b>
3.1	Project Introduction .....	13
3.2	Project Description .....	13
	3.2.1 Description of the Proposed Activity and Layout .....	13
<b>4</b>	<b><u>LAYOUT OF THE EMPr .....</u></b>	<b><u>18</u></b>
4.1	Planning & Design Phase .....	18
4.2	Construction Phase .....	18
4.3	Operational Phase.....	18
4.4	Decommissioning Phase.....	19
<b>5</b>	<b><u>MITIGATION AND/OR MANAGEMENT MEASURES.....</u></b>	<b><u>20</u></b>
<b>6</b>	<b><u>ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS</u></b>	<b><u>31</u></b>
6.1	Management Structure .....	31
6.2	Roles & Responsibilities .....	31
	6.2.1 The Developer .....	31
	6.2.2 The Piggery Manager/Foreman .....	31
	6.2.3 Environmental Control Officer (ECO) – If required in the environmental authorisation .	31
6.3	Compliance Monitoring & Corrective Action .....	32
6.4	Emergency Preparedness .....	32
6.5	Environmental Incident Management.....	33
6.6	Record Keeping – If required in the environmental authorisation.....	33
<b>7</b>	<b><u>ENVIRONMENTAL AWARENESS.....</u></b>	<b><u>34</u></b>
7.1	Environmental Training .....	34
7.2	Monitoring of Environmental Training.....	34
<b>8</b>	<b><u>CONCLUSIONS.....</u></b>	<b><u>35</u></b>



<b>APPENDIX A</b> .....	<b>36</b>
<b>APPENDIX B</b> .....	<b>36</b>
<b>APPENDIX C</b> .....	<b>39</b>
<b>APPENDIX D</b> .....	<b>42</b>
<b>APPENDIX E</b> .....	<b>45</b>
<b>APPENDIX F</b> .....	<b>51</b>

## LIST OF TABLES

Table 1-1: NEMA EIA Regulations EMPr Requirements in Accordance with Appendix 4. ....	8
Table 1-2: List of Applicable Legislation for the Piggery Project .....	9
Table 3-1: Corner point coordinates of the proposed Piggery Development. ....	16
Table 3-2: Listed activities triggered by the proposed piggery development. ....	16

## LIST OF FIGURES

Figure 3-1: Locality Map of the Proposed Piggery Development. ....	14
Figure 3-2: Layout Map of the Proposed Piggery Development Site within Portion 7 of Farm 788. ...	15
Figure 3-3: Corner Point Coordinates (1 – 6) of the Proposed Piggery Development Site .....	16



# 1 INTRODUCTION

This Environmental Management Programme (EMPr) has been compiled to provide mitigation, monitoring and institutional measures to be taken during the construction and operation of the Tsitsikamma Wind Farm Trust (TWFT) Piggery Development near Tsitsikamma in the Eastern Cape Province (“the proposed piggery development”). These measures aim to eliminate, offset and/or reduce adverse environmental and social impacts.

This EMPr informs all relevant parties, in this case, the Developer, the Piggery Manager, the Environmental Control Officer (ECO) and all other staff employed by the Tsitsikamma Wind Farm Trust on the affected property as to their duties in the fulfilment of the legal requirements for the construction and operation of the proposed piggery development, with particular reference to the prevention and mitigation of anticipated potential adverse environmental and social impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the Environmental Authorisation (EA) granted by the relevant environmental permitting authority [to be included in this EMPr upon receipt]. The Competent Authority for the proposed piggery development in the Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT).

## 1.1 OBJECTIVES OF THE EMPr

The general objectives of the EMPr are to:

- Ensure compliance with the regulatory authority stipulations and guidelines which could be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures which could optimise beneficial impacts;
- Create management structures that address the concerns and complaints of I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Ensure that safety recommendations are complied with; and
- Specify time periods within which the measures contemplated in the Final EMPr must be implemented, *where appropriate*.

## 1.2 STRUCTURE AND FUNCTION OF THE EMPr

An EMPr is focused on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment and social setting through the lifetime of a development. In addition, an EMPr identifies measures which should be in place or will be actioned



to manage any incidents and emergencies that could occur during the construction and/or operation of the proposed piggery development. The contents of this EMPr are consistent with the requirements as set out in Appendix 4 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments), as listed in the table below.

**Table 1-1: NEMA EIA Regulations EMPr Requirements in Accordance with Appendix 4.**

REQUIREMENTS OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT IN TERMS OF APPENDIX 4
<p>(1) An EMPr must comply with Section 24(N) of the Act and include -</p> <p>(a) Details of –</p> <p>(i) The EAP who prepared the EMPr; and</p> <p>(ii) The expertise of the EAP to prepare an EMPr, including a <i>curriculum vitae</i>;</p> <p>(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</p> <p>(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</p> <p>(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –</p> <p>(i) Planning and design;</p> <p>(ii) Pre-construction activities;</p> <p>(iii) Construction activities;</p> <p>(iv) Rehabilitation of the environment after construction and where applicable post closure; and</p> <p>(v) Where relevant, operation activities;</p> <p>(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable include actions to –</p> <p>(i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</p> <p>(ii) Comply with any prescribed environmental management standards or practices;</p> <p>(iii) Comply with any applicable provisions of the Act regarding closure, where applicable;</p> <p>(iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</p> <p>(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p> <p>(h) The frequency of monitoring the implementation of the impact management actions contemplated in (f);</p> <p>(i) An indication of the persons who will be responsible for the implementation of the impact management actions;</p> <p>(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</p> <p>(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</p> <p>(l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;</p> <p>(m) An environmental awareness plan describing the manner in which –</p> <p>(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and</p> <p>(ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and</p> <p>(n) Any specific information that may be required by the competent authority.</p> <p>(2) Where a government notice <i>gazetted</i> by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.</p>

### 1.3 LEGAL REQUIREMENTS

The construction and operation of the proposed piggery development must be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Developer, or the Piggery Manager on behalf of the Developer, as to their duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of adverse environmental and social impacts caused by the proposed piggery



development. The Developer/Piggery Manager should note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter must prevail.

The Developer/Piggery Manager must identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the proposed piggery development must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:

**Table 1-2: List of Applicable Legislation for the Piggery Project**

LEGISLATION	ADMINISTERING AUTHORITY	TYPE Permit/ license/ authorisation/comment
National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments)	Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)	Environmental Authorisation required.
National Water Act (NWA) (Act No. 36 of 1998, as amended)	Eastern Cape Department of Water and Sanitation (DWS)	General Authorisations/Water Use Licence required.
National Environmental Management: Biodiversity Act (NEM:BA, Act No. 10 of 2004)	Eastern Cape Provincial DEDEAT and the Department of Agriculture, Forestry and Fisheries (DAFF)	Plant Removal Permits and Alien Vegetation Management
Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1983 and subsequent amendments)		
<b>ADDITIONAL LEGISLATION, POLICIES AND GUIDELINES</b>		
<ul style="list-style-type: none"> <li>→ The Constitution of the Republic of South Africa (Act No. 108 of 1996, as amended)</li> <li>→ National Heritage Resources Act (NHRA) (Act No. 25 of 1999)</li> <li>→ National Environmental Management: Waste Act (NEM:WA) (Act No.59 of 2008, as amended)</li> <li>→ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>→ Occupational Health and Safety Act (OHSA) (Act No. 85 of 1993, as amended)</li> <li>→ Cape Nature and Environmental Conservation Ordinance (Ordinance No. 19 of 1974)</li> <li>→ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – Alien and Invasive Species (AIS) Regulations</li> <li>→ Eastern Cape Biodiversity Conservation plan (ECBCP, 2007) Critical Biodiversity Areas (CBAs)</li> <li>→ Eastern Cape Biodiversity Conservation plan (ECBCP, 2020) Critical Biodiversity Areas (CBAs)</li> <li>→ Eastern Cape Vision 2030 Provincial Development Plan (ECDP, 2014)</li> <li>→ All relevant provincial legislation, municipal by-laws and ordinances, including the Sarah Baartman District Municipality Integrated Development Plan 2017-22 and the Koukamma Local Municipality municipal by-laws</li> </ul>		



# 2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT TEAM

## 2.1 EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT TEAM

**EAP Team:** Mr Justin Green  
Mr Gregory Shaw  
Dr Alan Carter

**NEMA registered Company:** Coastal and Environmental Services, trading as “CES” (Grahamstown Branch)

### CES Head Office

Physical Address: 67 African Street, Grahamstown, 6140

Postal Address: PO Box 934, Grahamstown, 6140

Telephone: +27 (0)46 622 2364

Website: [www.cesnet.co.za](http://www.cesnet.co.za)

Email: [j.green@cesnet.co.za](mailto:j.green@cesnet.co.za) | [g.shaw@cesnet.co.za](mailto:g.shaw@cesnet.co.za) | [a.carter@cesnet.co.za](mailto:a.carter@cesnet.co.za)

### **Dr Alan Carter**

*Project Leader & Quality Assurance*

Dr Alan Carter is an Executive and the East London Branch Manager at CES. He has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. He is also certified ISO14001 EMS Auditor with the American National Standards Institute. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years. He is a registered professional with the South African Council for Natural Scientific Professionals (SACNASP) and a member of the Environmental Assessment Practitioners Association of South Africa (EAPASA).

### **Mr Gregory Shaw**

*Project Manager & Report Reviewer*

Greg is a principal environmental consultant with more than 10 years' experience, who has carried out ESIA's for a variety of infrastructure developments in Africa and Europe. His experience is with development projects where there is creation or modification of infrastructure, via capital works and complex logistics. He is able to engage with the full portfolio of diverse stakeholder groups and regulators via meetings, written material, face-to-face workshops, presentation events, negotiation and discussion to achieve mutually agreeable mitigation measures and solutions. As part of many of the ESIA's he has been involved in or managed he has been responsible for the development and execution of environmental surveys (and subsequent monitoring programmes), sub-contractor management (including contracting), report writing and project management. In addition, he has been responsible for developing and auditing plans associated with managing large infrastructure projects e.g. Environmental Management Plans (EMP). Greg forms strong relationships and ensure



that the team works together in an integrated way towards the clear common goal, making effective use of time and resources.

### Mr Justin Green

#### *Lead Report Writer & GIS Mapping*

Justin is employed as a Senior Environmental Consultant at Coastal & Environmental Services (CES), having spent the past 8 years working on Basic Assessments, EIA's, Monitoring Programme's, RAPs, Specialist Assessments and international fieldwork. I have worked on projects in the DRC, Lesotho, Mozambique, Zambia, Cameroon, Tanzania, Malawi, Swaziland, Madagascar and extensively throughout South Africa. Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. He is currently the lead GIS specialist for CES, responsible for digitizing and processing vector and raster data for BAR's, EIA's and ESHIA's both locally and internationally. I have formed part of the GIS department for the past 7 years with my primary experience working with ArcGIS software and ArcEditor for developing GIS databases, data creation and snapping tolerances. He has experience in training field teams and specialists in the use of OruxMaps and ODK collect as the primary tool for data collection. I am experienced in fieldworker training and team management resulting in the collection of field data, which can then be incorporated into GIS databases.

## 2.2 COMPANY PROFILE

CES has its head office in Grahamstown, where it was founded in 1990, to service a then fledgling market in the fields of Environmental Management and Impact Assessment. CES now has offices in South Africa (Cape Town, Port Elizabeth, East London and Johannesburg), the United Kingdom (Romsey) as well as a wholly owned subsidiary in Maputo, Mozambique (Coastal & Environmental Services LDa., registered as an Environmental Practitioner with the Mozambican authorities).

The Company has grown apace with the increased market demand for environmental and social advisory services in Southern Africa and further afield. Our principal area of expertise lies in assessing the risks and impacts of the development process on the natural, social and economic environments through, among other instruments, the Environmental Impact Assessment (EIA) process. We believe that by offering these services we contribute meaningfully towards sustainable development.

We adopt a scientific approach to our studies, underpinned by an informed and holistic view of the environment and a pragmatic approach to sustainable development. This results in deliverables that are robust, defensible and credible. This is important for both the development and EIA processes, and as a result the outputs of our studies demonstrate objectivity, sincerity and professionalism. We believe that a balance between development and environmental protection can be achieved by skilful and careful planning, and that our outputs reflect this. Our track record across twenty (20) African countries as well as in the Middle East and Asia is evidence of the value add we bring to the environmental and social advisory services we provide, and has contributed to our deep understanding of the environmental and social challenges associated with establishing and operating facilities and infrastructure in emerging markets.



In addition, CES has well-developed working relationships with a number of other individual specialists and specialist consulting companies who provide us with expertise in disciplines such as air quality impact assessments, noise impact assessments, heritage, archaeological and paleontological assessments, radiation hazard assessments, groundwater studies and health impact assessments. Generally, we have worked with the same sub-consultants for over a decade, so they understand our requirements and are willing to go the extra mile for us. Our network of environmental and social professionals across the continent has enhanced our ability to successfully execute projects outside of South Africa. In 2018 we established strategic alliances with likeminded consultancies in Oman (Middle East), Serbia (Eastern Europe) and Bangladesh in order to extend our advisory services into these regions.



## 3 BACKGROUND INFORMATION

### 3.1 PROJECT INTRODUCTION

The Tsitsikamma Community Wind Farm (TCWF) is a 95 MW wind farm comprising 31 wind turbines on the farm Wittekleibosch in the Tsitsikamma area, situated within the Koukamma Local Municipality in the Eastern Cape Province. The Project was awarded Preferred Bidder in the Department of Energy (DoE's) Renewable Energy Independent Power Producer Procurement Programme ("RE IPPPP") in May 2012 and reached Commercial Operation date in August 2016.

As part of the REIPPP, TCWF committed to spending 2.1% of its revenue on socio-economic and enterprise development programmes in communities located within 50km radius of the wind farm. Cennergi which is the management service provider and shareholder of the Tsitsikamma Community Wind Farm founded the Tsitsikamma Wind Farm Trust (TWFT) to solely manage and decide on the disbursements of the Socio-Economic Development (SED) and Enterprise Development (ED) funds. The Proposed Piggery forms part of the enterprise development initiative funded by the TWFT.

### 3.2 PROJECT DESCRIPTION

The study area is located on a section of Portion 7 of Farm 788 (Figure 2), approximately 2.4 km south of Clarkson and 40 km west of Humansdorp. This area falls within the Kou-kamma Local Municipality (KLM), seated in the Sarah Baartman District Municipality (SBDM) of the Eastern Cape Province. The total extent of Portion 7 of Farm 788, on which study site is situated, is 594 ha (**Error! Reference source not found.**). The site can be accessed via the R102, through the Guava Juice residential development.

#### 3.2.1 Description of the Proposed Activity and Layout

The proposed facility will contain infrastructure (**Figure 3**) for:

- Project Boundary (71,326 m<sup>2</sup>);
- Bathroom facilities (6 m<sup>2</sup>);
- Sleeping facilities (12 m<sup>2</sup>);
- Administration office (2,669m<sup>2</sup>);
- Feed storage (36 m<sup>2</sup>);
- Pig House (8,012 m<sup>2</sup>);
- Pig Shed - 50 sows, 3 boars and 500 piglets (3,083m<sup>2</sup>);
- Slurry pit area (1,567 m<sup>2</sup>), Volume: (10 m<sup>3</sup>);
- Water tank (16 m<sup>2</sup>), Volume: (10 m<sup>3</sup>);
- A 200m gravel road, 6m wide (16,370 m<sup>2</sup>); and
- Electricity connection.

The area will be fenced off, preventing outside access, contamination, and theft of pigs.

A combination of rainwater and borehole will be the source of water for the site. A borehole will need to be identified and drilled as the main source of water for the piggery. It is anticipated that this borehole could be sited within the site boundary. The specific location has not been determined. The project expects to use 183m<sup>3</sup> of water per month.

The facility is expected to produce approximately 60 tons of solid waste per month.



It is estimated that a piggery of this size will produce approximately 2 tons of effluent per day. The effluent is a mixture of dung, urine and wash water. The effluent will be stored in a slurry pit, with a portion of the solids (60m<sup>2</sup>/month) used as compost.



Figure 3-1: Locality Map of the Proposed Piggery Development.

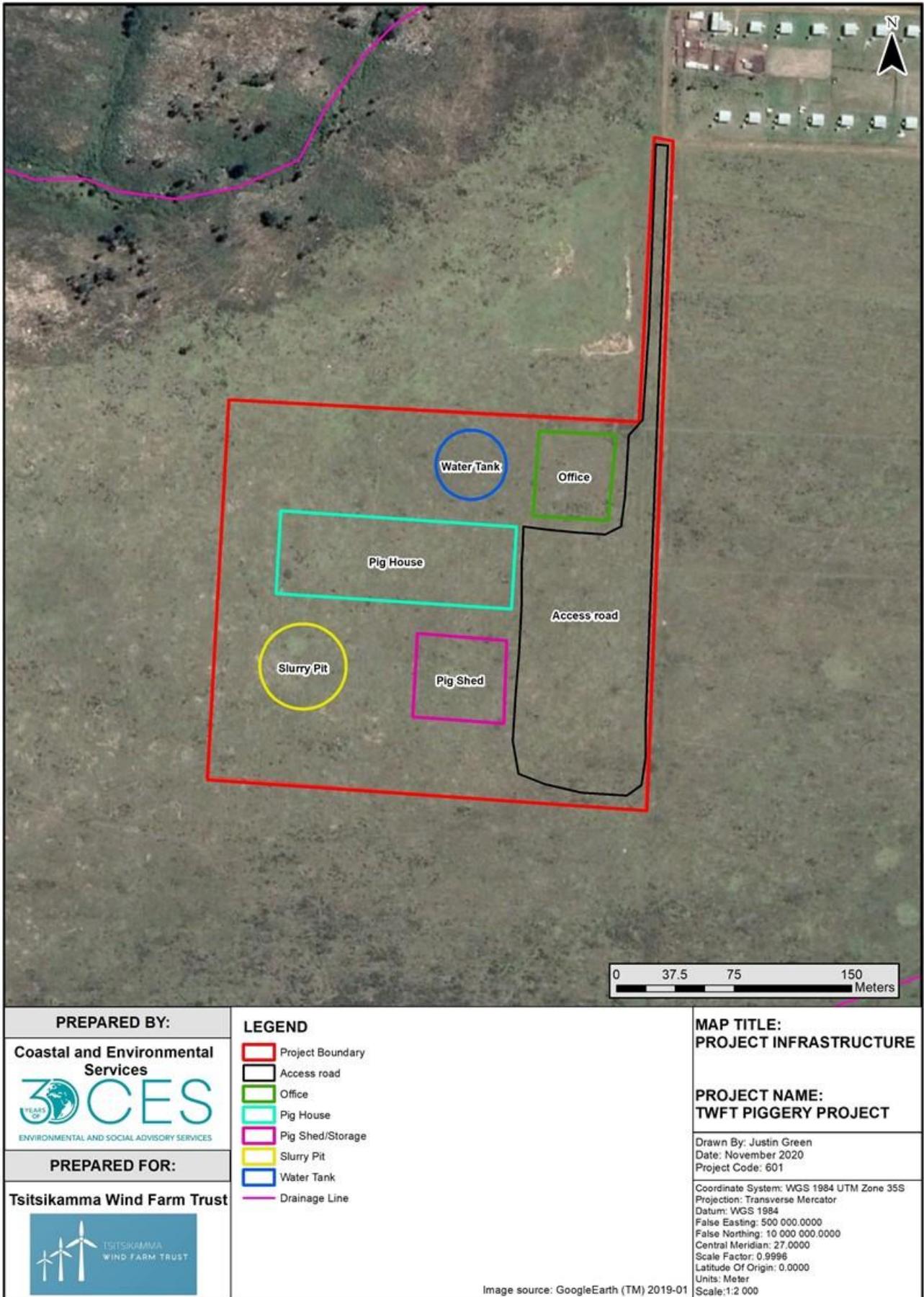
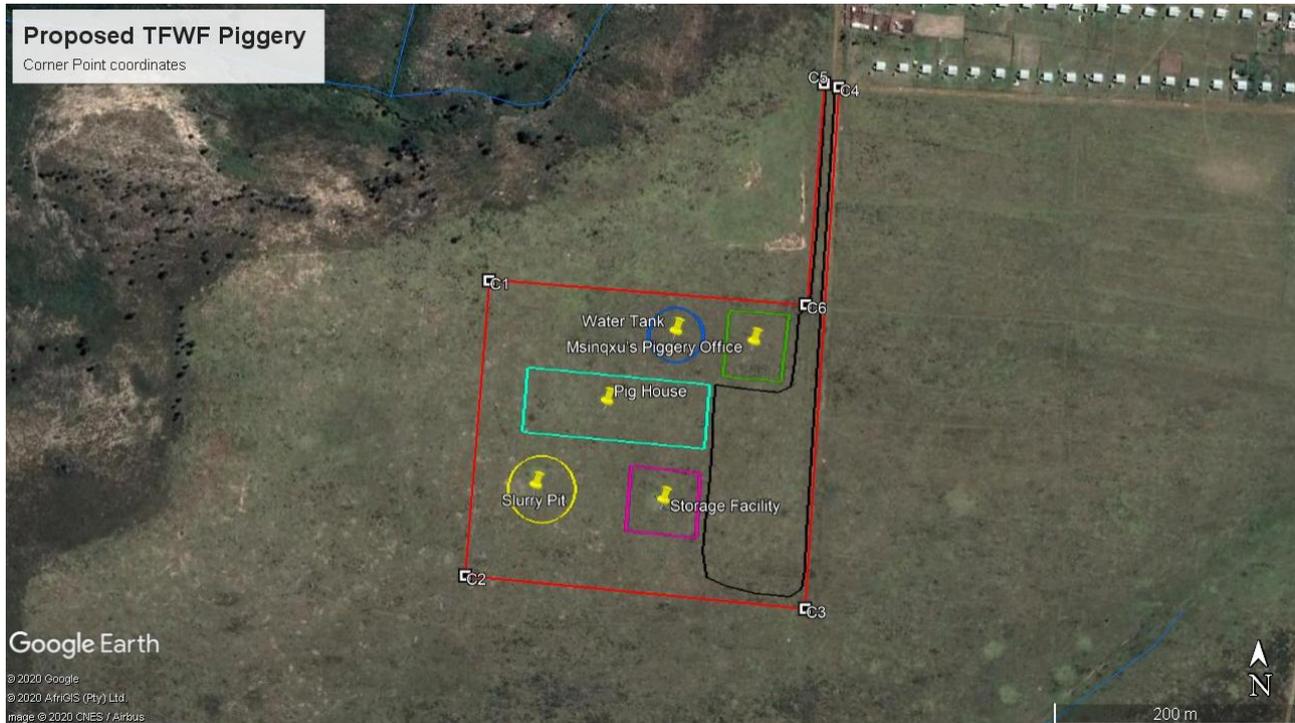


Figure 3-2: Layout Map of the Proposed Piggery Development Site within Portion 7 of Farm 788.



**Table 3-1: Corner point coordinates of the proposed Piggery Development.**

No. in Figures 3 & 4	Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
	DD	MM	SS	DD	MM	SS
1	34°	2'	19.40"S	24°	20'	9.22"E
2	34°	2'	27.29"S	24°	20'	8.46"E
3	34°	2'	28.17"S	24°	20'	19.37"E
4	34°	2'	14.24"S	24°	20'	20.45"E
5	34°	2'	14.15"S	24°	20'	19.98"E
6	34°	2'	20.05"S	24°	20'	19.39"E



**Figure 3-3: Corner Point Coordinates (1 – 6) of the Proposed Piggery Development Site**

CES has been appointed by the Applicant to undertake the required Application for Environmental Authorisation (EA). The proposed piggery development triggers a Basic Assessment Process in accordance with the NEMA EIA Regulations (2014 and subsequent 2017 amendments) Listing Notice 1 and Listing Notice 3 activities as per Table 3-2 below.

**Table 3-2: Listed activities triggered by the proposed piggery development.**

Relevant notice:	Activity No (s) (in terms of the relevant notice) :	Description of each listed activity as per the Government Notice:
GN. R 324 as Amended 7 April 2017	4	The development and related operation of facilities or infrastructure for the concentration of animals in densities that exceed – (i) 20 square meters per large stock unit and more than 500 units per facility; (ii) 8 square meters per small stock unit and; a. more than 1 000 units per facility excluding pigs where (b) applies; or b. more than 250 pigs per facility excluding piglets that are not yet weaned;
	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required



		<p>for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <ul style="list-style-type: none"> <li>a. Eastern Cape</li> <li>ii. Within critical biodiversity areas identified in bioregional plans.</li> </ul>
	<p>14</p>	<p>The development of</p> <p><del>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</del></p> <p><del>where such development occurs—</del></p> <ul style="list-style-type: none"> <li><del>(a) within a watercourse;</del></li> <li><del>(e) if no development setback has been adopted, within 32 m of a watercourse measured from the edge of the watercourse</del></li> </ul> <ul style="list-style-type: none"> <li>a. Eastern Cape             <ul style="list-style-type: none"> <li>i. Outside urban areas:                 <ul style="list-style-type: none"> <li><b>(ff)</b> Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</li> <li><b>(hh)</b> Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</li> </ul> </li> </ul> </li> </ul>
<p><b>GN. R 327</b> as <b>Amended 7</b> <b>April 2017</b></p>	<p>27</p>	<p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for</p> <ul style="list-style-type: none"> <li>i. The undertaking of a linear activity; or</li> <li>ii. Maintenance purposes undertaken in accordance with a maintenance management plan.</li> </ul>



## 4 LAYOUT OF THE EMPR

---

In order to ensure a holistic approach to the management of environmental and social impacts associated with the proposed piggery development, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Developer/Piggery Manager and all other parties involved.

### 4.1 PLANNING & DESIGN PHASE

The Design EMPr is an integral component of the project life cycle and ensures that the Developer/Piggery Manager is aware of the environmental constraints that must be considered and incorporated into the final design/layout of the project. The format of this design EMPr is checklist in nature to ensure that all specifications are included in the design phase. The design EMPr phase requires ongoing discussions between the Developer, the Piggery Manager and the Environmental Control Officer (ECO) (if required).

### 4.2 CONSTRUCTION PHASE

The Construction EMPr details the Environmental Management System (EMS)/framework within which construction activities will be governed for the construction phase. The Construction EMPr consists of various actions, initiatives and systems that the Developer and/or Piggery Manager will have to ensure are in place and are undertaken. The Construction EMPr consists of both a management system and environmental specifications which contain detailed specifications that will need to be undertaken or adhered to by the Developer and/or Piggery Manager.

The Construction EMPr must be developed in parallel with the final design stages, and constructive input should be invited from the Developer. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the Developer and the Piggery Manager, while being bound by the EMPr, fully understand it and have had input into its final development. For this reason, the final Construction EMPr will need to be signed off prior to the initiation of construction activities.

### 4.3 OPERATIONAL PHASE

The Operational EMPr provides specific guidance related to operational activities associated with a particular development. Operational EMPr's are sometimes referred to as EMS. Impacts during the operational phase of a development of this nature could be few in number and low in intensity. By taking pro-active measures during the construction phase, potential environmental impacts emanating during the operational phase will be minimised. Monitoring of certain issues such as the success of vegetation re-establishment and erosion control will be required to continue during operation. The final Operational EMPr should be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.



#### 4.4 DECOMMISSIONING PHASE

It is unlikely that the piggery development will be decommissioned in the foreseeable future but, if the piggery is decommissioned at a later stage, the impacts associated with the decommissioning of the piggery development are likely to be similar to the impacts which have been identified for the construction phase. It is recommended that the approved EMPr is updated by a suitably qualified EAP prior to the decommissioning of the piggery development and implemented throughout the decommissioning phase.



## 5 MITIGATION AND/OR MANAGEMENT MEASURES

The following table sets out the environmental and social issues which could potentially occur during the various phases of the proposed piggery development.

PLANNING AND DESIGN PHASE		
IMPACT	IMPACT DESCRIPTION	MITIGATION
P-1. <b>COMPLIANCE WITH RELEVANT LEGISLATION</b>	During the Planning and Design Phase, failure to obtain the necessary authorisations and/or permits, as well as failure to adhere to existing policies and legal obligations, could lead to the project conflicting with local, provincial and national policies and legislation. This could result in a lack of institutional support for the project, overall project failure and undue social and environmental impacts.	<ul style="list-style-type: none"> <li>→ Activities, which trigger listed activities in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments), must not commence prior to receipt of an Environmental Authorisation (EA) from the provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT).</li> <li>→ Vegetation clearing and construction activities within 100 m of a watercourse or within 500 m of a wetland must not commence prior to receipt of the necessary water use authorisation(s) from the Department of Water and Sanitation (DWS).</li> <li>→ All additional permitting and authorisation requirements, including plant removal permits, must be obtained prior to the commencement of any vegetation clearance and/or construction activities.</li> <li>→ If necessary, a suitably qualified Environmental Control Officer (ECO) must be appointed prior to the commencement of the construction phase to monitor the Applicant's compliance with the conditions of all the relevant permits and authorisations.</li> <li>→ All phases of the piggery development must comply with the relevant municipal by-laws and should consider the available best practice guidelines.</li> </ul>
CONSTRUCTION PHASE		
IMPACT	IMPACT DESCRIPTION	MITIGATION
C-1 <b>LOSS OF INDIGENOUS VEGETATION</b>	Vegetation clearance is required for the piggery development during the construction phase and it will result in the loss of natural vegetation which is	<ul style="list-style-type: none"> <li>→ The conservation status of Tsitsikamma Sandstone Fynbos is classified as 'Vulnerable' and is listed as 'poorly protected'. The conservation target (percent of area) as set by the NSBA is 22%.</li> </ul>



	<p><b>(TSITSIKAMMA SANDSTONE FYNBOS AND EASTERN COASTAL SHALE BAND VEGETATION)</b></p>	<p>classified as Tsitsikamma Sandstone Fynbos &amp; Eastern Coastal Shale Band vegetation (Mucina and Rutherford, 2018), including sections which are classified as Critical Biodiversity Areas (CBAs)</p>	<ul style="list-style-type: none"> <li>→ A comprehensive Plant Search and Rescue must be conducted prior to vegetation clearance.</li> <li>→ A qualified botanical specialist must conduct the translocation of any Species of Conservation Concern (SCC) and should be present onsite during the further clearance of vegetation in case additional, previously undetected SCC are found.</li> <li>→ The remainder of the property should be declared a protected area, in order to secure the required habitat for translocated species.</li> <li>→ The clearance of vegetation at any given time should be kept to a minimum.</li> <li>→ Vegetation clearance and trampling should be avoided in areas demarcated as no-go areas.</li> <li>→ Employees must be prohibited from making fires and harvesting plants.</li> <li>→ Any alien vegetation which establishes during the construction phase should be removed from site and disposed of at a registered waste disposal site. Continuous monitoring for seedlings should take place throughout the construction phase.</li> <li>→ Only indigenous species should be used for rehabilitation purposes.</li> <li>→ As far as practically possible, existing roads should be utilised.</li> <li>→ An Alien Vegetation Management Plan should be compiled (for implementation during the phases that follow).</li> </ul>
<p>C-2.</p>	<p><b>LOSS OF BIODIVERSITY</b></p>	<p>During the construction phase, vegetation clearing, soil ripping etc., will lead to damage to and the removal of natural vegetation, loss of faunal habitat, and SCC within the proposed site boundaries. The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems.</p>	<ul style="list-style-type: none"> <li>→ The clearance of vegetation at any given time should be kept to a minimum.</li> <li>→ Vegetation clearance and trampling should be avoided in areas demarcated as no-go areas.</li> <li>→ Employees must be prohibited from making fires and harvesting plants.</li> <li>→ Any alien vegetation which establishes during the construction phase should be removed from site and disposed of at a registered waste disposal site. Continuous monitoring for seedlings should take place throughout the construction phase.</li> <li>→ Only indigenous species should be used for rehabilitation purposes which must aim to re-vegetate exposed soil.</li> <li>→ As far as practically possible, existing roads should be utilised.</li> </ul>
<p>C-3.</p>	<p><b>LOSS OF SPECIES OF CONSERVATION CONCERN (SCC)</b></p>	<p>During the construction phase, construction activities, including the clearance of vegetation, could permanently damage or destroy plant SCC which are present on site, contributing to the cumulative loss of plant SCC in the region.</p>	<ul style="list-style-type: none"> <li>→ The clearance of vegetation at any given time should be kept to a minimum.</li> <li>→ Vegetation clearance and trampling should be avoided in areas demarcated as no-go areas.</li> <li>→ Employees must be prohibited from making fires and harvesting plants.</li> </ul>
<p>C-4.</p>	<p><b>EROSION</b></p>	<p>During the construction phase, the clearance of vegetation and associated construction activities could result in erosion and the loss of topsoil within the development site and surrounds.</p>	<ul style="list-style-type: none"> <li>→ A Stormwater Management Plan should be compiled for implementation during the construction phase.</li> <li>→ Vegetation clearance must be kept to a minimum and retained where possible to avoid soil erosion.</li> </ul>



			<ul style="list-style-type: none"> <li>→ Disturbed areas must be rehabilitated as soon as possible after construction.</li> <li>→ The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.</li> </ul>
C-5.	<b>ESTABLISHMENT OF ALIEN PLANT SPECIES</b>	The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems.	<ul style="list-style-type: none"> <li>→ An Alien Vegetation Management Plan must be developed and implemented to prevent the establishment and spread of undesirable alien plant species during all phases of development.</li> <li>→ Any alien vegetation which establishes during the construction phase should be removed from site and disposed of at a registered waste disposal site. Continuous monitoring for seedlings should take place throughout the construction phase.</li> </ul>
C-6.	<b>HABITAT LOSS/FRAGMENTATION</b>	During the construction phase, the loss of vegetation coincides with the loss of faunal habitat, reducing breeding and rearing locales. Faunal populations could become locally extinct or diminish in size.	<ul style="list-style-type: none"> <li>→ A comprehensive Faunal Search and Rescue should be conducted prior to vegetation clearance.</li> <li>→ The clearance of vegetation at any given time should be kept to a minimum.</li> <li>→ Vegetation clearance and trampling should be avoided in areas demarcated as no-go areas.</li> <li>→ Employees must not trap, hunt, handle or remove any faunal species from the site.</li> <li>→ As far as practically possible, existing roads must be utilised.</li> </ul>
C-7.	<b>WILDLIFE MORTALITIES</b>	During the construction phase, the increase in the presence of vehicles, crew and materials could increase animal fatalities through opportunistic hunting, collisions, accidents or baiting and trapping.	<ul style="list-style-type: none"> <li>→ A comprehensive Faunal Search and Rescue should be conducted prior to vegetation clearance.</li> <li>→ Vehicle speed must be limited to 40 km per hour to reduce faunal collision mortality.</li> <li>→ All staff on site must receive training with regards to the proper management and response should animals be encountered on site.</li> <li>→ Search and clear the construction footprint prior to work commencing, relocating animals where found.</li> <li>→ Animals must not be injured or killed where possible.</li> <li>→ No hunting, baiting or trapping shall be allowed within the affected property or surrounding property by construction staff.</li> </ul>
C-8.	<b>INADEQUATE REHABILITATION AND MAINTENANCE OF DISTURBED AREAS</b>	During the construction phase, failure to implement rehabilitation measures could lead to the erosion of- and permanent loss of valuable soil, the unnecessary loss of indigenous vegetation and the establishment of alien invasive vegetation.	<ul style="list-style-type: none"> <li>→ A Rehabilitation Plan must be compiled for implementation during the construction and post-construction phases.</li> <li>→ All temporarily disturbed areas which do not form part of the piggery development, must be rehabilitated using indigenous vegetation.</li> <li>→ All impacted areas must be restored and/or managed in accordance with the approved EMPr.</li> </ul>
C-9.	<b>INCREASE IN NOISE LEVELS</b>	During the construction phase, construction activities could result in an increase in ambient noise levels onsite and on the surrounding	<ul style="list-style-type: none"> <li>→ All relevant municipal by-laws relating to noise control must be adhered to.</li> </ul>



		properties due to the increase in movement of vehicles and staff as well as due to the machinery used for vegetation clearance.	<ul style="list-style-type: none"> <li>→ Activities which include the movement of heavy vehicles and the operation of machinery should be restricted to normal working hours (06:00am – 18:00pm).</li> <li>→ A “complaints register”, consisting of all public complaints and actions in response to these complaints, must be maintained during the construction phase.</li> </ul>
C-10.	<b>INCREASE IN AIR POLLUTION IN THE FORM OF DUST</b>	During the construction phase, the moving of construction vehicles and other construction activities, such as vegetation clearing, could result in air pollution in the form of dust, especially during dry, windy conditions.	<ul style="list-style-type: none"> <li>→ Exposed soil should be dampened down during excessively dry and windy conditions, if necessary.</li> <li>→ The clearance of vegetation at any given time should be kept to a minimum.</li> <li>→ Any complaints or claims emanating from dust issues must be attended to immediately and noted in the complaints register.</li> <li>→ Construction vehicles should adhere to the recommended speed limit of 30 km per hour.</li> </ul>
C-11.	<b>HANDLING AND STORAGE OF HAZARDOUS SUBSTANCES</b>	During the construction phase, the use of vehicles, machinery, fertilisers, pesticides and/or herbicides within the proposed site could result in spillages or leaching of hazardous substances. Spillages and/or leaching could result in the contamination of soils, surface- and groundwater, as well as pose a health and safety risk to staff.	<ul style="list-style-type: none"> <li>→ Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) and the SABS Code of Practise must be adhered to throughout the construction phase.</li> <li>→ If applicable, the staff that will be handling hazardous materials must be trained to do so.</li> <li>→ All hazardous substances such as diesel, pesticides and fertilisers must be stored in a bunded area with an impermeable surface beneath them.</li> <li>→ Maintenance of any vehicles or machinery should not take place within 50 m of any watercourse and drip trays must be used under stationary machinery.</li> <li>→ Spill kits must be available onsite for the duration of the construction phase.</li> <li>→ The appointed ECO must determine and/or approve the precise method for the treatment of polluted soil. This could involve the application of oil absorbent materials or oil-digestives.</li> </ul>
C-12.	<b>WASTE MANAGEMENT</b>	During the construction & operational phases, the inappropriate storage and disposal of general waste is likely to result in the pollution of the site and surrounding environment.	<ul style="list-style-type: none"> <li>→ Littering must not occur during the construction phase and all general waste must be disposed of in bins or waste skips for disposal at a suitably registered landfill.</li> <li>→ Waste must not be buried or burned onsite.</li> <li>→ Construction rubble shall be disposed of at a licenced landfill site</li> <li>→ Littering by the employees of the Contractor shall not be allowed under any circumstances.</li> <li>→ All waste must be removed from the site and transported to a suitably permitted landfill site.</li> <li>→ All waste hazardous materials must be carefully stored and then disposed of offsite at a licensed landfill site.</li> </ul>



			<ul style="list-style-type: none"> <li>→ Implement buffer zones to surface water bodies, avoiding the application of manure within these areas.</li> <li>→ Contaminants to be stored safely to avoid spillage.</li> <li>→ Machinery must be properly maintained to keep oil leaks in check.</li> </ul>
C-13.	<b>IMPACT ON TRAFFIC FLOW</b>	During the construction phase, construction and transportation vehicles traveling to and from the proposed piggery development site could increase traffic volumes on the existing access road and along the gravel roads. This could adversely impact the flow of traffic in the area.	<ul style="list-style-type: none"> <li>→ Activities which include the movement of heavy vehicles and the operation of machinery should be restricted to normal working hours (06:00am – 18:00pm).</li> <li>→ Surrounding landowners should be notified once construction activities commence.</li> <li>→ Vehicles must adhere to the recommended speed limit of 40 km per hour along gravel roads.</li> </ul>
C-14.	<b>HEALTH AND SAFETY</b>	During the construction phase, inadequate fire safety awareness and the lack of availability of firefighting equipment could result in runaway fires, an unsafe working environment and the potential loss of lives or property. However, it is likely that the piggery development will be a lower fire risk than the current natural vegetation which occurs within the proposed site.	<ul style="list-style-type: none"> <li>→ Operational firefighting equipment must be present on site at all times as per the Occupational Health and Safety Act.</li> <li>→ Employees should be trained in basic fire hazard control and firefighting techniques.</li> <li>→ No smoking near flammable substance.</li> <li>→ The necessary emergency contact details should be made available to all staff during the construction phase.</li> <li>→ Burning of cleared vegetation must not occur within the proposed site.</li> </ul>
C-15.	<b>VISUAL AND AESTHETIC IMPACTS</b>	During the construction phase, construction activities, such as the clearance of vegetation resulting in an increase in dust, as well as the presence and use of machinery onsite and along access roads, could result in a visual disturbance to nearby sensitive visual receptors. The transformation of the current, indigenous vegetation, to a piggery is likely to alter the aesthetic quality of the area.	<ul style="list-style-type: none"> <li>→ Vegetation clearance must be restricted to the demarcated development footprints.</li> <li>→ Any disturbed areas should be rehabilitated as soon as possible.</li> </ul>
C-16.	<b>CREATION OF EMPLOYMENT OPPORTUNITIES</b>	During the construction phase, both permanent and temporary employment opportunities will be created by the proposed piggery development.	<ul style="list-style-type: none"> <li>→ Where possible, individuals residing in nearby communities should be contracted for unskilled and semi-unskilled employment opportunities.</li> </ul>
C-17.	<b>CULTURAL HERITAGE</b>	During the construction phase, the clearance of vegetation and the disturbance of the soil profile could potentially have adverse impacts on cultural heritage resources within the proposed site. The development will take place approximately 900	<ul style="list-style-type: none"> <li>→ All recommendations and mitigation measures made by the Heritage Specialists must be implemented/adhered to during the construction phase.</li> <li>→ Should cultural heritage material be exposed during the construction phase then work must cease in the immediate area of the finds and it must be reported to the archaeologist at the Albany Museum (Tel.: 046 6222312) and/or to the Eastern Cape</li> </ul>



		metres from the Sundays River in an area where one would expect to find freshwater shell middens. These are important archaeological sites and special care must be taken that these sites are not destroyed during development. Although it is unlikely that any significant archaeological heritage remains will be exposed during the development, there is always a possibility that human remains and/or other archaeological and historical material may be uncovered during the development (Eastern Cape Heritage Consultants cc, November 2019).	Provincial Heritage Resources Authority (Tel.: 043 7450888) immediately so that a systematic and professional investigation can be undertaken. All work must stop to allow an archaeologist to conduct a systematic and professional investigation. Sufficient time should be allowed to remove/collect such material. Please see Appendix B of the <i>Letter of Recommendation (With Conditions) for the Exemption of a Full Phase 1 Archaeological Impact Assessment</i> (Eastern Cape Heritage Consultants cc, November 2019) for a list of possible archaeological sites that maybe found in the area.
C-18.	<b>SURFACE AND GROUNDWATER IMPACTS</b>	During the construction phase, various substances used during construction activities could result in the pollution of surface and groundwater resources. Groundwater could be contaminated due to poor vehicle maintenance, such as oil spills due to the inadequate usage of drip tray under stationary vehicles, and improper storage of hazardous materials, such as fuel. In addition, construction activities could lead to sediment being deposited into the nearby watercourse to the east of the site and washing down of vehicles and equipment near the watercourse could result in the pollution of the watercourse.	<ul style="list-style-type: none"> <li>→ A Stormwater Management Plan should be compiled and implemented during the construction phase.</li> <li>→ Stationary vehicles and machinery must not be parked within 50 m of the watercourse overnight.</li> <li>→ Water Use Authorisation must be obtained from the Department of Water and Sanitation (DWS) prior to any development within watercourses (100 m) and wetlands (500 m).</li> </ul>
C-19.	<b>LOSS OR DEGRADATION OF LOCAL WETLAND AREAS</b>	The unnamed tributaries/wetlands situated along the western and eastern boundary of the survey area are unlikely to be affected by the clearance of vegetation. As these tributaries form part of the SWSA they are pivotal for the sustained delivery of water quantity and quality downstream. However, should proper mitigation measures not be followed, this could have a significant impact on the naturally occurring species within the wetlands. It is unlikely that construction activities could cause destruction	<ul style="list-style-type: none"> <li>→ The clearance of vegetation at any given time should be kept to a minimum and vegetation clearance must be strictly limited to the development footprint;</li> <li>→ Demarcate and/or fence in the construction site.</li> <li>→ Highlight all prohibited activities to workers through training and notices.</li> <li>→ Design measures to effectively control vehicle access, vehicle speed, dust, stormwater run-off, erosion and sedimentation on the road</li> <li>→ As far as practically possible, existing roads should be utilised.</li> <li>→ Suitable Stormwater Management Plan must be developed to ensure no hazardous water is released into the surrounding system.</li> </ul>



		or degradation of this system, which feeds into the Tsitsikamma River to the south. However, during all phases of the project, continued vehicle and livestock activity, and proliferation of alien flora could cause degradation of local wetland areas through increased erosion and sedimentation.	
C-20.	<b>ENVIRONMENTAL CONTAMINATION</b>	Various contaminants are present in pig effluent including nutrients, pathogens, veterinary pharmaceuticals (including inter alia antibiotics), and naturally excreted hormones. Inappropriate slurry management and improper disposal of carcasses as well as excess fodder, chemicals (e.g. pesticides) and any other operational waste could cause contamination and/or eutrophication of local soils and more importantly, downstream wetland areas and receiving water courses.	<ul style="list-style-type: none"> <li>→ Ensure that the facility is designed in accordance with international best practice norms, and with advice from an appropriate specialist, to ensure that there is no environmental contamination from effluent, fodder, carcasses and other waste, and to ensure that there is also effective storm water management, which will contain a 1:100 year flood and prevent flooding of the slurry pit facility.</li> <li>→ Designate a secured, access restricted, signposted room for the storage of potentially hazardous substances such as herbicides, pesticides dips and medication</li> <li>→ Monitor and maintain the control measures to ensure that they remain effective;</li> <li>→ All hazardous waste should be disposed of at an appropriate licensed facility;</li> <li>→ Waste recycling should be incorporated into the facility's operations as far as possible;</li> <li>→ Educate workers about the facility's waste management and handling of hazardous substances with regular training and notices;</li> <li>→ Establish appropriate emergency procedures for accidental contamination of the surrounding;</li> <li>→ Initiate a long-term annual monitoring programme to determine river quality downstream of facility.</li> </ul>
<b>OPERATIONAL PHASE</b>			
<b>IMPACT</b>		<b>IMPACT DESCRIPTION</b>	<b>MITIGATION</b>
O-1.	<b>EROSION</b>	During the operational phase, failure to install erosion control and stormwater management measures could result in increased run-off and further erosion within the boundaries of Portion 7 of Farm 788.	<ul style="list-style-type: none"> <li>→ The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.</li> <li>→ Stormwater control must be undertaken to prevent soil loss from the site.</li> <li>→ All erosion control mechanisms must be regularly maintained.</li> <li>→ Vegetation must be retained where possible to avoid soil erosion.</li> <li>→ A suitable Erosion Management Plan or method statement should be developed.</li> </ul>



			<ul style="list-style-type: none"> <li>→ Exposed and/or cleared areas must be established using the appropriate vegetation to prevent soil erosion and the loss of valuable topsoil.</li> <li>→ The quality and health status of surrounding soils should be monitored throughout the operational phase.</li> </ul>
O-2.	<b>LOSS OF SOIL QUALITY</b>	During the operational phase, soil leaching caused by poor irrigation methods and/or stormwater management, coupled with the application of fertilisers, pesticides, and/or herbicides, could lead to the loss/alteration of soil quality and structure within the study area.	<ul style="list-style-type: none"> <li>→ Disturbed areas must be established using the appropriate vegetation to prevent soil erosion and the loss of valuable topsoil.</li> <li>→ The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.</li> <li>→ Any alteration of soil quality should be remediated in line with best practices.</li> </ul>
O-3.	<b>LOSS OF INDIGENOUS VEGETATION</b>	During the operational phase, unsustainable and irresponsible farming practises could result in the loss or damage of the surrounding indigenous vegetation.	<ul style="list-style-type: none"> <li>→ The proposed vegetation clearing and ripping of soil required for the cultivation must be restricted to the piggery boundary.</li> </ul>
O-4.	<b>ESTABLISHMENT OF ALIEN PLANT SPECIES</b>	During the Operational phase, the poor rehabilitation of disturbed areas may lead to the permanent degradation of ecosystems as well as allow alien vegetation species to expand.	<ul style="list-style-type: none"> <li>→ The Alien Vegetation Management Plan must be implemented to prevent the establishment and prevent the spread of undesirable alien plant species during the Operational Phase.</li> <li>→ Monitoring of the establishment of alien seedlings should continue throughout the operational phase. Any alien seedlings should be removed and disposed of at a suitably registered landfill.</li> </ul>
O-5.	<b>WILDLIFE MORTALITIES</b>	During the operational phase, vehicles, crew and materials could increase animal fatalities through opportunistic hunting, collisions, accidents or baiting and trapping.	<ul style="list-style-type: none"> <li>→ Train all staff on site regarding the proper management and response should animals be encountered.</li> <li>→ The specified road speed limits should be adhered to.</li> </ul>
O-6.	<b>INADEQUATE REHABILITATION AND MAINTENANCE OF DISTURBED AREAS</b>	During the operational phase, failure to rehabilitate temporary areas, which were impacted during the construction phase, could lead to the erosion of- and permanent loss of valuable soil, the degradation of the surrounding indigenous vegetation, and the establishment of alien invasive vegetation.	<ul style="list-style-type: none"> <li>→ Stormwater control must be undertaken to prevent soil loss from the site.</li> <li>→ All erosion control mechanisms must be regularly maintained.</li> <li>→ Vegetation must be retained where possible to avoid soil erosion.</li> <li>→ Any cleared areas, which are not used for the cultivation of piggery, should be rehabilitated post-construction using only indigenous plant species.</li> <li>→ Irrigation methods must ensure minimal runoff.</li> <li>→ The quality and health status of surrounding soils should be monitored throughout the operational phase.</li> <li>→ Any alteration of soil quality should be remediated in line with best practice.</li> </ul>
O-7.	<b>WASTE MANAGEMENT</b>	During the operational phase, the inappropriate storage and disposal of general waste is likely to	<ul style="list-style-type: none"> <li>→ Littering must not occur during the construction phase and all general waste must be disposed of in bins or waste skips for disposal at a suitably registered landfill.</li> <li>→ Waste must not be buried or burned onsite.</li> </ul>



		result in the pollution of the site and surrounding environment.	
O-8.	<b>PRODUCTION OF VALUABLE PRODUCTS</b>	During the operational phase, the fertiliser by products be monitored to comply with national standards prior to being used for agricultural purposes on the nearby farmlands.	<ul style="list-style-type: none"> <li>→ Local customers for the fertilizer by-products should be sought, whereby capital costs on the digester can be recovered.</li> <li>→ Disposal to a landfill should only be considered as a last resort. If there is a possibility that the waste can be reused/repurposed or converted to something useful, this option should ALWAYS be considered preferable.</li> <li>→ Ensure that sufficient land is available for optimal spreading of manure without negatively impacting on soil chemistry.</li> </ul>
O-9.	<b>VISUAL AND AESTHETIC IMPACTS</b>	During the operational phase, the visual and aesthetic impact is likely to be minimal because the proposed piggery is in line with the surrounding land uses.	<ul style="list-style-type: none"> <li>→ The rehabilitation of disturbed areas should be monitored during the operational phase.</li> </ul>
O-10.	<b>CREATION OF EMPLOYMENT OPPORTUNITIES</b>	During the operational phase, both permanent and temporary employment opportunities will be created by the proposed piggery development.	<ul style="list-style-type: none"> <li>→ Where possible, individuals residing in nearby communities should be contracted for unskilled and semi-unskilled employment opportunities.</li> </ul>
O-11.	<b>COMPLIANCE WITH THE WASTE HIERARCHY</b>	During the operational phase, generation of waste due to operational activities can contaminate the surrounding environment	<ul style="list-style-type: none"> <li>→ Regular cleaning of the site must take place to avoid litter contamination and littering.</li> <li>→ Waste bins must be provided to minimize littering.</li> <li>→ The supervisor must ensure that feeders are checked for cleanliness and freshness and contaminated pig food and faeces removed.</li> <li>→ The supervisor must ensure that drinkers are checked for correct operation, desired flow rates achieved and malfunctions reported.</li> <li>→ The supervisor must ensure that feed and other operational waste are appropriately and effectively contained and disposed of at the approved site.</li> </ul>
O-12.	<b>PRODUCTION OF PIG MANURE</b>	During the operational phase, generation of waste due to accumulation of pig manure can attract flies and contaminate the surrounding environment	<ul style="list-style-type: none"> <li>→ The supervisor must ensure that manure is appropriately removed.</li> <li>→ The owner must ensure that pig houses have enough windows to allow cooling for manure and pigs.</li> <li>→ The personnel trained for removing manure must prevent water drinking troughs from spilling into solid manure as flies, mosquitoes and rodents are attracted to the wet manure.</li> <li>→ The supervisor must monitor the pond so as to prevent irregularly adding large amounts of organic matter to the pond which results in increased Volatile Fatty Acids and an associated pH drop that compromises the methane formers.</li> <li>→ The supervisor must carefully manage the pond so as to maintain a healthy population of the microorganisms used to degrade the manure</li> </ul>



			<ul style="list-style-type: none"> <li>→ Monitor and maintain the control measures to ensure that they remain effective;</li> <li>→ Adhere to best practice pig husbandry and waste disposal norms;</li> <li>→ Poor slurry management on the site will impact on the surface ground water resources                         <ul style="list-style-type: none"> <li>→ During the operational phase the potential exists for the pig effluent to pollute surface and groundwater resources on the site if the effluent dam is positioned, designed and maintained irresponsibly.</li> <li>→ The effluent dam needs to be positioned as per engineer’s specifications to eliminate any negative impacts on surface and groundwater quality.</li> <li>→ Suitable management of the piggery, its wastewater management system and mortality management system is required to minimise the potential negative impacts on surface and groundwater quality.</li> <li>→ The effluent dam must have a high-density polyethylene (HDPE) membrane as per the DWS requirements to contain or prevent waste constituents and leachate from escaping the proposed waste management site</li> </ul> </li> <li>→ All hazardous waste should be disposed of at an appropriate licensed facility;</li> </ul>
O-13.	<b>DISPOSAL OF CARCASSES</b>	During the operational phase, inappropriate disposal of carcasses may pollute the surrounding environment and biodiversity.	<ul style="list-style-type: none"> <li>→ The owner must ensure that carcasses are appropriately and effectively contained and disposed of at the approved site.</li> <li>→ The supervisor must monitor and control carcasses disposal site.</li> </ul>
O-14.	<b>AIR QUALITY REDUCTION DUE TO ODOURS</b>	During the operational phase, accumulation of manure and urine, dirty drinkers and feeders can generate odours that may pollute the surrounding environment and biodiversity.	<ul style="list-style-type: none"> <li>→ The supervisor must ensure that feeders are checked for cleanliness and freshness and contaminated pig food and pig manure removed.</li> <li>→ The supervisor must ensure that drinkers are checked for correct operation, desired flow rates achieved and malfunctions reported.</li> <li>→ The supervisor must ensure that contaminated food and other operational waste are appropriately and effectively contained and disposed of at the approved site.</li> <li>→ Pigs are fed at the correct time and rate.</li> </ul>
O-15.	<b>POTENTIAL SPREAD OF DISEASES</b>	During the operational phase, inadequate care of animal can result in transmission of diseases.	<ul style="list-style-type: none"> <li>→ The supervisor must ensure that disease treatment and control procedures are carried out as instructed.</li> <li>→ The supervisor must make sure that sick or injured pigs are cared for in line with veterinary advice and ensure that all relevant hygiene requirements are implemented.</li> <li>→ The supervisor must ensure that the piggery is controlled and monitored in order to maintain an optimal environment for pigs.</li> </ul>

**No-Go ALTERNATIVE**



IMPACT	IMPACT DESCRIPTION	MITIGATION
NG-1.	The No-Go Option entails no development of the Tsitsikamma Wind Farm Trust piggery.	→ No mitigation proposed. If the development of the piggery does not proceed then none of the negative impacts identified for the planning and design, construction and operational phases will take place.
NG2.	<b>NO-GO ALTERNATIVE</b>	The No-Go Option could preserve the integrity of the indigenous and riparian vegetation as a result of the development of the piggery.
NG3.		The No-Go Option would not create any job opportunities.
		→ No mitigation required.
<b>DECOMMISSIONING PHASE</b>		
<p>It is unlikely that the piggery development will be decommissioned in the foreseeable future but, if the piggery is decommissioned at a later stage, the impacts associated with the decommissioning of the piggery development are likely to be similar to the impacts which have been identified for the construction phase. It is recommended that the approved EMP is updated by a suitably qualified EAP prior to the decommissioning of the piggery development and implemented throughout the decommissioning phase.</p>		



# 6 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

## 6.1 MANAGEMENT STRUCTURE

In line with this EMPr, the Developer and/or Piggery Manager should prepare a document clearly outlining and demonstrating the environmental responsibilities, accountability and liability of the Developer's employees.

## 6.2 ROLES & RESPONSIBILITIES

### 6.2.1 *The Developer*

The Developer (Applicant) is the responsible entity for monitoring the implementation of the EMPr and compliance with the Environmental Authorisation. However, if the Developer assigns the duties to the Piggery Manager or Foreman of the farm to implement the proposed mitigation measures, documented in this EMPr, on their behalf then the Piggery Manager's/Foreman's responsibilities are outlined as per the section that follows.

### 6.2.2 *The Piggery Manager/Foreman*

The Piggery Manager/Foreman will:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA.
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the Developer and the EA.
- Ensure that all third parties, who carry out all or part of the Piggery Manager's/Foreman's obligations under the contract, comply with the requirements of this EMPr.
- Ensure that the appointment of the ECO, if required by the Competent Authority, is subject to the approval of the Developer.

### 6.2.3 *Environmental Control Officer (ECO) – If required in the environmental authorisation*

The EA could stipulate the requirement for the appointment of an ECO to undertake site audits to monitor the implementation of this EMPr. The EA will stipulate the frequency of these site audits (if any). Should this be a requirement, the ECO will be responsible for the monitoring, reviewing and verifying of compliance with this EMPr and conditions of the EA by the Developer/Piggery Manager/Foreman. The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the authorisations and permits required in terms of the applicable legislation have been obtained.
- Monitoring and verifying that the EMPr, EA and any other conditions are always adhered to and taking action if specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Inspecting the site and surrounding areas to determine compliance with the EMPr, EA and any other conditions.
- Ensuring that activities on site comply with all relevant environmental legislation.
- Undertaking an internal review of the EMPr and submitting any changes to the Developer and the authority for review and approval as applicable.



- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance.
- Recommending additional environmental protection measures, should this be necessary.
- Providing feedback on any environmental issues at site meetings (if required).

The appointed ECO must have:

- A good working knowledge of all relevant environmental policies, legislation, guidelines and standards.
- The ability to conduct inspections and audits and to produce thorough, readable and informative reports.
- The ability to manage public communication and complaints.
- The ability to think holistically about the structure, functioning and performance of environmental systems.
- Proven competence in the application of the following integrated environmental management tools:
  - Environmental Impact Assessment;
  - Environmental Management Plans/Programmes;
  - Environmental auditing;
  - Mitigation and optimisation of impacts;
  - Monitoring and evaluation of impacts; and
  - Environmental management systems.

The ECO must be fully conversant with the Basic Assessment Report, this EMPr, the EA and all relevant environmental legislation for the project. The Developer will have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMPr or this specification. Such instruction will be in writing and must be clearly set out with reasons why a replacement is required and within what timeframe.

### 6.3 COMPLIANCE MONITORING & CORRECTIVE ACTION

Non-compliance with the conditions of the EMPr could include the following:

- There is evidence of contravention of the EMPr or its environmental specifications within the boundaries of the proposed site.
- Construction-related activities take place within the affected property without authorisation from the relevant authorities.
- Environmental damage ensues due to negligence.
- The Developer/Piggery Manager/Foreman fails to comply with corrective or other instructions issued by the ECO within a specific time.
- The Developer/Piggery Manager/Foreman fails to respond adequately to complaints from the public or authorities.

Where rehabilitation is required, rehabilitation must be undertaken to the satisfaction of the ECO and the Competent Authority.

### 6.4 EMERGENCY PREPAREDNESS

The Developer/Piggery Manager must develop environmental emergency response procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents which will cause environmental or social impacts. Such activities may include, *inter alia*:

- Accidental discharges to water and land;



- Accidental exposure of employees to hazardous substances;
- Accidental fires;
- Accidental spillage of hazardous substances; or
- Specific environmental and ecosystem effects from accidental releases or incidents.

## 6.5 ENVIRONMENTAL INCIDENT MANAGEMENT

A report should be completed for all incidents, and appropriate action taken where necessary to minimise any potential impacts. DEDEAT must be informed of any environmental incident, in accordance with legislative requirements, should this be necessitated by a major environmental incident.

## 6.6 RECORD KEEPING – IF REQUIRED IN THE ENVIRONMENTAL AUTHORISATION

The ECO must monitor the adherence to the approved impact prevention procedures and the ECO must issue the Developer/Piggery Manager/Foreman with a notice of non-compliance if transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance should be documented and reported to the Developer. These reports must be made available to the DEDEAT if/when requested.



# 7 ENVIRONMENTAL AWARENESS

## 7.1 ENVIRONMENTAL TRAINING

The Developer/Piggery Manager/Foreman must ensure that their employees and any third party, who carries out all or part of the obligations, is adequately trained regarding the implementation of the EMPr and the general environmental legal requirements and obligations.

The ECO (*if required*) should ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records must verify each of the targeted personnel's training experience.

The Developer/Piggery Manager/Foreman must ensure that adequate environmental training takes place. All employees must be made aware of:

- The importance of conformance with all environmental policies.
- The environmental impacts, actual or potential, of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures.
- The mitigation measures required to be implemented when carrying out their work activities.
- Environmental legal requirements and obligations.
- Details regarding floral and faunal SCC and protected species.
- Details regarding the identification and reporting of archaeological resources.
- The importance of not littering.
- The importance of using supplied ablution facilities.
- The need to use water sparingly.
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible.

## 7.2 MONITORING OF ENVIRONMENTAL TRAINING

The Developer/Piggery Manager/Foreman must monitor the performance of workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO (*if required*) should be called to the site to further explain aspects of environmental or social behaviour that are unclear.



## 8 CONCLUSIONS

---

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Berlin Beef Feedlot as detailed in the BAR and specialist reports. The EMPr could thus change daily, and if managed correctly lead to a successful construction and operational phases.

Further guidance should also be taken for any conditions contained in the Environmental Authorisation, if the project is granted approval, and that these DEDEAT conditions must be incorporated into the final EMPr.

All attempts should be made to have this EMPr available, as part of any tender documentation, so that the engineers and contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these.



## APPENDIX A

*Please insert a copy of the Environmental Authorisation here (if/when received).*





## APPENDIX B

*Please insert a copy of the Water Use Authorisation(s) here (if/when received).*



## APPENDIX C

### EXAMPLE OF AN ENVIRONMENTAL EDUCATION COURSE OUTLINE FOR ALL FARM WORKERS



[www.webweaver.nu/clipart/environmental.shtml](http://www.webweaver.nu/clipart/environmental.shtml)

#### Reasons why should we look after the environment

- We have a right to a clean environment
- A clean environment is essential to healthy living
- All our basic needs come from the environment
- A contract has been signed – development vs the environment
- Penalties / fines could be issued



## How to look after the environment

-  Report issues
-  Teamwork
-  Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
-  Conserve, reuse and recycle

## Tips and Guidelines

-  Workers and equipment should not be allowed outside demarcated areas
-  No swimming or polluting of water bodies allowed
-  No damage / disturbance to vegetation or water bodies without consent / permits
-  No disturbance allowed in no-go areas
-  No hunting of animals
-  Report all fires
-  No burning or burying of waste
-  No smoking near hazardous materials
-  Training on fire fighting equipment
-  Hazardous materials to be stored in designated and bunded areas
-  Spill kits and drip trays a must
-  Report all spills
-  Control dust and Noise
-  Maintain construction vehicles
-  Availability and maintenance of sanitation facilities



### Tips and Guidelines

- 🍃 Only eat in designated areas
- 🍃 Do not litter
- 🍃 Vehicles to remain on approved tracks and adhere to speed limit
- 🍃 Ensure emergency phone numbers are available
- 🍃 Ensure PPE is worn
- 🍃 Report fires, leaks and injuries
- 🍃 Ask if unsure





## APPENDIX D

### METHOD STATEMENT DESCRIPTION

Method Statements need to be compiled by the Developer for approval by the ECO. For the purposes of the environmental specification, a Method Statement is defined as a written submission by the Developer to the ECO setting out the plant, materials, labour and method the Developer proposes using to carry out an activity, in such detail that the ECO is enabled to assess whether the proposal is in accordance with the EMPr and/or will produce results in accordance with EMPr.

Method Statements can be used to cover applicable details with regards to:

- Construction procedures;
- Materials and equipment to be used;
- Getting the equipment to and from site;
- How the equipment/material will be moved while on site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that could occur;
- Timing and location of activities;
- Compliance/non-compliance with the specifications/conditions, and
- Any other information deemed necessary by the DWS regarding the development near a watercourse.

The Developer should abide by these approved Method Statements (if any), and any activity covered by a Method Statement must not commence until the appointed ECO has approved it. Any Method Statements, which are required, should be submitted to the ECO not less than twenty (20) days prior to the intended date of commencement of the activity, or as directed by the ECO.



**EXAMPLE OF A METHOD STATEMENT**

**CONTRACT:**..... **DATE:**.....

**PROPOSED ACTIVITY** (give title of method statement and reference number from the EMPr):

[Empty box for Proposed Activity]

**WHAT WORK IS TO BE UNDERTAKEN** (give a brief description of the works):

[Empty box for What Work is to be Undertaken]

**WHERE ARE THE WORKS TO BE UNDERTAKEN** (where possible, provide an annotated plan and a full description of the extent of the works):

**START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:**

Start Date:	End Date:

**HOW ARE THE WORKS TO BE UNDERTAKEN** (provide as much detail as possible, including annotated sketches and plans where possible):

[Empty box for How are the Works to be Undertaken]

*\* Note: please attach extra pages if more space is required*

**DECLARATIONS**

**1) ENVIRONMENTAL CONTROL OFFICER**

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

\_\_\_\_\_  
(Signed) (Print name)

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



**2) PERSON UNDERTAKING THE WORKS**

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

\_\_\_\_\_  
(Signed)

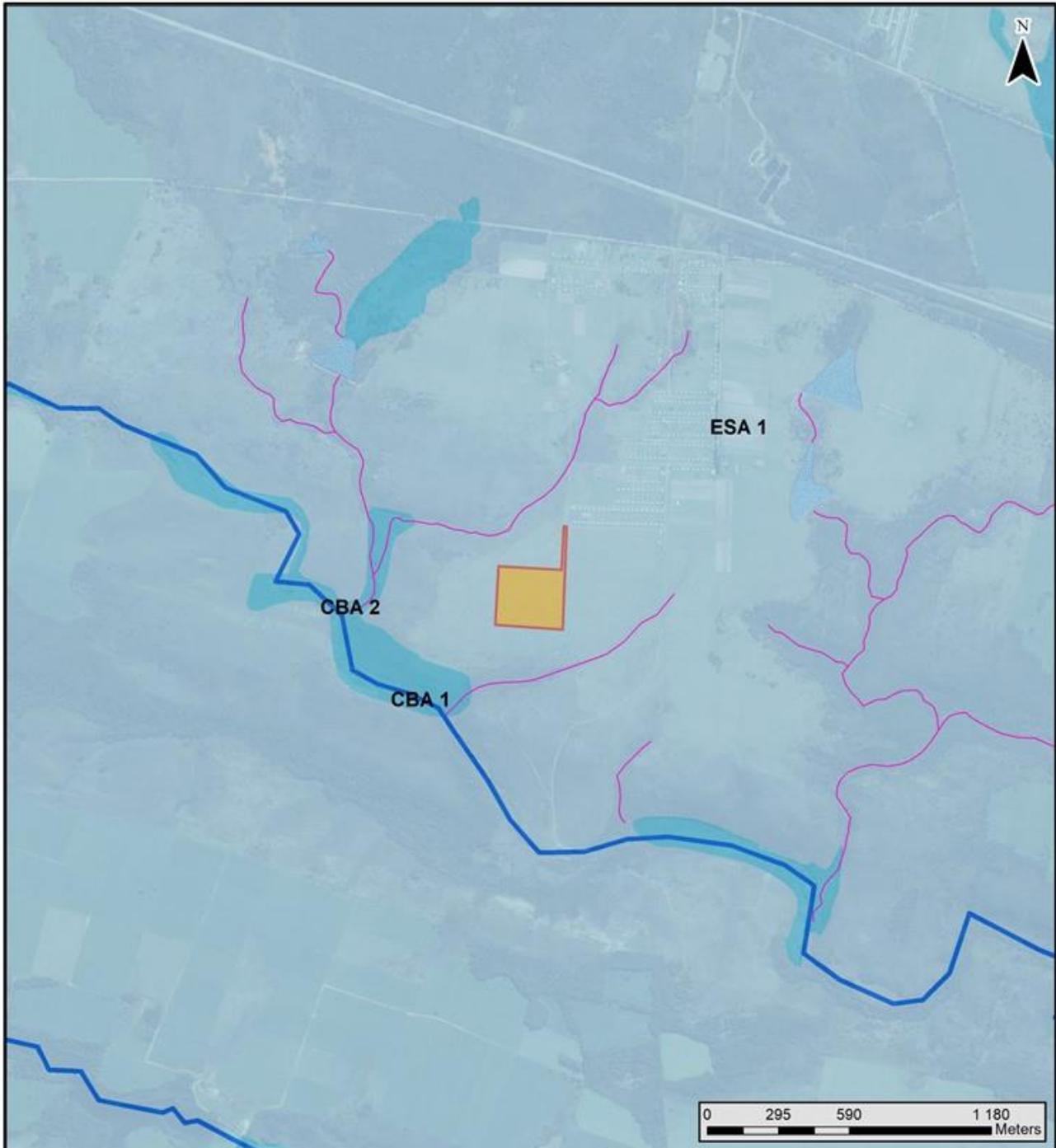
\_\_\_\_\_  
(Print name)

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



## APPENDIX E

### SENSITIVITY MAPS

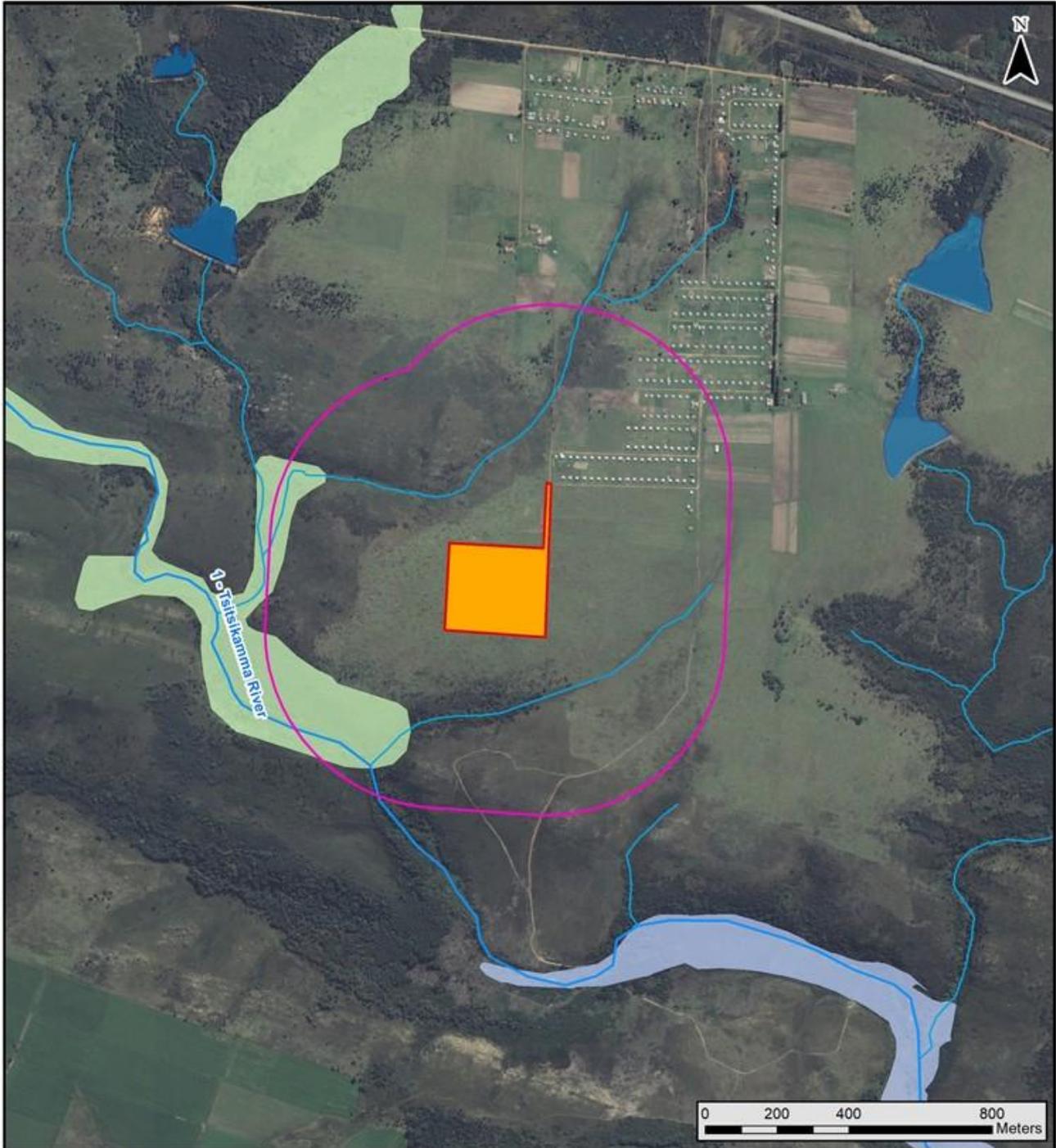


<p><b>PREPARED BY:</b></p>	<p><b>LEGEND</b></p>	<p><b>MAP TITLE:</b></p>
<p>Coastal and Environmental Services  </p>	<p> TCWF Project Boundary   Drainage Lines  <b>Dams/Reservoirs</b>   Dam</p> <p><b>ECBCP_FRESHWATER Critical Biodiversity Areas</b>   CBA 1   CBA 2   ESA 1</p>	<p>ECBCP (2020)                  AQUATIC CBA &amp; ESA  <b>PROJECT NAME:</b>                  TWFT PIGGERY PROJECT</p>
<p><b>PREPARED FOR:</b></p>		<p>Drawn By: Justin Green                  Date: November 2020                  Project Code: 601</p>
<p>Tsitsikamma Wind Farm Trust  </p>		<p>Coordinate System: WGS 1984 UTM Zone 35S                  Projection: Transverse Mercator                  Datum: WGS 1984                  False Easting: 500 000.0000                  False Northing: 10 000 000.0000                  Central Meridian: 27.0000                  Scale Factor: 0.9996                  Latitude Of Origin: 0.0000                  Units: Meter                  Scale: 1:15 000</p>

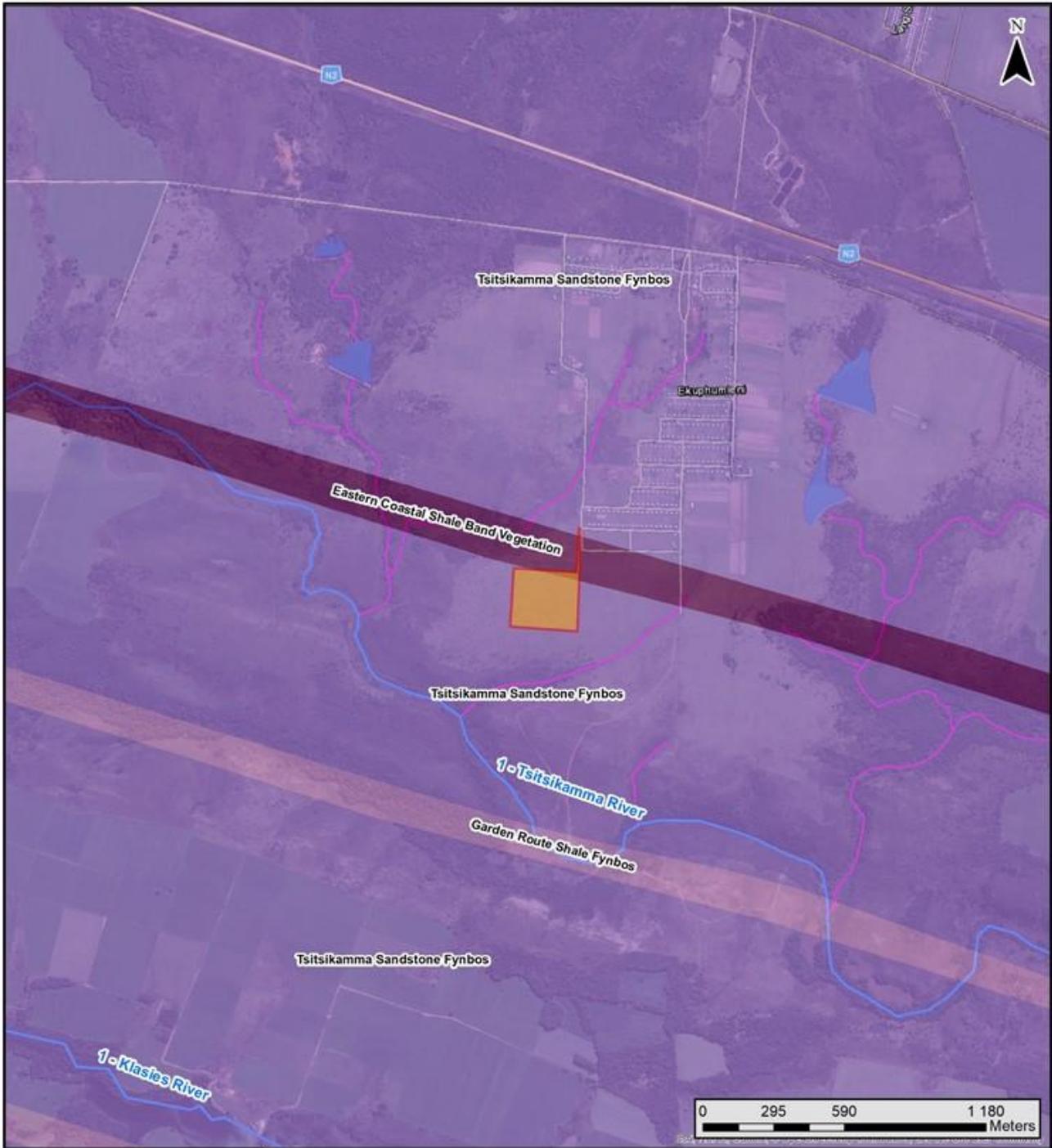
Image source: NGI 50cm Aerial



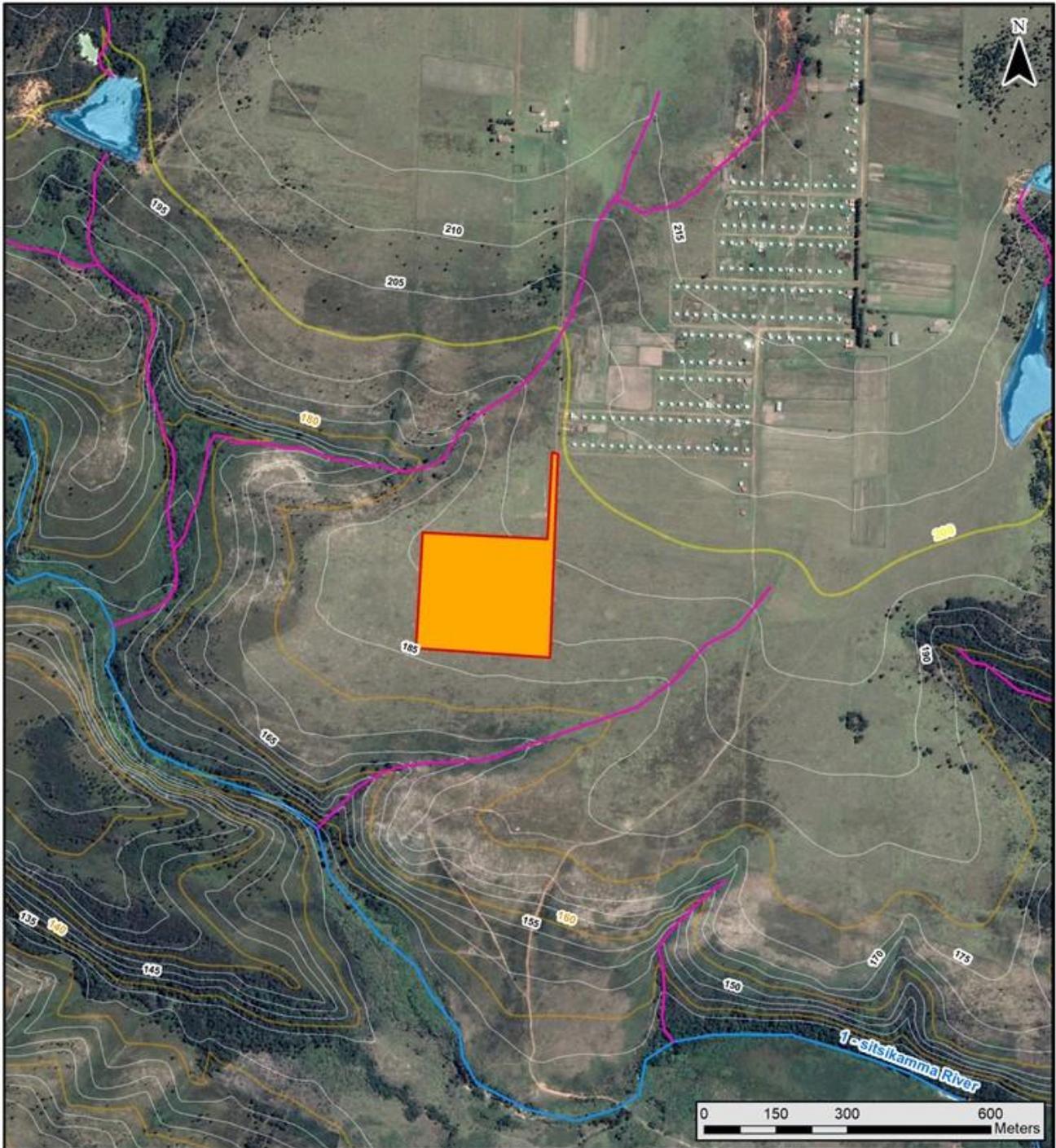
<p><b>PREPARED BY:</b></p>	<p><b>LEGEND</b></p>	<p><b>MAP TITLE:</b> ECBCP (2020) TERRESTRIAL CBA &amp; ESA</p>
<p>Coastal and Environmental Services <b>30 YEARS OF CES</b> ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES</p>	<p><b>ECBCP_TERRESTRIAL</b></p> <p><b>Rivers DWA</b></p> <ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Rivers</li> <li><span style="color: pink;">—</span> Drainage Lines</li> </ul> <p><b>Dams/Reservoirs</b></p> <ul style="list-style-type: none"> <li><span style="color: lightblue;">■</span> Dam</li> </ul>	<p><b>PROJECT NAME:</b> TWFT PIGGERY PROJECT</p> <p>Drawn By: Justin Green Date: November 2020 Project Code: 601</p>
<p><b>PREPARED FOR:</b></p>	<p><b>Critical Biodiversity Areas</b></p> <ul style="list-style-type: none"> <li><span style="color: green;">■</span> CBA 1</li> <li><span style="color: lightgreen;">■</span> CBA 2</li> <li><span style="color: yellow;">■</span> ESA 1</li> <li><span style="color: lightyellow;">■</span> ESA 2</li> <li><span style="color: grey;">■</span> Other</li> </ul>	<p>Coordinate System: WGS 1984 UTM Zone 35S Projection: Transverse Mercator Datum: WGS 1984 False Easting: 500 000.0000 False Northing: 10 000 000.0000 Central Meridian: 27.0000 Scale Factor: 0.9996 Latitude Of Origin: 0.0000 Units: Meter Scale: 1:15 000</p>
<p><b>Tsitsikamma Wind Farm Trust</b></p> 	<p>Image source: NGI 50cm Aerial</p>	



<p><b>PREPARED BY:</b></p>	<p><b>LEGEND</b></p>		<p><b>MAP TITLE:</b></p>
<p>Coastal and Environmental Services</p>  <p>ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES</p>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> TFWT Project Boundary</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 2px solid pink; margin-right: 5px;"></span> TFWT Project Boundary 500m Buffer</li> <li><b>Rivers DWA Set</b></li> <li><span style="display: inline-block; width: 15px; border-bottom: 2px solid blue; margin-right: 5px;"></span> Rivers</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid blue; margin-right: 5px;"></span> Drainage Lines</li> </ul>	<p>NBA2018 National Wetland Map5 NWM52_L4A</p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid black; margin-right: 5px;"></span> Channelled valley-bottom wetland</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; border: 1px solid black; margin-right: 5px;"></span> River (Riverine Wetland)**</li> <li><b>Dams/Reservoirs</b></li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; border: 1px solid black; margin-right: 5px;"></span> Dam</li> </ul>	<p>NBA (2018) SAIIAE Wetland Map 5</p>
<p><b>PREPARED FOR:</b></p>			<p><b>PROJECT NAME:</b></p>
<p>Tsitsikamma Wind Farm Trust</p> 	<p>Image source: South Africa 50cm Colour</p>		<p><b>TWFT PIGGERY PROJECT</b></p> <p>Drawn By: Justin Green Date: November 2020 Project Code: 601</p> <p>Coordinate System: WGS 1984 UTM Zone 35S Projection: Transverse Mercator Datum: WGS 1984 False Easting: 500 000.0000 False Northing: 10 000 000.0000 Central Meridian: 27.0000 Scale Factor: 0.9996 Latitude Of Origin: 0.0000 Units: Meter Scale: 1:10 000</p>



<p><b>PREPARED BY:</b></p>	<p><b>LEGEND</b></p>	<p><b>MAP TITLE:</b></p>
<p>Coastal and Environmental Services</p>  <p>ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES</p>	<p> TCWF Project Boundary</p> <p><b>National Vegetation Map 2018</b></p> <p><b>Terrestrial</b></p> <ul style="list-style-type: none"> <li> FFb 6 Eastern Coastal Shale Band Vegetation</li> <li> FFh 9 Garden Route Shale Fynbos</li> <li> FFs 20 Tsitsikamma Sandstone Fynbos</li> </ul>	<p><b>NBA (2018)</b> Nation Vegetation Map</p> <p><b>PROJECT NAME:</b> TWFT PIGGERY PROJECT</p>
<p><b>PREPARED FOR:</b></p>	<p><b>Rivers DWA</b></p> <ul style="list-style-type: none"> <li> Rivers</li> <li> Drainage Lines</li> </ul>	<p>Drawn By: Justin Green Date: November 2020 Project Code: 601</p>
<p>Tsitsikamma Wind Farm Trust</p> 	<p><b>Dams/Reservoirs</b></p> <ul style="list-style-type: none"> <li> Dam</li> </ul> <p>Image source: GoogleEarth (TM) 2019-01</p>	<p>Coordinate System: WGS 1984 UTM Zone 35S Projection: Transverse Mercator Datum: WGS 1984 False Easting: 500 000.0000 False Northing: 10 000 000.0000 Central Meridian: 27.0000 Scale Factor: 0.9996 Latitude Of Origin: 0.0000 Units: Meter Scale: 1:15 000</p>



<p><b>PREPARED BY:</b></p>	<p><b>LEGEND</b></p>	<p><b>MAP TITLE:</b></p>
<p>Coastal and Environmental Services</p> 	<p> TCWF Project Boundary</p> <p> Drainage</p> <p><b>Contour class</b></p> <p> 100 m</p> <p> 20 m</p> <p> 5 m</p>	<p><b>PROJECT NAME:</b></p> <p><b>TWFT PIGGERY PROJECT</b></p>
<p><b>PREPARED FOR:</b></p>	<p><b>Rivers DWA Set</b></p> <p> Rivers</p>	<p>Drawn By: Justin Green Date: November 2020 Project Code: 601</p>
<p>Tsitsikamma Wind Farm Trust</p> 	<p><b>Dams/Reservoirs</b></p> <p> Dam</p>	<p>Coordinate System: WGS 1984 UTM Zone 35S Projection: Transverse Mercator Datum: WGS 1984 False Easting: 500 000.0000 False Northing: 10 000 000.0000 Central Meridian: 27.0000 Scale Factor: 0.9996 Latitude Of Origin: 0.0000 Units: Meter Scale: 1:7 500</p>

Image source: GoogleEarth (TM) 2019-01



**APPENDIX F**

**CURRICULUM VITAE**



## CONTACT DETAILS

<b>Name of Company</b>	<b>CES – Environmental and Social Advisory Services</b>
<b>Designation</b>	Cape Town Branch
<b>Profession</b>	Senior Environmental Consultant; GIS Specialist; and Aquatic Specialist
<b>Years with firm</b>	8 Years
<b>E-mail</b>	<a href="mailto:J.Green@cesnet.co.za">J.Green@cesnet.co.za</a> / <a href="mailto:Justin.Green@eoh.co.za">Justin.Green@eoh.co.za</a>
<b>Office number</b>	+27 (0)46 622 2364
<b>Nationality</b>	South African
<b>Professional Body</b>	<ul style="list-style-type: none"> <li>➤ SACNASP, South African Council for Natural Scientific Profession, Professional (Pending)</li> <li>➤ African Journal of Aquatic Science</li> <li>➤ IAIASa: Member of the International Association for Impact Assessments South Africa</li> </ul>
<b>Key areas of expertise</b>	<ul style="list-style-type: none"> <li>➤ Geographic Information Systems (GIS)</li> <li>➤ Wetland Assessment</li> <li>➤ Surface Water &amp; Aquatic Assessment</li> </ul>

## PROFILE

### Mr Justin Green

Justin is employed as a Senior Environmental Consultant at Coastal & Environmental Services (CES), having spent the past 8 years working on Basic Assessments, EIA's, Monitoring Programme's, RAPs, Specialist Assessments and international fieldwork. I have worked on projects in the DRC, Lesotho, Mozambique, Zambia, Cameroon, Tanzania, Malawi, Swaziland, Madagascar and extensively throughout South Africa. Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements.

He is currently the lead GIS specialist for CES, responsible for digitizing and processing vector and raster data for BAR's, EIA's and ESHIA's both locally and internationally. I have formed part of the GIS department for the past 7 years with my primary experience working with ArcGIS software and ArcEditor for developing GIS databases, data creation and snapping tolerances. Typical GIS projects include watershed analysis, viewshed analysis, infrastructure layouts, RAP data implementation, Sentinel-2 processing and specialist field data extraction. Projects have been completed for numerous international projects all up to African Bank, IFC and World Bank standards.

He has experience in training field teams and specialists in the use of OruxMaps and ODK collect as the primary tool for data collection. I am experienced in fieldworker training and team management resulting in the collection of field data, which can then be incorporated into GIS databases. Tablet based questionnaires are also used by these field teams to conduct surveys to collect information on project affected persons that are capable of linking to the spatial data collect. All survey data can then efficiently and accurately be captured in a Microsoft Access database for evaluation.



He is also specialized in Water Resources Management and Aquatic Biomonitoring and Assessment using the South African Scoring System (SASS5) methodology and am an accredited SASS5 practitioner. His experience in this field has included numerous large-scale mining, industrial, wastewater and agricultural EIA's that have required the construction of dams, pipelines and reservoirs. Many of these projects have also required the application for WULA's to be assessed.

<b>EMPLOYMENT EXPERIENCE</b>	<p><b>Coastal &amp; Environmental Services, Grahamstown, South Africa</b> Senior Environmental Consultant <i>January 2020 – Present</i></p> <ul style="list-style-type: none"> <li>➤ Senior Consultant</li> <li>➤ GIS Specialist</li> <li>➤ Surface Water &amp; Aquatic Specialist</li> <li>➤ Wetland Specialist</li> </ul> <p><b>Coastal &amp; Environmental Services, Grahamstown, South Africa</b> Environmental Consultant <i>April 2012 – December 2019</i></p> <ul style="list-style-type: none"> <li>➤ Consultant</li> <li>➤ GIS Specialist</li> <li>➤ Surface Water &amp; Aquatic Specialist</li> <li>➤ Wetland Specialist</li> </ul>
<b>ACADEMIC QUALIFICATIONS</b>	<ul style="list-style-type: none"> <li>➤ Bachelor of Science: Zoology and Entomology, Rhodes University, Grahamstown, 2006 - 2010</li> <li>➤ Post-Graduate Diploma in Enterprise Management Rhodes University, Grahamstown, 2011</li> </ul>
<b>COURSES</b>	<ul style="list-style-type: none"> <li>➤ Rhodes University and CES - <b>EIA Short Course</b>. 2012.</li> <li>➤ IMBEWU - <b>Contaminated Land Workshop</b>. 2013.</li> <li>➤ GroundTruth - <b>SASS5 Aquatic Biomonitoring Training Course</b>. 2015.</li> <li>➤ Rhodes University - <b>Tools for Wetland Assessment</b>. 2017.</li> <li>➤ ESRI - <b>Do-It-Yourself Geo Apps</b> – 2020</li> <li>➤ ESRI - <b>Going Places with Spatial Analysis</b> - 2020</li> </ul>
<b>CONSULTING EXPERIENCE</b>	
<b>WETLANDS, SURFACE WATER &amp; AQUATIC ASSESSMENTS</b>  SOUTH AFRICA & INTERNATIONAL	<ul style="list-style-type: none"> <li>➤ Triton Nicanda Hills Graphite Mine, Mozambique (2014)</li> <li>➤ Sasol Nhangonzo Mozambique Biodiversity Assessment (2015)</li> <li>➤ Alphamin Resources Mining ESIA, DRC (2015)</li> <li>➤ GK Ancuabe Graphite Mine S.A. , Mozambique (2016)</li> <li>➤ Murrimo Macadamias, Potatoes and Grains Project, Mozambique (2016)</li> <li>➤ Kenmare Pivivili Mine, Mozambique (2017)</li> <li>➤ Kenmare Road upgrade, Mozambique (2018)</li> <li>➤ Triton Ancuabe Graphite Mine, Mozambique (2017)</li> <li>➤ Triton Ancuabe Graphite Mine Monitoring, Mozambique (2018)</li> <li>➤ JCM Cameroon Solar PV, Cameroon (2017)</li> <li>➤ Suni Balama Graphite Mine, Mozambique (2018)</li> <li>➤ CGA Siyahluma Citrus Farm, South Africa (2019)</li> <li>➤ CGA Nomzamo Citrus Farm, South Africa (2019)</li> <li>➤ Transnet Telecomms towers (x4), South Africa (2020)</li> </ul>
<b>ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT</b>	<ul style="list-style-type: none"> <li>➤ Environmental Impact Statement: Sentinel Deposit, North Western Province, Zambia (2012)</li> <li>➤ Mooi-Mgeni Transfer Scheme – Phase 2, Kwazulu-Natal Province, South Africa (2013)</li> </ul>



<p><b>(ESIA)</b></p> <p>INTERNATIONAL</p>	<ul style="list-style-type: none"> <li>➤ Syrah Balama Graphite Project: Pre-feasibility and Environmental Scoping Report, Mozambique (2013)</li> <li>➤ Kamiesberg Project, Namakwaland, South Africa (2013)</li> <li>➤ Belmont Valley Golf Course and Makana Residential Estate (EIA) (2013)</li> <li>➤ Environmental and Social Impact Assessment Ranobe Mine Project, Southwest Region, Madagascar (2013)</li> <li>➤ RHDHV – Biofuel ESIA Disclosure, Sofala Province, Mozambique (2014)</li> <li>➤ London Mining Marampa Iron Ore Sierra Leone (2014)</li> <li>➤ Proposed Upgrade of the Maroua Oil Mill in the Republic of Cameroon (2014)</li> <li>➤ Proposed Upgrade of the Garoua Oil Mill in the Republic of Cameroon (2014)</li> <li>➤ Green Resources Medium Density Fibreboard Production, Niassa Province, Mozambique (2014)</li> <li>➤ Eastern Cape Biofuels Production (SEA) (2016)</li> <li>➤</li> </ul>
<p><b>MINING PROJECTS</b></p> <p>INTERNATIONAL</p>	<ul style="list-style-type: none"> <li>➤ Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar (2014)</li> <li>➤ Syrah Resources, Cabo del Gado, Mozambique (2014)</li> <li>➤ Baobab Mining, Tete, Mozambique (2014)</li> <li>➤ Triton Minerals Nicanda Hill Graphite Mine, Cabo del Gado, Mozambique (2014)</li> <li>➤ Alphamin Resources TIN Mine ESIA, DRC (2016)</li> <li>➤ Kenmare Pilivili Heavy Minerals Mine ESIA, Moma, Mozambique (2017)</li> <li>➤ Metals of Africa Graphite Mine, Ancuabe, Mozambique (2017)</li> <li>➤ Triton Minerals Ancuabe Graphite Mine, Cabo del Gado, Mozambique (2017)</li> </ul>
<p><b>RESSETLEMENT ACTION PLANS (RAP)</b></p>	<ul style="list-style-type: none"> <li>➤ Murrimo Macadamias, Potatoes and Grains Project, Mozambique (2015)</li> <li>➤ Kenmare Moma Mine, Moma, Mozambique (2017)</li> <li>➤ Kenmare Pilivili Mine, Moma, Mozambique (2019)</li> <li>➤ Total East Africa Midstream B.V - East African Crude Oil Pipeline (EACOP), Tanzania (2018-2019)</li> <li>➤ Millennium Challenge Account (MCA) RAP Audit, Malawi, (2019)</li> <li>➤ EEC Transmission RAP, Swaziland (2020)</li> </ul>
<p><b>WIND ENERGY PROJECTS (EIA)</b></p> <p>SOUTH AFRICA</p>	<ul style="list-style-type: none"> <li>➤ MakanaOne Wind Energy Project (2012)</li> <li>➤ Middleton Wind Energy (2012)</li> <li>➤ Mossel Bay Wind Energy Project (2012)</li> <li>➤ Plan 8 Wind Energy Project (2012)</li> <li>➤ Grassridge Wind Energy Project (Coega) (2013)</li> <li>➤ St Lucia Wind Energy Project (2013)</li> <li>➤ Cookhouse Wind Energy Project (2013)</li> <li>➤ Dassiesridge Wind Energy (2014)</li> <li>➤ Inyanda-Roodeplaar Farm Wind Energy (2015)</li> </ul>
<p><b>SOLAR ENERGY PROJECTS (EIA)</b></p> <p>SOUTH AFRICA</p>	<ul style="list-style-type: none"> <li>➤ MakanaOne Brack Kloof Photovoltaic Solar Energy Project, RSA (2012)</li> <li>➤ MakanaOne Hilton Photovoltaic Solar Energy Project, RSA (2012)</li> <li>➤ MakanaOne Table Hill Photovoltaic Solar Energy Project, RSA (2012)</li> <li>➤ MakanaOne Watt Hill Photovoltaic Solar Energy Project, RSA (2012)</li> <li>➤ JCM Solar PV Project, Cameroon (2017)</li> </ul>
<p><b>BASIC ASSESSMENT (BAR)</b></p> <p><b>SECTION 24G RECTIFICATIONS REPORTS</b></p>	<ul style="list-style-type: none"> <li>➤ Resort Development on Portion 17 of Farm Gorah 398 (2012)</li> <li>➤ Walmer 17th Avenue 132KV Powerline (2012)</li> <li>➤ SANRAL Grahamstown to Fish River Road Upgrade (2013)</li> <li>➤ Rehabilitation of R61 Section 2 Elinus Farm (Km42.2) To N10 (Km85), Cradock, Eastern Cape) (2013)</li> <li>➤ Rehabilitation of N10 Section 3 between Riet River Bridge (km 45.2) and Tarka Bridge (km 68.5), Cradock, Eastern Cape (2013)</li> </ul>



SOUTH AFRICA	<ul style="list-style-type: none"> <li>➤ Uhambiso Glenhurd Road Upgrade &amp; Baakens River Bridge (2015)</li> <li>➤ Innowind Ukomeleza &amp; Olifantskop Substations and Overhead Powerlines (2015)</li> <li>➤ Grahamstown Fairewood Estate Development (2015)</li> <li>➤ Zirco Kenhardt Prospecting Application (2015)</li> <li>➤ Justin Le Roux S24G, RSA (2018)</li> <li>➤ Ramotshere Berg Housing, RSA (2020)</li> <li>➤ Ramotshere kort Housing, RSA (2020)</li> <li>➤ Adcock Housing Development S24G, RSA (2020)</li> <li>➤ Oudtshoorn Cemetery S24G, RSA (2020)</li> <li>➤ TCWF Piggery BAR, RSA (2020)</li> </ul>
<b>MONITORING PROGRAMMES</b>	<ul style="list-style-type: none"> <li>➤ Innowind Waainek Wind Farm (2017) – 12 Month Bat Monitoring</li> <li>➤ Triton Ancuabe Graphite Mine (2019) – 12 Month Water Monitoring</li> <li>➤ Kenmare Pilivili (2020) – Mangrove Monitoring</li> <li>➤ ELIDZ (2020) – Water Monitoring Plan</li> </ul>
<b>ADDITIONAL EXPERIENCE</b>	<p><b>Faunal Assessments</b></p> <ul style="list-style-type: none"> <li>➤ Lesotho Highlands Water Project ESIA, Lesotho (2014) <ul style="list-style-type: none"> <li>➤ Mammal component for Faunal specialist study (trapping and identification), assistant to Faunal specialist.</li> </ul> </li> </ul> <p><b>Ecological Assessments</b></p> <ul style="list-style-type: none"> <li>➤ Borrow Pit in Libode, Eastern Cape Province (2014)</li> <li>➤ LHDA Botanical Survey and Impact Assessment, Lesotho (2014)</li> <li>➤ Kenmare Terrestrial Monitoring Program, Specialist Survey, MOMA, Mozambique (2014 &amp; 2016)</li> <li>➤ Doorndraai Citrus Ecological Assessment, Bedford, South Africa (2017)</li> </ul> <p><b>Due Diligence</b></p> <ul style="list-style-type: none"> <li>➤ Coega Brick Due Diligence (2012)</li> <li>➤ MCA Malawi Millenium RAP Audit Review (2019)</li> </ul> <p><b>Environmental Auditing</b></p> <ul style="list-style-type: none"> <li>➤ Strowan Mine Environmental Auditing (2013)</li> <li>➤ Grahamstown Municipal Dump Auditing (2017)</li> <li>➤ Lalibela Lentaba Lodge Construction auditing (2017)</li> <li>➤ Construction Audit: Biotherm Energy Access Road and Power Line, South Africa (2019)</li> <li>➤ Construction Audit: Biotherm Energy Golden Valley-Kopleegte 132kV Power Line, South Africa (2019)</li> <li>➤ Construction Audit: Amstilite Golden Valley Wind Energy Facility, South Africa (2019)</li> </ul> <p><b>Policy and Guidelines</b></p> <ul style="list-style-type: none"> <li>➤ Water use licence applications for various river crossings for Rehabilitation of R61 Section 2 Elinus Farm (Km42.2) To N10 (Km85), Cradock, Eastern Cape (BAR) (2013)</li> </ul> <p><b>Mining applications</b></p> <ul style="list-style-type: none"> <li>➤ Mining Application for Hard Rock Quarry and borrow pits for N10-3 road upgrade (2013)</li> <li>➤ Mining Application for Hard Rock Quarry and borrow pits for R61-2 road upgrade (2013)</li> <li>➤ Mining Application for Hard Rock Quarries and borrow pits for N2 road upgrade (2013)</li> </ul>



Languages	Speak	Read	Write
English	Excellent	Excellent	Excellent
Afrikaans	Satisfactory	Satisfactory	Satisfactory

**CERTIFICATION**

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

A handwritten signature in black ink, appearing to read 'Justin Green', written in a cursive style.

**JUSTIN GREEN**

Date: November 2020



## CONTACT DETAILS

<b>Name of Company</b>	<b>CES</b>
<b>Designation</b>	Grahamstown Branch
<b>Profession</b>	Principal Environmental Consultant
<b>Years with firm</b>	3 Years
<b>E-mail</b>	<a href="mailto:g.shaw@csetnet.co.za">g.shaw@csetnet.co.za</a>
<b>Office number</b>	+27 (0)46 622 2364
<b>Nationality</b>	South African
<b>Professional Body</b>	SACNASP, South African Council for Natural Scientific Profession, Professional (Pending)
<b>Key areas of expertise</b>	<ul style="list-style-type: none"><li>➤ Marine Ecology</li><li>➤ Environmental and Social Impact Assessment (ESIA)</li><li>➤ Environmental Management and Monitoring</li><li>➤ Project Management</li></ul>

## PROFILE

### Mr Gregory Shaw

Greg is a principal environmental consultant with more than 10 years' experience, who has carried out ESIA's for a variety of infrastructure developments in Africa and Europe. His experience is with development projects where there is creation or modification of infrastructure, via capital works and complex logistics.

He is able to engage with the full portfolio of diverse stakeholder groups and regulators via meetings, written material, face-to-face workshops, presentation events, negotiation and discussion to achieve mutually agreeable mitigation measures and solutions. As part of many of the ESIA's he has been involved in or managed he has been responsible for the development and execution of environmental surveys (and subsequent monitoring programmes), sub-contractor management (including contracting), report writing and project management. In addition, he has been responsible for developing and auditing plans associated with managing large infrastructure projects e.g. Environmental Management Plans (EMP).

Greg forms strong relationships and ensure that the team works together in an integrated way towards the clear common goal, making effective use of time and resources.



## EMPLOYMENT EXPERIENCE

November 2016 - Present:  
Principal Consultant (EOH Coastal & Environmental Services)  
Grahamstown, South Africa

January 2008 – October 2016:  
Senior Consultant (Royal HaskoningDHV)  
Peterborough, United Kingdom

January 2004 – January 2007:  
Part-time consultant (Public Process Consultants)  
Port Elizabeth, South Africa

## ACADEMIC QUALIFICATIONS

**Nelson Mandela Metropolitan University, Port Elizabeth**  
MSc (Botany)  
2005 – 2007

**Nelson Mandela Metropolitan University, Port Elizabeth**  
BSc (Hons) (Environmental Management)  
2004

**University of Port Elizabeth, Port Elizabeth**  
BSc (Natural Sciences)  
2000 - 2003

## COURSES

- 2013 Royal HaskoningDHV Accelerated Development Programme
- 2012 First Aid
- 2012 Handling Conflict
- 2011 Client Relationships
- 2011 Financial Management
- 2010 Report Writing
- 2010 Project Management
- 2010 Effective Communication
- 2010 Knowing Your Business
- 2010 Phase I Ecological Surveying Techniques and Taxonomy
- 2009 CIWEM Structured Training
- 2009 Project Management
- 2008 Sustainable Construction
- 2006 South African Association of Botanists - Annual Seminar
- 2005 Resource Directed Measures
- 2005 Training in Integrated Environmental Management
- 2005 Integrated Water Resource Management Workshop

## CONSULTING EXPERIENCE

Environmental consulting experience as project manager or team member is broad and covers a number of key industry sectors (ports, nuclear, renewable energy). The majority of the international ESIA's were conducted in accordance with international standards including the IFC Performance Standards and have been reviewed by international Development Finance Institutions.

### South Africa

- Nirove Paint Stripping Facility [Project manager]
- Wison Coal to Urea EIA [Project manager]



- St Francis Bay EIA [Project Manager, Marine specialist]
- EOH Powerstation Feasibility Assessment [Project manager]
- Richard's Bay breakwater refurbishment [Marine specialist]
- KBK Engineers (Sanral) Basic Assessment [Project manager]
- Bayview Wind Energy Facility [Project director]
- Rushmere Noach Attorneys [Project manager and marine specialist]
- TNPA East London Quay 3 Assessment [Environmental specialist]
- TNPA Ballast Water Management Plan [Environmental specialist]
- Fairwood Estate Environmental Authorisation [ESMP author]
- Environmental Scoping Report cc. Erf 2387, Port Elizabeth. Baobab Agencies. [Environmental specialist].
- Proposed Hybrid Residential Development Scoping Report, Port Elizabeth. [Environmental specialist].
- Ingleside Development, Port Elizabeth. [Specialist Review].
- Port of Ngqura Marine Biomonitoring Programme. Coega Development Corporation. [Surveyor / research assistant].
- Construction and Operation of the Deepwater Port of Ngqura EIA. Coega Development Corporation. [Specialist review].

#### Africa

- Kenmare Mangrove Baseline Assessment (Mozambique) [Lead surveyor]
- Sphinx Energy Solar PV Facilities in Guider & Maroua (Cameroon) [Project manager]
- Olam Cocoa Plantation ESIA (Tanzania) [Project manager, ESIA manager]
- MCA-Malawi RAP Audit [Project Manager, Lead Auditor]
- JCM Power ESMS [Project manager]
- JCM Power Solar Power Station ESIA [Project Manager, Report Author]
- Suni Resources Traffic Impact Assessment [Report author]
- NCCL Isanye Dam EPB (Zambia) [Project manager]
- NCCL Ngoli Dam EPB (Zambia) [Project manager]
- NCCL Kasama Dam ESIA (Zambia) [ESIA manager]
- JCM Power Solar PV ESIA (Cameroon) [ESIA manager]
- Tete Iron Ore Project ESIA (Mozambique) [ESMP]
- Triton Ancuabe ESIA (Mozambique) [Specialist coordination, ESMP]
- Badagry Greenfield Port Development ESIA including management plans (Nigeria) [ESIA and marine specialist]
- Saly Coastal Protection Project ESIA (Senegal) [Marine specialist]
- Port Mole Waterfront Development ESIA including management plans (Gabon) [ESIA manager and marine specialist]
- Bulk Handling Facility ESIA including management plans (Conakry Guinea) [ESIA manager and marine specialist]
- Kamsar Container Terminal ESIA including management plans (Conakry Guinea) [ESIA manager and marine specialist]
- Port of Ziguinchor ESIA including management plans (Senegal) [Marine specialist / Reviewer]
- Eko Atlantic Shoreline Protection ESIA including management plans (Nigeria) [Marine specialist]
- Eko Atlantic Topside Infrastructure ESIA (Nigeria) [ESIA manager]
- Construction of a Jetty Facilitating Transfer of Petroleum Products from Ship to Shore (Eritrea) [Environmental Clerk of Works]

#### United Kingdom

- Thamesport Phase IV Quay Extension EIA [Reviewer]
- East Lane, Bawdsey Coast Defence Works [Environmental Clerk of Works]



- Kilkeel Offshore Wind Farm Feasibility and Scoping Report [Project manager]
- Wells Channel Deepening and Jetty Construction EIA [EIA and marine specialist]
- Wells Channel Deepening and Jetty Construction Environmental Monitoring Programme (2010-2016) [Project manager and marine specialist]
- Trinity III Enhancement Monitoring Programme (2008 – 2011) ([Marine specialist]
- Trimley Ecological Monitoring Programme (2008 – 2011) [ Marine specialist]
- SEAs for the Eastern England Shoreline, required for Shoreline Management Plans [Marine specialist]
- River Habitat Survey, Tributary of Car Dyke [Field work and report writing]
- Hinkley Point C Environmental Impact Assessment [EIA coordinator and marine specialist]
- Harwich Haven Annual Environmental Reporting (2009 – 2011) [Project manager and marine specialist]
- Environmental Monitoring and Mitigation Plan / Habitat Regulations Assessment East Lane [Project manager and marine specialist]
- Thanet Offshore Wind Farm [Environment Manager]
- The Wash Tide Gauge [Consent advisor and marine specialist]
- Dogger Bank Creyke Beck A&B, Teesside A&B EIA [Marine specialist]
- Kentish Flats Offshore Wind Farm Extension [Consent advisor / environment manager]
- Royal National Lifeboat Institute (RNLI) Feasibility [Project manager and marine specialist]
- Bacton Gas Terminal Coast Protection Works and Offshore Borrow Area EIA [Consent and marine specialist]
- Newhaven East Quay and Port Expansion Area EIA [Marine specialist]
- Sizewell C New Nuclear Build Habitats Regulations Assessment [Project manager]
- DNV Subsea Cable Installation Guidelines [Marine and Consenting expert]
- 

## CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

**GREGORY SHAW**

Date: November 2020