

**APPENDIX G:  
ENVIRONMENTAL MANAGEMENT  
PROGRAMME**

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# WILMAR VEGETABLE OIL PIPELINE KWAZULU-NATAL PROVINCE

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## ENVIRONMENTAL MANAGEMENT PROGRAMME

August 2019

**Prepared for:**

Wilmar Processing (Pty) Ltd  
Woodmead Office Park  
Cnr van Reenans Avenue & Woodmead Drive  
Sandton  
2191

**Prepared by:**

**Savannah Environmental (Pty) Ltd**

First Floor, Block 2, 5 Woodlands Drive Office Park  
Woodmead  
Johannesburg, 2191  
Tel: +27 (0)11 656 3237  
Fax: +27 (0)86 684 0547  
E-mail: [info@savannahsa.com](mailto:info@savannahsa.com)  
[www.savannahsa.com](http://www.savannahsa.com)

savannah  
environmental

## PROJECT DETAILS

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<b><u>KZN EDTEA Ref</u></b>	:	<u>DC2800102019</u>
<b>Title</b>	:	Environmental Management Programme: Wilmar Vegetable Oil Pipeline, KwaZulu-Natal Province
<b>Authors</b>	:	Savannah Environmental (Pty) Ltd Reuben Maroga Gideon Raath Jo-Anne Thomas
<b>Client</b>	:	Wilmar Processing (Pty) Ltd
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## DEFINITIONS AND TERMINOLOGY

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**Alien species:** A species that is not indigenous to the area or out of its natural distribution range.

**Alternatives:** Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process, or technology alternatives, temporal alternatives or the 'do nothing' alternative.

**Assessment:** The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

**Biological diversity:** The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

**Commence:** The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

**Construction:** Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

**Cumulative impacts:** Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

**Decommissioning:** To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

**Direct impacts:** Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

**'Do nothing' alternative:** The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

**Environment:** the surroundings within which humans exist and that are made up of:

- (i) The land, water and atmosphere of the earth;
- (ii) Micro-organisms, plant and animal life;
- (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and

(iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental assessment practitioner:** An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

**Environmental Impact:** An action or series of actions that have an effect on the environment.

**Environmental impact assessment:** Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

**Environmental management:** Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

**Environmental management programme:** A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

**Habitat:** The place in which a species or ecological community occurs naturally.

**Hazardous waste:** Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

**Incident:** Section 30 of NEMA defines an 'incident' as "an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed."

**Indigenous:** All biological organisms that occurred naturally within the study area prior to 1800.

**Indirect impacts:** Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

**Interested and affected party:** Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

**Pollution:** A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

**Pre-construction:** The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

**Rare species:** Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

**Red data species:** Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**Significant impact:** An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Waste:** Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister.

## ABBREVIATIONS AND ACRONYMS

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DEA	National Department of Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Office
GG	Government Gazette
GN	Government Notice
Ha	Hectare
I&AP	Interested and Affected Party
IDZ	Industrial Development Zone
km <sup>2</sup>	Square kilometres
m <sup>2</sup>	Square meters
<u>KZN DARD</u>	<u>KwaZulu-Natal Department of Agriculture and Rural Development</u>
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
NEMA	National Environmental Management Act (Act No 107 of 1998)
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
PM	Project Manager
RB IDZ	Richards Bay Industrial Development Zone
RBT	Richards Bay Port Terminal
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SEZ	Special Economic Zone
SHE	Safety, Health and Environment
TPNA	Transnet National Port Authority

## TABLE OF CONTENTS

	<b>PAGE</b>
<b>PROJECT DETAILS</b> .....	<b>i</b>
<b>DEFINITIONS AND TERMINOLOGY</b> .....	<b>ii</b>
<b>ABBREVIATIONS AND ACRONYMS</b> .....	<b>v</b>
<b>TABLE OF CONTENTS</b> .....	<b>vi</b>
<b>APPENDICES</b> .....	<b>viii</b>
<b>LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS</b> .....	<b>viii</b>
<b>CHAPTER 1: INTRODUCTION</b> .....	<b>1</b>
<b>CHAPTER 2: PROJECT DETAILS</b> .....	<b>2</b>
2.1 Study area .....	2
2.2 Project Description .....	2
2.4 Findings of the Environmental Impact Assessment (EIA) .....	8
2.4.1 Impacts on Ecology .....	8
2.4.1 Impacts on Wetlands .....	9
2.4.2 Impacts on Soil and Agricultural Potential .....	9
2.4.3 Impacts on Heritage Resources, Archaeology and Palaeontology .....	10
2.4.4 Social Impacts .....	10
<b>CHAPTER 3: Purpose and Objectives of the EMPr</b> .....	<b>13</b>
<b>CHAPTER 4: STRUCTURE OF THIS EMPr</b> .....	<b>15</b>
<b>CHAPTER 5: MANAGEMENT PROGRAMME: DESIGN AND PLANNING</b> .....	<b>18</b>
<i>OBJECTIVE 1: Ensure the pipeline responds to identified environmental constraints and opportunities. ...</i>	<i>18</i>
<i>OBJECTIVE 2: Ensure that the relevant permits and plans are in place to manage impacts on the environment</i> .....	<i>20</i>
<i>OBJECTIVE 3: To ensure effective communication mechanisms</i> .....	<i>21</i>
<b>CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION</b> .....	<b>23</b>
6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase .....	23
<i>OBJECTIVE 1: Establish clear reporting, communication, and responsibilities' in relation to the overall implementation of the EMPr.</i> .....	<i>23</i>
6.2 Objectives .....	25
<i>OBJECTIVE 2: Minimise impacts related to inappropriate site establishment</i> .....	<i>25</i>
<i>OBJECTIVE 3: Appropriate management of the construction site and construction workers</i> .....	<i>27</i>
<i>OBJECTIVE 3: Limit the ecological footprint of the pipeline</i> .....	<i>30</i>
<i>OBJECTIVE 4: Appropriate handling and management of waste</i> .....	<i>32</i>
<i>OBJECTIVE 5: Appropriate handling and storage of chemicals, hazardous substances</i> .....	<i>33</i>
<i>OBJECTIVE 6: Protection of Heritage Resources</i> .....	<i>36</i>
6.3 Detailing Method Statements .....	37
<i>OBJECTIVE 7: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimize environmental risk.</i> .....	<i>37</i>
6.4 Awareness and Competence: Construction Phase .....	38
<i>OBJECTIVE 8: Ensure all construction personnel have the appropriate level of environmental and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm</i> .....	<i>38</i>
6.4.1 Environmental Awareness and Induction Training .....	39



6.4.2	Toolbox Talks .....	40
6.5	Monitoring Programme: Construction Phase .....	40
	<i>OBJECTIVE 8: To monitor the performance of the control strategies employed against environmental objectives and standards .....</i>	<i>40</i>
6.5.1	Non-Conformance Reports .....	41
6.5.2	Monitoring Reports .....	41
6.5.3	Audit Reports .....	41
6.5.4	Final Audit Report .....	42
	<b>CHAPTER 7: MANAGEMENT PROGRAMME: REHABILITATION .....</b>	<b>43</b>
7.1	Objectives.....	43
	<i>OBJECTIVE 1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed .....</i>	<i>43</i>
	<b>CHAPTER 8: MANAGEMENT PROGRAMME: OPERATION .....</b>	<b>45</b>
8.1	Objectives.....	45
	<i>OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr during the operation phase. ....</i>	<i>45</i>
	<i>OBJECTIVE 2: Limit the ecological footprint of the pipeline .....</i>	<i>46</i>
	<i>OBJECTIVE 3: To ensure vegetable oil spills, leaks and rupture of the pipeline are effectively contained</i>	<i>47</i>
	<b>CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING .....</b>	<b>49</b>
9.1.	Objectives.....	49
9.2.	Approach to the Decommissioning Phase .....	49

## APPENDICES

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- Appendix A:** Curriculum Vitae of the Project Team  
**Appendix B:** Grievance Mechanism for Public Complaints and Issues  
**Appendix C:** Invasive Alien Plants Management Plan  
**Appendix D:** Fossils Chance Find Procedure  
**Appendix E:** A3 Maps

## LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS

An overview of the contents of the Environmental Management Programme, as prescribed by Appendix 4 of the 2014 EIA Regulations (GNR 326) as amended, and where the corresponding information can be found within the reported is provided in **Table 1.1**

**Table 1.1:** Legal requirements in terms of the EIA regulations

<b>EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)</b>	<b>Cross-reference in this Environmental Management Programme</b>
<b>Content of environmental management programme (EMPr)</b>	
(1) (a) An EMPr must comply with section 24N of the Act and include: <ul style="list-style-type: none"> <li>i. Details of the EAP who prepared the EMPr; and</li> <li>ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae.</li> </ul>	Section 4.1.1 - 4.1.2
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 3
(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.	Chapter 2 Section 2.5
(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 environmental impact assessment process for all phases of the development including- <ul style="list-style-type: none"> <li>(i) planning and design</li> <li>(ii) pre-construction activities</li> <li>(iii) construction activities</li> <li>(iv) rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities;</li> </ul>	Chapters 4, 5, 6, 7, 8 and 9
(f) a description of proposed mitigation 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- <ul style="list-style-type: none"> <li>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</li> <li>(ii) comply with any prescribed environmental management standards or practices;</li> <li>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and</li> <li>(iv) comply with any provisions of the Act regarding financial provision for rehabilitation</li> </ul>	Chapters 4, 5, 6, 7, 8 and 9
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f)	Chapters 4, 5, 6, 7, 8 and 9
(i) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6.5.1 – 6.5.4, and 9.2.6
(j) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 6.1 -8.1
(k) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 6.5.1 – 6.5.4 and 9.2.6
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Chapter 6

<b>EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)</b>	<b>Cross-reference in this Environmental Management Programme</b>
	Section 6.5.2, 6.5.3 and 6.5.4
(m) an environmental awareness plan describing the manner in which- i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and ii. risks must be dealt with in order to avoid pollution or the degradation of the environment; and.	Chapter 6 Section 6.4.1
(n) any specific information that may be required by the Competent Authority	
(2) where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	

## CHAPTER 1: INTRODUCTION

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This Environmental Management Programme has been compiled for the vegetable oil pipeline proposed by Wilmar Processing (Pty) Ltd. The project includes the development of a pipeline to transport raw material from the Richards Bay Port (RBT) to the proposed Wilmar Processing facility located within the Richards Bay Industrial Development Zone (RB IDZ). The corridor is located approximately 3km south-west of Arboretum, 4km south-east of the Richard's Bay Central Business District (CBD), 16km east of Empangeni and within the Transnet National Port Authority (TPNA) precinct where it will route in a north-easterly direction towards the processing facility proposed within Phase 1A of the RB IDZ in the KwaZulu-Natal Province. A corridor of up to 50m wide and 2.8km long was assessed through a Basic Assessment process to allow for the optimisation of the pipeline to accommodate environmental sensitivities identified.

The EMPr has been developed on the basis of the findings of the Final Basic Assessment (BA), and must be implemented to protect on-site and off-site features through controlling construction and operation activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all employees and contractors working on the pre-construction, construction, operation and maintenance phases of the project. In terms of the Duty of Care provision in S28(1) of NEMA, the project proponent must ensure that reasonable measures are taken throughout the lifecycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, halted or minimised. The document must therefore be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the Final BA Report for the project.

## CHAPTER 2: PROJECT DETAILS

### 2.1 Study area

**Table 2.1** provides information regarding the proposed corridor for the pipeline, and also includes information regarding the properties that may be impacted by the project.

**Table 2.1:** A description of the study area identified for the corridor for the Wilmar Vegetable Oil Pipeline

Province	KwaZulu-Natal		
District Municipality	King Cetshwayo District Municipality		
Local Municipality	City of uMhlatuze Local Municipality		
Ward number(s)	02		
Nearest town(s)	The Wilmar Vegetable Oil pipeline will be located ~ 3km south-west of Arboretum, 4km south-east of the Richards Bay CBD, 6km south-west of Wilde en Wiede, and 16km south-east of Empangeni.		
Farm Name(s) & Portion Number (s)	<ul style="list-style-type: none"> <li>» Remainder of the Farm Lot 233 Umhlatuzi No. 16230</li> <li>» Remainder of Portion 21 of Erf 5333</li> <li>» Portion 153 of Erf 5333</li> <li>» Erf 16856</li> <li>» <u>Erf 16181</u></li> <li>» Erf 16182</li> <li>» Erf 17424</li> <li>» Erf 17422</li> </ul>		
SG 21 Digit Code (s)	<ul style="list-style-type: none"> <li>» N0GV00000001623000000</li> <li>» N0GV0421000053330021</li> <li>» N0GV04210000533300153</li> <li>» N0GV042100001685600000</li> <li>» <u>N0GV04210001618100000</u></li> <li>» N0GV04210001618200000</li> <li>» N0GV04210001742400000</li> <li>» N0GV04210001742200000</li> </ul>		
Current zoning	Industrial Use - The affected properties are located within the Richards Bay Industrial Development Zone (RBIDZ), Phase 1A, which has been reserved for agro-processing facilities.		
Corridor width (m)	~50m		
Corridor length (m)	~2.8km		
Co-ordinates		Latitude	Longitude
	Start point	28°47'28.98"S	32° 3'2.28"E
	End point	28°46'42.80"S	32° 3'43.12"E

A locality and a zoomed in map illustrating the corridor of the Wilmar Vegetable Oil Pipeline are included in **Figure 2.1 and Figure 2.2**.

### 2.2 Project Description

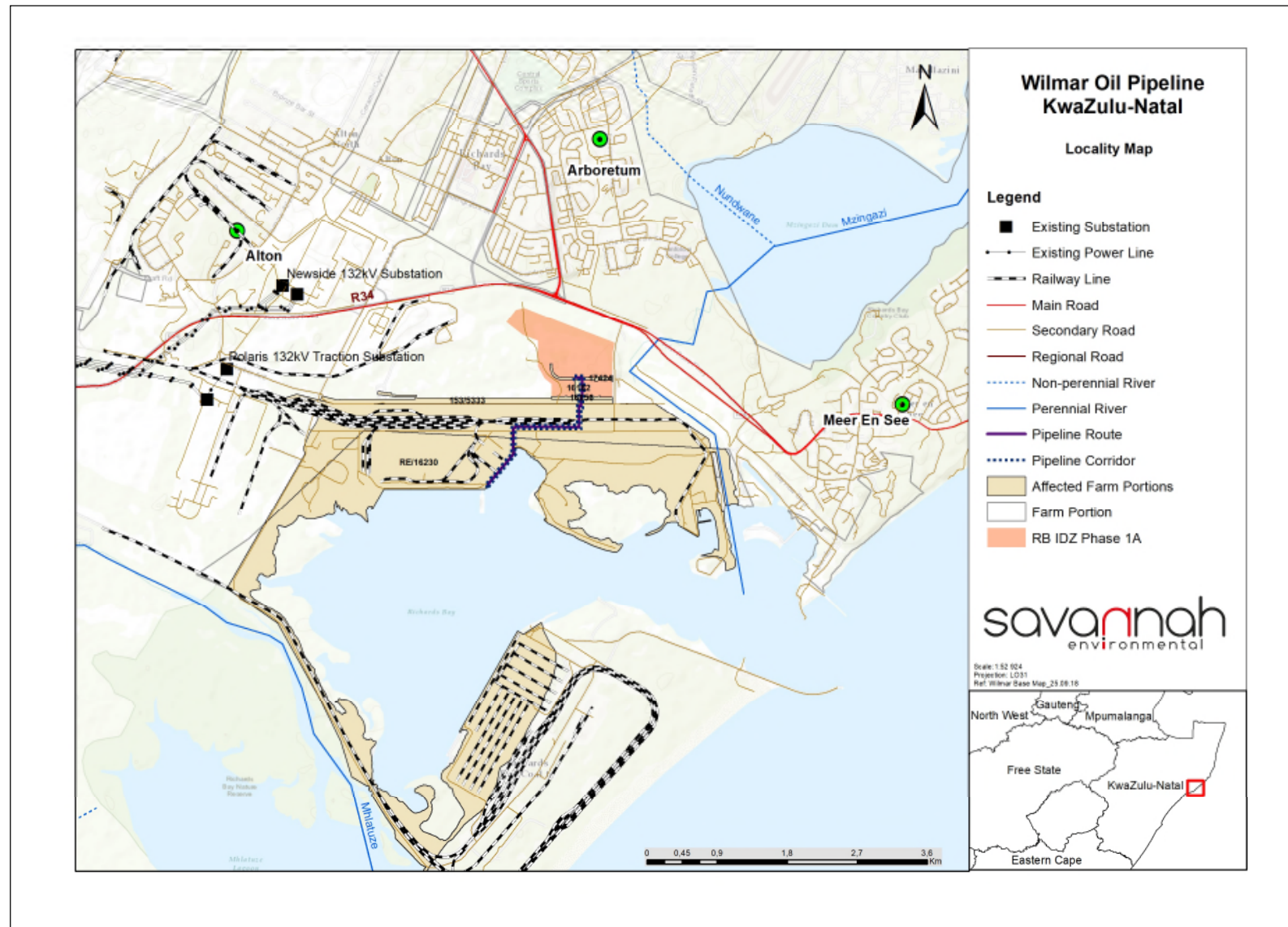
The proposed corridor for the pipeline will accommodate road and railway crossing and duct access shafts. The infrastructure for the pipeline will include the following:

- » Four (4) x 216mm Steel Pipes; and
- » Overhead Steel Bridges on Rail/Road Crossings.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.2**.

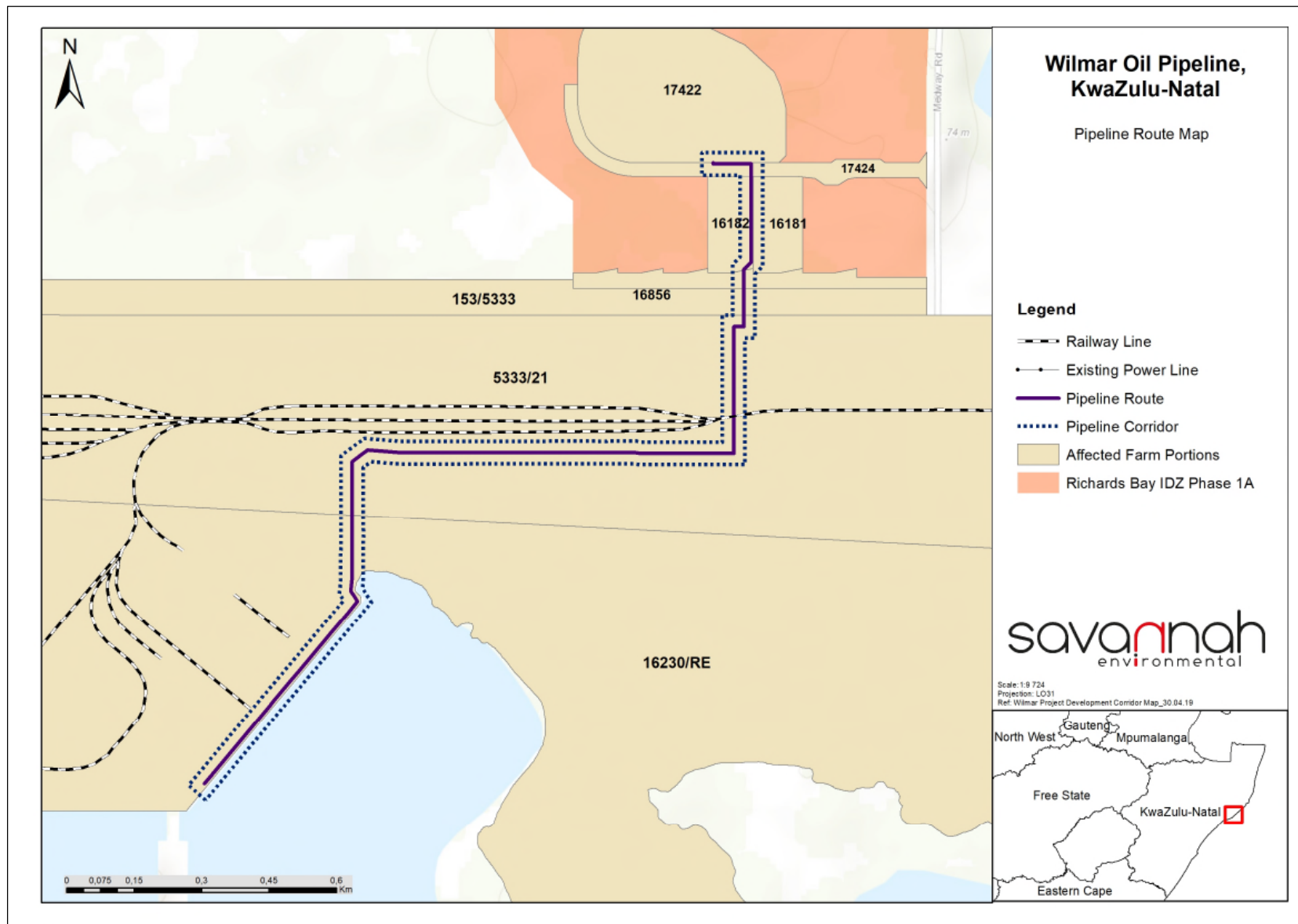
**Table 2.2:** Planned infrastructure proposed as part of the Wilmar Vegetable Oil Pipeline

Infrastructure	Footprint, dimensions and details
Corridor width (for assessment purposes)	1 x corridor has been assessed for the construction, operation and maintenance of the Wilmar Vegetable Oil Pipeline.
Pipeline Capacity	up to 250cm <sup>3</sup> of vegetable oil per hour, or 220Mt per hour (only when the operational vessel is discharging)
Pipeline length	up to 2.8km
Road and Railway Crossings of the Wilmar Vegetable Oil Pipeline	» 6 crossings are envisaged within the existing railway and road infrastructure.
Support structure foundations	» Concrete pad foundations (approximately 1.5m x 1.5m and 1.2m below the ground)
Access roads/ tracks	Existing roads will be used to maintain and service the pipeline, as all parts of the proposed project development corridor are accessible by existing roads within the Port and RB IDZ.



**Figure 2.1:** Locality map illustrating the assessed corridor proposed for the development of the Wilmar Vegetable Oil Pipeline





**Figure 2.2:** A zoomed map of the identified corridor for the Wilmar Vegetable Oil Pipeline

**Table 2.2:** Details of the pipeline development phases (i.e. construction, operation and decommissioning)

<b><u>Construction Phase</u></b>	
	<ul style="list-style-type: none"> <li>» Duration of the construction phase is expected to be up to 6 months.</li> <li>» Create direct construction employment opportunities. Up to 50 employment opportunities will be created during the construction phase.</li> <li>» No on-site labour camps. Employees to be accommodated in Richards Bay and the nearby towns, and transported to and from site on a daily basis.</li> <li>» Overnight on-site worker presence would be limited to security staff.</li> <li>» Construction waste will be stored on site and waste removal and sanitation will be undertaken by a sub-contractor or the municipality.</li> <li>» Negligible water will be required for the construction phase and potable needs. If required, water will be sourced from the municipality or private sources.</li> </ul>
<b>Construction sequence</b>	<p>The pipelines are to be constructed in the following simplified sequence:</p> <ul style="list-style-type: none"> <li>» Step 1: Surveying of the development area and negotiating with affected landowners;</li> <li>» Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and potential environmental sensitivities; obtain required environmental permits (such as biodiversity permits, heritage permits &amp; WUL/GA);</li> <li>» Step 3: Vegetation clearance;</li> <li>» Step 4: Construction of concrete pad foundations;</li> <li>» Step 5: Assembly and erection of infrastructure on site;</li> <li>» Step 6: Rehabilitation of disturbed areas</li> <li>» Step 7: Continued maintenance.</li> </ul> <p>The final definition of the centre line for the pipeline and co-ordinates of each bend in the line (if applicable) will be determined on receipt of an environmental authorisation of the assessed corridor by the competent authority and after negotiations with landowners and final environmental and technical surveys<sup>1</sup>.</p>
<b><u>Operation Phase</u></b>	
	<ul style="list-style-type: none"> <li>» Duration will be ~20 years, or longer as needed for the operation of the processing facility.</li> <li>» Requirements for security and maintenance of the pipeline.</li> <li>» Employment opportunities relating mainly to operation activities and maintenance. Very limited employment opportunities will be available.</li> </ul>
<b>Activities to be undertaken</b>	
Operation and Maintenance	<ul style="list-style-type: none"> <li>» Part-time security and maintenance staff, especially for the pipeline.</li> <li>» Disposal of waste products in accordance with relevant waste management legislation.</li> <li>» On-going rehabilitation of those areas which were disturbed during the construction phase.</li> <li>» The maintenance of the pipeline infrastructure will be the responsibility of the holder of the Environmental Authorisation.</li> </ul>

<sup>1</sup> The start, middle and end coordinates of the nominated corridor is included in **Appendix L**.

### **Decommissioning Phase**

<b>Requirements</b>	<ul style="list-style-type: none"><li>» Decommissioning of the pipeline infrastructure at the end of its economic life.</li><li>» Expected lifespan of approximately 20 years (with maintenance) before decommissioning is required.</li><li>» Decommissioning activities to comply with the legislation relevant at the time.</li></ul>
<b>Activities to be undertaken</b>	
Site preparation	<ul style="list-style-type: none"><li>» Confirming the integrity of access to the pipeline to accommodate the required equipment.</li><li>» Mobilisation of decommissioning equipment.</li></ul>
Disassemble components and rehabilitation	<ul style="list-style-type: none"><li>» The pipeline components will be disassembled, and reused and recycled (where possible).</li><li>» Where components cannot be reused or recycled these will be disposed of in accordance with the regulatory requirements at the time of decommissioning.</li><li>» Disturbed areas, where infrastructure has been removed, will be rehabilitated, if required and depending on the future land-use of the affected areas and the relevant legislation applicable at the time of decommissioning.</li></ul>

## 2.4 Findings of the Environmental Impact Assessment (EIA)

The Final BA Report together with the specialist studies contained within **Appendices D – H** provide a detailed assessment of the potential impacts that may result from the development of the pipeline. This section of the Environmental Management Programme (EMPr) provides a summary of the results and conclusions of the BA of the development footprint within the development corridor proposed for the pipeline. In doing so, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the EAP, and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur within the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as predicted by the specialists.

The potential environmental impacts associated with the pipeline identified and assessed through the BA process include:

- » Impacts on ecology, flora, fauna and avifauna.
- » Impacts to soils and agricultural potential.
- » Impacts on heritage resources, including archaeology and palaeontology.
- » Positive and negative socio- economic impacts.

### 2.4.1 Impacts on Ecology

The conclusions of the Ecological Impact Assessment (**Appendix D**) are based on the findings of two site visits undertaken in summer (27 November 2018) and again in late summer (11 March 2019) and assessed the impact of the vegetable oil pipeline on the sensitive ecological features present within the project development corridor for the life-cycle of the project. The assessment identified impacts within the construction and operation phase of the project.

During the construction phase (and the decommissioning phase) the impacts include destruction and loss of flora and vegetation, loss of species of conservation significance, disturbance and injury of local fauna populations, and pollution of soils and aquatic habitat. During the operation phase, the anticipated impact only includes, colonisation by invasive alien plant species (IAPs) and weeds.

From the findings of the Ecological Impact Assessment, it can be concluded that no impacts of high ecological significance were identified that would hinder the development of the Wilmar Vegetable Oil Pipeline. The entire corridor is located within an area of low sensitivity. The proposed development is considered to be appropriate and acceptable from an ecological perspective and will not result in detrimental impacts to ecosystems and habitat features present within the project development corridor and within the surrounding environment. The specialist has, therefore, indicated that the development of the vegetable oil pipeline may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures (refer to **Appendix D** for more details).

### **2.4.1 Impacts on Wetlands**

The conclusions of the Wetland Delineation Impact Assessment (**Appendix E**) are based on the findings of two site visits undertaken in early spring (18 September 2018) and in early summer (30 November 2018) that both assessed the impact of the vegetable oil pipeline on the wetland features present within the study area for the life-cycle of the project. One depression wetland as well as an unlined artificial drainage channel were identified, ground-truthed and delineated within the study area. In the regulated area (< 500m) of the depression wetland, the surrounding wetlands identified included an estuarine wetland to the south and north of the project development corridor, as well as the unchannelled valley bottom wetland to the south. No watercourses were identified within the vicinity of the project development corridor.

Potential impacts on the wetland and artificial drainage channel features would result from a variety of activities and risk factors associated with the construction phase of the project. Direct potential impacts to the depression wetland and artificial drainage channel are not expected as the proposed pipeline will span the channel and avoid the wetland, as advised with the mitigation measures below, and no mounting or piling structures are to be placed directly within the depression wetland and artificial drainage channel. Furthermore, no direct or indirect potential impacts are expected for the nearby un-channelled valley bottom wetland since there are a number of physical barriers (road infrastructure) which already fragment the proposed pipeline from the catchment of the un-channelled valley bottom wetland, and thus create a hydraulic barrier.

For the construction phase, the anticipated impacts include, the hydrological and geomorphological impacts in the depression wetland and artificial drainage channel and impacts on the water quality of the wetland and artificial drainage channel. No impacts were assessed for the operation phase of the pipeline.

The significance of the construction phase impacts will be low, following the implementation of the recommended mitigation measures by the specialist (refer to **Appendix E** for more details).

The development of the Wilmar Vegetable Oil Pipeline is thus supported from a wetland perspective and considered acceptable subject to obtaining the necessary water use licence (WUL) or general authorisation (GA) from the Department of Water and Sanitation.

### **2.4.2 Impacts on Soil and Agricultural Potential**

The findings of the Soils and Agricultural Potential Impact Assessment (**Appendix F**) are based on a field-based soil survey (undertaken on 3 December 2018), where the impacts of the Wilmar Vegetable Oil Pipeline were assessed against the soil types within the proposed project development corridor. The assessment identified impacts within the construction and operation phase of the project.

Impacts expected include inaccessibility of potentially arable and grazing land due to the presence of the infrastructure, soil erosion during both construction and operation, soil compaction due to the movement of vehicles on site during construction, and soil contamination typically occurring as incidental spills or leaks during the construction phase. Although the soil within which the corridor is located contains portions that are suitable for agriculture, it is not feasible to undertake any agricultural activities within the area as it has been zoned for industrial activities.

The above-mentioned impacts are anticipated to occur during the construction and operation phase of the pipeline. The identified impacts will have a low significance following the implementation of the recommended mitigation measures by the specialist (refer to **Appendix F**). No fatal flaws have been identified from a soils and agricultural potential perspective and all impacts can be mitigated to be within low and acceptable levels, hence the development of the Wilmar Vegetable Oil Pipeline is considered acceptable from a soils and agricultural potential perspective.

### **2.4.3 Impacts on Heritage Resources, Archaeology and Palaeontology**

The findings of the Heritage Impact Assessment (**Appendix G**) inclusive of a palaeontological study are based on a site visit undertaken in December 2018. No archaeological or heritage resources of significance identified within the project development corridor. Therefore, no impacts are identified from a heritage and palaeontological perspective. This also means that the proposed development of the Wilmar Vegetable Oil Pipeline is supported from a heritage and archaeological perspective.

Taking into consideration the project development corridor for the proposed development, the area has undergone extensive modification since the construction of the harbour in the 1970s. The geology of the area suggests the lithologies could contain invertebrate fossils, however, these are likely to have been disturbed by the construction of the Richards Bay Harbour and other infrastructure present within the area. Therefore, there is a small chance other fossil forms could occur within the Maputoland Group rocks within the area, and a 'Fossil Chance Find Procedure' has been included within the EMPr. Taking into consideration the fact that no fossil finds have been reported within the area to date, the proposed development of the Wilmar Vegetable Oil Pipeline is supported from a palaeontological perspective.

### **2.4.4 Social Impacts**

The Social Impact Assessment (**Appendix H**) identified that most social impacts associated with the development of the Wilmar Vegetable Oil Pipeline will have a short term duration associated with the construction phase, with some impacts expected during the operation phase of the pipeline. Positive and negative social impacts have been identified for the construction, whilst only positive impacts are identified for the operation phase of the pipeline.

During the construction phase, negative social impacts include, nuisance, dust and noise impacts, an increased risk of crime, an influx of construction workers in the area, disruption of daily living patterns, disruptions to social and community infrastructure. Positive social impacts identified for the construction phase include job creation and skills development opportunities and socio-economic benefits. These positive impacts are applicable to the operational phase of the pipeline.

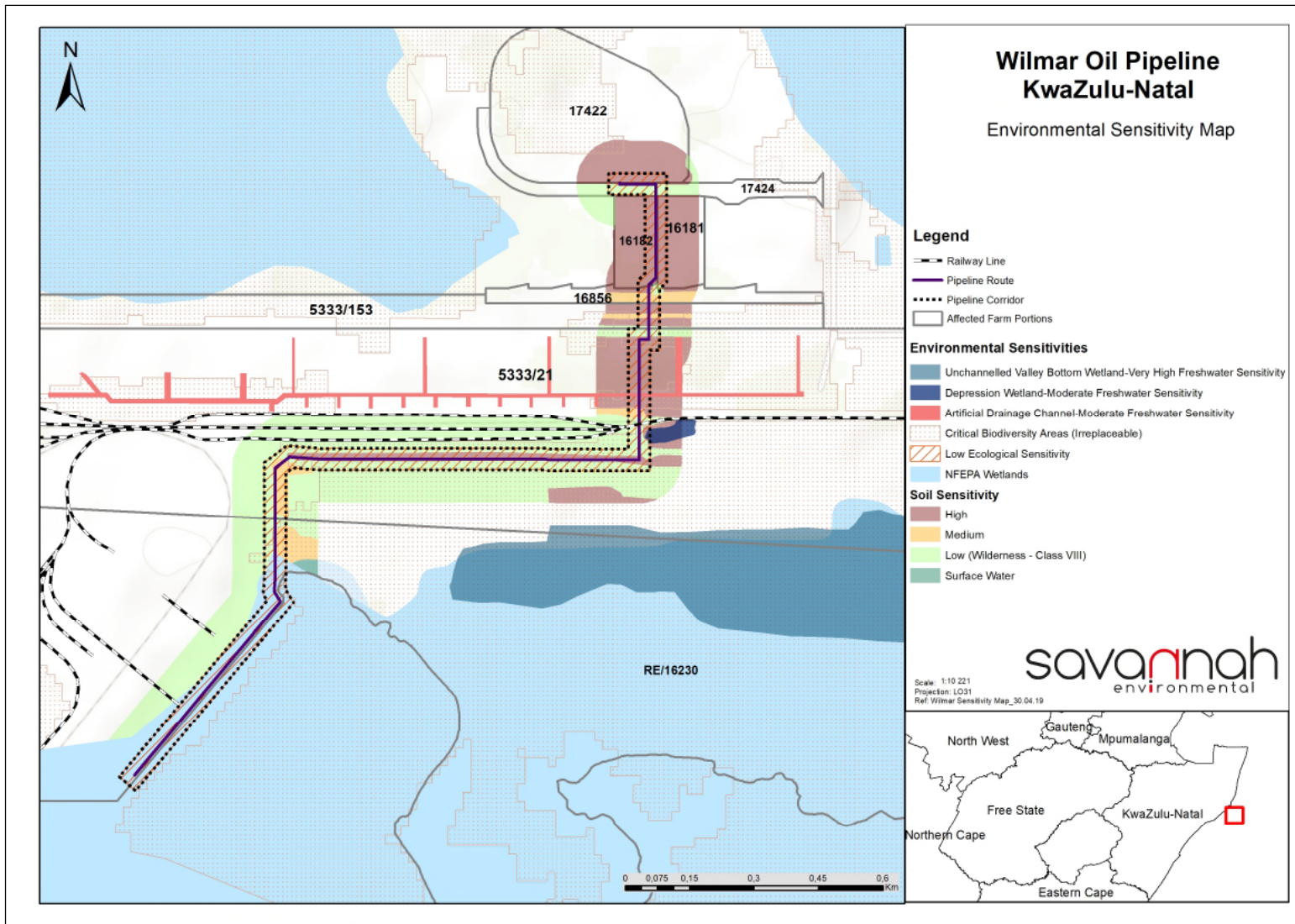
The significance of the positive social impacts will be medium following the implementation of the recommended enhancement measures by the specialist. No fatal flaws are identified associated with the proposed development as the project will result in limited negative impacts on the social environment of the Richards Bay area and surrounding communities.

## **2.5 Environmental Sensitivity of the Identified Corridor**

From the specialist investigations undertaken for the vegetable oil pipeline, the following sensitive areas/environmental features have been identified and demarcated within the corridor (refer to **Figure 2.2**).

These features would need to be considered by the Developer for the location of the pipeline within the corridor.

Sensitivity Rating	Sensitive areas / environmental features
High	<ul style="list-style-type: none"> <li>» The Fernwood/Longlands soil type identified within the corridor is associated with a high sensitivity. This is due to its inherent arable properties, which make it susceptible to erosion. The arable attribute of this soil type is regarded as a key characteristic in soil types indicative of wetlands. From a land capability perspective, these soils are considered suitable for agricultural land use and grazing. Agriculture within those areas of the corridor which contain these soils are, however, not considered viable due to current ongoing industrial activities in the vicinity of the TPNA and RB IDZ areas, which are envisage to persist for the foreseeable future since the surrounding RB IDZ has been designated for industrial land use. While development within these areas is acceptable, erosion management will be critical to minimise impacts.</li> <li>» The unchanelled valley bottom wetland located to the south of the corridor is associated with a high sensitivity. This is because the wetland is associated with a high biodiversity andt is very sensitive to flow and habitat modifications. Although the corridor falls outside the footprint of the wetland, the corridor falls within the regulated area (i.e. a 500m radius of the wetland) which is listed as a water use under the National Water Act (Act No. 36 of 1998). Direct impacts on this wetland must be avoided.</li> </ul>
Medium	<ul style="list-style-type: none"> <li>» The Mispah/Glenrosa soil type is associated with a medium sensitivity. The majority of the corridor falls within the soil type, especially where the pipeline makes a crossing with the single railway line. The medium sensitivity follows as this soil type is sensitive to erosion due to historic anthropogenic activities that have taken place in this area. While the development within these areas is acceptable, erosion management will be critical to minimise impacts.</li> <li>» The artificial drainage channel and depression wetland located to the north and east of the corridor have a moderate/medium sensitivity. Although the wetlands are not sensitive to flow and habitat modifications, and the partially falls outside the area of the depression wetland, both features are regarded as being ecologically significant at a provincial and local level. The corridor falls within the regulated area (i.e. a 500m radius of the wetland and drainage channel) which is listed as a water use under the National Water Act (Act No. 36 of 1998). Direct impacts on this drainage channel and wetland must be avoided.</li> </ul>
Low	<ul style="list-style-type: none"> <li>» The Witbank soil type is resistant to erosion, and is considered as being of a low sensitivity due to the artificial surface hardening material used on the existing infrastructure (i.e. paved roads, buildings, concrete parking areas etc.).</li> <li>» Although a few plant species of conservation concern were located within the study area, these species were only restricted to the habitat outside of the corridor. Potential occurrences of plant species such as those from the families <i>Amaryllidaceae</i>, <i>Hyacinthaceae</i>, <i>Iridaceae</i> and <i>Orchidaceae</i> can be relocated with ease. In addition, impacts on fauna within the vegetation units' <i>P. elliotii</i> and <i>O. moniliferum</i> can be mitigated. The corridor in its entirety is of a low significance from an ecological perspective.</li> </ul>



**Figure 2.2:** Environmental sensitivity map overlain with the identified corridor for the Wilmar Vegetable Oil Pipeline.



## CHAPTER 3: PURPOSE AND OBJECTIVES OF THE EMPR

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An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced”. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the vegetable oil pipeline. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Wilmar Vegetable Oil Pipeline. The document will be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations ,2014 (as amended). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the Wilmar Vegetable Oil Pipeline and/or as the project develops. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

The EMPr has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Wilmar Vegetable Oil Pipeline.
- » Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the BA process.

The mitigation measures identified within the BA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

The Developer must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the BA process for the Wilmar Vegetable Oil Pipeline, it is important that this document be read in conjunction with the Final BA Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle.

## CHAPTER 4: STRUCTURE OF THIS EMPr

The first three chapters provide background to the EMPr and the Wilmar Vegetable Oil Pipeline, while the chapters which follow consider the following:

- » Planning & Design activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

These chapters set out the procedures necessary for the project owner to minimise the environmental impacts and achieve environmental compliance. For each of the phases of implementation for the project, an overarching environmental goal is stated. In order to meet this goal, a number of objectives are listed. The management programme has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

**OBJECTIVE: Description of the objective that is necessary to meet the overall goal, which takes into account the findings of the BA specialist studies**

<b>Project Component/s</b>	List of project components affecting the objective, i.e.: » Pipeline
<b>Potential Impact</b>	Brief description of potential environmental impact if objective is not met.
<b>Activity/Risk Source</b>	Description of activities which could affect achieving the objective.
<b>Mitigation: Target/Objective</b>	Description of the target and/or desired outcomes of mitigation.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

<b>Performance Indicator</b>	Description of key indicator(s) that track progress/indicate the effectiveness of the management programme.
<b>Monitoring</b>	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the components and/or layout of the facility);
- » Modification to or addition to environmental objectives and targets;

- » Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMP to prevent deterioration or further deterioration of the environment.
- » Relevant legal or other requirements are changed or introduced; and
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

#### 4.1 Project Team

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326) the applicant appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the application for EA and the supporting BA process. The application for EA and the BA process, is being managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

##### 4.1.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned), and is rated as a Level 2 Broad-based Black Economic Empowerment (B-BBEE) Contributor. Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 13 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

This BA process is being managed by Jo-Anne Thomas. She is supported by Reuben Maroga, Gideon Raath and Nicolene Venter.

- » **Jo-Anne Thomas** is a Director at Savannah Environmental (Pty) Ltd. Jo-Anne has a Master of Science Degree in Botany (M.Sc. Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP). She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past 20 years. She has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.
- » **Reuben Maroga** is the principle author of this report. He holds a Bachelor degree in Environmental Management and has 2.5 years of experience in the environmental management field. His key focus is on environmental impact assessments, public participation, environmental management programmes, water use licence applications, as well undertaking ECO reporting for a variety of projects.
- » **Gideon Raath**, is the co-author for this report. He has 4.5 years of work experience in the environmental consulting industry. Furthermore, Gideon has an MSc in Environmental Management and Geography and is registered with SACNASP (11718), and his particular focus is on environmental impact assessments mainly within the renewable energy (wind and solar) sector, as well as for infrastructure (roads, pipelines and power line) related projects.

» **Nicolene Venter** is a Social and Public Participation Consultant at Savannah Environmental. Nicolene has a Higher Secretarial Certificate from Pretoria Technicon, and a Certificate in Public Relations from the Public Relation Institute of South Africa at Damelin Management School. Nicolene has over 21 years of experience as a Public Participation Practitioner and Stakeholder Consultant, and is a Board Member of the International Association for Public Participation Southern Africa (IAP2SA). Nicolene's experience includes managing the stakeholder engagement components of large and complex environmental authorisation processes across many sectors, with particular experience in the power sector. Nicolene is well versed with local regulatory requirements as well as international best practice principles for community consultation and stakeholder engagement, as well as international guidelines and performance standards. Nicolene is responsible for managing the Public Participation process required as part of the EIA for this project.

Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 13 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development, and therefore have extensive knowledge and experience in EIAs and environmental management, having managed and drafted EMPs for numerous other pipeline projects throughout South Africa. Curricula Vitae (CVs) detailing the Savannah Environmental team's expertise and relevant experience are provided in **Appendix K** of the EMP.

#### 4.1.2 Details of the Specialist Consultants

A number of independent specialist consultants have been appointed as part of the BA project team in order to adequately identify and assess potential impacts associated with the project (refer to **Table 4.1**). The specialist consultants have provided input into the BA Report as well as this EMP.

**Table 4.1: Specialist Consultants which form part of the BA Project Team.**

Specialist Area of Expertise	Specialist Company	Specialists Names
Ecology	Rautenbach Biodiversity Consulting	Anita Rautenbach
Wetland Delineation	Savannah Environmental & Peer reviewed by SiVEST.	Shaun Taylor Gideon Raath Peer review: Stephen Burton
Soils and Agricultural Potential Impact Assessment	Nhloso Land Resources	Snethemba Mchunu
Heritage (Archaeology and Palaeontology)	CTS Heritage	Jenna Lavin
Social Impact Assessment	Neville Bews & Associates	Dr Neville Bews

## CHAPTER 5: MANAGEMENT PROGRAMME: DESIGN AND PLANNING

**Overall Goal:** undertake the pre-construction activities (planning and design phase) in a way that:

- » Ensures that the preferred design and layout of the pipeline responds to the identified environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- » Ensures that the best environmental options are selected.
- » Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

### 5.1 Objectives

**OBJECTIVE 1: Ensure the pipeline responds to identified environmental constraints and opportunities.**

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Soil erosion</li> <li>» Impacts on flora and fauna</li> <li>» Impacts on protected plant and fauna species</li> <li>» Impacts on wetlands</li> </ul>
<b>Activities/Risk Sources</b>	» Construction of the pipeline
<b>Mitigation: Target/Objective</b>	» The route of the pipeline and design of the associated infrastructure responds to the identified environmental constraints and opportunities.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Developer Contractor	Pre-construction
Undertake a detailed geotechnical pre-construction survey	Developer Geotechnical specialist	Pre-construction
<u>Develop a Stormwater Management Plan (SWMP) for the construction of the pipeline and ensure it is submitted to the Provincial Department of Water and Sanitation prior to construction.</u>	<u>Developer Civil Engineer</u>	<u>Planning and Design</u>
<u>The SWMP should enable or accommodate the flow of water from the site to the natural environment surrounding the pipeline corridor.</u>	<u>Developer Civil Engineer</u>	<u>Planning and Design</u>
The EMP and terms of the Environmental Authorisation should all be included in all tender documentation and must form part of the contract with the Contractors appointed to construct the	Developer Contractor	Tender Design and Design Review Stage

Mitigation: Action/Control	Responsibility	Timeframe
pipeline, and must be used to ensure compliance with environmental specifications and management measures.		
Ensure that no laydown areas are located within the identified wetland areas.	Developer	Project planning
Clear rules and regulations for access to the proposed site must be developed.	Developer Contractor	Pre-Construction
A designated access to the site must be created and clearly marked to ensure safe entry and exit.	Developer Contractor	Design
Contractors and construction workers must be clearly informed of the no-go areas.	Developer Contractor	Pre-construction
Demarcation of no-go areas must reflect the exact footprint of the construction area, including all duct access shaft access points and associated infrastructure which are to be surveyed and pegged before any physical construction commences on site.	Developer Contractor	Pre-construction
Reduce the construction period as far as possible through careful planning and productive implementation of resources.	Developer Contractor	Pre-construction
A local procurement policy must be adopted to maximise the benefit to the local economy.	Developer	Pre-construction
Develop a database of local companies, specifically Historically Disadvantaged (HD) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) prior to the tender process and invite them to bid for project-related work where applicable.	Developer	Pre-construction
Where applicable, any tender documentation which may be prepared for the project is to stipulate the use of local labour as far as possible.	Developer Contractor	Pre-Construction
Inform local community members of the construction schedule and exact size of workforce (e.g. Ward Councillor, surrounding landowners).	Developer Contractor	Pre-Construction
Local community organisations and policing forums must be informed of construction times and the duration of the construction phase. Also procedures for the control and removal of loiters at the construction site should be established.	Developer Contractor	Pre-Construction
Security company to be appointed and appropriate security procedures to be implemented.	Developer Contractor	Pre-Construction
Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	Contractor	Pre-construction
A comprehensive employee induction programme must be developed and utilised to cover land access protocols, fire management and road safety.	Contractor	Pre-construction
Have a personnel trained in first aid on site to deal with smaller incidents that require medical attention.	Contractor	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» The design meets the objectives and does not degrade the environment.</li> <li>» No laydown areas are planned for the sensitive wetland areas.</li> <li>» Design and layouts respond to the mitigation measures and recommendations in the BA Report.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Review of the design of the pipeline and the route by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction.</li> </ul>

**OBJECTIVE 2: Ensure that the relevant permits and plans are in place to manage impacts on the environment**

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	» Impacts on identified sensitive areas and protected species.
<b>Activities/Risk Sources</b>	» Positioning of all project components.
<b>Mitigation: Target/Objective</b>	» To ensure that relevant permits and plans are in place to manage impacts on the environment.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<p>Undertake pre-construction walk-through of the final route in order to locate species of conservation concern that can be translocated as well as comply with the KwaZulu-Natal Nature Conservation Act (Act No. 9 of 1997) and Ezemvelo KwaZulu-Natal Wildlife and KZN DARD permit conditions.</p> <p><u>eKZN Wildlife Contact Details:</u>  <u>1 Peter Brown Drive</u>  <u>Pietermaritzburg</u>  <u>3201</u>  <u>Tel: (033) 845 1999</u></p> <p><u>KZN DARD (North Region) Contact Details:</u>  <u>Private Bag X1048</u>  <u>Richards Bay</u>  <u>3900</u>  <u>Tel: (035) 780 6700</u></p>	Specialist	Pre-construction
Undertake pre-construction walk-through of the pipeline route to identify areas of flora, fauna and avifaunal sensitivity (i.e. raptor nests) in the proximity of the pipeline route	Specialist	Pre-construction
Obtain relevant permits from the Department of Agriculture, Forestry and Fisheries (DAFF) and the Ezemvelo KwaZulu-Natal Wildlife (eKZN Wildlife) prior to any construction activities at the site.	Developer	Pre-construction
The necessary water use license (WUL) or general authorisation (GA) must be obtained from the Department of Water and Sanitation prior to commencing with construction within 500m of delineated wetlands (i.e. within the regulated area of a watercourse or wetland).	Developer	Pre-construction



Mitigation: Action/Control	Responsibility	Timeframe
Obtain abnormal load permits for transportation of project components to site (if required).	Developer	Pre-construction
Undertake search and rescue for identified species of concern before construction.	Developer Contractor Specialist	Pre-construction
Protected plant species such as <i>Ficus trichopoda</i> and <i>Zantedescia aethopica</i> located close to the corridor must be clearly marked and cordoned off with a construction tape or similar barriers and marked as no-go areas.	Developer	Pre-construction
Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.	Developer	Pre-construction
A suitably qualified specialist must map and quantify the Invasive Alien Plant (IAP) and weeds on the site. This must be undertaken with the aim of developing a suitable IAP and Weed Management plan as per DEA and NEMBA requirements.	Developer Specialist	Pre-construction
Prepare a Fire Management Plan (FMP) in collaboration with surrounding landowners. Communicate the FMP to surrounding landowners and maintain records thereof.	Developer	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Permits are obtained and relevant conditions complied with.</li> <li>» Impact on protected plant species reduced to some degree through Search and Rescue.</li> <li>» Relevant management plans and Method Statements prepared and implemented.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Review of the design by the Project Manager and the ECO prior to the commencement of construction.</li> <li>» Monitor ongoing compliance with the EMPr and method statements.</li> </ul>

### OBJECTIVE 3: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operation phases of the pipeline. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

<b>Project component/s</b>	» Pipeline
<b>Potential Impact</b>	» Impacts on affected and surrounding landowners and land uses.
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Activities associated with construction.</li> <li>» Activities associated with operation.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Effective communication with affected and surrounding landowners</li> <li>» Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement a grievance mechanism procedure for the public (following the guidelines of the grievance mechanism in <b>Appendix B</b> ) to be implemented during both the	Developer Contractor	Pre-construction (construction procedure)

Mitigation: Action/control	Responsibility	Timeframe
construction and operation phases of the pipeline. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.		Pre-operation (operation procedure)
Develop and implement a grievance mechanism for the construction, operation and closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Developer Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Liaison with landowners must be undertaken prior to the commencement of construction.	Developer Contractor	Pre-construction
<u>The Developer and the Contractor should liaise with the City of uMhlathuze Local Municipality's Labour Desk and provide the municipality with the number of employees the project will require during construction.</u>	<u>Developer</u> <u>Contractor</u>	<u>Design and Planning</u>
Before construction commences, representatives from the local municipality, community leaders, community-based organisations and the surrounding property owners (of the larger area), must be informed of the details of the contractors, size of the workforce and construction schedules.	Developer Contractor	Pre-construction and construction
Local community organisations and policing forums must be informed of construction times and the duration of the construction phase. Procedures for the control and removal of loiterers at the construction site should be established.	Developer Contractor	Planning and design

<b>Performance Indicator</b>	» Effective communication procedures in place.
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» A Public Complaints register must be maintained, by the Contractor and monitored by the ECO, to record all complaints and queries relating to the project and the action taken to resolve the issue.</li> <li>» All correspondence should be in writing.</li> <li>» Developer and contractor must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes during construction.</li> </ul>

## CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION

**Overall Goal:** Undertake the construction phase in a way that:

- » Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- » Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- » Minimises the impact on the identified wetland areas.
- » Minimises impacts on fauna (including bird species) in the study area.
- » Minimises the impact on heritage sites should they be uncovered.
- » An environmental baseline during construction activities on the site, where possible is established.

### 6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the applicant, Wilmar Processing (Pty) Ltd must ensure that the proposed pipeline complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. Thus, Wilmar Processing (Pty) Ltd, as the Developer will retain various key roles and responsibilities during the construction phase of the vegetable oil pipeline.

**OBJECTIVE 1: Establish clear reporting, communication, and responsibilities' in relation to the overall implementation of the EMPr.**

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Site Manager, Safety and Health Representative, Independent Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that the key procedures are executed.

**Site Manager** will:

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that the Developer and its Contractor(s) are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings.
- » Be fully knowledgeable with the contents of the Final BA Report.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents of the EMPr.
- » Have overall responsibility of the EMPr and its implementation.
- » Conduct audits to ensure compliance to the EMPr.
- » Ensure there is communication with the Technical Director, the ECO, the Internal Environmental Officer and relevant discipline engineers on matters concerning the environment.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.

- » Confine activities to the demarcated construction site.

**Contractors and Service Providers:** It is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. Each Contractor must appoint an Internal EO who will be responsible for informing contractor employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Internal EO and Contractor's obligations in this regard include the following:

- » Must be fully knowledgeable on all environmental features of the construction site and the surrounding environment.
- » Be fully knowledgeable with the contents and the conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents with the EMPr.
- » Be fully knowledgeable of all the licences and permits issued for the site.
- » Ensure a copy of the Environmental Authorisation and EMPr is easily accessible to all on-site staff members.
- » Ensure contractor employees are familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed facility.
- » Ensure that prior to commencing any site works, all contractor employees and sub-contractors must have attended environmental awareness training included in the induction training which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.
- » Manage the day-to-day on-site implementation of this EMPr, and the compilation of regular (usually weekly) Monitoring Reports.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken, including those of the Independent ECO.
- » Inform staff of the environmental issues as deemed necessary by the Independent ECO.

All Contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications.
- » Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken.
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- » Ensuring that a register of all public complaints is maintained.
- » Ensuring that all employees, including those of sub-contractors, receive training before the commencement of construction in order for the sub-contractors to constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained on the environmental obligations).

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and

verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- » Be fully knowledgeable of the contents of the Final BA Report.
- » Be fully knowledgeable of the contents of the conditions of the EA (once issued).
- » Be fully knowledgeable of the contents of the EMPr.
- » Be fully knowledgeable of the contents of all relevant environmental legislation, and ensure compliance therewith.
- » Be fully knowledgeable with the contents of all relevant licences and permits issued for the project.
- » Ensure that the contents of the EMPr are communicated to the Contractors' site staff and that the Site Manager and Contractors are constantly made aware of the contents through ongoing discussion.
- » Ensure that compliance with the EMPr is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep records of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Independently report to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA) in terms of compliance with the specifications of the EMPr and conditions of the EA (once issued).
- » Keep records of all reports submitted to KZN EDTEA.

The frequency of ECO auditing must be as agreed with the Competent Authority.

## 6.2 Objectives

In order to meet the overall goals for construction, the following objectives, actions, and monitoring requirements have been identified.

### **OBJECTIVE 2: Minimise impacts related to inappropriate site establishment**

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	» Hazards to landowners and the public. » Visual impact of general construction activities.
<b>Activities/Risk Sources</b>	» Excavations. » Movement of construction vehicles in the area and on-site » Transport to and from the temporary construction area/s.
<b>Mitigation: Target/Objective</b>	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents. » Minimal visual intrusion by construction activities.

Mitigation: Action/Control	Responsibility	Timeframe
All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition.	Developer Contractor	Site establishment and Construction
<u>The depression wetland and other protected tree species located within and along the pipeline corridor should be clearly demarcated with fencing or orange mesh netting. The barricading measures should not restrict the movement of fauna in and out of the area.</u>	<u>Developer</u> <u>Contractor</u> <u>EO</u>	<u>Pre-construction and construction</u>
Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and Construction
Ensure access to adjacent areas is strictly controlled.	Contractor	Construction.
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Adequate protective measures must be implemented to prevent unauthorised access to the working area.	Contractor	Site establishment, and Construction
All open and unattended excavations must be adequately demarcated.	Contractor	Construction
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment
Visual impacts must be reduced during construction through minimising areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed soil as closely as possible to their original contour and vegetation.	Contractor	Site establishment, and Construction
Provide adequate ablution and sanitation facilities and ablutions for construction workers so that the surrounding environment is not polluted (at least one sanitary facility for each sex and for every 30 workers as per the 2014 Construction Regulations; Section 30(1) (b)) at appropriate locations on site). The facilities must be placed within the construction area and along the road.	Contractor	Site establishment, and Construction
Ablution or sanitation facilities must not be located within 100m from the identified wetlands or drainage channels.	Contractor	Site establishment, and Construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at the site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. Provision should be made for separation of waste for recycling.	Contractor	Site establishment, and Construction
Foundations and trenches must be backfilled to originally excavated materials as much as possible. Excess excavation materials must be disposed of only in approved areas, or, if suitable, stockpiled for use in reclamation activities.	Contractor	Site establishment, and Construction and Rehabilitation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No members of the public/ landowners injured.</li> <li>» Appropriate and adequate waste management and sanitation facilities provided at construction site.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» An incident reporting system is used to record non-conformances to the EMPr.</li> </ul>

- » EO and ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the Site Manager.

**OBJECTIVE 3: Appropriate management of the construction site and construction workers**

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Damage to indigenous natural vegetation and sensitive areas.</li> <li>» Damage to and/or loss of topsoil (i.e. pollution, compaction etc.).</li> <li>» Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities.</li> <li>» Pollution/contamination of the environment.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Vegetation clearing and levelling of equipment storage area/s.</li> <li>» Access to and from the equipment storage area/s.</li> <li>» Ablution facilities.</li> <li>» Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Limit equipment storage within demarcated designated areas.</li> <li>» Ensure adequate sanitation facilities and waste management practices.</li> <li>» Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Restrict public access to works areas including construction areas, laydown and storage sites via appropriate security. Only allow site access after appropriate induction and use of appropriate PPE.	Contractors	Construction
Contractors must be clearly informed of the no-go, very high and high sensitivity areas.	Developer Contractor	Prior to the commencement of construction
In order to minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the BA Report, and this EMPr, as well as the requirements of all relevant environmental legislation.	Contractor	Construction
Introduce an incident reporting system to be tabled at weekly/monthly project meetings.	Contractor and sub-contractor/s	Pre-construction
All construction vehicles must adhere to clearly defined and demarcated roads. No driving outside of the development boundary must be permitted.	Contractor	Construction
Ensure all construction equipment and vehicles are properly maintained at all times.	Contractor	Construction
Restrict work activities that require power tools and plant that generates noise to normal working hours and limit such activities over weekends.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community and/or environment.	Contractor	Construction
Contact details of emergency services should be prominently displayed on site.	Contractor	Construction
Open fires on the site for heating, smoking or cooking are not allowed, except in designated areas.	Contractor	Construction
Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	Contractor	Construction
Personnel trained in first aid should be on site to deal with smaller incidents that require medical attention.	Contractor	Construction
Encourage contractors and local people to report any suspicious activity associated with crime to the appropriate authorities.	Contractor	Construction
Ensure that the local municipalities, police, security companies, and policing forums are alerted to the increased construction activities in the region and the risk it poses in respect of crime.	Contractor	Duration of Contract
Ensure waste storage facilities are maintained and emptied on a regular basis.	Contractor	Site establishment, and duration of construction
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Duration of construction
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site. Ablutions must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No fires are allowed on site. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.	Contractor	Duration of contract
A Method Statement should be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable.	Contractor	Construction
No disturbance of flora or fauna must be undertaken outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Workers must be aware of the importance of not polluting rivers or wetlands (especially those located outside of the corridor) and the	Contractor and EO	Pre-construction Construction



Mitigation: Action/Control	Responsibility	Timeframe
significance of not undertaking activities that could result in such pollution, and this awareness must be promoted throughout the construction phase.		
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of theft and trespassing on the adjacent plots of land.	Contractor and sub-contractor/s	Pre-construction
On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction
When possible, no activity should be undertaken at the site between sunset and sunrise, except for security personnel guarding the development.	Contractor and sub-contractor/s	Construction
Keep record of all accidents or transgressions of safety in accordance with OHS Act and implement corrective action.	Contractor	Construction
Implement an HIV/AIDS Awareness and Training Programme for the Contractor's workforce and if feasible the local community within two weeks of commencement of construction. Ensure that the HIV/AIDS Awareness and Training Programme is consistent with national guidelines and/or IFC's Good Practice.	Contractor	Construction
Provide voluntary and free counselling, free testing and condom distribution services.	Contractor	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement.</li> <li>» All areas are rehabilitated promptly after construction in an area is complete.</li> <li>» Excess vegetation clearing and levelling is not undertaken.</li> <li>» No complaints regarding contractor behaviour or habits.</li> <li>» Appropriate training of all staff is undertaken prior to them commencing work on the construction site.</li> <li>» Code of Conduct drafted before commencement of the construction phase.</li> <li>» Compliance with Occupational Health and Safety Act (Act No. 85 of 1993)</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Proof of disposal of sewage at an appropriate licensed wastewater treatment works.</li> <li>» Proof of disposal of waste at an appropriate licensed waste disposal facility.</li> <li>» An incident reporting system should be used to record non-conformances to the EMPr.</li> <li>» Observation and supervision of Contractor practices throughout the construction phase by the EO.</li> <li>» Complaints will be investigated and, if appropriate, acted upon.</li> </ul>

### OBJECTIVE 3: Limit the ecological footprint of the pipeline

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Loss of threatened flora and faunal species.</li> <li>» Removal of wetland habitat.</li> <li>» Erosion of soils surrounding wetland.</li> <li>» Potential proliferation of alien and invasive species within the wetland.</li> <li>» Contamination of wetland areas as a result of spillages</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Vegetation clearance</li> <li>» Fuelling, usage and maintenance of construction vehicles.</li> <li>» Cement usage.</li> <li>» Labourer using ablution facilities.</li> <li>» Use of any chemicals or hazardous materials/dangerous goods during construction.</li> <li>» Movement of construction vehicles in the area and on-site</li> <li>» Transport to and from the temporary construction area/s.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Reduce potential loss of habitat and ecological structure</li> <li>» No incidents related to spills of chemicals and hazardous materials.</li> <li>» No release of contaminated water in watercourses including streams and pans.</li> <li>» No loss of or damage to vegetation in areas outside the immediate development footprint.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified person.	Developer Contractor	Site establishment and Construction.
Vegetation clearance must start in the dry season as far as possible.	Developer Contractor	Site establishment and Construction.
Ensure that vegetation is not unnecessarily cleared or removed during the construction phase. Avoid clearing the vegetation cover all at once; the study area can be divided into subsections that will be progressively cleared only when required according to the construction schedule.	Contractor	Site establishment and Construction.
Ensure that no activities infringe on identified no-go, very high and high sensitivity areas.	Contractor	Construction
Where erosion takes place, the EO must inspect the degree of erosion and propose suitable mitigation measures to prevent further erosion.	Contractor EO	Site establishment and duration of contract.
If there are active nests near construction areas, these should be reported to the ECO and should be monitored until the birds have finished nesting and the fledglings have left the nest.	Contractor	Pre-construction and Construction
No killing and poaching of any wild animal is to be allowed. This should be clearly communicated to all employees and subcontractors by the EO.	EO Contractor	Pre-construction and duration of project.
EO to enforce a ban on hunting and collecting of avifauna or their products (e.g. eggs and nestlings).	EO	Pre-construction and Construction.
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
No laydown areas, operation and maintenance buildings are to be established in the wetland areas and associated buffer zones.	Contractor	Pre-construction, construction
Vehicle movement within the wetlands must be prohibited, and existing service roads utilised were practical and feasible.	Contractor	Construction
Ensure strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.). General storage of fuels, oils and any other hazardous substances must be contained in bunded areas.	Contractor	Construction
All vehicles and machinery must be checked for leaks before being allowed to operate on the project site. Should leaks be detected, the relevant vehicles and machinery must be repaired before being allowed to operate on the project site.	Contractor	Construction
Temporary sanitation facilities may not be placed directly or within 100m of the depression wetland or the artificial drainage channel.	Contractor	Construction
Temporary sanitation facilities must be regularly checked for leaks and spillages, and repaired where any leakages are detected before being allowed for use on the project site.	Contractor	Construction
Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.	Contractor	Site establishment, and Construction
Rehabilitate all disturbed areas, construction areas, servitudes, etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.	Contractor	Upon completion of construction, or on an ongoing basis during construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No major preventable spillages are recorded.</li> <li>» No erosion recorded within the depression wetland adjacent to the development area.</li> <li>» No degradation of the water resources within the development area.</li> <li>» Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.</li> <li>» Avifaunal microhabitat loss restricted to infrastructure footprint.</li> <li>» Low disturbance and impact on red-listed avifaunal species.</li> <li>» No disturbance of breeding raptors (i.e. no nest abandonment due to disturbance).</li> <li>» No poaching or collecting of avifauna or their products (e.g. eggs and nestlings) by construction personnel.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitor management measures in place for potentially hazardous materials.</li> <li>» Monitoring occurrence of erosion and degradation within the depression wetland.</li> <li>» Monitoring of vegetation clearing during construction (by contractor as part of construction contract).</li> <li>» Vegetation is cleared only within footprint areas during construction.</li> </ul>

#### **OBJECTIVE 4: Appropriate handling and management of waste**

The construction of the Wilmar Vegetable Oil Pipeline will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generation by the construction activities include:

- » general solid waste
- » hazardous waste
- » liquid waste (including grey water and sewage)

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
<b>Activity/Risk Source</b>	» Hydrocarbon use and storage » Spoil material from excavation, earthworks and site preparation » Other construction wastes
<b>Mitigation: Target/Objective</b>	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Construction
Ensure no illegal dumping of waste.	Contractor	Duration of contract
Specific areas must be designated on-site for the temporary management of various waste streams. Location of such areas must minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.	Contractor	Duration of contract
Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate.	Contractor	Duration of construction
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Slips of disposal to be retained as proof of responsible disposal. <u>These should be made available to the KZN Department of Water and Sanitation as and when required.</u>	Contractor	Maintenance: duration of contract within a particular area
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of waste.	Contractor	During and post construction.
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
SABS approved spill kits to be available on site and easily accessible.	Contractor	Duration of contract
Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	Contractor	Duration of contract
Under no circumstances may waste be burnt on site.	Contractor	Duration of construction
<u>Stockpiling of soil or any other materials during construction must not be allowed near steep slopes or watercourses.</u>	<u>Contractor</u>	<u>Duration of construction</u>
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose.	Contractor	Completion of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping.</li> <li>» Appropriate waste management measures implemented.</li> <li>» Provision of all appropriate waste manifests for all waste streams.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of waste management practices throughout construction phase.</li> <li>» Waste collection will be monitored on a regular basis.</li> <li>» Waste documentation completed.</li> <li>» Proof of disposal of sewage at an appropriate wastewater treatment works.</li> <li>» A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

#### **OBJECTIVE 5: Appropriate handling and storage of chemicals, hazardous substances**

The construction phase may involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Temporary laydown area.</li> <li>» Temporary hydrocarbon and chemical storage areas.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Release of contaminated water from contact with spilled chemicals.</li> <li>» Generation of contaminated wastes from used chemical containers.</li> </ul>

	» Soil pollution.
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Vehicles associated with site preparation and earthworks.</li> <li>» Construction activities of linear infrastructure.</li> <li>» Hydrocarbon spills by vehicles and machinery during vegetation clearance and transport of workers, materials and equipment and fuel storage tanks.</li> <li>» Accidental spills of hazardous chemicals.</li> <li>» Pollution from concrete mixing.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons.</li> <li>» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.</li> <li>» Prevent and contain hydrocarbon leaks.</li> <li>» Store hazardous chemicals safely in a bunded area.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
Establish an appropriate Hazardous Stores which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This should include but not be limited to: <ul style="list-style-type: none"> <li>» Designated area;</li> <li>» All applicable safety signage;</li> <li>» Firefighting equipment;</li> <li>» Enclosed by an impermeable bund;</li> <li>» Protected from the elements,</li> <li>» Lockable;</li> <li>» Ventilated; and</li> <li>» Has adequate capacity to contain 110% of the largest container contents.</li> </ul>	Contractor	Duration of Contract
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract
Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
All stored fuels to be maintained within an appropriate bund and on a sealed surface as per the requirements of SABS 089:1999 Part 1 and any relevant by-laws.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	Contractor	Construction
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	Contractor	Construction
Minimise fuels and chemicals stored on site.	Contractor	Construction
<u>Should any hazardous substances be stored on site, these should not pose a risk to the environment, and must be kept outside the 1:100 year flood line. A bund wall must be built around the storage areas and access must be restricted to authorized personnel only.</u>	<u>Contractor</u>	<u>Construction</u>
Implement a <u>Spillage Contingency Plan</u> to handle spills, so that environmental damage is avoided.	Contractor	Construction
<u>In the event of a spillage, the following procedure should be followed:</u> » <u>Stop the spill at the source.</u> » <u>Contain the spill.</u> » <u>Remove the spillage for authorised disposal.</u> » <u>Assess and determine if there was any impact to the natural environment following the spill.</u> » <u>Where necessary, undertake remedial actions in consultation with KZN DWS.</u> » <u>Record the incident and keep all records.</u>	<u>Contractor</u> <u>EO</u>	<u>Construction</u> and <u>duration of contract</u>
<u>Should any significant spillages of fuels or chemicals occur during construction, these should be reported to the KwaZulu-Natal Provincial Department of Water and Sanitation:</u>  <u>9<sup>th</sup> Floor, Southern Life Building</u> <u>88 Joe Slovo Street</u> <u>Durban</u> <u>4000</u> <u>Tel: (035) 336 2700</u> <u>Fax: (031) 336 2849</u>	<u>Contractor</u> <u>EO</u>	<u>Construction</u>
No refuelling, servicing of plant/equipment or chemical substance storage allowed outside of designated areas.	Contractor	Construction
Drip trays should be used during al fuel/chemical dispensing.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No chemical spills outside of designated storage areas.</li> <li>» No water or soil contamination by spills.</li> <li>» No complaints received regarding waste on site or indiscriminate dumping.</li> <li>» Safe storage of hazardous chemicals.</li> </ul>
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<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase.</li> <li>» A complaints register must be maintained, in which any complaints from the community will be logged.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> <li>» On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures.</li> </ul>
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### OBJECTIVE 6: Protection of Heritage Resources

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	» Heritage objects or artefacts found on site are inappropriately managed or destroyed.
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks.</li> <li>» Foundations or plant equipment installation.</li> <li>» Mobile construction equipment movement on site.</li> </ul>
<b>Mitigation: Target/Objective</b>	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow if they find sites. All staff should also be familiarised with procedures for dealing with heritage objects/sites.	Contractor, ESA and heritage specialist	Duration of contract, particularly during excavations
Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	Contractor EO	Pre-construction, Construction and Duration of contract.
Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor	Construction
A Chance Find Procedure must be developed and implemented in the event that archaeological or palaeontological resources are found. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.	Developer Contractor	Construction and duration of contract
Chance fossil finds such as invertebrate remains should be safeguarded preferably in-situ and reported by the EO as soon as possible to the KwaZulu-Natal Provincial Heritage Authority (Amafa)	EO Archaeologist	Construction and duration of contract.
<p>Contact Details:</p> <p>195 Langalibalele Street P.O Box 2685 Pietermaritzburg 3201 Tel: +27 (033) 394 6543</p>		



Mitigation: Action/control	Responsibility	Timeframe
Fax: +27 (033) 342 6097 www.hertiagekzn.co.za		

### 6.3 Detailing Method Statements

**OBJECTIVE 7: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimize environmental risk.**

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

- » Responsible person/s;
- » 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 may occur;
- » Timing and location of activities;
- » Compliance/non-compliance with the Specifications; and
- » Any other information deemed necessary by the Site Manager.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- » Preparation of the site (i.e. clearing vegetation, etc).
- » Soil management/stockpiling and erosion control.
- » Excavations and backfilling procedure.
- » Ablution facilities (placement, maintenance, management and servicing).
- » Solid Waste Management:
  - \* Description of the waste storage facilities (on site and accumulative).

- \* Placement of waste stored (on site and accumulative).
- \* Management and collection of waste process.
- \* Recycle, re-use and removal process and procedure.
- » Liquid waste management.
- » Dust and noise pollution:
- » Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of harmful and hazardous substances and materials. South African National Standards apply).
  - \* Lists of all potentially hazardous substances to be used.
  - \* Appropriate handling, storage and disposal procedures.
  - \* Prevention protocol of accidental contamination of soil at storage and handling areas.
  - \* All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
- » Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - \* Rehabilitation, re-vegetation process and bush clearing.
- » Incident and accident reporting protocol.
- » General administration
- » Designate access road and the protocols while roads are in use.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager (with input from the ECO), except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

#### **6.4 Awareness and Competence: Construction Phase**

**OBJECTIVE 8: Ensure all construction personnel have the appropriate level of environmental and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm**

To achieve effective environmental management, it is important that all personnel involved in the project are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The EO is responsible for ensuring compliance pre, during and post construction. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

- » All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.

- » The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity are to have copies of the relevant Method Statements and be aware of the contents thereof.
- » Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff are aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
  - \* Records must be kept of those that have completed the relevant training.
  - \* Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
  - \* Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- » All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- » Contractors and main sub-contractors should have a basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- » Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- » Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

#### **6.4.1 Environmental Awareness and Induction Training**

The EO, in consultation with the contractor, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMPr and the environmental requirements it prescribes. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, induction training should include:

- » Explanation of the importance of complying with the EMPr;
- » Explanation of the importance of complying with the Environmental Authorisation;
- » Discussion of the potential environmental impacts of construction activities;
- » Awareness regarding sensitivities on the site, including sensitive plant species (including the use of visual aids and on-site identification);
- » The benefits of improved personal performance;
- » Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractor's Health and Safety Representative);

- » Explanation of the mitigation measures that must be implemented when carrying out their activities; and
- » Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).

Environmental Awareness Training must take the form of an on-site talk and demonstration by the EO/ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the EO/ECO on site. Proof of awareness training should be kept on record. Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's Environmental Officer and should include discussing the developer's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO on site.

#### **6.4.2 Toolbox Talks**

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and ones recommended by the on-site EO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

#### **6.5 Monitoring Programme: Construction Phase**

**OBJECTIVE 8: To monitor the performance of the control strategies employed against environmental objectives and standards**

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). Where this is not clearly dictated, Wilmar Processing (Pty) Ltd will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/ Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications
- » Ensure adequate and appropriate interventions to address non-compliance
- » Ensure adequate and appropriate interventions to address environmental degradation
- » Provide a mechanism for the lodging and resolution of public complaints
- » Ensure appropriate and adequate record keeping related to environmental compliance
- » Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site
- » Aid in communication and feedback to authorities and stakeholders

All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the Kwa-Zulu Natal Provincial Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA) in terms of the Environmental Authorisation..

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

#### **6.5.1 Non-Conformance Reports**

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

#### **6.5.2 Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis (or on a period determined by the Competent Authority) and must be submitted to the Director: Compliance Monitoring at KZN EDTEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the KZN EDTEA regarding waste related activities.

#### **6.5.3 Audit Reports**

The holder of the Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr remain valid, ensure that project compliance with the conditions of the Environmental Authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the KZN EDTEA.

An environmental internal audit must be conducted and submitted every 3 months and an external audit must be conducted once a year. An annual audit report must be compiled and submitted to the KZN EDTEA until the completion of the construction and rehabilitation. This report must be compiled in accordance

with Appendix 7 of the EIA Regulations, 2014, as amended, and indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

#### **6.5.4 Final Audit Report**

A final environmental audit report must be compiled by an independent auditor and must be submitted to the KZN EDTEA upon completion of the construction and rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

## CHAPTER 7: MANAGEMENT PROGRAMME: REHABILITATION

**Overall Goal:** Undertake the rehabilitation measures in a way that:

- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

### 7.1 Objectives

In order to meet this goal, the following objectives, actions and monitoring requirements are relevant:

#### **OBJECTIVE 1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed**

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

<b>Project Component/s</b>	» Pipeline corridor
<b>Potential Impact</b>	» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
<b>Activity/Risk Source</b>	» Temporary construction areas » Other disturbed areas/footprints
<b>Mitigation: Target/Objective</b>	» Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Compile and implement a revegetation and rehabilitation plan	Contractor	Following execution of the works
All temporary facilities, equipment, and waste materials must be removed from site as soon as construction is completed.	Contractor	Following execution of the works
<u>Utilise indigenous perennial shrubs and grasses from the local area during rehabilitation of construction areas.</u>	<u>Contractor</u>	<u>Rehabilitation</u>
Remove demarcation measures around protected plant trees species.	Contractor	Following completion of construction activities in an area
No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.	Contractor	Following completion of construction activities in an area
All hardened surfaces within the construction equipment camp area should be ripped, all imported materials removed. Where relevant, the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area

Mitigation: Action/Control	Responsibility	Timeframe
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
Where disturbed areas are not to be used during the operation of the proposed pipeline, these areas must be rehabilitated/re-vegetated with appropriate natural indigenous vegetation and/or local seed mix.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated areas may need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Proponent in consultation with rehabilitation specialist	Post-rehabilitation
On-going alien plant monitoring and removal must be undertaken on an annual basis.	Proponent	Post-rehabilitation
A site rehabilitation programme should be implemented and this should be developed in collaboration with specialists following completion of construction	Contractor in consultation with Specialist	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» All portions of the site, including construction equipment camp and working areas, cleared of equipment and temporary facilities.</li> <li>» Topsoil replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas.</li> <li>» Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites.</li> <li>» Completed site free of erosion and alien invasive plants.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented during the operational lifespan of the facility.</li> <li>» On-going alien plant monitoring and removal should be undertaken on an annual basis.</li> </ul>



## CHAPTER 8: MANAGEMENT PROGRAMME: OPERATION

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**Overall Goal:** To ensure that the operation of the pipeline does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the pipeline in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- » Enables the operation activities to be undertaken without significant disruption to other land uses in Richards Bay Industrial Development Zone (RBIDZ)
- » Minimises impacts on fauna using the site.

An environmental manager must be appointed during operation whose duty it will be to ensure the implementation of the operational EMPr.

### 8.1 Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements

**OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr during the operation phase.**

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Operations Manager, and Environmental Manager for the operation phase of this project are detailed below.

The **Operations Manager** will:

- » Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
- » Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
- » Take appropriate action as a result of findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.

The **Technical/SHEQ Manager** will:

- » Develop and Implement an Environmental Management System (EMS) for the vegetable oil pipeline and associated infrastructure.
- » Manage and report on the pipeline's environmental performance.
- » Maintain a register of all known environmental impacts and manage the monitoring thereof.
- » Conduct internal environmental audits and co-ordinate external environmental audits.
- » Liaise with statutory bodies such as the Kwa-Zulu Natal Provincial Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA).
- » Conduct environmental training and awareness for the employees who operate and maintain the vegetable oil pipeline.

- » Compile environmental policies and procedures.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

## **OBJECTIVE 2: Limit the ecological footprint of the pipeline**

Indirect impacts on vegetation and terrestrial fauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated, post-construction must be undertaken until these areas have successfully re-established.

<b>Project Component/s</b>	» Pipeline
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Disturbance to or loss of vegetation and/or habitat.</li> <li>» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.</li> <li>» Mortality and disturbance of fauna and avifauna within and beyond the footprint of the pipeline due to the presence of personnel and the movement of vehicles in the area.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Movement of employee vehicles within and around the site.</li> <li>» Human presence</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Maintain minimised footprints of disturbance of vegetation/habitats on-site.</li> <li>» Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Rehabilitate disturbed areas should the previous attempt be unsuccessful.	Developer	Operation
Any vegetation clearing that needs to take place as part of the maintenance activities must be done in an environmentally friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.	Developer	Operation and maintenance
Vehicle movements must be restricted to designated access roads.	Developer	Operation
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Developer	Operation
Maintain erosion control measures implemented during the construction phase.	Developer	Operation
Site access should be controlled and only authorised staff and contractors should be allowed on-site.	Developer	Operation
Any maintenance activities should avoid listed plant species and strive to keep the footprint as low as possible.	Developer	Operation
No herbicides should be used and if vegetation clearing needs to take place, this should be done by hand.	Developer	Operation
An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Developer	Operation

Mitigation: Action/Control	Responsibility	Timeframe
The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.	Developer	Operation
Mounting structures are to be monitored post-construction for erosion and subsidence around the depression wetland and artificial drainage channel. This should be undertaken once every year for a period of two (2) years post-construction by an appropriate agent to check on the structural integrity of the structures. If erosion is observed, appropriate measures should be implemented to manage this	Developer	Operation
Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities must be removed to a safe location.	Developer	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Limited soil erosion around site.</li> <li>» No further disturbance to vegetation or terrestrial faunal habitats.</li> <li>» No poaching or collecting of avifauna or their products (e.g. eggs and nestlings) by maintenance personnel.</li> <li>» Continued improvement of rehabilitation efforts.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.</li> </ul>

### **OBJECTIVE 3: To ensure vegetable oil spills, leaks and rupture of the pipeline are effectively contained**

Taking into consideration that the pipeline is located within 32m of a depression wetland, there could be unforeseen and indirect impacts on the riparian habitat associated with the wetland in the event of a significant spill or a rupture of the pipeline as a result of mechanical faults. Therefore, in order to ensure long-term environmental integrity of the natural environment within which a portion of the pipeline will be located, the mechanical integrity and operability of the pipeline should be monitored at pre-determined periods by Wilmar Processing (Pty) Ltd.

<b><u>Project Component/s</u></b>	» <u>Pipeline</u>
<b><u>Potential Impact</u></b>	» <u>Disturbance and alteration to ecological processes within the depression wetland.</u>
<b><u>Activities/Risk Sources</u></b>	<ul style="list-style-type: none"> <li>» <u>Leaks on the pipeline.</u></li> <li>» <u>Mechanical failure on the pipeline due to human error during the mechanical integrity inspection.</u></li> <li>» <u>Potential rupture of the pipeline as a result of sudden pressure surge during pumping.</u></li> <li>» <u>Corrosion of carbon steel.</u></li> </ul>
<b><u>Mitigation: Target/Objective</u></b>	<ul style="list-style-type: none"> <li>» <u>Implement an inspection programme to ensure maintenance the mechanical integrity of the pipeline, valves and other associated process equipment.</u></li> <li>» <u>Prepare and implement Standard Operating Procedures (SOPs) for the pumping of vegetable from the vessels, as well as for the activities associated with undertaking maintenance work and routine checks on the pipeline.</u></li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
<p><u>Monitor the pipeline, valves and joints for potential mechanical failure points. These should be reported to the Technical or Operations Manager immediately.</u></p>	<p><u>Developer</u></p>	<p><u>Operation</u></p>
<p><u>In the event of a significant spill or leak, the following procedure should be followed in addition to that provided by SOPs:</u></p> <ul style="list-style-type: none"> <li>* <u>Stop the spill or leak at the source.</u></li> <li>* <u>Contain the spill.</u></li> <li>* <u>Remove the spillage for authorised disposal.</u></li> <li>* <u>Assess and determine if there was any impact to the natural environment following the spill.</u></li> <li>* <u>Where necessary, undertake remedial actions in consultation with KZN DWS.</u></li> </ul>	<p><u>Developer</u></p>	<p><u>Operation</u></p>
<p><u>Undertake non-destructive tests on the pipeline continuously to ensure its competency to handle the envisaged volume of raw material (vegetable oil) being transported from the Richards Bay Port to the oil processing facility at Phase 1A of the RBIDZ.</u></p>	<p><u>Developer</u></p>	<p><u>Operation</u></p>

## CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

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The Wilmar Vegetable Oil Pipeline is expected to have a lifespan of at least 20 years (with routine maintenance). The infrastructure would only be decommissioned and rehabilitated once it has reached the end its economic life. It is most likely that decommissioning activities of the infrastructure of the pipeline considered in the BA process would comprise the disassembly and replacement of the individual components with more appropriate technology/infrastructure available at that time.

The relevant mitigation measures contained under the construction section of this EMPr

### » **Site Preparation**

Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

### » **Disassemble and Remove Infrastructure**

Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements.

## 9.1. Objectives

Within a period of at least 12 months prior to the decommissioning of the site, a Decommissioning Method Statement must be prepared and submitted to the City of uMhlatuze Local Municipality, as well as the KZN EDTEA. This method statement must cover site restoration, soil replacement, landscaping, conservation, and a timeframe for implementation. Furthermore, this decommissioning must comply with all relevant legal requirements administered by any relevant and competent authority at that time.

The objectives of the decommissioning phase of the proposed project are to:

- » Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
- » Implement progressive rehabilitation measures, beginning during the construction phase.
- » Leave a safe and stable environment for both humans and animals and make their condition sustainable.
- » Return rehabilitated land-use to a standard that can be useful to the post-project land user.
- » Where applicable, prevent any further soil and surface water contamination by maintaining suitable storm water management systems.
- » Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

## 9.2. Approach to the Decommissioning Phase

It is recommended that planning of the decommissioning of the project and rehabilitation of the site should take place well in advance (at least two years) of the planned decommissioning activities. Important factors that need to be taken into consideration are detailed below.

- » Remove the vast majority of the oil inside the pipeline, using specially designed cleaning instruments;
- » Clean the pipeline using a combination of cleaning instruments and chemicals to wipe and clean the pipeline.
- » Disconnect the pipeline, this will entail sealing off any active facilities like the pump station (at the proposed Wilmar Processing Facility), to prevent the oil, or any other material or organisms (i.e. fauna species like rodents) from re-entering the decommissioned pipeline;
- » Segment the pipeline with permanent physical barriers to prevent it from acting as a water conduit. Segmentation plugs are strategically placed along sections of the pipeline;
- » All concrete and imported foreign material must be removed along the pipeline route, i.e. Overhead Steel Bridges, and Access Duct Shafts;
- » Any foundations of the Access Duct Shafts and Overhead Steel Bridges must be removed, levelled and be covered with subsoil and topsoil;
- » Infrastructure that will not be required following the decommissioning of the pipeline must be removed along the pipeline route;
- » Access roads and servitudes not required for the post-decommissioning use of the site must be rehabilitated. If necessary, an ecologist should be consulted to give input into rehabilitation specifications;
- » Tracks that are to be utilised for the future land use operations should be left *in-situ*. The remainder of the tracks to be removed (ripped) and topsoil replaced;
- » All ancillary buildings and access points are to be removed unless they can be used for the future land use;
- » All material (pipeline, bolts, components used to the join the pipeline etc.) must be re-used or recycled wherever possible;
- » The competent authority may grant approval to the owner not to remove the landscaping and underground foundations;
- » The site must be seeded with locally sourced indigenous vegetation to allow revegetation of the site; and
- » Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.

**Appendix A:**  
**Curriculum Vitae of the Project Team**

## CURRICULUM VITAE OF KHOMOTJO REUBEN MAROGA

<b>Profession :</b>	Environmental Consultant
<b>Specialisation:</b>	Environmental Impact Assessments, Basic Assessments, Site Visits, Compilation of Environmental Management Programmes and Liaison with authorities
<b>Work Experience:</b>	2.5 years of experience in the environmental management field

### VOCATIONAL EXPERIENCE

Khomotjo Reuben Maroga has two years of experience in the environmental field. He has worked on a mining infrastructure project in compiling environmental control officer's reports and conducting air and groundwater monitoring using the DustTrak DRX Aerosol Monitor and a Bailer as apparatuses. Additionally, he has provided assistance to Eco-Elementum & Engineering on WUL applications and EIAs.

### SKILLS BASE AND CORE COMPETENCIES

- ECO Report writing
- Environmental monitoring
- Administrative tasks

### EDUCATION AND PROFESSIONAL STATUS

#### Degrees:

- B.Sc. (Hons) Geology, University of Johannesburg, 2016
- B.Sc. Geology and Environmental Management, University of Johannesburg, 2015

#### Courses:

- Business Communication, ProEarth Learning Academy (Pty) in Middelburg (2018)
- Describe the functions of a Health and Safety representative, Elite Training (Pty) Ltd in Middelburg (2017)
- Basic Fire Fighting, Elite Training (Pty) Ltd in Middelburg (2017)
- Combined OSHAS 18001: 2007 and ISO 14001: 2015 Introduction, NOSA in eMalahleni (2017)
- Combined OSHAS 18001: 2007 and ISO 14001: 2015 Implementation (2017), NOSA in eMalahleni (2017)
- Emotional Intelligence, LearnMe (Pty) Ltd in Middelburg (2017)



**EMPLOYMENT**

Date	Company	Roles and Responsibilities
October 2018 - current	Savannah Environmental (Pty) Ltd	Environmental Consultant  <i>Tasks include:</i> Applying applicable legislation, research of related environmental policy documentation required for EIAs, efficient and quality report writing, liaison with relevant environmental authorities, site visits, compilation of application forms, environmental management programmes (EMPrs) and public participation include documentation. Other related tasks include undertaking water use license applications, environmental auditing (Environmental Control Officer – ECO work) and any other related authorisation, permitting and licensing tasks (on an as and when required basis).
September 2016 - October 2018	Yoctolux Collieries (Pty) Ltd	Environmental Management Intern  <i>Tasks included:</i> Drafting monthly ECO reports, conducting monthly environmental monitoring, providing assistance on WULAs and EIAs to Eco-Elementum & Engineering (Pty) Ltd and providing oversight on IAPs eradication and management programme.
January – September 2016	University of Johannesburg Auckland Park, Kingsway Campus	Second-year Practical Demonstrator  <i>Tasks included:</i> Marking of practical's, attending to any ad-hoc administrative duties and liaising with designated lecturers.

**PROJECT EXPERIENCE****Mining Projects: Coal Mining****Water Use Licence Application**

Project Name & Location	Client Name	Role
Compiling a water use licence report for an underground coal mining development (Tala Bethal Coal) in Hendrina, Mpumalanga.	Diepsoils Investments (Pty) Ltd Vernon Siemelink: 072 196 9928	Assistant

**Waste Treatment Works**

Project Name & Location	Client Name	Role
Kriel Power Station Lime Plant Upgrade, Kriel, Mpumalanga	Eskom Holdings SOC Limited Khuliso Rasimphi : 017 615 2634	Junior EAP

## Renewable Energy

### Basic Assessments

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Basic Assessment Process for Sirius 2x 100MW Solar Photovoltaic facilities, Upington, Northern Cape	SOLA Future Energy (Pty) Ltd Tseliso Mahao: 076 067 8221	Junior EAP
Basic Assessment Process for Aggeneys 2x 100MW Solar Photovoltaic facilities, Aggeneys, Northern Cape.	Atlantic Energy Partners (Pty) Ltd and ABO Wind AG Sonia Mischczak: 021 418 2596	Junior EAP

### Section 53 Applications

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Section 53 applications for the Veld PV North and PV South, Northern Cape.	Veld Renewables (Pty) Ltd Jason Cope: 021 020 1044/ 082 598 1123	EAP

### Part 1 Amendments

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
20MW Konkoonsies Solar Photovoltaic facility, Pofadder, Northern Cape.	Biotherm Energy (Pty) Ltd Michael Barnes: 011 367 4600	Junior EAP
10MW Aries Solar PV Photovoltaic facility, near Kenhardt, Northern Cape.	Biotherm Energy (Pty) Ltd Michael Barnes: 011 367 4600	Junior EAP
27MW Klipheuwel/Dassiefontein Wind Energy facility near Calendon, Western Cape.	Biotherm Energy (Pty) Ltd Michael Barnes: 011 367 4600	Junior EAP
Matzikama Solar PV Photovoltaic facility, near Vredendal, Western Cape.	SolaireDirect (Pty) Ltd Reggie Niemand: 082 674 1233	EAP
Grootspruit Solar PV Photovoltaic facility, near Welkom, Free State.	SolaireDirect (Pty) Ltd Reggie Niemand: 082 674 1233	EAP
Reddersburg Solar PV Photovoltaic facility, near Reddersburg, Free State.	SolaireDirect (Pty) Ltd Reggie Niemand: 082 674 1233	EAP
Graspan Solar PV Photovoltaic facility, near Hopetown, Northern Cape	SolaireDirect (Pty) Ltd Reggie Niemand: 082 674 1233	EAP

## Infrastructure Development

### Basic Assessments

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Basic Assessment Process for the Wilmar Vegetable Oil Pipeline, Richards Bay, Kwa-Zulu Natal.	Wilmar Processing (Pty) Ltd Aidan Dowdle: 082 872 3628	Junior EAP

## Waste Management

### Basic Assessments

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
<i>Decommissioning of the Asbestos landfill at the Kriel Power Station, Mpumalanga. .</i>	<i>Eskom Holdings SOC Limited Khuliso Rasimphi : 017 615 2634</i>	<i>EAP</i>

## CURRICULUM VITAE OF GIDEON RAATH

<b>Profession :</b>	Environmental and Permitting Consultant
<b>Specialisation:</b>	Environmental Impact Assessments, Water Use Licencing, Waste Licencing, Environmental Compliance Officer, Ecological Specialist, Wetland Specialist, GIS, MPRDA permitting
<b>Work Experience:</b>	5 years' experience in environmental management, project management, National Water Act, Mineral and Petroleum Resources Development Act, ECO and compliance auditing, wetland and ecological specialist reporting

### VOCATIONAL EXPERIENCE

Gideon holds an MSc (Geography and Environmental Management; SU), a BSc Honours (Ecology and Environmental Studies - Cum laude; Wits) and a BSc (Geography and Environmental Management; UJ). His MSc thesis focused on the hydrological impact on the spatial distribution of invasive Eucalyptus trees along the Breede River, while his honours thesis evaluated ethnobotanical relationships around the Rio Tinto copper mine in Phalaborwa. Most recently he has worked as an Environmental Consultant at EOH Coastal and Environmental Services (EOH CES), conducting environmental authorisations applications (NWA, NEMA, MPRDA), Public Participation Processes, GIS specialisation as well as Ecological and Wetland specialist studies. Previously, Gideon worked as the Monitoring & Evaluation Project Manager for the City of Cape Town's invasive species unit (Environmental Resources Management Department).

Gideon's GIS background includes the management of the City of Cape Town invasive species GIS database, involving the storage, management, recall and quality control off all sightings, clearance visits and known infestations. Further experience include mapping for various consulting projects, boundary verification through ground-truthing and the spatial mapping and delineation component of this MSc research. Gideon has further attended public participation workshops, and has been involved with IAP identification, translation, public meetings and engagement for a variety of projects, mainly within the Afrikaans speaking Northern Cape. Gideon is interested in invasion ecology, treatment of groundwater pollution through phytoremediation, botanical and wetland specialist studies, GIS application for ecology and environmental management, and the EIA processes in general.

### SKILLS BASE AND CORE COMPETENCIES

- Environmental Management
- Project Management
- GIS data manipulation, storage, management and mapping
- EIA Impact Assessments and Basic Assessment
- Environmental Management Programmes
- Environmental Compliance Monitoring
- Mining Rights, Mining Permits, Prospecting Rights (and renewal) applications (MPRDA & NEMA)
- Public and Stakeholder Engagement (NEMA)
- Ecological/Botanical Specialist Studies

- Wetland Delineation, Functional and Impact Assessment studies
- Water Use Licence Applications (NWA)
- General Authorisations (NWA)

## EDUCATION AND PROFESSIONAL STATUS

### Degrees:

- M.Sc. Geography and Environmental Science (2014), Stellenbosch University (2014)
- B.Sc. (Hons) Ecology, Environment and Conservation (Cum Laude), University of the Witwatersrand (2011)
- B.Sc. Life and Environmental Sciences, University of Johannesburg (2010)

### Short Courses:

- GroundTruth SASS5 competency course, GroundTruth Aquatic Consulting (2017)
- DWS 21C&I GA training workshop, Department of Water and Sanitation (2016)
- IAIAAsa Public Participation Process Workshop, IAIA South Africa (2016)
- EIA Theory and application, EOH Coastal and Environmental Services (2015)
- Water Safety Training, City of Cape Town Environmental Resources Department (2014)
- Herbicide safety and application for weed control, City of Cape Town Environmental Resources Department (2014)
- Snake awareness training, City of Cape Town Environmental Resources Department (2014)
- Habitable Planet Workshop, Applied Centre for Climate & Earth Systems Science, Cape Town (2011)

### Professional Society Affiliations:

- South African Council for Scientific Natural Professionals (SACNASP): Certified Natural Scientist – Pr.Sci.Nat. (Membership No.: 117178)
- Golden Key International Honour Society – University of the Witwatersrand Chapter
- IAIAAsa (Membership No.: 3619)

### Other Relevant Skills:

- GPS use, spatial data capturing and ground truthing

## EMPLOYMENT

Date	Company	Roles and Responsibilities
October 2018 - Current:	Savannah Environmental (Pty) Ltd	<p>Environmental and Permitting Consultant</p> <p><u>Tasks include:</u> Gideon is responsible for overall Project Management, including budgeting, time allocation and performance, resource allocation, staffing allocation and performance and strategic control of project related risks, including amongst others document review and quality control, specialist liaison and quality control, and project team management (both internal &amp; external)</p> <p>Further tasks include undertaking environmental impact assessments, basic assessments, environmental management programmes</p>

Date	Company	Roles and Responsibilities
		(EMPrs), environmental amendments, water use license applications, general authorisations, wetland assessments, botanical/ecological assessments, mining rights and permit applications, prospecting rights applications, environmental compliance officer audits and reporting, Ensuring environmental compliance on permitting processes, client liaison and relationship management.
<b>February 2015 – September 2018</b>	EOH Coastal and Environmental Services (Pty) Ltd	<p>Senior Environmental Consultant</p> <p><u>Tasks included:</u>            Undertaking environmental impact assessments, basic assessments, environmental management programmes (EMPrs), environmental amendments, water use license applications, general authorisations, wetland assessments, botanical/ecological assessments, mining rights and permit applications, prospecting rights applications, environmental compliance officer audits and reporting, Ensuring environmental compliance on permitting processes, client liaison and relationship management, public participation processes for environmental authorisations.</p> <p><u>Responsibilities included:</u></p> <ul style="list-style-type: none"> <li>• Project finance control;</li> <li>• Project schedule control;</li> <li>• Specialist liaison and deliverable quality control;</li> <li>• Competent authority liaison and project risk control;</li> <li>• Project team management (internal and external);</li> <li>• Deliverables and delegation thereof;</li> <li>• Strategic project risk management (with oversight)</li> </ul>
<b>March 2014 – February 2015</b>	Invasive Species Unit (ISU), Environmental Resources Management Department (ERMD), City of Cape Town	<p>Professional Officer</p> <p><u>Tasks included:</u> Managed the Monitoring &amp; Evaluation project portfolio, entailing the establishment of an invasive species monitoring &amp; evaluation system for the ISU, as well as GIS database management, quality assurance and reporting thereof. Position required managing a small staff compliment (dealing directly with GIS database management), managing time and budgets for the monitoring division, conducting monitoring trials and research, writing species management plans as well as handling the GIS</p>

Date	Company	Roles and Responsibilities
		database, quality control, verification and integrity for the ISU.
<b>January 2012 – March 2014</b>	University of Stellenbosch	Departmental Assistant  <u>Tasks included:</u> Technical editing of academic reports. Formatting of PhD and MSc reports on a weekly basis, with short turnaround time and good quality feedback.
<b>January 2011 – January 2012</b>	University of the Witwatersrand	Departmental Assistant  <u>Tasks included:</u> Responsible for practical tutorials and marking of 1st year medical students. Included zoology and botany.
<b>January 2006 – November 2010 (part time)</b>	Codeon Networking CC	Co-founder and web developer  <u>Tasks included:</u> Small business owner, responsible for all facets of the business. Self-taught HTML, CSS, PHP and MySQL. Won and produced two medium enterprise websites serving the gaming community. Websites required user profiles & permissions, CMS system and automated payment options as functionality. Development and maintenance of a user database and account management system.

## PROJECT EXPERIENCE

Project experience includes project management (all facets), EIA, BA and EMPr documentation development, integrated water use license applications, general authorisations, specialist botanical and ecological impact assessments, specialist wetland delineation and impact assessments, GIS applications and mapping, compliance auditing and monitoring, vegetation rehabilitation and monitoring plans, integrated waste management plans and waste licencing, mining right & permits, as well as prospecting rights applications.

Industry experience includes the waste sector (IWMP's and waste licencing), road and rail infrastructure (BAR, S&EIR, WUL/GA, Waste Licence), ports and harbours (management plans), private sector clients across varying industries (various permits), mining sector (BAR, S&EIR, mining permits and rights, prospecting rights), conservation sector (biodiversity plans), renewable energy industry (BAR, S&EIR) as well as the gas and oil industry (biodiversity reports).

Gideon is responsible for the following aspects of each project he manages:

- Project finance control;
- Contracting;
- Project schedule control;
- Specialist liaison and deliverable quality control;
- Competent authority liaison and project risk management;
- Environmental Process and permitting requirements;
- Project team management (internal staffing and resourcing, as well as external project steering committee and technical staff);
- Deliverables, delegation thereof and ultimate quality thereof;
- Strategic project risk management (fatal flaws, procedural risks, legislative requirements and competent authority)

## **RENEWABLE POWER GENERATION PROJECTS: SOLAR ENERGY FACILITIES**

### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Enel Paleisheuwel Solar compliance auditing, Paleisheuwel, Northern Cape	Enel Green Power RSA (EGP RSA)	Environmental consultant

## **RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
G7 Brandvalley S&EIR, Matjiesfontein, Northern Cape	G7 Renewable Energy (Pty) Ltd	Environmental consultant
G7 Rietkloof S&EIR, Matjiesfontein, Northern Cape	G7 Renewable Energy (Pty) Ltd	Environmental consultant

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
G7 Renewable Energy 132kV BAR & EMPr, Matjiesfontein, Northern Cape	G7 Renewable Energy (Pty) Ltd	Project Manager, Environmental consultant, Public Participation

### **Compliance Advice and ESAP reporting**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Biotherm Energy Golden Valley Wind Energy Facility ESAP, Bedford, Eastern Cape	Biotherm Energy Pty Ltd	Environmental consultant

### **Amendments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Mosselbay Energy EA Amendment, Mosselbay, Western Cape	Mosselbay Energy IPP (Pty) Ltd	Environmental consultant

## **GAS PROJECTS**

### **Screening Studies**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
iGas integrated biodiversity screening, Saldanha, Western Cape	Central Energy Fund - iGas (subsidiary)	Environmental consultant, Faunal specialist (assistant)

## **MINING SECTOR PROJECTS**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Triton Minerals Limited Ancuabe and Nicanda Hills EPDA, Ancuabe, Cabo Del Gado Province, Mozambique	Triton Minerals Ltd	Environmental consultant
Ancuabe graphite mine Environmental and Social Impact Assessment (ESIA), Cabo Del Gado Province, Mozambique	Grafex Limitada Mozambique	Environmental consultant



**Basic Assessments**

Project Name & Location	Client Name	Role
SANRAL material sourcing BAR (DMR), Hendrina, Mpumalanga Province	SANRAL SOC Ltd & Leo consulting engineers	Project Manager, Environmental consultant, Public Participation
SANRAL Bierspruit R510 Borrow Pit authorisation, Thabazimbi, Limpopo Province	SANRAL SOC Ltd & Royal HaskoningDHV South Africa	Project Manager, Environmental consultant, Ecological specialist, Public Participation
Almenar tin prospecting BAR, Carnarvon, Northern Cape	Almenar Property Investments (Pty) Ltd	Environmental consultant

**Rehabilitation Studies**

Project Name & Location	Client Name	Role
Ancuabe baseline vegetation monitoring assessment and programme, Ancuabe, Cabo Del Gado Province, Mozambique	Grafex Limitada Mozambique	Botanical specialist
Prospecting pit rehabilitation programme, Ancuabe, Cabo Del Gado Province, Mozambique	Grafex Limitada Mozambique	Botanical specialist, Environmental consultant
Mayfield Quarry rehabilitation plan, Grahamstown, Eastern Cape	Mayfield Quarry	Environmental consultant

**Environmental Compliance, Auditing and ECO**

Project Name & Location	Client Name	Role
Construction monitoring and DMR environmental authorisation, Hendrina, Mpumalanga Province	SANRAL SOC Ltd & Leo consulting engineers	Project Manager, ECO,
SANRAL Caledon N2 Section 3 road upgrade ECO Audits and Reporting, Caledon, Western Cape Province	JG Afrika Engineering	Project Manager, ECO

**Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

Project Name & Location	Client Name	Role
VMC Mining permit renewal application, Rust De Winter, Gauteng	Vergenoeg Mining Company (Pty) Ltd	Environmental consultant
Zirco Resources Kamiesberg heavy mineral sand mine water use licence, Kamiesberg, Northern Cape	Zirco Roode Heuwel (Pty) Ltd	Environmental consultant

**INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)****Environmental Impact Assessments and Environmental Management Programmes**

Project Name & Location	Client Name	Role
S&EIR authorisation for the SANRAL Zandkraal-Windburg N1 road upgrade, Windburg, Free State Province	SANRAL SOC Ltd & SMEC Consulting Engineers	Project Manager, Environmental consultant, Public Participation
Thabazimbi Local Municipality Integrated Waste Management Plan, Thabazimbi, Limpopo Province	Thabazimbi Local Municipality & Anglo-American Plc	Environmental consultant, Public Participation

**Basic Assessments**

Project Name & Location	Client Name	Role
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SANRAL Masekwaspoort N1 Road Upgrade BA, Louis Trichardt, Limpopo Province	SANRAL SOC Ltd & Knight Piésold Consulting	Project Manager, Environmental consultant, Public Participation
SANRAL Polokwane N1 Ring Road Upgrade Basic Assessment, Polokwane, Limpopo Province	SANRAL SOC Ltd & KBK Engineers	Environmental consultant
Boshoek Loop Rail Upgrade BAR, Rustenburg, North-West Province	Transnet SOC Ltd	Project Manager, Environmental consultant, Wetland specialist, Public Participation
Heysterkrand Loop Rail Upgrade BAR, Rustenburg, North-West Province	Transnet SOC Ltd	Project Manager, Environmental consultant, Public Participation
SANRAL Bierspruit R510 road upgrade Basic Assessment, Thabazimbi, Limpopo Province	SANRAL SOC Ltd & Royal HaskoningDHV South Africa	Project Manager, Environmental consultant, Ecological specialist, Public Participation
Barberton IAPS Waste Water Treatment Works development BAR, Barberton, Mpumalanga Province	Umjindi Local Municipality and Rhodes University	Project Manager, Environmental consultant, Public Participation
SANRAL Caledon N2 Section 3 road upgrade project Basic Assessment, Caledon, Western Cape Province	JG Afrika Engineering	Project Manager, Environmental consultant, Ecological specialist, ECO

#### Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
Construction Monitoring and DMR environmental authorisation, Hendrina, Mpumalanga Province	SANRAL SOC Ltd & Leo consulting engineers	Project Manager, Environmental consultant, ECO

#### Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Water use licence for the SANRAL Zandkraal-Windburg N1 road upgrade and quarrying, Windburg, Free State Province	SANRAL SOC Ltd & SMEC Consulting Engineers	Project Manager, Environmental consultant, Public Participation
SANRAL Masekwaspoort N1 road upgrade water use licence application, Louis Trichardt, Limpopo Province	SANRAL SOC Ltd & Knight Piésold Consulting	Project Manager, Environmental consultant, Public Participation
Boshoek Loop Rail Upgrade water use licence application, Rustenburg, North-West Province	Transnet SOC Ltd	Project Manager, Environmental consultant, Wetland specialist, Public Participation
SANRAL Bierspruit R510 road water use licence, Thabazimbi, Limpopo Province	SANRAL SOC Ltd & Royal HaskoningDHV South Africa	Project Manager, Environmental consultant, Ecological specialist, Public Participation
Barberton IAPS Waste Water Treatment Works water use licence and SASS 5 assessment, Barberton, Mpumalanga Province	Umjindi Local Municipality and Rhodes University	Project Manager, Environmental consultant, Aquatic specialist, Public Participation

SANRAL Caledon N2 Section 3 road upgrade water use licence and specialist reports, Caledon, Western Cape Province	JG Afrika Engineering	Project Manager, Environmental consultant, Ecological specialist, Public Participation
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## **HOUSING AND URBAN PROJECTS**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Scoping and EIR authorisation, Water Use Licence, for the Ganspan tourism facility development, Jan Kempdorp, Northern Cape	Frances Baard Local Municipality	Project Manager, Environmental consultant, Public Participation

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Basic Assessment for the office complex development within the Pretoria National Botanical Gardens, Pretoria, Gauteng	South African National Biodiversity Institute (SANBI)	Project Manager, Environmental consultant, Public Participation, ECO
Corner Berg and Drooge Street township development BAR, Zeerust, North-West Province	Ramotshere Moiloa Local Municipality	Project Manager, Environmental consultant, Public Participation
Corner Kort and Bree Street township development BAR, Zeerust, North-West Province	Ramotshere Moiloa Local Municipality	Project Manager, Environmental consultant, Public Participation
Hope Village township development BAR, Johannesburg, Gauteng	Door of Hope Charity Organisation	Project Manager, Environmental consultant, Public Participation
ACSA Jones Road Filling Station Basic Assessment, Johannesburg, Gauteng	Airports Company South Africa SOC Ltd	Project Manager, Environmental consultant, Public Participation

### **Screening Studies**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Kibler Park Church Development ecological assessment, Johannesburg, Gauteng	Riverside Community Church	Project Manager, Ecological specialist
DEA Quoin Point dune specialist assessments, Gansbaai, Western Cape	Department of Environmental Affairs (national)	Project Manager, Environmental consultant

### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Transnet Depot and Siding compliance auditing programme, Johannesburg, Gauteng & Rustenburg, North-West Province	Transnet SOC Ltd	ECO
Environmental compliance monitoring for the office complex development within the Pretoria National Botanical Gardens, Pretoria, Gauteng	South African National Biodiversity Institute (SANBI)	Project Manager, Environmental consultant, Public Participation, ECO

### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
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Atmospheric Emissions Licence, Section 24G for the ER Galvanizing plant and operations, Johannesburg, Gauteng	ER Galvanizers Pty Ltd	Project Manager, Environmental consultant, Public Participation
City of Johannesburg nature reserve proclamation (Phase II), Johannesburg, Gauteng	City of Johannesburg SOC Ltd	Project Manager, Environmental consultant, Public Participation, Botanical specialist
Hope Village township development water use licence, Johannesburg, Gauteng	Door of Hope Charity Organisation	Project Manager, Environmental consultant, Public Participation
Diamond Park Township Development Section 24G, Kimberley, Northern Cape	Sol Plaatje Local Municipality	Project Manager, Environmental consultant, Public Participation
Boschendal Wine Estate hydro-electric power station Water Use Licence and S24G application, Stellenbosch, Western Cape	Boschendal Wine Estate	Environmental consultant
City of Johannesburg nature reserve proclamation boundary verification (Phase I), Johannesburg, Gauteng	City of Johannesburg SOC Ltd	Environmental consultant
PRDW Cape Town harbour breakwater rehabilitation EMPr, Cape Town, Western Cape	PRDW Engineering	Project Manager, Environmental consultant
PRDW Bushman's Estuary dune encroachment project management, Kenton-on-sea, Eastern Cape	PRDW Engineering	Environmental consultant
Corner Berg and Drooge Street township development water use licence application, Zeerust, North-West Province	Ramotshere Moiloa Local Municipality	Project Manager, Environmental consultant
Corner Kort and Bree Street township development water use licence, Zeerust, North-West Province	Ramotshere Moiloa Local Municipality	Project Manager, Environmental consultant
Bloekombos (Kraaifontein) hospital water use licence application, Cape Town, Western Cape	Western Cape Provincial Government (PGWC)	Project Manager, Environmental consultant, Botanical specialist, Wetland specialist

#### **SPECIALIST STUDIES**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Boshoek Loop Rail Upgrade BAR and Water Use Licence, Rustenburg, North-West Province	Transnet SOC Ltd	Wetland specialist
City of Johannesburg nature reserve proclamation (Phase II), Johannesburg, Gauteng	City of Johannesburg SOC Ltd	Botanical specialist
SANRAL Bierspruit R510 road upgrade Water Use Licence, Basic Assessment, Thabazimbi, Limpopo Province	SANRAL SOC Ltd & Royal HaskoningDHV South Africa	Ecological specialist
Kibler Park Church Development Ecological Assessment, Johannesburg, Gauteng	Riverside Community Church	Ecological specialist
Barberton IAPS Waste Water Treatment Works development BAR, water use licence and SASS 5 assessment, Barberton, Mpumalanga Province	Umjindi Local Municipality and Rhodes University	Aquatic specialist
Wijnberg Trust Dam 2 expansion Aquatic Impact Assessment, Greyton, Western Cape	Wijnberg Trust	Aquatic specialist

SANRAL Caledon N2 Section 3 road upgrade project Basic Assessment, Water Use Licence and Specialist reports, Caledon, Western Cape Province	JG Afrika Engineering	Ecological specialist
City of Johannesburg nature reserve proclamation boundary verification (Phase I), Johannesburg, Gauteng	City of Johannesburg SOC Ltd	GIS specialist
iGas integrated biodiversity screening, Saldanha, Western Cape	Central Energy Fund - iGas (subsidiary)	Faunal specialist (assistant)
Bloekombos (Kraaifontein) botanical baseline and impact assessment, Cape Town, Western Cape	Western Cape Provincial Government (PGWC)	Wetland specialist Botanical specialist
Masetjaba water tower development Ecological Impact Assessment, Tsakane, Gauteng	Naidoo Consulting (for City of Ekurhuleni)	Ecological specialist
Nigel gas pipeline development, Nigel, Gauteng	Energy Group Pty Ltd	Ecological specialist

## CURRICULUM VITAE OF NICOLENE VENTER

<b>Profession :</b>	Public Participation and Social Consultant
<b>Specialisation:</b>	Public participation process; stakeholder engagement; facilitation (workshops, focus group and public meetings; public open days; steering committees); monitoring and evaluation of public participation and stakeholder engagement processes
<b>Work Experience:</b>	21 years' experience as a Public Participation Practitioner and Stakeholder Consultant

### VOCATIONAL EXPERIENCE

Over the past 21 years Nicolene established herself as an experienced and well recognised public participation practitioner, facilitator and strategic reviewer of public participation processes. She has experience in managing public participation projects and awareness creation programmes. Her experience includes designing and managing countrywide public participation and awareness creation projects, managing multi-project schedules, budgets and achieving project goals. She has successfully undertaken several public participation processes for EIA, BA and WULA projects. The EIA and BA process include linear projects such as the NMPP, Eskom Transmission and Distribution power lines as well as site specific developments such as renewable energy projects i.e. solar, photo voltaic and wind farms. She also successfully managed stakeholder engagement projects which were required to be in line with the Equator Principles.

### SKILLS BASE AND CORE COMPETENCIES

- Project Management
- Public Participation, Stakeholder Engagement and Awareness Creation
- Public Speaking and Presentation Skills
- Facilitation (workshops, focus group meetings, public meetings, public open days, working groups and committees)
- Social Assessments (Stakeholder Analysis / Stakeholder Mapping)
- Monitoring and Evaluation of Public Participation and Stakeholder Engagement Processes
- Community Liaison
- IFC Performance Standards
- Equator Principles
- Minute taking, issues mapping, report writing and quality control

### EDUCATION AND PROFESSIONAL STATUS

#### Degrees:

- Higher Secretarial Certificate, Pretoria Technicon (1970)

#### Short Courses:

- Techniques for Effective Public Participation, International Association for Public Participation (IAP2) (2008)

- Foundations of Public Participation (Planning and Communication for Effective Public Participation, IAP2 (2009)
- Certificate in Public Relations, Public Relation Institute of South Africa (Damelin Management School (1989)

**Professional Society Affiliations:**

- Board Member of International Association for Public Participation (IAP2): Southern Africa

**EMPLOYMENT**

Date	Company	Roles and Responsibilities
2016 – Current	Independent Consultant Imaginative Africa (Pty) Ltd	<p>Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements: <i>Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&amp;APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.</i></p> <p><i>Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved</i></p> <p><u>Clients:</u> <i>SIVEST Environmental, Savannah Environmental, Baagi Environmental; Royal Haskoning DHV (previously SSI)</i></p>
2013 - 2016	Senior Public Participation Practitioner Zitholele Consulting	<p>Project Manager <i>Project managed public participation process for EIA/BA/WULA/EAL projects. Manages two Public Participation Administrators. Public Participation tasks as outlined as above and including financial management of public participation processes.</i></p>
2011 - 2013	Independent Consultant Imaginative Africa (Pty) Ltd	<p>Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements: <i>Tasks include: Drafting</i></p>

Date	Company	Roles and Responsibilities
		<p>of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&amp;APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.</p> <p>Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved</p> <p><u>Clients:</u> Bohlweki Environmental, Bemani Sustainability (Pty) Ltd; Naledzi Environmental</p>
<p><b>2007 – 2011</b></p>	<p>Unit Manager: Public Participation Practitioner SIVEST SA (Pty) Ltd</p>	<p>Unit Manager Project managed public participation process for EIA/BA projects. Manages two Junior Public Participation Practitioners. Public Participation tasks as outlined as above and including financial management of public participation processes.</p>
<p><b>2005 – 2006</b></p>	<p>Independent Consultant Imaginative Africa (Pty) Ltd</p>	<p>Public Participation and Stakeholder Engagement Practitioner. Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&amp;APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.</p> <p>Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved.</p>



Date	Company	Roles and Responsibilities
		<u>Clients:</u> Manyaka-Greyling-Meiring (previously Greyling Liaison and currently Golder Associates)
2004 – 2005	Personal Assistant National Intelligence Agency	Responsibilities: Upkeep of diary; Review and ensure Submissions are compliant to Regulations; Travel arrangements (domestic & international); Compilation of travel reports
1997 - 2004	Independent Consultant Imaginative Africa (Pty) Ltd	Public Participation Practitioner. Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, affected landowners, etc.  Managing interaction between Stakeholders and Team Members, liaising with National, Provincial Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved.  <u>Clients:</u> Greyling Liaison (currently Golder Associates); Bembani Sustainability (Pty) Ltd; Lidwala Environmental; Naledzi Environmental

## PROJECT EXPERIENCE

### Renewable Power Generation Projects: Solar Energy Facilities

#### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Trisitseng PV, Substations & Power Lines, Lichtenburg, North West Province	BioTherm Energy (Pty) Ltd EAP: SIVEST	Public Participation, Landowner and Community Consultation
Sendawo PVs, Substations & Power Lines, Vryburg, North West Province		
Helena Solar 1, 2 and 3 PVs, Copperton, Northern Cape Province		
Farm Spes Bona 23552 Solar PV Plants, Bloemfontein, Free State Province	Surya Power (Pty) Ltd EAP: SIVEST	Public Participation, Landowner and

		Community Consultation
De Aar Solar Energy Facility, De Aar, Northern Cape Province	South Africa Mainstream Renewable Power Developments (Pty) Ltd EAP: SIVEST	Public Participation, Landowner and Community Consultation
Droogfontein Solar Energy Facility, Kimberley, Northern Cape Province		
Kaalspruit Solar Energy Facility, Loeriesfontein, Northern Cape Province		
Platsjambok East PV, Prieska, Northern Cape Province		
Renosterburg PV, De Aar, Northern Cape Province	Renosterberg Wind Energy Company (Pty) Ltd EAP: SiVEST	Public Participation, Landowner and Community Consultation
19MW Solar Power Plant on Farm 198 (Slypklip), Danielskuil, Northern Cape Province	Solar Reserve South Africa (Pty) Ltd EAP: SiVEST	Public Participation, Landowner and Community Consultation

#### **Renewable Power Generation Projects: Wind Energy Facilities**

##### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Aletta Wind Farm, Copperton, Northern Cape Province	BioTherm Energy (Pty) Ltd EAP: SiVEST	Public Participation
Eureka Wind Farm, Copperton, Northern Cape Province		
Loeriesfontein Wind Farm, Loeriesfontein, Northern Cape Province	South Africa Mainstream Renewable Power Developments (Pty) Ltd EAP: SIVEST	Public Participation
Droogfontein Wind Farm, Loeriesfontein, Northern Cape Province		
Four Leeuwberg Wind Farms, Loeriesfontein, Northern Cape Province		
Noupoort Wind Farm, Noupoort, Northern Cape Province		
Mierdam PV & Wind Farm, Prieska, Northern Cape Province		
Platsjambok West Wind Farm & PV, Prieska, Northern Cape Province		

#### **Renewable Power Generation Projects: Concentrated Solar Facilities (CSP)**

##### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Upington Concentrating Solar Plant and associated Infrastructures	Eskom Holdings SOC Ltd EAP: Bohlweki Environmental	Public Participation

## Grid Infrastructure Projects

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Pluto-Mahikeng Main Transmission Substation and 400kV Power Line (Carletonville to Mahikeng), Gauteng and North West Provinces	Eskom Holdings SOC Ltd Baagi Environmental	
Thyspunt Transmission Lines Integration Project, Eastern Cape Province	Eskom Holdings SOC Ltd EAP: SiVEST	Public Participation, Landowner and Community Consultation
Westrand Strengthening Project, Gauteng Province		
Mookodi Integration Project, North-West Province		Public Participation,
Transnet Coallink, Mpumalanga and KwaZulu-Natal Provinces		
Delarey-Kopela-Phahameng Distribution power line and newly proposed Substations, North-West Province		Public Participation, Landowner and Community Consultation
Invubu-Theta 400kV Eskom Transmission Power Line, KwaZulu-Natal Province	Eskom Holding SOC Ltd EAP: Bem bani Environmental	Community Consultation

### **Basic Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Melkhout-Kudu-Grassridge 132kV Power Line Project (project not submitted to DEA), Eastern Cape Province	Eskom Holdings SOC Ltd EAP: SiVEST	Public Participation, Landowner and Community Consultation
Tweespruit-Welroux-Driedorp-Wepener 132kV Power Line, Free State Province		Public Participation, Landowner and Community Consultation
Kuruman 132kV Power Line Upgrade, Northern Cape Province	Eskom Holdings SOC Ltd EAP: Zitholele	Public Participation, Landowner and Community Consultation
Vaalbank 132kV Power Line, Free State Province		Public Participation, Landowner and Community Consultation
Pongola-Candover-Golela 132kV Power Line (Impact Phase), KwaZulu-Natal Province		Public Participation, Landowner and Community Consultation
Ndumo-Geziza 132kV Power Line, KwaZulu-Natal Province		Public Participation, Landowner and Community Consultation

## Power Generation Sector Projects

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Medupi Flue Gas Desulphurisation Project (up to completion of Scoping Phase), Limpopo Province	Eskom Holdings SOC Ltd EAP: Zitholele Consulting	

Kendal 30-year Ash Disposal Facility, Mpumalanga Province		Public Participation, Landowner and Community Consultation
Kusile 60-year Ash Disposal Facility		
Camden Power Station Ash Disposal Facility, Mpumalanga Province		
Tutuka Fabric Filter Retrofit and Dust Handling Plant Projects, Mpumalanga Province	Eskom Holdings SOC Ltd Lidwala Environmental	Public Participation, Landowner and Community Consultation
Eskom's Majuba and Tutuka Ash Dump Expansion, Mpumalanga Province		Public Participation, Landowner and Community Consultation
Hendrina Ash Dam Expansion, Mpumalanga Province		Public Participation, Landowner and Community Consultation

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Proposed Realignment of the Bulshoek Dam Weir near Klawer and the Doring River Weir near Clanwilliam, Western Cape Province	Applicant: Dept of Water and Sanitation EAP: Zitholele	Public Participation

### **Environmental Authorisation Amendments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Proposed Beaufort West 280MW Wind Farm into two 140MW Trakas and Beaufort West Wind Farms, Western Cape Province	South Africa Mainstream Renewable Power Developments (Pty) Ltd EAP: SIVEST	Public Participation

### **Infrastructure Development Projects (bridges, pipelines, roads, etc)**

#### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Transnet's New Multi-Products Pipeline	Transnet DEAP: Bohlweki Environmental	Public Participation

### **Screening Studies**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Environmental Screening Study for potential power line alternatives from Humansdorp to Port Elizabeth, Eastern Cape Province	Nelson Mandela Bay Municipality EAP: SIVEST	Social Assessment

### **Mining Sector**

#### **Environmental Impact Assessment and Environmental Management Programme**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Koffiefontein Slimes Dam	Petra Diamond Mines EAP: Zitholele	Public Participation
Baobab Project: Ethenol Plant, Chimbanje, Middle Sabie, Zimbabwe	Applicant: Green Fuel (Private) Limited EAP: SIVEST	Public Participation & Community Consultation
BHP Billiton Energy Coal SA's Middelburg Water Treatment Plant, Mpumalanga Province	BHP Billiton Group EAP: Jones & Wagener	Public Participation

### **Facilitation**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Meeting Type</b>
Bloemfontein Strengthening Project	Eskom Holdings SOC Ltd EAP: Baagi Environmental	Public Meetings
Moodraai-Smitkloof 132kV Power Line and Substation, Northern Cape Province	Eskom Holdings SOC Ltd EAP: SSI	Focus Group Meetings
Thabametsi IPP Power Station, Limpopo Province	Thabametsi Power Company Proprietary Limited EAP: Savannah Environmental	Focus Group Meeting & Public Meeting
Aggeneis-Oranjemond 400kV Eskom Transmission Power Line, Northern Cape Province	Eskom Holdings SOC Ltd EAP: Savannah Environmental	Focus Group Meetings & Public Meetings
Ariadne-Eros 400kV/132kV Multi-Circuit Transmission Power Line (Public Meetings)	Eskom Holdings SOC Ltd EAP: ACER Africa	Public Meetings
Majuba-Venus 765kV Transmission Power Lines		Public Meetings
SmancorCR Chemical Plant (Public Meeting)	Samancor Chrome (Pty) Ltd EAP: Environmental Science Associates	Public Meeting

### **Stakeholder Engagement**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Determination, Review and Implementation of the Reserve in the Olifants/Letaba System	Department of Water and Sanitation	Secretarial Services
Orange River Bulk Water Supply System	Golder Associates	
Levuvu-Letaba Resources Quality Objectives		

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## CURRICULUM VITAE OF JO-ANNE THOMAS

<b>Profession:</b>	Environmental Management and Compliance Consultant; Environmental Assessment Practitioner
<b>Specialisation:</b>	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
<b>Work experience:</b>	Twenty one (21) years in the environmental field

### VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

### SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects

- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

## EDUCATION AND PROFESSIONAL STATUS

### Degrees:

- B.Sc Earth Sciences, University of the Witwatersrand, Johannesburg (1993)
- B.Sc Honours in Botany, University of the Witwatersrand, Johannesburg (1994)
- M.Sc in Botany, University of the Witwatersrand, Johannesburg (1996)

### Short Courses:

- Environmental Impact Assessment, Potchefstroom University (1998)
- Environmental Law, Morgan University (2001)
- Environmental Legislation, IMBEWU (2017)
- Mining Legislation, Cameron Cross & Associates (2013)
- Environmental and Social Risk Management (ESRM), International Finance Corporation (2018)

### Professional Society Affiliations:

- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Scientist (400024/00)
- Registered with the International Associated for Impact Assessment South Africa (IAIASa): 5601

- Member of the South African Wind Energy Association (SAWEA)

## EMPLOYMENT

Date	Company	Roles and Responsibilities
<b>January 2006 - Current:</b>	Savannah Environmental (Pty) Ltd	Director Project manager Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor.
<b>1997 – 2005:</b>	Bohlweki Environmental (Pty) Ltd	Senior Environmental Scientist at. Environmental Management and Project Management
<b>January – July 1997:</b>	Sutherland High School, Pretoria	Junior Science Teacher

## PROJECT EXPERIENCE

Project experience includes large infrastructure projects, including electricity generation and transmission, wastewater treatment facilities, mining and prospecting activities, property development, and national roads, as well as strategy and guidelines development.

## **RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES**

### **Environmental Impact Assessments and Environmental Management Programmes**

Project Name & Location	Client Name	Role
Christiana PV 2 SEF, North West	Solar Reserve South Africa	Project Manager & EAP
De Aar PV facility, Northern Cape	iNca Energy	Project Manager & EAP
Everest SEF near Hennenman, Free State	FRV Energy South Africa	Project Manager & EAP
Graafwater PV SEF, Western Cape	iNca Energy	Project Manager & EAP
Grootkop SEF near Allanridge, Free State	FRV Energy South Africa	Project Manager & EAP
Hertzogville PV 2 SEF with 2 phases, Free State	SunCorp / Solar Reserve	Project Manager & EAP



<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Karoshhoek CPV facility on site 2 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Kgabalatsane SEF North-East for Brits, North West	Built Environment African Energy Services	Project Manager & EAP
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy Global	Project Manager & EAP
Lethabo Power Station PV Installation, Free State	Eskom Holdings SoC Limited	Project Manager & EAP
Majuba Power Station PV Installation, Mpumalanga	Eskom Holdings SoC Limited	Project Manager & EAP
Merapi PV SEF Phase 1 – 4 South-East of Excelsior, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Sannaspos Solar Park, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Ofir-Zx PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV Energy South Africa	Project Manager & EAP
Project Blue SEF North of Kleinsee, Northern Cape	WWK Development	Project Manager & EAP
S-Kol PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Sonnenberg PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Tutuka Power Station PV Installation, Mpumalanga	Eskom Transmission	Project Manager & EAP
Two PV sites within the Northern Cape	MedEnergy Global	Project Manager & EAP
Two PV sites within the Western & Northern Cape	iNca Energy	Project Manager & EAP
Upington PV SEF, Northern Cape	MedEnergy Global	Project Manager & EAP
Vredendal PV facility, Western Cape	iNca Energy	Project Manager & EAP
Waterberg PV plant, Limpopo	Thupela Energy	Project Manager & EAP
Watershed Phase I & II SEF near Lichtenburg, North West	FRV Energy South Africa	Project Manager & EAP

Project Name & Location	Client Name	Role
Alldays PV & CPV SEF Phase 1, Limpopo	BioTherm Energy	Project Manager & EAP
Hyperion PV Solar Development 1, 2, 3, 4, 5 & 6	Building Energy	Project Manager & EAP

### Basic Assessments

Project Name & Location	Client Name	Role
Aberdeen PV SEF, Eastern Cape	BioTherm Energy	Project Manager & EAP
Christiana PV 1 SEF on Hartebeestpan Farm, North-West	Solar Reserve South Africa	Project Manager & EAP
Heuningspruit PV1 & PV 2 facilities near Koppies, Free State	Sun Mechanics	Project Manager & EAP
Kakamas PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Kakamas II PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Machadodorp 1 PV SEF, Mpumalanga	Solar To Benefit Africa	Project Manager & EAP
PV site within the Northern Cape	iNca Energy	Project Manager & EAP
PV sites within 4 ACSA airports within South Africa, National	Airports Company South Africa (ACSA)	Project Manager & EAP
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo3 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo4 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Sannaspos PV SEF Phase 2 near Bloemfontein, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Solar Park Expansion within the Rooiwal Power Station, Gauteng	AFRKO Energy	Project Manager & EAP
Steynsrus SEF, Free State	SunCorp	Project Manager & EAP
Sirius Solar PV Project Three and Sirius Solar PV Project Four (BA in terms of REDZ regulations), Northern Cape	SOLA Future Energy	Project Manager & EAP

### Screening Studies

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Allemans Fontein SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Amandel SEF near Thabazimbi, Limpopo	iNca Energy	Project Manager & EAP
Arola/Doomplaat SEF near Ventersdorp, North West	FRV & iNca Energy	Project Manager & EAP
Bloemfontein Airport PV Installation, Free State	The Power Company	Project Manager & EAP
Brakspruit SEF near Klerksorp, North West	FRV & iNca Energy	Project Manager & EAP
Carolus Poort SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Damfontein SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Everest SEF near Welkom, Free State	FRV & iNca Energy	Project Manager & EAP
Gillmer SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Grootkop SEF near Allansridge, Free State	FRV & iNca Energy	Project Manager & EAP
Heuningspruit PV1 & PV 2 near Koppies, Free State	Cronimat	Project Manager & EAP
Kimberley Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Kolonnade Mall Rooftop PV Installation in Tshwane, Gauteng	Momentous Energy	Project Manager & EAP
Loskop SEF near Groblersdal, Limpopo	S&P Power Unit	Project Manager & EAP
Marble SEF near Marble Hall, Limpopo	S&P Power Unit	Project Manager & EAP
Morgenson PV1 SEF South-West of Windsorton, Northern Cape	Solar Reserve South Africa	Project Manager & EAP
OR Tambo Airport PV Installation, Gauteng	The Power Company	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV & iNca Energy	Project Manager & EAP
Rhino SEF near Vaalwater, Limpopo	S&P Power Unit	Project Manager & EAP
Rustmo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Spitskop SEF near Northam, Limpopo	FRV & iNca Energy	Project Manager & EAP
Steynsrus PV, Free State	Suncorp	Project Manager & EAP
Tabor SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Upington Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Valeria SEF near Hartebeestpoort Dam, North West	Solar to Benefit Africa	Project Manager & EAP
Watershed SEF near Lichtenburg, North West	FRV & iNca Energy	Project Manager & EAP
Witkop SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Woodmead Retail Park Rooftop PV Installation, Gauteng	Momentous Energy	Project Manager & EAP

### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO and bi-monthly auditing for the construction of the Adams Solar PV Project Two South of Hotazel, Northern Cape	Enel Green Power	Project Manager
ECO for the construction of the Kathu PV Facility, Northern Cape	REISA	Project Manager
ECO and bi-monthly auditing for the construction of the Pulida PV Facility, Free State	Enel Green Power	Project Manager
ECO for the construction of the RustMo1 SEF, North West	Momentous Energy	Project Manager
ECO for the construction of the Sishen SEF, Northern Cape	Windfall 59 Properties	Project Manager
ECO for the construction of the Upington Airport PV Facility, Northern Cape	Sublary Trading	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Kathu PV facility, Northern Cape	REISA	Project Manager
ECO for the construction of the Konkoonsies II PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
ECO for the construction of the Aggeneys PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager

## Compliance Advice and ESAP Reporting

Project Name & Location	Client Name	Role
Aggeneys Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Airies II PV Facility SW of Kenhardt, Northern Cape	BioTherm Energy	Environmental Advisor
Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Environmental Advisor
Kathu PV Facility, Northern Cape	Building Energy	Environmental Advisor
Kenhardt PV Facility, Northern Cape	BioTherm Energy	Environmental Advisor
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Environmental Advisor
Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Environmental Advisor
Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Lephalale SEF, Limpopo	Exxaro	Environmental Advisor
Pixley ka Seme PV Park, South-East of De Aar, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Environmental Advisor
Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Environmental Advisor
Sirius PV Plants, Northern Cape	Aurora Power Solutions	Environmental Advisor
Upington Airport PV Power Project, Northern Cape	Sublunary Trading	Environmental Advisor
Upington SEF, Northern Cape	Abengoa Solar	Environmental Advisor
Ofir-ZX PV SEF near Keimoes, Northern Cape	Networx S28 Energy	Environmental Advisor
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Environmental Advisor
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Environmental Advisor

## Due Diligence Reporting

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
5 PV SEF projects in Lephalale, Limpopo	iNca Energy	Environmental Advisor
Prieska PV Plant, Northern Cape	SunEdison Energy India	Environmental Advisor
Sirius Phase One PV Facility near Upington, Northern Cape	Aurora Power Solutions	Environmental Advisor

### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Biodiversity Permit & WULA for the Aggeneys SEF near Aggeneys, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permit for the Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Project Manager & EAP
Environmental Permitting for the Upington SEF, Northern Cape	Abengoa Solar	Project Manager & EAP
Environmental Permitting for the Kathu PV Facility, Northern Cape	Building Energy	Project Manager & EAP
Environmental Permitting for the Konkoonises Solar Farm, Northern Cape	BioTherm Energy	Project Manager & EAP
Environmental Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Project Manager & EAP
Environmental Permitting for the Sirius PV Plant, Northern Cape	Aurora Power Solutions	Project Manager & EAP
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Permits for the Kleinbegin and UAP PV Plants, Northern Cape	MedEnergy Global	Project Manager & EAP
S53 Application for Arriesfontein Solar Park Phase 1 – 3 near Danielskuil, Northern Cape	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for Hertzogville PV1 & PV 2 SEFs, Free State	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for the Bloemfontein Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
S53 Application for the Kimberley Airport PV Facility, Northern Cape	Sublunary Trading	Project Manager & EAP
S53 Application for the Project Blue SEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 Application for the Upington Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
WULA for the Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Project Manager & EAP

## **RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Ilanga CSP near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Ilanga Tower 1 Facility near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Karoshhoek CPVPD 1-4 facilities on site 2 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshhoek CSP facilities on sites 1.4; 4 & 5 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Karoshhoek Linear Fresnel 1 Facility on site 1.1 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

#### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO for the construction of the !Khi CSP Facility, Northern Cape	Abengoa Solar	Project Manager
ECO for the construction of the Ilanga CSP 1 Facility near Upington, Northern Cape	Karoshhoek Solar One	Project Manager
ECO for the construction of the folar Park, Northern Cape	Kathu Solar	Project Manager
ECO for the construction of the KaXu! CSP Facility, Northern Cape	Abengoa Solar	Project Manager
Internal audit of compliance with the conditions of the IWUL issued to the Karoshhoek Solar One CSP Facility, Northern Cape	Karoshhoek Solar One	Project Manager

#### **Screening Studies**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Upington CSP (Tower) Plant near Kanoneiland, Northern Cape	iNca Energy and FRV	Project Manager & EAP

#### **Compliance Advice and ESAP reporting**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Environmental Advisor
Ilangaletu CSP 2, Northern Cape	FG Emvelo	Environmental Advisor
Kathu CSP Facility, Northern Cape	GDF Suez	Environmental Advisor
Lephalale SEF, Limpopo	Cennergi	Environmental Advisor
Solis I CSP Facility, Northern Cape	Brightsource	Environmental Advisor



**Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Environmental Permitting for the Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Environmental Permitting for the Kathu CSP, Northern Cape	GDF Suez	Project Manager & EAP
WULA for the Solis I CSP Facility, Northern Cape	Brightsource	Project Manager & EAP

**RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES**

**Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Sere WEF, Western Cape	Eskom Holdings SoC Limited	EAP
Aberdeen WEF, Eastern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Amakhala Emoyeni WEF, Eastern Cape	Windlab Developments	Project Manager & EAP
EXXARO West Coast WEF, Western Cape	EXXARO Resources	Project Manager & EAP
Goereesoe Wind Farm near Swellendam, Western Cape	iNca Energy	Project Manager & EAP
Hartneest WEF, Western Cape	Juwi Renewable Energies	Project Manager & EAP
Hopefield WEF, Western Cape	Umoya Energy	EAP
Kleinsee WEF, Northern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Klipheuwel/Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Moorreesburg WEF, Western Cape	iNca Energy	Project Manager & EAP
Oyster Bay WEF, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Project Blue WEF, Northern Cape	Windy World	Project Manager & EAP
Rheboksfontein WEF, Western Cape	Moyeng Energy	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Spitskop East WEF near Riebeeck East, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Suurplaat WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Swellendam WEF, Western Cape	IE Swellendam	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro	Project Manager & EAP
West Coast One WEF, Western Cape	Moyeng Energy	Project Manager & EAP

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Amakhala Emoyeni Wind Monitoring Masts, Eastern Cape	Windlab Developments	Project Manager & EAP
Beaufort West Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
Koekenaap Wind Monitoring Masts, Western Cape	EXXARO Resources	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Palm Tree Power	Project Manager & EAP
Laingsburg Area Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Overberg Area Wind Monitoring Masts, Western Cape	BioTherm Energy	Project Manager & EAP
Oyster Bay Wind Monitoring Masts, Eastern Cape	Renewable Energy Systems Southern Africa (RES)	Project Manager & EAP

### **Screening Studies**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Albertinia WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Pal Tree Power	Project Manager & EAP
Napier Region WEF Developments, Western Cape	BioTherm Energy	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Tsitsikamma WEF, Eastern Cape	Exxarro Resources	Project Manager & EAP
Various WEFs within an identified area in the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Investec Bank Limited	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Eskom Holdings Limited	Project Manager & EAP
Various WEFs within the Western Cape	Western Cape Department of Environmental Affairs and Development Planning	Project Manager & EAP
Velddrift WEF, Western Cape	VentuSA Energy	Project Manager & EAP
Wind 1000 Project	Thabo Consulting on behalf of Eskom Holdings	Project Manager & EAP
Wittekleibosch, Snylip & Doriskraal WEFs, Eastern Cape	Exxarro Resources	Project Manager & EAP

#### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO for the construction of the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager
ECO for the construction of the Gouda WEF, Western Cape	Blue Falcon	Project Manager
EO for the Dassiesklip Wind Energy Facility, Western Cape	Group 5	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Gouda Wind Energy facility near Gouda, Western Cape	Blue Falcon	Project Manager
Annual auditing of compliance with all environmental licenses for the operation activities at the West Coast One Wind Energy facility near Vredenburg, Western Cape	Aurora Wind Power	Project Manager
External environmental and social audit for the Amakhala Wind Farm, Eastern Cape	Cennergi	Project Manager

External environmental and social audit for the Tsitsikamma Wind Farm, Eastern Cape	Cennergi	Project Manager
ECO for the construction of the Excelsior Wind Farm and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
External compliance audit of the Dassiesklip Wind Energy Facility, Western Cape	BioTherm Energy	Project Manager

### Compliance Advice

Project Name & Location	Client Name	Role
Amakhala Phase 1 WEF, Eastern Cape	Cennergi	Environmental Advisor
Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Environmental Advisor
Excelsior Wind Farm, Western Cape	BioTherm Energy	Environmental Advisor
Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Hopefield Community WEF, Western Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Rheboksfontein WEF, Western Cape	Moyeng Energy	Environmental Advisor
Tiqua WEF, Western Cape	Cennergi	Environmental Advisor
Tsitsikamma WEF, Eastern Cape	Cennergi	Environmental Advisor
West Coast One WEF, Western Cape	Moyeng Energy	Environmental Advisor

### Due Diligence Reporting

Project Name & Location	Client Name	Role
Witteberg WEF, Western Cape	EDPR Renewables	Environmental Advisor
IPD Vredenburg WEF within the Saldanha Bay area, Western Cape	IL&FS Energy Development Company	Environmental Advisor

## Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permitting for the Power Line between the Tsitikamma Community WEF & the Diep River Substation, Eastern Cape	Cennergi	Project Manager & EAP
Biodiversity Permitting for the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager & EAP
Environmental Permitting for the Excelsior WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Plant Permits & WULA for the Tsitsikamma Community WEF, Eastern Cape	Cennergi	Project Manager & EAP
S24G and WULA for the Rectification for the commencement of unlawful activities on Ruimsig AH in Honeydew, Gauteng	Hossam Soror	Project Manager & EAP
S24G Application for the Rheboksfontein WEF, Western Cape	Ormonde - Theo Basson	Project Manager & EAP
S53 Application & WULA for Suurplaat and Gemini WEFs, Northern Cape	Engie	Project Manager & EAP
S53 Application for the Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
S53 Application for the Project Blue WEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 for the Oyster Bay WEF, Eastern Cape	RES	Project Manager & EAP
WULA for the Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

## CONVENTIONAL POWER GENERATION PROJECTS (COAL)

### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Mutsho Power Station near Makhado, Limpopo	Mutsho Consortium	Project Manager & EAP

Coal-fired Power Station near Ogies, Mpumalanga	Ruukki SA	Project Manager & EAP
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Project Manager & EAP
Transalloys Coal-fired Power Station, Mpumalanga	Transalloys	Project Manager & EAP
Tshivasho IPP Coal-fired Power Station (with WML), near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Umbani Coal-fired Power Station, near Kriel, Mpumalanga	ISS Global Mining	Project Manager & EAP
Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP

### Basic Assessments

Project Name & Location	Client Name	Role
Coal Stockyard on Medupi Ash Dump Site, Limpopo	Eskom Holdings	Project Manager & EAP
Biomass Co-Firing Demonstration Facility at Arnot Power Station East of Middleburg, Mpumlanaga	Eskom Holdings	Project Manager & EAP

### Screening Studies

Project Name & Location	Client Name	Role
Baseload Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Coal-Fired Power Plant near Delmas, Mpumalanga	Exxaro Resources	Project Manager & EAP
Makhado Power Station, Limpopo	Mutsho Consortium, Limpopo	Project Manager & EAP

### Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the Camden Power Station, Mpumalanga	Eskom Holdings	Project Manager

## Compliance Advice

Project Name & Location	Client Name	Role
Thabametsi IPP Coal-fired Power Station, near Lephhalale, Limpopo	Axia	Environmental Advisor

## Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Permit application for the Thabametsi Bulk Water Pipeline, near Lephhalale, Limpopo	Axia	Project Manager & EAP
S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephhalale, Limpopo	Exxaro Resources	Project Manager & EAP
S53 Application for the Tshivasho Coal-fired Power Station near Lephhalale, Limpopo	Cennergi	Project Manager & EAP

## CONVENTIONAL POWER GENERATION PROJECTS (GAS)

### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ankerlig OCGT to CCGT Conversion project & 400 kV transmission power line between Ankerlig and the Omega Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Gourikwa OCGT to CCGT Conversion project & 400 kV transmission power line between Gourikwa & Proteus Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Plant, KwaZulu-Natal	Richards Bay Gas	Project Manager & EAP
Decommissioning & Recommissioning of 3 Gas Turbine Units at Acacia Power Station & 1 Gas Turbine Unit at Port Rex Power Station to the existing Ankerlig Power Station in Atlantis Industria, Western Cape	Eskom Holdings	Project Manager & EAP

Two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
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### Screening Studies

Project Name & Location	Client Name	Role
Fatal Flaw Analysis for 3 area identified for the establishment of a 500MW CCGT Power Station	Globeleq Advisors Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP

### GRID INFRASTRUCTURE PROJECTS

#### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Project Manager & EAP
Ankerlig-Omega Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Karoshhoek Grid Integration project as part of the Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Koeberg-Omega Transmission Power Lines,, Western Cape	Eskom Transmission	Project Manager & EAP
Koeberg-Stikland Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Kyalami Strengthening Project, Gauteng	Eskom Transmission	Project Manager & EAP
Mokopane Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Saldanha Bay Strengthening Project, Western Cape	Eskom Transmission	Project Manager & EAP
Steelpoort Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Transmission Lines from the Koeberg-2 Nuclear Power Station site, Western Cape	Eskom Transmission	Project Manager & EAP



<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Tshwane Strengthening Project, Phase 1, Gauteng	Eskom Transmission	Project Manager & EAP

### Basic Assessments

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Dassenberg-Koeberg Power Line Deviation from the Koeberg to the Ankerlig Power Station, Western Cape	Eskom Holdings	Project Manager & EAP
Golden Valley II WEF Power Line & Substation near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Golden Valley WEF Power Line near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Karoshhoek Grid Integration project as part of the Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Konkoonsies II PV SEF Power Line to the Paulputs Substation near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Perdekraal West WEF Powerline to the Eskom Kappa Substation, Western Cape	BioTherm Energy	Project Manager & EAP
Rheboksfontein WEF Powerline to the Aurora Substation, Western Cape	Moyeng Energy	Project Manager & EAP
Soetwater Switching Station near Sutherland, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Solis Power I Power Line & Switchyard Station near Upington, Northern Cape	Brightsource	Project Manager & EAP
Stormwater Canal System for the Ilanga CSP near Upington, Northern Cape	Karoshhoek Solar One	Project Manager & EAP
Tsitsikamma Community WEF Powerline to the Diep River Substation, Eastern Cape	Eskom Holdings	Project Manager & EAP

## Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Ferrum-Mookodi Transmission Line, Northern Cape and North West	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section A Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section B Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Hydra IPP Integration project, Northern Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Kappa-Sterrekus Section C Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Namaqualand Strengthening project in Port Nolloth, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
ECO for the construction of the Neptune Substation Soil Erosion Mitigation Project, Eastern Cape	Eskom	Project Manager
ECO for the construction of the Ilanga-Gordonia 132kV power line, Northern Cape	Karoshhoek Solar One	Project Manager

## Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting and WULA for the Rockdale B Substation & Loop in Power Lines,	Eskom Holdings	Project Manager & EAP
Environmental Permitting and WULA for the Steelpoort Integration project, Limpopo	Eskom Holdings	Project Manager & EAP
Environmental Permitting for Solis CSP near Upington, Northern Cape	Brightsource	Project Manager & EAP

## **MINING SECTOR PROJECTS**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Elitheni Coal Mine near Indwe, Eastern Cape	Elitheni Coal	Project Manager & EAP
Groot Letaba River Development Project Borrow Pits	liso	Project Manager & EAP
Grootegeluk Coal Mine for coal transportation infrastructure between the mine and Medupi Power Station (EMPr amendment) , Limpopo	Eskom Holdings	Project Manager & EAP
Waterberg Coal Mine (EMPr amendment), Limpopo	Seskoko Resources	Project Manager & EAP
Aluminium Plant WML & AEL, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
Decommissioning and Demolition of Kilns 5 & 6 at the Slurry Plant, Kwa-Zulu Natal	PPC	Project Manager & EAP

### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO for the construction of the Duhva Mine Water Recovery Project, Mpumalanga	Eskom Holdings SoC Limited	Project Manager
External compliance audit of Palesa Coal Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Palesa Coal Mine's Waste Management License (WML) and EMP, near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Mbali Coal Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga	HCI Coal	Project Manager

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mining Operations (Brand se Baai), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mineral Separation Plant (MSP), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Smelter Operations (Saldanha), Western Cape	Tronox Namakwa Sands	Project Manager
Compliance Auditing of the Waste Management Licence for the PetroSA Landfill Site at the GTL Refinery, Western Cape	PetroSA	Project Manager

#### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Waste Licence Application for the Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
WULA for the Expansion of the Landfill site at Exxaro's Namakwa Sands Mineral Separation Plant, Western Cape	Exxaro Resources	Project Manager & EAP
S24G & WML for an Aluminium Plant, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

#### **INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)**

#### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Bridge across the Ngotwane River, on the border of South Africa and Botswana	Eskom Holdings	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Chemical Storage Tanks, Metallurgical Plant Upgrade & Backfill Plant upgrade at South Deep Gold Mine, near Westonaria, Gauteng	Goldfields	Project Manager & EAP
Expansion of the existing Welgedacht Water Care Works, Gauteng	ERWAT	Project Manager & EAP
Golden Valley WEF Access Road near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Great Fish River Wind Farm Access Roads and Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Ilanga CSP Facility Watercourse Crossings near Upington, Northern Cape	Karoshhoek Solar one	Project Manager & EAP
Modification of the existing Hartebeestfontein Water Care Works, Gauteng	ERWAT	Project Manager & EAP
N10 Road Realignment for the Ilanga CSP Facility, East of Upington, Northern Cape	SANRAL	Project Manager & EAP
Nxuba (Bedford) Wind Farm Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Pollution Control Dams at the Medupi Power Station Ash Dump & Coal Stockyard, Limpopo	Eskom	Project Manager & EAP
Qoboshane borrow pits (EMPr only), Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Tsitsikamma Community WEF Watercourse Crossings, Eastern Cape	Cennergi	Project Manager & EAP
Clayville Central Steam Plant, Gauteng	Bellmall Energy	Project Manager & EAP
Msenge Emoyeni Wind Farm Watercourse Crossings and Roads, Eastern Cape	Windlab	Project Manager & EAP

### Basic Assessments

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Harmony Gold WWTW at Doornkop Mine, Gauteng	Harmony Doornkop Plant	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Ofir-ZX Watercourse Crossing for the Solar PV Facility, near Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Goboshane bridge & access roads, Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Relocation of the Assay Laboratory near Carletonville, Gauteng	Sibanye Gold	Project Manager & EAP
Richards Bay Harbour Staging Area, KwaZulu-Natal	Eskom Holdings	Project Manager & EAP
S-Kol Watercourse Crossing for the Solar PV Facility, East of Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Sonnenberg Watercourse Crossing for the Solar PV Facility, West Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
Masetjaba Water Reservoir, Pump Station and Bulk Supply Pipeline near Nigel, Gauteng	Naidu Consulting Engineers	Project Manager & EAP
Access Road for the Dwarsug Wind Farm, Northern Cape Province	South Africa Mainsteam Renewable Power	Project Manager & EAP

### Screening Studies

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Roodepoort Open Space Optimisation Programme (OSOP) Precinct, Gauteng	TIMAC Engineering Projects	Project Manager & EAP
Vegetable Oil Plant and Associated Pipeline, Kwa-Zulu Natal	Wilmar Oils and Fats Africa	Project Manager & EAP

### Environmental Compliance, Auditing and ECO

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO and bi-monthly auditing for the construction of the Olifants River Water Resources Development Project (ORWRDP) Phase 2A: De Hoop Dam, R555 realignment and housing infrastructure	Department of Water and Sanitation	Project Manager Auditor

ECO for the Rehabilitation of the Blaaupan & Storm Water Channel, Gauteng	Airports Company of South Africa (ACSA)	Project Manager
Due Diligence reporting for the Better Fuel Pyrolysis Facility, Gauteng	Better Fuels	Project Manager
ECO for the Construction of the Water Pipeline from Kendal Power Station to Kendal Pump Station, Mpumalanga	Transnet	Project Manager
ECO for the Replacement of Low-Level Bridge, Demolition and Removal of Artificial Pong, and Reinforcement the Banks of the Crocodile River at the Construction at Walter Sisulu National Botanical Gardens, Gauteng Province	South African National Biodiversity Institute (SANBI)	Project Manager
External Compliance Audit of the Air Emission Licence (AEL) for a depot in Bloemfontein, Free State Province and in Tzaneen, Mpumalanga Province	PetroSA	Project Manager

#### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
WULA for the Izubulo Private Nature Reserve, Limpopo	Kjell Bismeyer, Jann Bader, Laurence Saad	Project Manager & EAP
WULA for the Masodini Private Game Lodge, Limpopo	Masodini Private Game Lodge	Environmental Advisor
WULA for the Ezulwini Private Nature Reserve, Limpopo	Ezulwini Investments	Project Manager & EAP
WULA for the Masodini Private Game Lodge, Limpopo	Masodini Private Game Lodge	Project Manager & EAP
WULA for the N10 Realignment at the Ilanga SEF, Northern Cape	Karoshhoek Solar One	Project Manager & EAP
WULA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
S24G and WULA for the illegal construction of structures within a watercourse on EFF 24 Ruimsig Agricultural Holdings, Gauteng	Sorrow Language Services	Project Manager & EAP

## **HOUSING AND URBAN PROJECTS**

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Postmasburg Housing Development, Northern Cape	Transnet	Project Manager & EAP

### **Compliance Advice and reporting**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Kampi ya Thude at the Olifants West Game Reserve, Limpopo	Nick Elliot	Environmental Advisor
External Compliance Audit of WUL for the Johannesburg Country Club, Gauteng	Johannesburg Country Club	Project Manager

### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Due Diligence Audit for the Due Diligence Audit Report, Gauteng	Delta BEC (on behalf of Johannesburg Development Agency (JDA))	Project Manager

## **ENVIRONMENTAL MANAGEMENT TOOLS**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Development of the 3rd Edition Environmental Implementation Plan (EIP)	Gauteng Department of Agriculture and Rural Development (GDARD)	Project Manager & EAP
Development of Provincial Guidelines on 4x4 routes, Western Cape	Western Cape Department of Environmental Affairs and Development Planning	EAP



Compilation of Construction and Operation EMP for the Braamhoek Transmission Integration Project, Kwazulu-Natal	Eskom Holdings	Project Manager & EAP
Compilation of EMP for the Wholesale Trade of Petroleum Products, Gauteng	Munaca Technologies	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for Medupi Power Station, Limpopo	Eskom Holdings	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Dube TradePort Site Wide Precinct	Dube TradePort Corporation	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Kusile Power Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Review of Basic Assessment Process for the Wittekleibosch Wind Monitoring Mast, Eastern Cape	Exxaro Resources	Project Manager & EAP
Revision of the EMP for the Sirius Solar PV	Aurora Power Solutions	Project Manager & EAP
State of the Environment (SoE) for Emalahleni Local Municipality, Mpumalanga	Simo Consulting on behalf of Emalahleni Local Municipality	Project Manager & EAP
Aspects and Impacts Register for Salberg Concrete Products operations	Salberg Concrete Products	EAP
First State of Waste Report for South Africa	Golder on behalf of the Department of Environmental Affairs	Project Manager & EAP
Responsibilities Matrix and Gap Analysis for the Kruisvallei Hydroelectric Power Generation Scheme, Free State Province	Building Energy	Project Manager
Responsibilities Matrix and Gap Analysis for the Roggeveld Wind Farm, Northern & Western Cape Provinces	Building Energy	Project Manager

## **PROJECTS OUTSIDE OF SOUTH AFRICA**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Advisory Services for the Zizabona Transmission Project, Zambia, Zimbabwe, Botswana & Namibia	PHD Capital	Advisor
EIA for the Semonkong WEF, Lesotho	MOSCET	Project Manager & EAP
EMP for the Kuvaninga Energia Gas Fired Power Project, Mozambique	ADC (Pty) Ltd	Project Manager & EAP
Environmental Screening Report for the SEF near Thabana Morena, Lesotho	Building Energy	EAP
EPBs for the Kawambwa, Mansa, Mwense and Nchelenge SEFs in Luapula Province, Zambia	Building Energy	Project Manager & EAP
ESG Due Diligence for the Hilton Garden Inn Development in Windhoek, Namibia	Vatange Capital	Project Manager
Mandahill Mall Rooftop PV SEF EPB, Lusaka, Zambia	Building Energy	Project Manager & EAP
Monthly ECO for the PV Power Plant for the Mocuba Power Station	Scatec	Project Manager

**Appendix B:**  
**Grievance Mechanism for Public  
Complaints and Issues**

## **GRIEVANCE MECHANISM / PROCESS**

### **PURPOSE**

This Grievance Mechanism has been developed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns raised by local landowners and or communities are addressed in a manner that:

- » Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting.
- » Builds trust as an integral component of broader community relations activities.
- » Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time-consuming legal process.

### **PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES**

- » Adjacent landowners, communities and/or authorities must be informed in writing by the Proponent of the grievance mechanism and the process by which grievances can be brought to the attention of the Proponent through its designated representative.
- » A company representative must be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person must be provided to adjacent landowners, communities and authorities.
- » Project related grievances relating to the construction, operation and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist adjacent landowners and or communities who may lack resources to submit/prepare written grievances.
- » The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and agree on a suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- » The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed).
- » Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.
- » The meeting should be chaired by the Proponent's representative appointed to address grievances. The Proponent must provide a person to take minutes of and record the meeting/s. Any costs associated with hiring venues must be covered by the Proponent.
- » Draft copies of the minutes must be made available to the Complainant and the Proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must

- be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.
- » In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
  - » In the event of a dispute between the Complainant and the Proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
  - » In the event that the parties agree to appoint a mediator, the Proponent will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Proponent, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Proponent. The Proponent must provide a person to take minutes of and record the meeting/s.
  - » In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
  - » In the event of the dispute not being resolved, the mediator must prepare a draft report that summarises the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to addressing the grievance.
  - » The draft report must be made available to the Complainant and the Proponent for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action can be or needs to be taken. Closure status will be classified in the Complaints Register as follows:

- » Resolved: Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- » Unresolved: Complaints where it has not been possible to reach an agreed resolution and the case has been authorised for close out by the Appeals Committee.
- » Abandoned: Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organisation to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of the Complainant and or the Proponent, either party may be of the opinion that legal action may be the most appropriate option.

**Appendix C:**  
**Invasive Alien Plants Management**  
**Plan**

## CONTROL GUIDELINES

This section provides an outline of the overall approach that should be adopted on the site in order to minimize the probability of invasive alien plants becoming established and ensuring that any outbreaks are managed quickly so that they do not become a long-term problem. The establishment of any dense infestations will be expensive to eradicate and will require more complex control measures than would be unnecessary for low density invasions.

### Prevention

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas. Prevention could also include measures such as washing the working parts and wheels of earth-moving equipment prior to it being brought onto site, visual walk-through surveys every three months and other measures, as listed in the section below ("Habitat management").

### Early identification and eradication

Monitoring plans should be developed which are designed to catch IAPs shortly after they arrive on the site. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When new IAPs are spotted an immediate response of locating the area for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

### Containment and control

If any IAPs are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that minimum energy and resources are required to maintain this status over the long-term. This will also ensure that natural systems are impacted on to the smallest degree possible.

### Construction phase activities required

The following management actions are required to minimise soil, vegetation disturbance and the establishment of IAPs on site during the construction phase:

ACTION	FREQUENCY
The Environmental Officer (EO/ESO) is to provide permission before any natural vegetation is to be cleared for development.	Daily/when required
Clearing of vegetation must be undertaken as the work front progresses. Mass clearing is not to be permitted unless the entire cleared area is to be rehabilitated immediately thereafter.	Weekly/when required
Should revegetation not be possible immediately, the cleared areas must be protected with packed brush or appropriately battered with fascine work (fixing horizontal branches along the ground using vertical pegs to create resistance to down-slope flow of water/materials). Alternatively, jute (Soil Saver) may be pegged over the soil to stabilize it.	Weekly

Organic matter used to encourage regrowth of vegetation on cleared areas should not be brought onto site from foreign areas. Brush from cleared areas should be used as much as possible. The use of manure or other soil amendments should not be used as this would encourage invasion.	Weekly
Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.	Weekly
EO/ESO to survey site once a month to detect aliens and have them removed.	Monthly
Alien vegetation regrowth must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method guidelines should adhere to best practice for the species concerned. Such information can be obtained from the Working for Water website as well as herbicide guidelines.	Monthly
Clearing activities must be contained within the affected zones and may not spill over into adjacent no-go areas. No-go areas should be clearly demarcated prior to construction.	Daily

### Operational phase activities required

The following management actions are aimed at maintaining areas clear of invasive alien species as well as reducing the abundance of any aliens on site:

ACTION	FREQUENCY
Surveys for alien species should be conducted regularly. All aliens identified should be cleared.	Every 3 months for 2 years and biannually thereafter.
Re-vegetation with indigenous, locally occurring species should take place in areas where natural vegetation is slow to recover or where repeated invasion has taken place.	Biannually, but re-vegetation should take place at the beginning of the rainy season.
Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected.	When necessary
No alien species should be cultivated on site. If vegetation is required for aesthetic or other purposes, then non-invasive locally occurring species should be used.	When necessary

### CONTROL METHODS

This section is a summary of existing control measures that have been published for various alien plant species. There are various means of managing invasive alien plants:

#### Mechanical control

This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ring-barking or bark stripping. This control option is only really feasible in sparse infestations or on small scale, and for controlling species that do not coppice after cutting. Species that tend to



coppice need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive, and could cause severe soil disturbance and erosion.

For the current project, hand-pulling or manual removal using hand tools (in this case cutstumping) will be the most appropriate methods.

### **Chemical control**

Chemical control should only be used as a last resort since it is hazardous for natural vegetation. It should not be necessary if regular monitoring is undertaken.

Chemical control involves the use of registered herbicides to kill the target weed. Managers and herbicide operators must have a basic understanding of how herbicides function. The use of inappropriate herbicides and the incorrect use of the appropriate herbicides are wasteful, expensive practices and often do more harm than good, especially when working close to watercourses. Some herbicides can quickly contaminate fresh water and/or be transported downstream where they may remain active in the ecosystem.

Contractors using herbicides are required to have a permit according to Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). Herbicides are either classified as selective or non-selective. Selective herbicides are usually specific to a particular group of plants, e.g. those specified for use on broad leaf plants, but should not kill narrow-leaf plants such as grasses. Non-selective herbicides can kill any plant that they come into contact with and are therefore not suitable for use in areas where indigenous vegetation is present.

Chemical application techniques include foliar (leaf) application, stem applications (basal stem, total frill, stem injections) and stump applications (cut stump, total stump, scrape and paint).

### **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plants reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilized. All of these outcomes will help to reduce the spread of the species. To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF) can be contacted.

### **Habitat management**

The best way to prevent invasion by alien invasive plant species is to manage the natural vegetation in such a way so as to reduce the opportunity for these plants becoming established. The general principle is to not disturb any areas beyond the footprint of the proposed infrastructure and to also ensure that the natural processes that maintain vegetation patterns are not disrupted.

### **Post-removal follow-up and rehabilitation**

Re-establishment of indigenous vegetation needs to be undertaken to reduce the probability of re-emergence of invasive alien plants and to reduce the risk of soil erosion where the soil surface is poorly vegetated. In most soils, the seeds and other propagules of the plants of the former natural habitat still survive. Thus natural regeneration without the need for planting may be possible in many cases. However, if natural regeneration is not likely due to

the length of time since disturbance or if the soil has been disturbed to such a degree that seeds and propagules no longer survive then planting or seeding may be required. Rehabilitation should follow these steps:

Monitor cleared areas on a regular basis (monthly during construction and three-monthly during operation) for emergent seedlings of invasive alien species and remove these (hand pulling).

All areas of exposed soil should immediately be protected by creating erosion control barriers.

If the soil remains relatively undisturbed and the area has some indigenous vegetation left intact, the natural regeneration process of the indigenous vegetation on the site should be managed. This involves regular follow-up to remove emerging IAPs and protecting the area from other forms of disturbance (disturbance by vehicles, etc.) while the vegetation re-established naturally.

If required, indigenous vegetation can be planted on the cleared areas. This can be in the form of a seed mix or plants rescued from previous clearing.

### Monitoring programme

In order to monitor the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien invasion on site as well as an assessment of the success of the management programme.

In general, the following principles apply to monitoring:

Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.

Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.

It is important that, if monitoring results in detection of invasive alien plants, it leads to immediate action.

### Construction phase monitoring

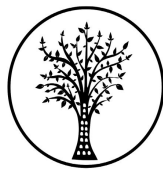
MONITORING ACTION	INDICATOR	TIMEFRAME
Document alien species present on site	Alien species list	Pre-construction and monthly thereafter
Alien plant distribution	Distribution maps, GPS coordinates	Monthly
Document and record alien control measures implemented	Record of clearing activities	6-monthly
Review alien control success rate	Decline in abundance of alien plant species over time	Annually

### Operational phase monitoring

MONITORING ACTION	INDICATOR	TIMEFRAME
Document alien species distribution and abundance on site	Alien species distribution maps	Annually
Document alien plant control measures implemented and success rate achieved	Records of control measures and their success rate	Annually

Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable bare areas over time	Annually
------------------------------------------------------------------------------------	--------------------------------------------	----------

**Appendix D:**  
**Fossils Chance Find Procedure**



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## **CHANCE FINDS OF PALAEOLOGICAL MATERIAL**

*(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)*

### **Introduction**

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

### **Training**

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO. It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

**CTS Heritage**

34 Harries Street, Plumstead, Cape Town, 7800

**Tel:** +27 (0)87 073 5739 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com



### **Actions to be taken**

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent. Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
  - The date
  - A description of the discovery
  - A description of the fossil and its context (e.g. position and depth of find)
  - Where and how the find has been stored
  - Photographs to accompany the preliminary report (the more the better):
    - A scale must be used
    - Photos of location from several angles
    - Photos of vertical section should be provided
    - Digital images of hole showing vertical section (side);
    - Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.



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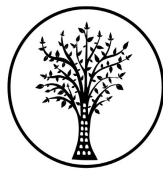
- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

**CTS Heritage**

34 Harries Street, Plumstead, Cape Town, 7800

**Tel:** +27 (0)87 073 5739 **Email:** [info@ctsheritage.com](mailto:info@ctsheritage.com) **Web:** [www.ctsheritage.com](http://www.ctsheritage.com)



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FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	<i>Lat:</i>	<i>Long:</i>
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	<i>Digital image of vertical section (side)</i>	
	<i>Fossil from different angles</i>	
	<i>Wider context of the find</i>	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

CTS Heritage

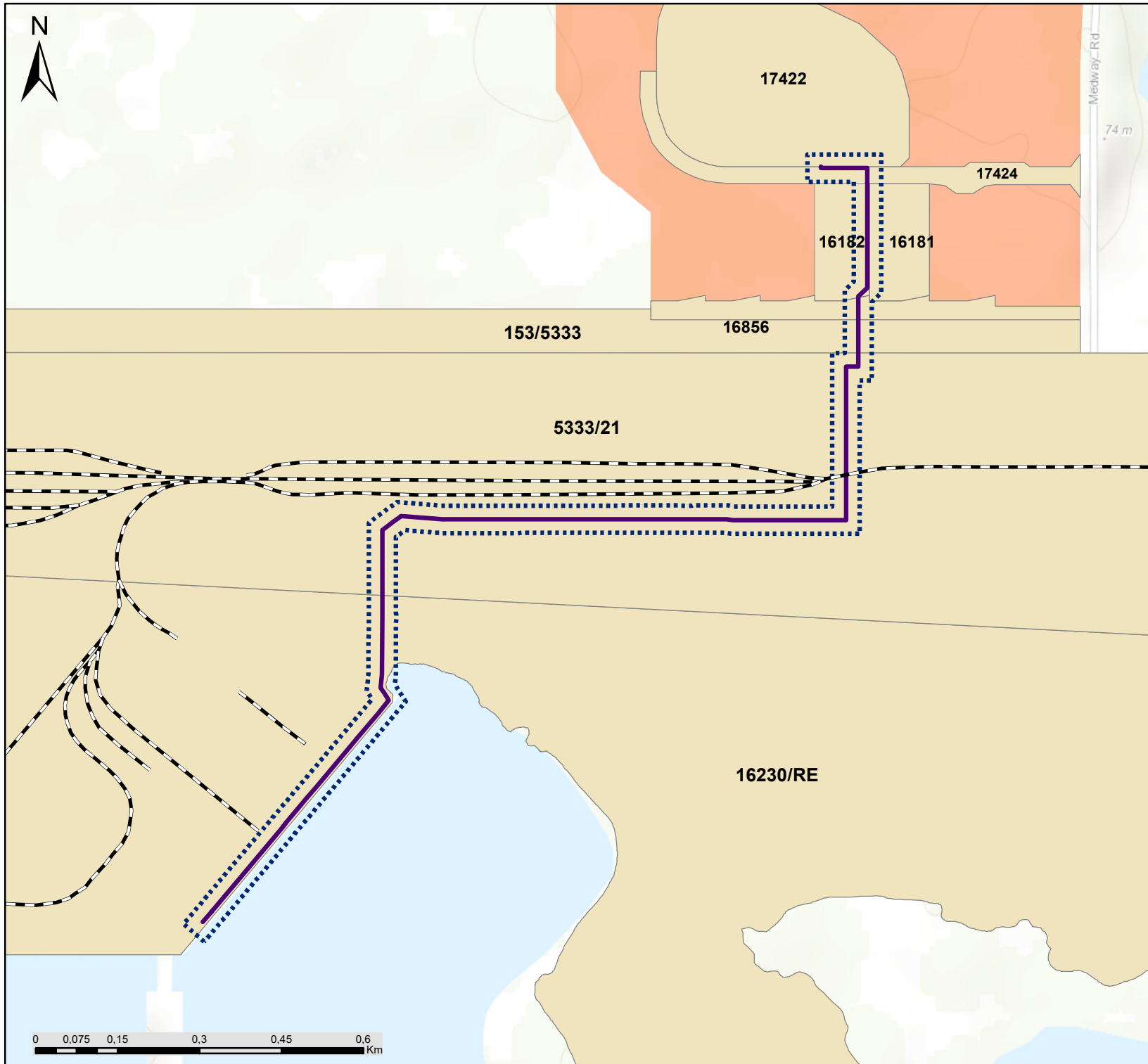
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# **Appendix E:**







## **A3 Maps**



# Wilmar Oil Pipeline, KwaZulu-Natal

Project Development Corridor Map

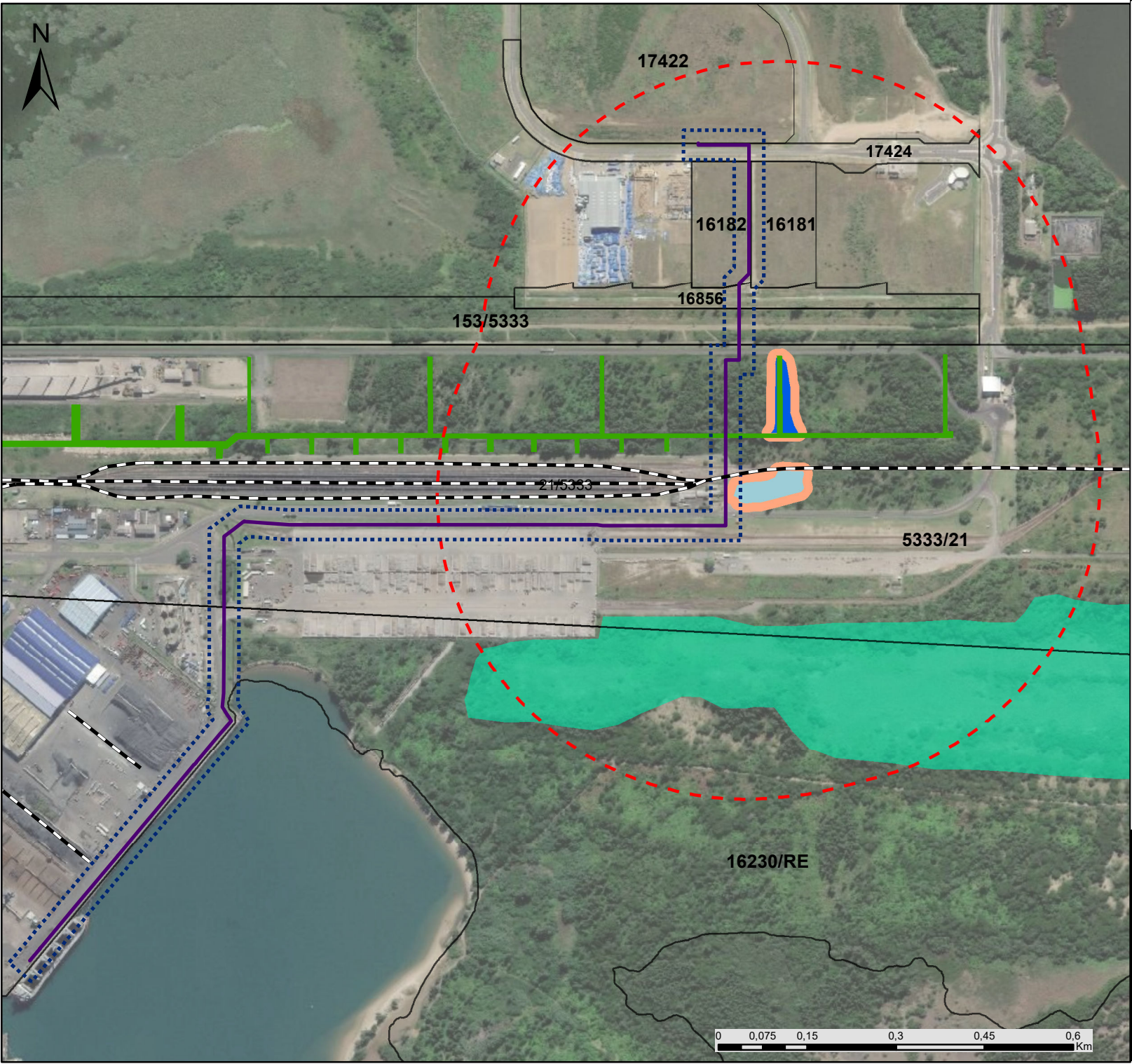
## Legend

-  Railway Line
-  Existing Power Line
-  Pipeline Route
-  Pipeline Corridor
-  Affected Farm Portions
-  Richards Bay IDZ Phase 1A

savannah  
environmental

Scale: 1:9 724  
Projection: LO31  
Ref: Wilmar Project Development Corridor Map\_30.04.19





# Wilmar Oil Pipeline, KwaZulu-Natal

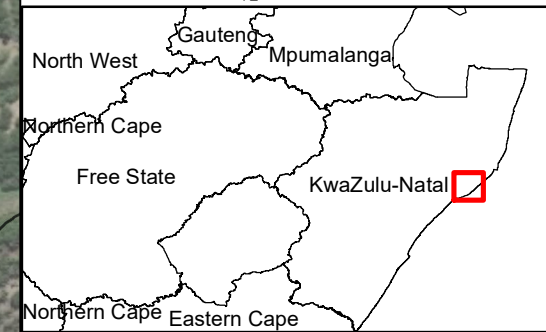
## Wetland Delineation Map

### Legend

- Pipeline Route
  - Pipeline Corridor
  - Railway Line
  - Affected Farm Portions
- ### Wetland Delineation
- 500m Regulated Area (GN.R 509)
  - Depression Wetland
  - 15m Depression Wetland Buffer
  - Artificial Drainage Canal
  - Channelled Valley Bottom Wetland
  - 15m Channelled Valley Bottom Wetland Buffer
  - Unchannelled Valley Bottom Wetland



Scale: 1:8 958  
 Projection: LO31  
 Ref: Wilmar Wetland Delineation Map\_28.03.19



# Wilmar Oil Pipeline KwaZulu-Natal Cumulative Map

## Legend

- Existing Substation
- +— Railway
- - - Non-perennial River
- Perennial River
- Regional Roads
- Main Roads
- Eskom Power Lines
- Pipeline Route
- - - Pipeline Corridor
- Affected Farm Portions
- RB IDZ Phase 1A

## Industrial Developments

- Eskom Combined Cycle Power Plant (Proposed)
- Gas to Power Plant Richards Bay
- Tata Steel KZN
- Fermentech Fertilizer Supplier
- South 32 Aluminium
- Mondi Richards Bay
- Port Richards Bay
- Bayside Aluminium Richards Bay
- Richards Bay Coal Terminal

Scale: 1:59 161  
 Projection: LO31  
 Ref: Wilmar Base Map\_02.07.19

