PROPOSED UPGRADE OF THE NDABAKAZI INTERCHANGE BETWEEN NDABAKAZI AND THE R409, NEAR BUTTERWORTH.
AMATHOLE DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

DEA Reference: 14/12/16/3/3/1/2047

Prepared for:	On behalf of:
V3 CONSULTING ENGINEERS **V3 Consulting Engineers**	THE SOUTH AFRICAN NATIONAL ROADS AGENCY LTD **South African National Roads Agency Ltd (SANRAL)**

Prepared by:

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1 INTRODUCTION

1.1 Objectives of an EMPr

This EMPr has been compiled to provide recommendations and guidelines according to which compliance monitoring can be done during the construction and operation of the road upgrade and re-alignment. The objective of the EMPr is also to ensure that all relevant factors are considered to ensure environmentally responsible development (Figure 1). The purpose of the EMPr is to provide specifications for "good environmental practice" for application during these phases.

This EMPr informs all relevant parties, which are in this case, the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by V3 Consulting Engineers and South African National Roads Agency Ltd. (SANRAL) at the site as to their duties in the fulfilment of the legal requirements for the construction and operation of the road upgrade with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

The objectives of an EMPr are to:

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

1.2 Structure and Function of an EMPr

An EMPr is focused on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies what measures will be in place or will be actioned to manage any incidents and emergencies that may occur during operation of the project.

As such the EMPr provides specifications that must be adhered to in order to minimise adverse environmental impacts associated with the construction and operation of the road upgrade and bridge construction. The content of the EMPr is consistent with the requirements as set out in Appendix 4 of the EIA regulations stated below, for the construction and operation phases.

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(a) Details of –
  (i) The EAP who prepared the environmental management programme; and
  (ii) The expertise of the EAP to prepare an environmental management programme, including a curriculum vitae;

(b) A detailed description of the aspects of the activity that are covered by the draft environmental management programme as identified by the project description;

(c) A map at an appropriate sale 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;

(d) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
  (i) Planning and design;
  (ii) Pre-construction;
  (iii) construction activities;
  (iv) Rehabilitation of the environment after construction and where applicable post closure; and
  (v) where relevant, operation activities;

(e) a description and identification of impact outcomes required for the aspects contemplated in (d).

(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable include actions to –
  (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  (ii) Comply with any prescribed environmental management standards or practices;
  (iii) Comply with any applicable provisions of the Act regarding closure, where applicable;
  (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);

(h) The frequency of monitoring the implementation of the impact management actions contemplated in (f);

(i) An indication of the persons who will be responsible for the implementation of the impact management actions;

(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;

(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);

(l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;

(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

(n) Any specific information that may be required by the competent authority.

1.3 Legal requirements

Construction must be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Contractor as to his/her duties in

the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter must prevail.

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

- Constitution Act (No. 108 of 1996);
- National Environment Management Act (No. 107 of 1998, as amended, NEMA);
- National Environmental Management: Biodiversity Act (No. 10 of 2004; NEMBA) ;
- Environmental Management: Protected Areas Act (Act No. 57 of 2003; NEMPAA);
- National Water Act (No. 36 of 1998; NWA);
- National Environmental Management: Waste Management Act (No. 59 or 2008; NEMWA);
- National Heritage Resources Act (No. 25 of 1999; NHRA);
- Informal Land Rights Act (No. 109 of 1996; ILRA) ; and
- National Forestry Act, 1998 (No. 84 of 1998; NFA)

Municipal policy

- Amathole District Municipality Integrated Development Plan (ADM IDP, 2018/2019);
- Mnquma Local Municipality IDP (MLM IDP, 2018/2019); and
- Mnquma Local Municipality Spatial Development Framework (SDF 2014/2015).

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT TEAM

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(a) Details of –

(i) The EAP who prepared the environmental management programme; and

(ii) The expertise of the EAP to prepare an environmental management programme, including a curriculum vitae;

2.1 Environmental Consulting Company:

CES
25 Tecoma Street, Berea, East London, 5241
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Tel: 043 726 7809
Fax: 043 726 8352
e-mail: cesel@cesnet.co.za
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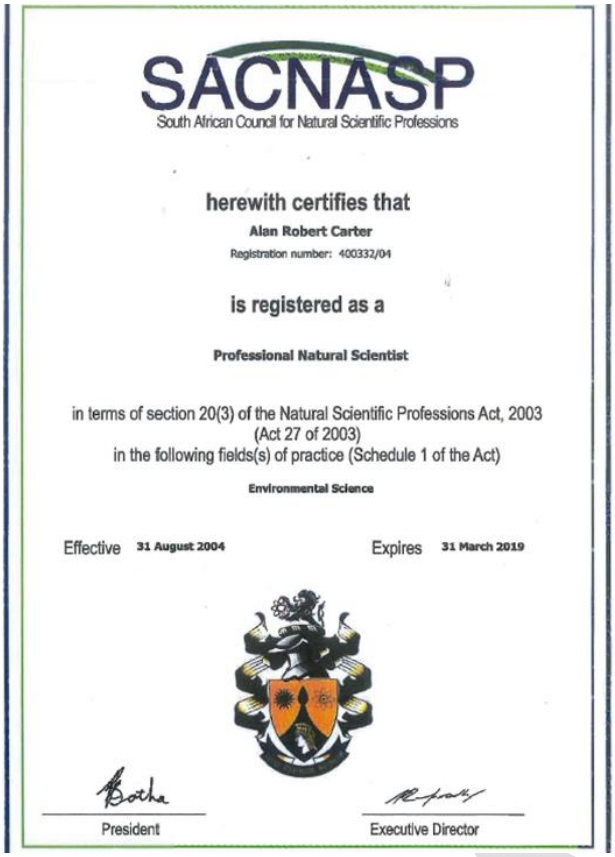
CES was established in 1990 as a specialist environmental consulting company and has considerable experience in terrestrial, marine and freshwater ecology, the Social Impact Assessment (SIA) process, State of Environment Reporting (SOER), Integrated Waste Management Plans (IWMP), EMPs, Spatial Development Frameworks (SDF), public participation, as well as the management and co-ordination of all aspects of the EIA and Strategic Environmental Assessment (SEA) processes.

2.2 Project Team:

- Dr Alan Carter
- Mr Roy de Kock
- Ms Caryn Clarke

Dr Alan Carter

Alan is the executive of the CES East London Office. He holds a PhD in Marine Biology and is a certified Public Accountant, with extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He has 25 years' experience in environmental management and has specialist skills in sanitation, coastal environments and industrial waste. Dr Carter is registered as a Professional Natural Scientist under the South African Council for Natural Scientific Professions (SACNASP). He is also registered as an EAP by the Environmental Assessment Practitioners of South Africa (EAPSA).



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that
Alan Robert Carter
Registration number: 400332/04

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective 31 August 2004 Expires 31 March 2019

President Executive Director

The Interim Certification Board
for
Environmental Assessment Practitioners
of
South Africa

Alan Robert Carter

was certified as an

ENVIRONMENTAL ASSESSMENT PRACTITIONER

on this 1st day of March 2012

Chairperson Secretary

Mr Roy de Kock

Roy is a Senior Consultant holding a BSc Honours in Geology and an MSc in Botany from the Nelson Mandela Metropolitan University in Port Elizabeth. His MSc thesis focused on Rehabilitation Ecology using an open-cast mine as a case study. He has been working for CES since 2010, and is based at the East London branch where he focuses on Ecological and Agricultural Assessments, Geological and Geotechnical analysis, Environmental Management Plans, mining applications and various environmental impact studies. Roy has worked on numerous projects in South Africa, Mozambique and Malawi. He is registered as a Natural Scientist under the South African Council for Natural Scientific Professions (SACNASP).

Ms Caryn Clarke

Caryn holds a M.Sc. degree in Environmental Science from Rhodes University. Her Master's dissertation investigated climate change adaptation strategies of vulnerable rural households in Willowvale and Lesseyton, Eastern Cape. Her professional interests include climate change policy, renewable energy and various environmental impact assessments. Caryn has worked on numerous basic assessments projects including various linear developments such as roads and pipelines. She has extensive public participation and stakeholder engagement experience. Caryn is a registered Candidate Natural Scientist under the South African Council for Natural Scientific Professions (SACNASP; No: 500022/14).

Refer to Appendix F for curriculum vitae.

3 PROPOSED ACTIVITY

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(b) A detailed description of the aspects of the activity that are covered by the draft environmental management programme as identified by the project description;

(c) A map at an appropriate sale 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;

3.1 Description of proposed activity

The South African National Roads Agency SOC Ltd. (SANRAL) is proposing the construction of the new Ndabakazi Interchange between the N2 and the R409, near Butterworth within the Amathole District Municipality of the Eastern Cape Province (see Figure 3.1 below).

The proposed Ndabakazi Interchange development will consist of the upgrading of the existing N2 and R409 roads at the intersection as well as the construction of a new bridge over the N2 with corresponding interchange ramps. These improvements will include extensive earth and drainage works, layer works, new surfacing, road repairs, road construction, construction of reinforced concrete structures, improvements/construction of drainage structures and vertical geometric improvements for the new N2/R409 bridge.

In particular, the project will consist of the following:

Existing roads:

- Increasing the road reserve width from 30m to a minimum of 50m wide;
- General widening of the existing road cross section for passing lanes and 3.0m surfaced shoulders.
- The main carriageway is 10.4m and needs to be increased to 20.8m; and
- Widening and/or new construction of existing drainage structures.

New Interchange (called the Ndabakazi Interchange):

- Construction of a new bridge on the R409 over the N2;
- Substantial vertical geometric improvements will be required for the new N2/R409 bridge;
- Rehabilitation of pavement structure on existing alignment and construction of new pavement on new alignment, all for which suitable material will need to be sourced;
- Cut faces requiring stabilisation.

Temporary deviations:

- Temporary traffic diversion routes will be used during the construction phase of the Ndabakazi Interchange;
- The temporary diversion routes will largely follow existing gravel roads through the adjacent community areas located alongside the existing N2 and proposed Ndabakazi Interchange; and
- All temporary diversion routes are to be surfaced.

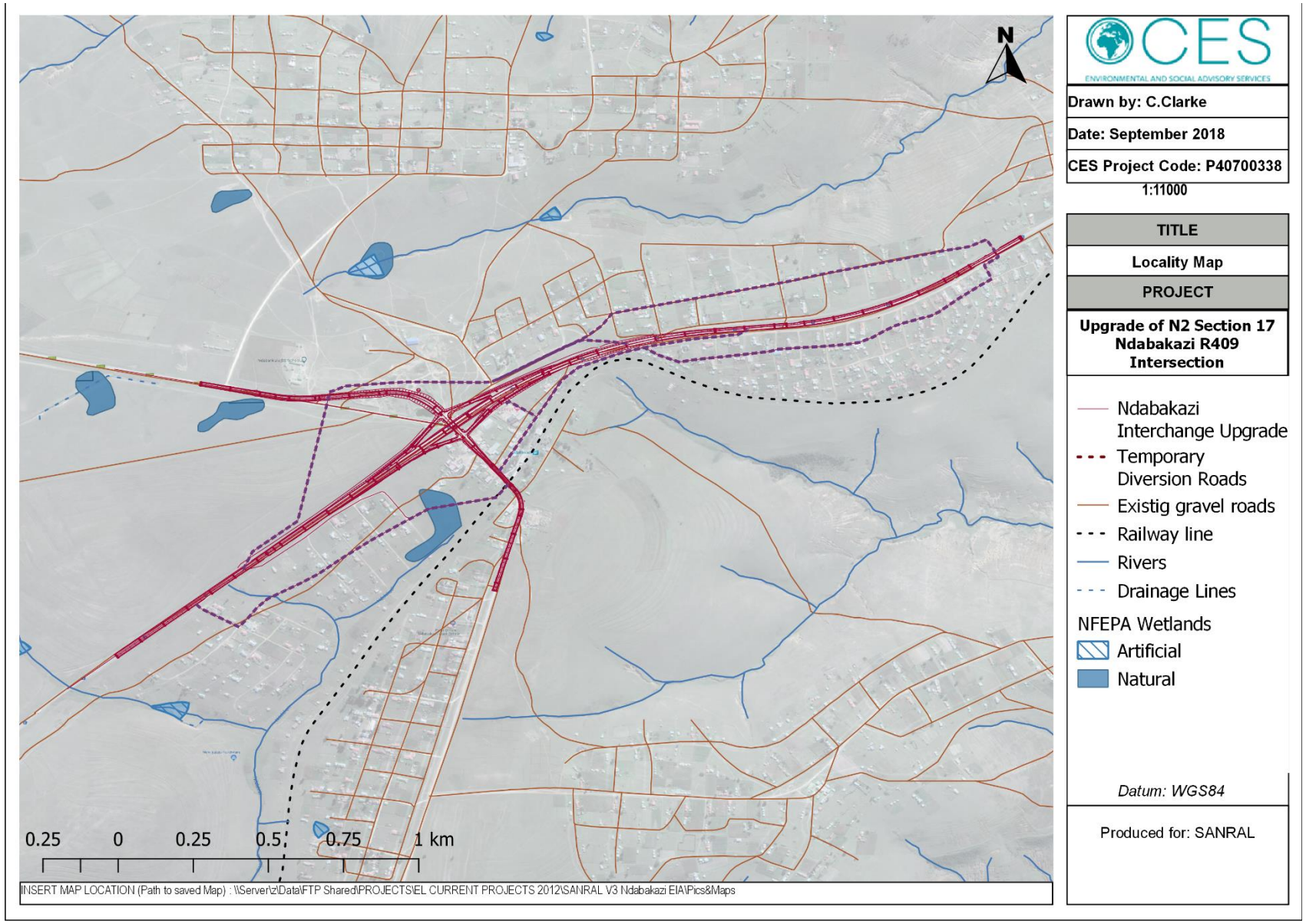


Figure 3.1: Proposed construction of the N2 Ndabakazi – R409 Interchange.

4 SCOPE OF THE EMPr

In order to ensure a holistic approach to the management of environmental impacts during the construction and operation of the proposed road upgrade, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

The EMPr is a dynamic document subject to influences and changes as are wrought by variations to the provisions of the project specification.

4.1 Layout of the EMPr

The EMPr is divided into three phases of development. Each phase has specific issues unique to that period of the construction and operation. The impacts are identified and given a brief description. The phases of the development are identified as below:

4.1.1 Planning and Design Phase

This section of the EMPr provides management principles for the planning and design phase of the project. Environmental actions, procedures and responsibilities as required from SANRAL during the planning and design phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfaction of the Project Coordinator and ECO.

4.1.2 Construction Phase

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfaction of the Project Coordinator and ECO.

4.1.3 Operational and Maintenance Phase

This section of the EMPr provides management principles for the operation and maintenance phase of the project. Environmental actions, procedures and responsibilities as required from SANRAL during the operation and maintenance phase are specified.

5 MITIGATION AND/OR MANAGEMENT MEASURES

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(d) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
  (i) Planning and design;
  (ii) Pre-construction;
  (iii) construction activities;
  (iv) Rehabilitation of the environment after construction and where applicable post closure; and
  (v) where relevant, operation activities;

(e) a description and identification of impact outcomes required for the aspects contemplated in (d).

(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable include actions to –
  (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  (ii) Comply with any prescribed environmental management standards or practices;
  (iii) Comply with any applicable provisions of the Act regarding closure, where applicable;
  (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

Table 5.1: Planning and design phase mitigation measures

1.	PLANNING AND DESIGN PHASE	
	ISSUE	**MITIGATION MEASURES**
1.1	Relevant National Legislation and Policy	• The development must adhere to the relevant legislation and/or policy, e.g. ECBCP, Municipal By-laws, SDFs, etc. • All legal matters pertaining to permitting must be completed prior to any construction activity. • All necessary Water Use Licences must be obtained for any water uses in terms of Section 21 of the National Water Act. • In particular, the relevant permits must be obtained from the competent authority in order to relocate any protected plant species, prior to relocation.
1.2	Scheduling of construction	• Wherever possible, construction activities should be undertaken during the driest part of the year to minimize downstream sedimentation due to excavation, etc. • When not possible, sediment traps must be used to ensure the watercourses are not negatively impacted by construction activity.
1.3	Changes to fluvial geomorphology and hydrology	• The road engineer must ensure that appropriate stormwater structures are designed in line with both SANRAL and DWS requirements. • Any upgraded culverts must be designed in such a manner so as not to impede or divert base flows or increase upstream flood inundation. • All necessary Water Use Licences must be obtained for any water uses in terms of Section 21 of the National Water Act

1.	PLANNING AND DESIGN PHASE	
	ISSUE	**MITIGATION MEASURES**
1.4	Stormwater management	• Appropriate stormwater structures must be designed to minimise erosion and sedimentation of watercourses. • All infrastructure situated on slopes must incorporate stormwater diversion. • A Storm Water Management Plan must be drawn up by a qualified engineer and approved by the ECO. • Stormwater design must be in line with SANRAL and DWS requirements.
1.5	Erosion Management	• An Erosion Management Plan must be compiled during the planning and design phase of the proposed development. • This plan must be implemented during the construction phase, where required.
1.6	Waste Management	• A Waste Management Plan must be compiled during the planning and design phase of the proposed development
1.7	Loss of natural vegetation(grassland)	• The road design and layout must have as minimal impact on the natural vegetation (grassland) as possible.
1.8	Loss of Species of Conservation Concern (SCC)	• A walkthrough must be done by a suitably qualified individual to confirm the occurrence of SCC's in the study area, prior to the commencement of construction. • Should it be impossible for the road layout to avoid identified plant SCCs (aloes), these plant SCCs must be relocated to outside the construction footprint prior to commencement of activities, to a nearby location deemed appropriate by the suitably qualified individual during the walkthrough. • The relevant permits must be obtained from the competent authority, prior to removal, in order to relocate any plant SCCs.
1.9	Control of alien plant species	• During the planning and design phase an Alien Vegetation Management Plan must be complied to reduce the establishment and spread of undesirable alien plant species.
1.10	Traffic	• A Traffic Management Plan must be compiled prior to the commencement of the construction phase detailing appropriate mitigation measures
1.11	Cultivated Land	• The construction footprint must be surveyed and demarcated prior to construction commencing to ensure that there is no unnecessary loss of cultivated land outside the approved road upgrade footprint.
1.12	Potential damage to Colonial Period structures	• The ECO and Contractor must be made aware of the location of all burial and heritage features on site. Such sites must be avoided. • Should the identified heritage buildings be unavoidable, a Phase 2 Heritage Study and the necessary heritage permits must be applied for and obtained from the relevant heritage authority.
1.13	Potential damage to burial sites	• The ECO and Contractor must be made aware of the location of all burial and heritage features on site. Such sites must be avoided. • Should the identified burial sites be unavoidable, grave relocation will be subject to authorisations and permitting by the relevant heritage authority.

1.	PLANNING AND DESIGN PHASE	
	ISSUE	**MITIGATION MEASURES**
1.14	Palaeontological Environment	• Provisions must be made for a Fossil Chance Find Protocol to be implemented during the construction phase should fossils be encountered.

2.	CONSTRUCTION PHASE	
	ISSUE	**MITIGATION MEASURES**
2.1	Relevant National Legislation and Policy	• The developer must employ an independent Environmental Control Officer (ECO) for the construction phase to ensure that construction is implemented according to specifications in the EA and EMPr. • Copies of all applicable licenses, permits and managements plans (EA, EMPr, Water Use Licenses, Permits, etc.) must be available on-site at all times. • Environmental Awareness Training must be included in site meetings/talks with all workers.
2.2	Scheduling of construction	• Wherever possible, construction activities should be undertaken during the driest part of the year to minimize downstream sedimentation due to excavation, etc.
2.3	Changes to fluvial geomorphology and hydrology	• Construction activities within licensed water crossings must adhere to the conditions of the Water Use License obtained prior to construction. • All work within the watercourses and drainage channels should be completed during the dry season, when flows are at their lowest, if possible. • Temporary access roads through wetlands must be rehabilitated to the satisfaction of the DWS and ECO once construction is completed, as per the Wetland Rehabilitation Plan included as Appendix E of the EMPr.
		• During the construction phase no stockpiles should be placed within 50 m of a watercourse or wetland system. • No ablution facilities must be located within 50 m of a watercourse or wetland system. • Construction must adhere to the conditions of the Water Use License.
2.4	Material Stockpiling	• No construction material must be stored within 50 m of a watercourse or wetland system.
2.5	Stormwater Management	• The Storm Water Management Plan must be implemented by the Contractor to minimize the ingress of sediment-laden stormwater into the watercourses/ wetlands and monitored by the ECO.
2.6	Erosion Management	• The Erosion Management Plan must be implemented during construction, where required.
2.7	Waste Management	• Construction rubble must be disposed of in predetermined, demarcated spoil dumps. • The ECO must monitor the sanitation of the work sites as well as the Contractor campsite for litter and waste.

2.	CONSTRUCTION PHASE	
	ISSUE	**MITIGATION MEASURES**
		• All waste must be removed from the site and transported to the closest licenced landfill site.
2.8	Site Closure and Rehabilitation	• On completion of the construction, the Contractor and the Developer must ensure that site camp is decommissioned, and all temporary construction related structures, materials and waste are removed from site. • Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and revegetation must be undertaken in accordance with the Rehabilitation Management Plan, and Erosion Management Plan where necessary. • Temporary access roads through wetlands must be rehabilitated to the satisfaction of the DWS and ECO once construction is completed, as per the Wetland Rehabilitation Plan included as Appendix E of the EMPr. • The ECO must ensure that all decommissioning and rehabilitation is done to a satisfactory standard.
2.9	Loss of natural vegetation (grassland)	• The construction footprint must be surveyed and demarcated prior to construction commencing to ensure that there is no unnecessary loss of natural vegetation outside the approved road upgrade footprint. • Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and revegetation must be undertaken.
2.10	Loss of Species of Conservation Concern (SCC)	• Identified plant SCC's (aloes) must be relocated immediately outside of the construction and operational footprint, as determined during the walkthrough exercise undertaken by the suitably qualified individual.
2.11	Control of alien plant species	• All temporarily impacted areas must be rehabilitated back to their original condition. • Only topsoil from the immediate area must be used for rehabilitation. • All temporarily impacted areas must be restored as per the Rehabilitation Management Plan.
2.12	Job creation	• Where possible, individuals residing in proximity to the proposed road route upgrade should be contracted for unskilled and semi-skilled employment.
2.13	Air pollution	• Cleared surfaces must be dampened whenever possible, especially during dry and windy conditions, to avoid excessive dust generation. • Any soil excavated, and not utilised for rehabilitation, must be removed from site or covered and no large mounds of soil may be left behind after construction.
2.14	Noise pollution	• Construction activity close to residential settlements, which includes the movement of construction vehicles, should be restricted to normal working hours (7:00am – 17:00pm).
2.15	Visual	• The site camp must be decommissioned and the area rehabilitated once construction has been completed. • All waste, materials and equipment must be removed from site.

2.	CONSTRUCTION PHASE	
	ISSUE	**MITIGATION MEASURES**
		• The project area is to be kept tidy and free of litter, where possible.
2.16	Health and Safety	• The contractor must ensure that operational firefighting equipment is present on site at all times as per Occupational Health and Safety Act. • All construction foremen must be trained in fire hazard control and firefighting techniques. • All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. • No open fires should be allowed on site unless in a demarcated area identified by the ECO. • All cooking should be done in demarcated areas considered safe in terms of runaway or uncontrolled fires. • The level of firefighting equipment must be assessed and evaluated thorough a typical risk assessment process.
		• The contractor must ensure that workers adhere to all safety regulations as per Occupational Health and Safety Act. • Appropriate PPE must be worn my workers at all time. • Regular training/talks must be given to all workers on site regarding safe working procedures. • The level of firefighting equipment must be assessed and evaluated thorough a typical risk assessment process.
		• The contractor must ensure that workers adhere to all safety regulations as per Occupational Health and Safety Act. • Appropriate PPE must be worn my workers at all time. • Regular training/talks must be given to all workers on site regarding safe working procedures. • The level of firefighting equipment must be assessed and evaluated thorough a typical risk assessment process.
		• Appropriate warning signs must be in place to notify the public regarding construction activities. • Appropriate measures must be put in place to reduce the speed of construction and road traffic through community areas.
2.17	Management of hazardous substances	• Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practise must be adhered to. This applies to solvents and other chemicals possibly used during the construction process. • The individual(s) that will be handling hazardous materials must be trained to do so. • All hazardous chemicals must be stored properly in a secure, bunded and contained area. • Concrete must not be mixed directly on the ground, or during rainfall events when the potential for transport to the stormwater system is the greatest. • Concrete must only be mixed in the area demarcated for this purpose and on an impermeable surface.

2.	CONSTRUCTION PHASE	
	ISSUE	**MITIGATION MEASURES**
		• Oil trays must be placed under construction machinery to avoid soil contamination. • Should a spill occur, the individual responsible for or the individual who discovers the petrochemical spill must report the incident to the Project Coordinator, ECO and/or Contractor as soon as reasonably possible. • The immediate response must be to contain the spill. • The ECO must determine the precise method of treatment of polluted soil. This could involve the application of oil absorbent materials or oil-digestive
2.18	Sanitation and Water	• Adequate sanitary and ablutions facilities must be provided for construction workers. • The facilities must be serviced regularly to reduce the risk of surface or groundwater pollution. • Contaminated wastewater must be managed by the Contractor to ensure the existing water resources on the site are not contaminated. • All wastewater from general activities in the camp must be collected and removed from the site for appropriate disposal at a licensed facility.
2.19	Traffic	• A Traffic Management Plan, prepared by SANRAL or the appointed engineers, must be implemented during construction.
2.20	Cultivated Land	• No construction related activities must take place outside of the demarcated development footprint.
2.21	Potential damage to Colonial Period structures	• Frequent monitoring of the identified heritage features by the ECO and Contractor must take place. • Such sites must be avoided and a 50 m conservation buffer applied. • Should the identified heritage buildings be unavoidable, a Phase 2 Heritage Study and the necessary heritage permits must be applied for and obtained from the relevant heritage authority.
2.22	Potential damage to burial sites	• Frequent monitoring of the identified burial sites by the ECO and Contractor must take place. • Identified burial sites must be avoided and a 100 m conservation buffer applied. • Should the identified burial sites be unavoidable, grave relocation will be subject to authorisations and permitting by the relevant heritage authority.
2.23	Palaeontological Environment	• A Fossil Chance Find Protocol (as per the Paleontological Report) must be implemented if fossils are found once excavations and construction have commenced. • The fossils should be rescued and a palaeontologist called to assess and collect a representative sample. • Before the fossils are removed from the site, a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

3	OPERATIONAL PHASE	
	ISSUE	**MITIGATION MEASURES**
3.1	Changes to fluvial geomorphology and hydrology	• The Storm Water Management Plan must be implemented, and infrastructure monitored and maintained by SANRAL, during the operation phase.
3.2	Stormwater Management	• Stormwater infrastructure and culverts must be monitored as part of SANRAL's on-going maintenance plan to ensure watercourses and wetlands do not have changes in sediment levels caused by the ingress of sediment-laden stormwater.
3.3	Erosion Rehabilitation	• An Erosion Management Plan must be included as part of SANRAL's on-going maintenance plan.
3.4	Management of hazardous substances	• SANRAL must ensure that emergency response procedures are in place for accidental spills as part of their on-ongoing maintenance plan.
3.5	Traffic	• No mitigation

6 ENVIRONMENTAL MONITORING

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);

(h) The frequency of monitoring the implementation of the impact management actions contemplated in (f);

A monitoring programme must be implemented for the duration of the construction and operation of the road upgrade. This programme should include:

- Establishing a baseline of pre-construction site conditions validated with photographic evidence.
- Monthly audits will be conducted by an independent ECO for the construction phase to ensure compliance with the conditions stipulated in this EMPr and, where necessary, make recommendations for corrective action. These audits can be conducted randomly and do not require prior arrangement with the Project Coordinator.
- Compilation of an audit report with a rating of compliance with the EMPr. The ECO must keep a photographic record of the demarcated site and construction area. The Contractor must be held liable for all unnecessary damage to the environment. A register must be kept of all complaints from the community. All complaints / claims must be handled immediately to ensure timeous rectification / payment by the responsible party.

7 ROLES AND RESPONSIBILITIES

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(i) An indication of the persons who will be responsible for the implementation of the impact management actions;

7.1 Project Coordinator

The Project Coordinator is responsible for overall management of the project and the implementation of the EMPr. The following tasks fall within his / her responsibilities:

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;
- Monitor site activities on a daily basis for compliance;
- Conduct internal audits of the construction site against the EMPr;
- Confine the construction site to the demarcated areas; and
- Rectify transgressions through the implementation of corrective action.

7.2 Contractor

The Contractor is responsible for the overall execution of the activities envisioned in the construction phase, including the implementation and compliance with recommendations and conditions of the EMPr. The Contractor must therefore ensure compliance with the EMPr at all times during construction activities and maintain an environmental register which keeps a record of all environmental incidents that occur on the site during construction and rehabilitation of the Ndabakazi Interchange. These incidents may include:

- Public involvement / complaints;
- Health and safety incidents;
- Incidents involving Hazardous materials stored on site; and
- Non-compliance incidents.

The Contractor is also responsible for the implementation of corrective actions issued by the ECO and Project Coordinator within a reasonable or agreed upon period of time.

7.3 Environmental Control Officer

For the purposes of implementing the conditions contained herein, SANRAL must appoint an ECO for the contract. The ECO must be the responsible person for ensuring that the provisions of the EMPr and that any necessary environmental authorisations are complied with during the construction period. The ECO's duties in this regard will include, *but are not limited to*, the following:

- Conduct regular site visits to be able to report on and respond to any environmental issues;
- Report compliance and non-compliance issues to the competent authority;
- Advise the Contractor on environmental issues within the defined work areas;
- Review access and incident records that may pertain to the environment and reconcile the entries with the observations made during site inspection, monitoring and auditing;
- Recommend corrective action when required for aspects of non-compliance within the EMPr;
- Take immediate action on site where clearly defined and agreed upon "no-go" areas are violated or in danger of being violated, inform a SANRAL representative of the occurrence immediately and take action; and

- Be contactable by the public regarding matters of environmental concern as they relate to the operation of the works.

8 COMPLIANCE WITH THE EMPr

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;

(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);

A copy of the EMPr must be kept on site at all times during the construction period. The EMPr will be binding on all contractors operating on the site and must be included within the Contractual Clauses.

It should be noted that in terms of Section 28 of the National Environmental Management Act (No. 107 of 1998): those responsible for environmental damage must pay the repair costs both to the environment, human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (The *'polluter pays'* principle).

8.1 Non-compliance

The contractors must act immediately when notice of non-compliance is received and take corrective action. Complaints received regarding activities on the construction site pertaining to the environment must be recorded in a dedicated register and the response(s) noted with the date and action taken. The ECO should be made aware of any complaints.

Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause must be reported to the competent authority for them to deal with the transgression, as it deems fit.

The Contractor is deemed not to have complied with the EMPr if, *inter alia*:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site and site extensions;
- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site;
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued within a specific time period.

It is recommended that the Contractors institute penalties for the following less serious violations and any others determined during the course of work, as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or unrepaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Removal and/or damage to fauna, flora, cultural or heritage objects on site.
- Urination and defecation anywhere except at designated facilities.

8.2 Emergency preparedness

The Contractor must compile and maintain environmental emergency procedures to ensure that there will be appropriate responses to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the construction period. Such activities may include, *inter alia*:

- Accidental waste water discharges to water and land.
- Accidental fires.
- Accidental spillage of hazardous substances.
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel and contact details.
- Details of emergency services available (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

The Contractor must comply with the emergency preparedness and incident- and accident-reporting requirements, as required by the Occupational Health and Safety Act (No. 85 of 1993), the NEMA (No. 107 of 1998) and the National Water Act (No. 36 of 1998) as amended and/or any other relevant legislation.

8.3 Incident reporting and remedy

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident. The following information must be provided:

- the location;
- the nature of the load;
- the extent of the impact; and
- the status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

8.4 Penalties

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMPr, SANRAL and/or the Contractor will be liable.

The following violations, and any others determined during the course of work, should be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites.

- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities *(if applicable).*
- Pollution of water sources.
- Unnecessary removal or damage to trees.

The following steps will be followed by the ECO, on behalf of SANRAL, when observing a transgression:

1. **Transgression observed**: Give a warning to the Contractor, with time to remedy the situation. Report transgression and agreed remedial action to SANRAL.
2. **Transgression not remedied**: Report the Contractor directly to SANRAL and issue a financial penalty to the Contractor with an agreed time period to remedy the situation with the assistance of SANRAL *(if necessary).*
3. **Failure to remediate**: Depending on the severity and impact significance of the transgression, which must be assessed and discussed with SANRAL prior to reporting to the competent authority, the ECO may report directly to DEA (Compliance) recommending that for:

- HIGH impact: DEA to issue a notice to cease construction;
- MEDIUM impact: DEA to issue a notice instructing SANRAL to implement recommended remedial action; and/or
- LOW impact: ECO to notify, but up to discretion of DEA to apply sanction.

In all cases, however, non-compliance must be reported to DEA in the monthly audit reports. However, the ECO will also report on corrective actions proposed and implemented.

The following schedule of fines for environmental damage or EMPr transgressions have been adapted from the City of Cape Town: Standard Environmental Specifications (which can be used as a guide).

Table 9.1. List of fines for transgressions or resultant environmental damage

TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	Min. fine	Max. fine
Failure to comply with prescriptions regarding ECO appointment and monitoring of EMPr	R1 000	R2 000
Failure to comply with prescriptions regarding environmental awareness training	R2000	R10 000
Failure to comply with prescriptions regarding method statements	R2 000	R10 000
Failure to report environmental damage or EMPr transgressions to the ECO	R1 000	R2 000
Failure to carry out instructions of the DEO/ECO regarding the environment of the EMPr	R1 000	R2 000
Failure to comply with prescriptions posting of emergency numbers	R2 000	R10 000
Failure to comply with prescriptions regarding information boards	R1 000	R2 000
Failure to comply with prescriptions regarding a complaints register	R1 000	R2 000
Failure to comply with prescriptions regarding site demarcation and enforcement of “no go” areas	R2 000	R10 000
Failure to comply with prescriptions regarding site clearing	R2 000	R10 000
Failure to comply with prescriptions for the storage of imported materials within a designated Contractors yard	R1 000	R2 000
Failure to comply with prescribed administration, storage or handling of hazardous substances	R1 000	R2 000
Failure to comply with prescriptions regarding equipment maintenance and storage	R1 000	R2 000
Failure to comply with fuel storage, refuelling, or clean-up prescriptions	R1 000	R2 000

Failure to comply with prescriptions regarding procedures for emergencies (spillages and fires)	R2 000	R10 000
Failure to comply with prescriptions regarding construction camp	R2 000	R10 000
Failure to comply with prescriptions for the use of ablution facilities	R1 000	R2 000
Failure to comply with prescriptions regarding water provision	R1 000	R2 000
Failure to comply with prescriptions for the use of designated eating areas, heating source for cooking or presence of fire extinguishers	R1 000	R2 000
Failure to comply with prescriptions regarding fire control	R2 000	R10 000
Failure to comply with prescriptions for solid waste management	R2 000	R10 000
Failure to comply with prescriptions to prevent water pollution and sedimentation	R2 000	R10 000
Failure to comply with prescriptions to the protection of natural features, flora, fauna and archaeology	R2 000	R10 000
Failure to comply with prescriptions regarding speed limits	R1 000	R2 000
Failure to comply with prescriptions regarding noise levels of construction activity	R2 000	R10 000
Failure to comply with prescriptions regarding working hours	R2 000	R10 000
Failure to comply with prescriptions regarding aesthetics	R1 000	R2 000
Failure to comply with prescriptions regarding dust control	R1 000	R2 000
Failure to comply with prescriptions regarding security and access onto private property	R1 000	R2 000
Failure to comply with prescriptions regarding cement and concrete batching	R2 000	R10 000

9 REPORTING

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;

9.1 Administration

Before the construction activities commence, the Contractor must provide the ECO and SANRAL with a written method statement setting out the following:

- Details of the construction activities;
- Location where the activity will take place;
- Identification of impacts that might result from the activity;
- Identification of activities that may cause impacts;
- Methodology and/or specifications for impact prevention for each activity or aspect;
- Methodology and/or specifications for impact containment for each activity or aspect;
- Emergency/disaster incident and reaction procedures; and the
- Treatment and continued maintenance of the impacted environment.

The Contractor should provide such information in advance of any or all construction activities provided that new submissions are given to the ECO whenever there is a change or variation to the original.

The ECO should provide comment on the methodology and procedures proposed by the Contractor but he/she will not be responsible for the Contractor's chosen measures of impact mitigation and emergency/disaster management systems.

9.2 Good housekeeping

The Contractor must undertake "good housekeeping" practices during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods to include the care for and preservation of the environment within which the construction is situated.

9.3 Record keeping

The ECO must continuously monitor the Contractor's adherence to the approved impact prevention procedures and the ECO must issue the Contractor with a notice of non-compliance whenever transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance should be documented and reported to SANRAL in the monthly report. These reports must be made available to DEA when requested.

9.4 Document control

The Contractor is responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person.

- Every document should identify the personnel and their position(s), who drafted and compiled the document(s), who reviewed and recommended approval, and who finally approved the document for distribution.
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor must ensure that documents are periodically reviewed and revised, *where necessary*, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed. All documents must be made available to the ECO and other independent external auditors.

10 ENVIRONMENTAL AWARENESS

According to APPENDIX 4 of GN R 326, an environmental management programme must include:

(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

The Contractors must ensure that their employees and any third party, who carries out all or part of the Contractors' obligations, are adequately trained with regard to the implementation of the EMPr and the general environmental legal requirements and obligations. Training should be conducted by the ECO where necessary.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes should contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

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

The Developer must ensure that adequate environmental training takes place. All employees must be given an induction presentation on environmental awareness and the content of the EMPr. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training must, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of approach roads or construction camps;
- The importance of not littering;
- The importance of using supplied ablution facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and the
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

Recommended Environmental Education Material is provided in Appendix 1.

10.1 Monitoring of environmental training

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended

11 CLOSURE PLANNING

Final site cleaning - the contractor must clear and clean the site and ensure that all equipment and residual materials not forming part of the permanent works is removed from site before issuing the completion certificate or as otherwise agreed.

Rehabilitation - the contractor (landscape architect/horticulturist) must be responsible for rehabilitating and re-vegetation of all areas disturbed/areas earmarked for conservation during construction to the satisfaction of the engineer and ECO.

11.1 Post-construction audit

A post-construction audit must be carried out and submitted to DEA at the expense of SANRAL. Objectives should be to audit compliances with the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The audit should be undertaken annually and should cover a cross section of issues, including implementation of environmental controls, environmental management and environmental monitoring.

Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on site and have not been dealt with in the current document.

11.2 General review of EMPr

The EMPr will be reviewed by the ECO on an on-going basis. Based on observations during site inspections and issues raised at site meetings, the ECO will determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on site.

Any such changes or updates will be registered in the ECO's record, as well as being included as an annexure to this document. Annexures of this nature must be distributed to all relevant parties.

12 CONCLUSIONS

The EMPr should be seen as a day-to-day management document in which all foreseeable actions and potential mitigations and/or management actions are contained. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the construction activities. The EMPr could thus change daily, and if managed correctly lead to a successful construction and operation phases.

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

APPENDIX A: ENVIRONMENTAL EDUCATION COURSE

PROPOSED ENVIRONMENTAL EDUCATION COURSE

WHAT IS THE ENVIRONMENT?

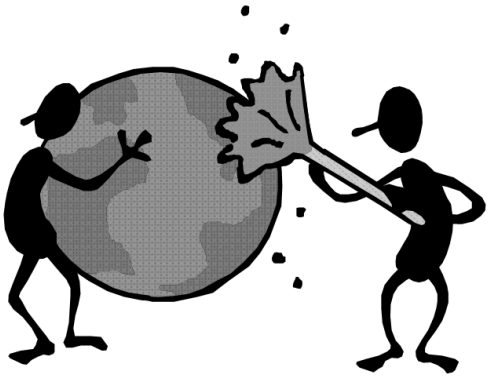
- Soil
- Water
- Plants
- People
- Animals
- Air we breathe
- Buildings, cars and houses

WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A contract has been signed
- Disciplinary action (e.g. construction could stop or fines issued)

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP



WORKING AREAS

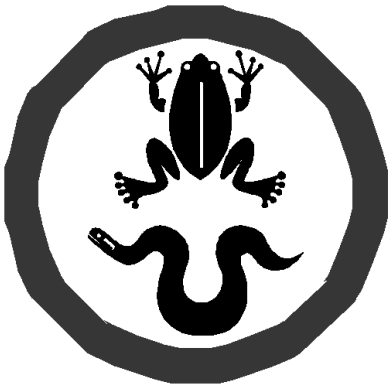
Workers & equipment must stay inside the site boundaries at all times

RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream

ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site



TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers

SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission

PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed

DUST

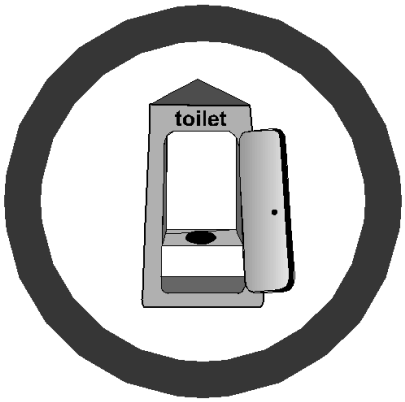
Try to avoid producing dust – Use water to make ground & soil wet

NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles

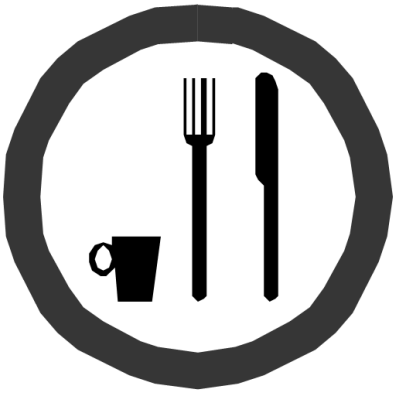
TOILETS

- Use the toilets provided
- Report full or leaking toilets



EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins



RUBBISH

- Do not litter – put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly

TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers – check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill

EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

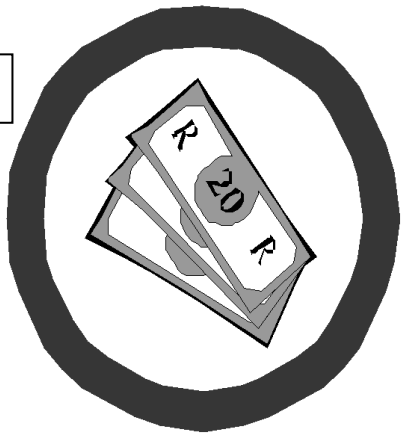
- Local Municipality:
- Ambulance:
- Fire:
- Police:

FINES AND PENALTIES

- Spot fines of between

To be confirmed by the Engineer

- Your company may be fined
- Removal from site
- Construction may be stopped



PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!

APPENDIX B: ENVIRONMENTAL AUTHORISATION

ENVIRONMENTAL AUTHORISATION

APPENDIX C: PRO-FORMA

PRO-FORMA: PROTECTION OF THE ENVIRONMENT

To be signed by Contractors

PRO FORMA

Employer_____

Contract No_____

Contract title_____

PROTECTION OF THE ENVIRONMENT

The Contractor will not be given right of access to the site until this form has been signed.

I/ we_____(Contractor) record as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities must be carried out with due regard to their impact on the environment.

2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in so far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.

3. I/ we acknowledge and accept the right of _____ to deduct, should they so wish, from any amounts due to me/us, such amounts (hereinafter referred to as fines) as the Resident Engineer and Environmental Site Officer must certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:

   3.1 The Resident Engineer and Environmental Officer, in determining the amount of such fine, must take into account *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences.

   3.2 The Resident Engineer and Environmental Officer must, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Resident Engineer and Environmental Officer has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed_____

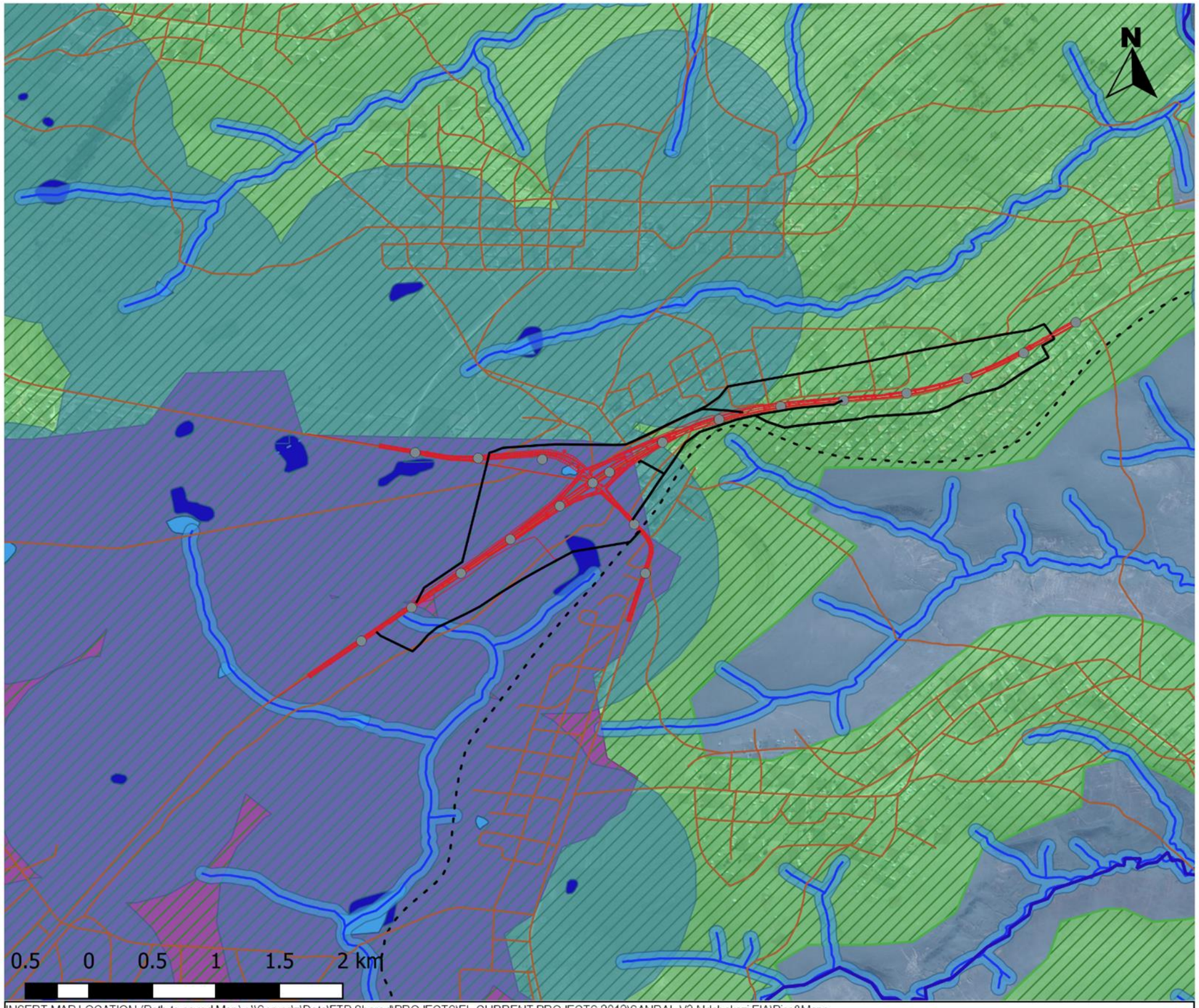
CONTRACTOR

Date_____

APPENDIX D: MAPS

D1 – LOCALITY MAP

D2 – SENSITIVITY MAP



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CES
ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

Drawn by: C.Clarke

Date: January 2019

CES Project Code: P40700338

1:15000

TITLE

Locality Map

PROJECT

Upgrade of N2 Section 17 Ndabakazi R409 Intersection

- Proposed Road Layout
- Proposed temp roads
- Existing Gravel Roads
- Railway line
- Rivers
- Drainage Lines

NFEPA Wetlands
- Artificial
- Natural
- 500m wetland buffer
- 32m river buffer

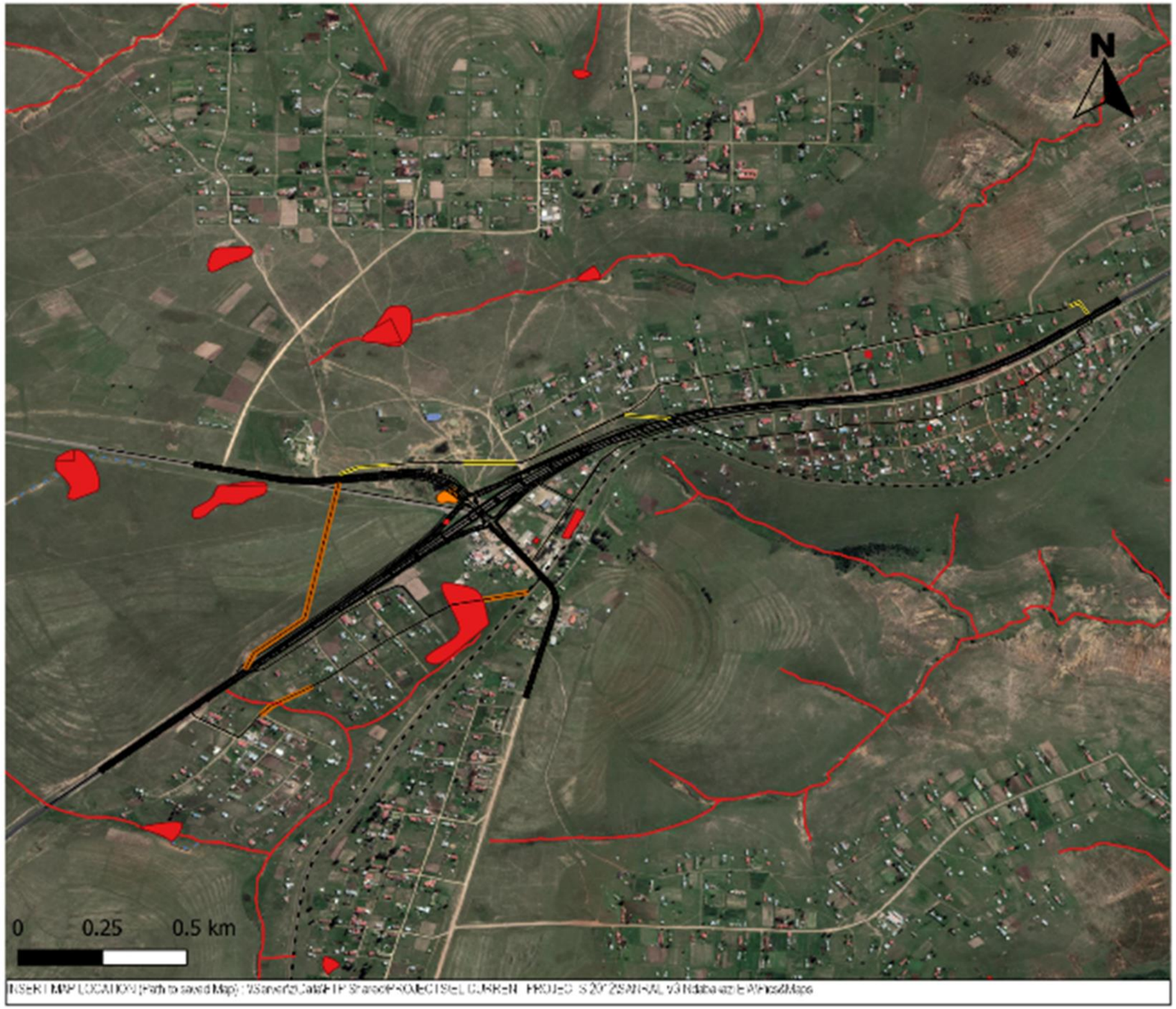
CBA terrestrial
- CBA 2

CBA aquatic
- CBA 2

Vegetation
- Mthatha Moist Grassland
- Bhisho Thornveld
- Road Coords

Datum: WGS84

Produced for: SANRAL



CES

Drawn by: C.Clarke

Date: May 2019

CES Project Code: P40700338

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TITLE

Sensitivity Map

PROJECT

Upgrade of N2 Section 17 Ndabakazi R409 Intersection

- Proposed Road Upgrade
- Temporary Diversion Roads
- Railway line

Sensitivity

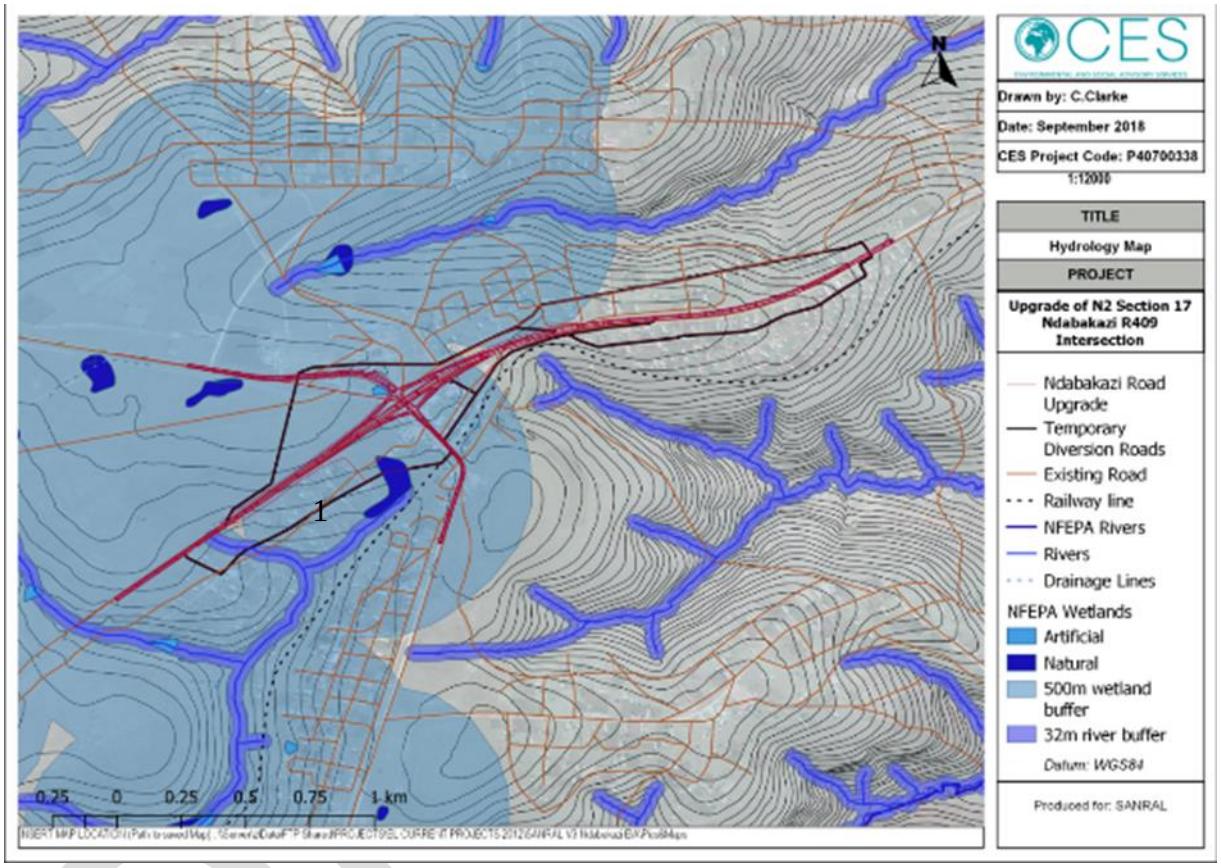
- High
- Medium
- Low

Datum: WGS84

Produced for: SANRAL

APPENDIX E: WETLAND REHABILITATION PLAN

A Wetland Rehabilitation Plan is required to be implemented and adhered to in order to achieve the overall biodiversity objective of minimising the loss of biodiversity, where possible. The proposed construction of the Ndabakazi Interchange and temporary traffic diversion routes falls within numerous wetland buffers. In particular, temporary diversion route 1 (as shown in the figure below) crosses a drainage channel and a wetland area. Temporary diversion routes through wetlands must be rehabilitated to the satisfaction of the relevant authorities and ECO once construction is completed.



In addition, should construction activities and/or vehicles and machinery encroach into the wetland areas (and their buffers) causing disturbance to the wetlands, and rehabilitation is required, then the principles below can be applied to the wetlands, where relevant.

Rehabilitation will aid the recovery of the ecosystems and can be seen as critical in preventing further impacts to the wetlands including those associated with alien plant infestations, soil erosion and sedimentation. Wetland rehabilitation work must be conducted during low rainfall seasons and the use of heavy machinery must be prohibited to avoid soil compaction.

1. Rehabilitation guidelines for a disturbed wetland

1.1. Stabilise unstable and eroded areas

- Any erosion features immediately upslope and/or within the wetland habitat that is created during the construction phase needs to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed. Compacted soil infill, rock plugs, gabions or any other suitable measures can be used for this purpose.

1.2. Remove any waste products

- All foreign sediment washed into the wetland from upslope erosion must be removed taking care not to remove or disturb the natural soil profile.
- Any foreign material or waste (spoil, construction materials, hazardous substances and general litter) must be removed from the wetlands and disposed of in proper waste facilities.
- Additional disturbance must be prevented by limiting the use of heavy vehicles and personnel during clean-up operations.

1.3. Remove alien plants from wetlands

- All exotic/alien plants and weeds that colonise the wetlands and buffer must be removed and properly disposed of prior to the implementation of rehabilitation measures.
- Alien invasive plant species in and around wetland areas must be removed in terms of the Conservation of Agricultural Resources Act (CARA) and National Environmental Management Biodiversity Act (NEMBA) and follow up actions for at least five years need to take place.

1.4. Restore natural topography and re-vegetation

- The natural topography of the wetland areas must be re-instated as close as practically possible to preconstruction conditions to ensure natural drainage patterns.
- In the case of unstable steep banks these may be reshaped to a stable angle of repose to avoid slumping.
- If significant soil compaction has occurred, the soil may need to be ripped to reduce the bulk density of the soil such that vegetation can become established at the site.
- If topsoil is lost during construction as a result of erosion, topsoil will need to be imported to the site and re-established. This topsoil must be sourced locally, responsibly and legally.
- For areas that are re-seeded via "broadcasting", the soil must be prepared to optimise germination. Such preparation can be done by hand hoeing.
- Where re-vegetation is not sufficient on its own to stabilise areas, "soft" stabilisation interventions should be installed where necessary and applicable. "Soft" stabilisation interventions should be favoured over "hard" interventions wherever possible to ensure that wetlands retain habitat.
- The following soft interventions (in addition to re-vegetation) should be investigated, if required:
    - Fibre mats / blankets/ mattresses / nets.
    - Fibre rolls.
    - Fibre bags.
    - Brush or vegetation mattresses (mats).
    - Terracing.
- A trained rehabilitation expert should be contracted to oversee the rehabilitation of wetland areas (in the event that they are inadvertently impacted).
- Once alien vegetation and waste products have been removed and soils are prepared for planting, vegetation must be reinstated as soon as weather conditions allow for plant growth.
- For wetland and riparian habitat, the disturbed and bare areas must be re-vegetated using indigenous plants with active planting using plugs and/or sprigs of indigenous locally occurring riparian vegetation similar/identical to that existing prior to disturbance or transplants of local vegetation that can only be sourced under the guidance of the ECO/re-vegetation specialist and must not be sourced from freshwater habitats. A qualified re-vegetation specialist must inform the selection of plug species as well as plug densities and spacing.
- Rapidly germinating indigenous species (e.g. fast growing, deep rooting, rhizomatous, stoloniferous) known to bind soils in terrestrial, riparian and/or wetland areas must be utilised where there is a strong motivation for stabilisation over reinstating similar plant communities to that being disturbed. Again, this should be informed by a qualified re-vegetation specialist.

- Wetland rehabilitation work must be conducted during low rainfall seasons and the use of heavy machinery must be prohibited to avoid soil compaction.
- Do not use fertilizer, lime, or mulch unless absolutely required.
- Alien plant species are not to be used for re-vegetation, particularly those with invasive potential (Conservation of Agricultural Resources Act (Act 43 of 1983), as well as the Alien & Invasive Species list (2014) of the National Environmental Management: Biodiversity Act (Act 10 of 2004).
- When sourcing plants from nurseries, it is important to consider the genetic origin of the plants. It is considered best to use small regional nurseries that breed plants from the region, instead of large commercial nurseries that are likely to obtain stock from large regional suppliers.
- Temporary erosion protection measures must only be removed once good vegetation cover has been established.
- Should the replanting area be invaded by weeds prior to planting, these must be hand pulled, hoed or killed with an appropriate environmentally friendly herbicide. Care must be taken, however, to not clear all weeds indiscriminately as the weeds may be performing a useful soil covering and binding function.

1.5. Monitor re-vegetation progress and administer alien plant control

- Recovery of disturbed areas should be assessed for the first 6 months to assess the success of rehabilitation actions. Any areas that are not progressing satisfactorily must be identified (e.g. on a map) and action must be taken to actively re-vegetate these areas. If natural recovery is progressing well, no further intervention may be required.
- The ECO should assess the need / desirability for further monitoring and control after the first 12 months and include any recommendations for further action.
- The use of herbicides in invasive alien plant control will require an investigation into the necessity, type to be used, effectiveness and impacts of the agent on aquatic biota (manual removal of alien vegetation should be sufficient).
- Any soil erosion in rehabilitated areas must also be addressed through appropriate actions.

CURRICULUM VITAE OF EAP AND PROJECT TEAM

ALAN ROBERT CARTER
Curriculum Vitae

CONTACT DETAILS

Name of Company	**CES – Environmental and Social Advisory Services**
Designation	East London Branch
Profession	Executive
Years with firm	17 (Seventeen) Years
E-mail	a.carter@cesnet.co.za
Office number	+27 (0)43 7267809 / 8313
Nationality	South African
Professional Body	SACNASP: South African Council for Natural Scientific Profession EAPSA: Environmental Assessment Practitioners Southern Africa IWMSA: Institute Waste Management Southern Africa TSBPA: Texas State Board of Public Accountancy (USA)
Key areas of expertise	➢ Marine Ecology ➢ Environmental and coastal management ➢ Waste management ➢ Financial accounting and project feasibility studies ➢ Environmental management systems, auditing and due-diligence

PROFILE

Alan has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. He is also a certified ISO14001 EMS auditor with the American National Standards Institute. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years.

EMPLOYMENT EXPERIENCE

- October 2013 – Present: Executive (EOH Coastal & Environmental Services, East London, South Africa)
- January 2002 – September 2013: Director (Coastal & Environmental Services, East London, South Africa)
- January 1999 – December 2001: Manager (Arthur Andersen LLP, Public Accounting Firm, Chicago, Illinois USA)
- December 1996 – December 1998: Senior Accountant/Auditor (Ernst & Young LLP, Public Accounting Firm, Austin, Texas, USA).)
- January 1994 – December 1996: Senior Accountant/Auditor (Ernst & Young, Charteris & Barnes, Chartered Accountants, East London, South Africa)
- July 1991 – December 1994: Associate Consultant (Coastal & Environmental Services, East London, South Africa)
- March 1989 – June 1990: Data Investigator (London Stock Exchange, London, England, United Kingdom)

ACADEMIC QUALIFICATIONS

- Ph.D. Plant Science (Marine) Rhodes University 1987
- B. Compt. Hons. Accounting Science University of South Africa 1997
- B. Com. Financial Accounting Rhodes University 1995
- B.Sc. Hons. Plant Science Rhodes University 1983
- B.Sc. Plant Science & Zoology Rhodes University 1982

COURSES

- *Environmental Management Systems Lead Auditor Training Course - American National Standards Institute and British Standards Institute (2000)*
- *ISO 14001:2015 Implementing Changes - British Standards Institute (2015)*
- *Numerous other workshops and training courses*

CONSULTING EXPERIENCE

Environmental Impact Assessment, Feasibility and Pre-feasibility Assessments

- Managed numerous projects and prepared environmental impact assessment (EIA) reports in terms of relevant EIA legislation and regulations for development proposals including: Infrastructure projects: bulk water and waste water, roads, electrical, mining, ports, aquaculture, renewable energy (solar and wind), industrial processes, housing developments, golf estates and resorts, etc. (2002 – present).
- Projects have also included preparation of applications in terms of other statutory requirements, such as water-use and mining licence /permit applications.
- Managed projects to develop pre-feasibility and feasibility assessments for various projects, including various tourism developments, infrastructure projects, etc.
- Managed project for the East London Industrial Development Zone (ELIDZ) to develop a Conceptual Framework for a Mariculture Zone within the ELIDZ (2009).
- Managed pre-feasibility study to establish a Mariculture Zone within the Coega Industrial Development Zone (2014).
- Assisted City of Johannesburg in the process to proclaim four nature reserves in terms of relevant legislation (2015-2016).

- Acted as Environmental Control Officer (ECO) for numerous projects including solar and wind farms, roads, industrial processes, etc.

Strategic Environmental Assessment

- Managed Strategic Environmental Assessment (SEA) project toward the development of a Biofuel Industry in the Eastern Cape Province of South Africa (2014-2016)
- Managed Strategic Environmental Assessment (SEA) projects for two South African ports (2006 – 2007).
- Managed Strategic Environmental Assessment (SEA) projects for five (5) local municipalities in the Eastern Cape as part of the municipal Spatial Development Framework plans (2004 – 2005).
- Involved in the financial assessment of various land-use options and carbon credit potential as part of a larger Strategic Environmental Assessment (SEA) for assessing forestry potential in Water Catchment Area 12 in the Eastern Cape of South Africa (2006).

Climate change, emissions trading and renewable energy

- Provided specialist peer review services for National Department of Environmental Affairs relating to climate change impact assessments for large infrastructure projects (2017-2018).
- Conducted climate change impact assessment for a proposed coal-fired power station in Africa (2017-2018).
- Participated in the development of a web-based Monitoring & Evaluation (M&E) system for climate change Mitigation and Adaptation in South Africa for National Department of Environmental Affairs (DEA) (2015-2016.
- Managed project to develop a Climate Change Strategy for Buffalo City Metro Municipality (2013).
- Managed projects to develop climate change strategies for two district municipalities in the Eastern Cape Province (2011).
- Conducted specialist carbon stock and greenhouse gas emissions impact and life cycle assessment as part of the Environmental, Social and Health Impact Assessment for a proposed sugarcane to ethanol project in Sierra Leone (2009 - 2010) and a proposed Jatropha bio-diesel project in Mozambique (2009 - 2010).
- Managed project to develop the Eastern Cape Province Climate Change Strategy (2010).
- Managed project to develop a Transnet National Ports Authority Climate Change Risk Strategy (2009)
- Participated in a project to develop a Renewable Energy roadmap for the East London Industrial Development Zone (ELIDZ) (2013).
- Participated in a project for the East London Industrial Development Zone (ELIDZ) and Eastern Cape Government to prepare a Renewable Energy Strategy (2009).
- Contributed to the development of Arthur Andersen LLP's International Climate Change and Emissions Trading Services (2001).
- Conducted carbon credit (Clean Development Mechanism - CDM) feasibility assessment for a variety of renewable energy projects ranging from biogas to solar PV.
- Participated in the preparation of CDM applications for two solar PV projects

in the Eastern Cape.

Waste Management

- Managed project to develop Integrated Waste Management Plans for six local municipalities on behalf of the Sarah Baartman District Municipality in the Eastern Cape Province (2016).
- Managed project to develop Integrated Waste Management Plans for four local municipalities on behalf of Alfred Nzo District Municipality in the Eastern Cape Province (2015).
- Managed project to develop Integrated Waste Management Plans for eight local municipalities on behalf of Chris Hani District Municipality in the Eastern Cape Province (2011).
- Managed a project to develop a zero-waste strategy for a community development in the Eastern Cape Province (2010).
- Managed waste management status quo analysis for a District Municipality in the Eastern Cape Province (2003).
- For three consecutive years, managed elements of the evaluation of the environmental financial reserves of the three largest solid waste companies (Waste Management, Inc., Republic Services, Inc., Allied Waste, Inc.) and number of smaller waste companies in the USA as part of the annual financial audit process for SEC reporting purposes. Ensured compliance with RCRA and CERCLA environmental regulations.
- Managed elements of the evaluation of the environmental financial reserves of the largest hazardous waste company in the USA (Safety-Kleen, Inc.), as part of the audit process for SEC reporting purposes. Ensured compliance with RCRA and CERCLA environmental regulations.

Environmental Due Diligence and Business Risk

- Conducted environmental due diligence projects on behalf of the German Development Bank for a forestry pulp and paper operation in Swaziland (2010) and for a large diversified South African agricultural/agro-processing company (2011)
- Managed project for the Transnet National Ports Authority to identify the environmental risks and liabilities associated with the operations of the Port of Durban as part of a broader National initiative to assess business and financial risks relating to environmental management (2006).
- Managed project to determine the financial feasibility of various proposed tourism developments for the Kouga Development Agency in the Eastern Cape Province (2006)
- Contributed significantly to a study to determine the financial and environmental feasibility of three proposed tourism development projects at Coffee Bay on the Wild Coast (2004).
- Conducted sustainability and cost/benefit analysis of various waste water treatment options (including a marine pipeline at Hood Point) for the West Bank of East London (2004).
- Conducted analysis of permit fees and application processing costs for off-road vehicle use on the South African coastline for the Department of Environmental Affairs and Tourism, Marine & Coastal Management (2003).
- Involved in the determination of the historical cost element of environmental remediation insurance claims for a number of multinational

companies, including Dow Chemicals, Inc. and International Paper, Inc.

- Evaluated the environmental budgeting process of the US Army and provided best practice guidance for improving the process.

Policy and Guidelines

- Development of Administration / Application Fee Structure for the Reclamation of Land, Coastal Use Permits, Coastal Waters
- Discharge Permits, Dumping Of Waste at Sea, Off-Road Vehicle Regulations Promulgated in Terms of the National Environmental Management Act: Integrated Coastal Management Act (Act No. 24 Of 2008) (2017).
- Managed project to develop an Estuarine Management Plan for the Buffalo River Estuary for the National Department of Environmental Affairs (2017).
- Managed project to develop a Coastal Management Programme for Amathole District Municipality, Eastern Cape (2015 – 2016).
- Managed project to develop a sustainability diagnostic report as part of the development of the Eastern Cape Development Plan and Vision 2030 (2013).
- Managed project for the Department of Environmental Affairs and Tourism, Marine & Coastal Management to determine the cost implications associated with the implementation of the Integrated Coastal Management Act (2007).
- Managed project to develop a Conservation Plan and Municipal Open Space System (MOSS) for Buffalo City Municipality (2007)
- Managed project to develop a Sanitation Policy and Strategy for Buffalo City Municipality, Eastern Cape (2004 – 2006).
- Managed project to develop an Integrated Environmental Management Plan and Integrated Coastal Zone Management Plan for Buffalo City Municipality, Eastern Cape (2004 – 2005).
- Managed projects to develop and implement an Environmental Management System (EMS) for the Chris Hani and Joe Gqabi (formerly Ukhahlamba) District Municipalities in the Eastern Cape generally in line with ISO14001 EMS standards (2004 – 2005).
- Managed project to develop a State of the Environment Report and Environmental Implementation Plans for Amathole, Chris Hani, OR Tambo and Joe Gqabi District Municipalities in the Eastern Cape Province (2005 – 20010).
- Conducted analysis of permit fees and application processing costs for off-road vehicle use on the South African coastline for the Department of Environmental Affairs and Tourism, Marine & Coastal Management (2003).

Environmental auditing and compliance

- Conducted environmental legal compliance audit for various large Transnet Freight Rail facilities (2018).
- Managed projects to develop Environmental & Social Management Systems (ESMS) in line with IFC Performance Standards for three (3) wind farms in South Africa (2015-2018).
- Managed project to develop an Environmental & Social Management System (ESMS) in line with IFC Performance Standards for a telecoms company in Zimbabwe on behalf of the German Development Bank (2013)
- Participated in numerous ISO14001 Environmental Management System (EMS) audits for large South African corporations including SAPPI, BHP

Billiton, SAB Miller, Western Platinum Refinery, Dorbyl Group and others (2002 – present).

- Reviewed the SHE data reporting system of International Paper, Inc. (IP) for three successive years as part of the verification of the IP SHE Annual Report, which included environmental assessments of 12 IP pulp and paper mills located throughout the USA.
- Conducted Environmental Management System (EMS) reviews for a number of large US corporations, including Gulfstream Aerospace Corporation

Public financial accounting

- While with Ernst & Young LLP, (USA), functioned as lead financial auditor for various public and private companies, mostly in the technology business segment of up to $200 million in annual sales. Client experience included assistance in a $100 million debt offering, a $100 million IPO and SEC annual and quarterly reporting requirements.
- Completed three years of articles (training contract) in fulfilment of the certification requirements of the South African Institute of Chartered Accountants which included auditing, accounting and preparation of tax returns for many small to medium sized commercial entities.

PUBLICATIONS

Refereed Publications

- Carter, A.R. 1985. Reproductive morphology and phenology, and culture studies of Gelidium pristoides (Rhodophyta) from Port Alfred in South Africa. Botanica Marina 28: 303-311.
- Carter, A.R. 1993. Chromosome observations relating to bispore production in Gelidium pristoides (Gelidiales, Rhodophyta). Botanica Marina 36: 253-256.
- Carter, A.R. and R.J. Anderson. 1985. Regrowth after experimental harvesting of the agarophyte Gelidium pristoides (Gelidiales: Rhodophyta) in the eastern Cape Province. South African Journal of Marine Science 3: 111-118.
- Carter, A.R. and R.J. Anderson. 1986. Seasonal growth and agar contents in Gelidium pristoides (Gelidiales, Rhodophyta) from Port Alfred, South Africa. Botanica Marina 29: 117-123.
- Carter, A.R. and R.H. Simons.1987. Regrowth and production capacity of Gelidium pristoides (Gelidiales, Rhodophyta) under various harvesting regimes at Port Alfred, South Africa. Botanica Marina 30: 227-231.
- Carter, A.R. and R.J. Anderson. 1991. Biological and physical factors controlling the spatial distribution of the intertidal alga Gelidium pristoides in the eastern Cape Province, South Africa. Journal of the Marine Biological Association of the United Kingdom 71: 555-568.

Published reports

- Water Research Commission. 2006. Profiling Estuary Management in Integrated Development Planning in South Africa with Particular Reference to the Eastern Cape. Project No. K5/1485.
- Turpie J., N. Sihlophe, A. Carter, T, Maswime and S. Hosking. 2006. Maximising the socio-economic benefits of estuaries through integrated planning and management: A rationale and protocol for incorporating and

enhancing estuary values in planning and management. Un-published Water Research Commission Report No. K5/1485

Conference Proceedings

- Carter, A.R. 2002. Climate change and emission inventories in South Africa. Invited plenary paper at the 5th International System Auditors Convention, Pretoria. Held under the auspices of the South African Auditor & Training Certification Association Conference (SAATCA).
- Carter, A.R. 2003. Accounting for environmental closure costs and remediation liabilities in the South African mining industry. Proceedings of the Mining and Sustainable Development Conference. Chamber of Mines of South Africa, Vol. 2: 6B1-5
- Carter, A.R. and S. Fergus. 2004. Sustainability analysis of wastewater treatment options on the West Bank of East London, Buffalo City. Proceedings of the Annual National Conference of the International Association for Impact Assessment, South African Affiliate: Pages 295-301.
- Carter, A., L. Greyling, M. Parramon and K. Whittington-Jones. 2007. A methodology for assessing the risk of incurring environmental costs associated with port activities. Proceedings of the 1st Global Conference of the Environmental Management Accounting Network.
- Hawley, GL, McMaster AR and Carter AR. 2009, Carbon, carbon stock and life-cycle assessment in assessing cumulative climate change impacts in the environmental impact process. Proceedings of the Annual National Conference of the International Association for Impact Assessment, South African Affiliate.
- Hawley, GL, McMaster AR and Carter AR. 2010. The Environmental and Social Impact Assessment and associated issues and challenges. African, Caribbean and Pacific Group of States (ACP), Science and Technology Programme, Sustainable Crop Biofuels in Africa.
- Carter, A.R. 2011. A case study in the use of Life Cycle Assessment (LCA) in the assessment of greenhouse gas impacts and emissions in biofuel projects. 2nd Environmental Management Accounting Network- Africa Conference on Sustainability Accounting for Emerging Economies. Abstracts: Pages 69-70.

CERTIFICATION

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

ALAN ROBERT CARTER Date: January 2019

The Interim Certification Board

for

Environmental Assessment Practitioners
of
South Africa

Alan Robert Carter

was certified as an

ENVIRONMENTAL ASSESSMENT PRACTITIONER

on this 1st day of March 2012

Chairperson

Secretary

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Alan Robert Carter

Registration number: 400332/04

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective **31 August 2004** Expires **31 March 2019**

President

Executive Director

CARYN CLARKE
Curriculum Vitae

CES
ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

CONTACT DETAILS

Name of Company	**CES – Environmental and Social Advisory Services**
Designation	East London Branch
Profession	Senior Environmental Consultant
Years with firm	1 (One) Year
E-mail	c.clarke@cesnet.co.za
Office number	+27 (0)43 7267809 / 8313
Nationality	South African
Professional Body	South African Council for Scientific Natural Professionals (SACNASP): Candidate Natural Scientist (500022/14)
Key areas of expertise	➢ Climate Change ➢ Environmental Authorisations (including ➢ MPRDA applications) ➢ Environmental Management Plans ➢ Environmental Compliance Monitoring ➢ Geographic Information Systems ➢ Licensing and Permit Applications ➢ Feasibility Assessments ➢ Public Participation Process

PROFILE

Caryn holds a M.Sc. Environmental Science (2012), B.Sc. Hon. Environmental Science (2010), and a B.Sc. Environmental Science and Economics (2009) from Rhodes University. Her M.Sc. thesis was titled "Responses to the linked stressors of Climate Change and HIV/AIDS amongst vulnerable rural households in the Eastern Cape, South Africa". Her B.Sc. Hon. thesis investigated climate change perceptions, drought responses and views on carbon farming amongst commercial livestock and game farmers within the Great Fish River Valley, Eastern Cape, from which a paper was published in the African Journal of Range and Forage Science 2012, 29(1):13-23. Caryn has further completed a Carbon Footprint Analysis Course (2013).

Caryn's expertise includes project management, environmental impact assessments including public participation, MPRDA applications, environmental compliance monitoring, various licensing and permit applications, feasibility assessments and GIS mapping. Caryn is a registered Candidate Natural Scientist under the South African Council for Natural Scientific Professions.

EMPLOYMENT EXPERIENCE

- Environmental Consultant, Coastal and Environmental Services
  August 2018 – current
- Environmental Consultant, Environmental Impact Management Services (EIMS)
  March 2013 – September 2015

ACADEMIC QUALIFICATIONS

- Rhodes University, 2012: M.Sc. (Environmental Science) with distinction
- Rhodes University, 2010: B.Sc. Hon. (Environmental Science) with distinction
- Rhodes University, 2009: B.Sc. (Environmental Science and Economics) with distinctions

COURSES

- *Terra Firma Academy, Johannesburg:*
  "Carbon Footprint Analysis Course" (2013)

CONSULTING EXPERIENCE

- Water Use Licensing for the Olivewood Gold Estate, Eastern Cape.
- Water Use Licensing for the Northern Cape Economic Development, Trade and Investment Promotion Agency (NCEDA) SEZ, Upington, Northern Cape.
- Environmental Sensitivity Assessment for the Lesotho Electricity Company 132 kV Mahlasela - Letseng Powerline, Lesotho.
- EIA, Water Use Licensing, and Coastal Discharge Permit for the Wild Coast Abalone Expansion, Eastern Cape.
- Conservation Management Plan for the CDC Wild Coast Mthatha SEZ, Eastern Cape.
- Basic Assessment and Mining License for the SANRAL Heidelberg to Lizmore road upgrade, Western Cape.
- Feasibility Assessment for the DAFF Multispecies Hatchery Development within the Eastern Cape.
- EIA for the proposed WildCoast SEZ Upper Ncise Aquaponics development, Mthatha Dam.
- Market Analysis for the DAFF Richards Bay Marine Cage Culture Aquaculture Feasibility Assessment.
- Basic Assessment for the proposed Eskom Lesokwana substation and associated powerlines, Gauteng.
- Basic Assessment and Water Use Licensing for the proposed SANRAL V3 Ndabakazi and R409 Interchange upgrade;
- Basic Assessment and Water Use Licensing for the proposed Kei Mouth Eco Estate.
- Public Participation for the Silver Wave Energy Exploration Rights;
- Integrated Water Use Licensing for Leiden Coal Mine;
- Integrated Water and Waste Management Plan for Vlakvarkfontein Coal Mine Consolidation;
- Environmental Impact Assessment for AOE Oil Production Right, Nanaga;
- Environmental Management Plan and compliance monitoring for the Noblesfontein Wind Energy Facility;
- Section 24G for the Tankatara Level Crossing to Coega Station service road

upgrade;

- Environmental Impact Assessment for BCMM Sunny South Housing Development;
- Environmental Impact Assessment for the AES Photovoltaic Solar Energy Facility near Aggeneys, Northern Cape;
- Vincent-Berea Local Spatial Development Framework (LSDF);
- Participatory Planning for Informal Settlements: National Upgrading Support Programme (NUSP);
- Basic Assessment for the formalisation of Mdantsane informal settlements;
- Water use License Applications for the formalisation of Mdantsane informal settlements;
- Basic Assessments for the Sidwadeni and Mngazi River Bridge and Access Road;
- Environmental Compliance Monitoring (ECO work) for Lusikisiki Waste Water Treatment Works;
- Environmental Compliance Monitoring for the East London Industrial Development Zone (ELIDZ) 1B West Infrastructure Services
- Environmental Compliance Monitoring for the reconstruction of Fleet Street, East London.
- Environmental Compliance Monitoring for the Sunny South Housing Development, East London.
- Numerous proposals, for example: Nelson Mandela Bay Metro Municipality's request for Environmental Consultant Services, Camdeboo Local Municipality's Integrated Waste Management Plan, Port St John's Environmental Management Plan, and the ELIDZ upgrade of Kemba electrical substation, Berlin, Eastern Cape; ELIDZ request for information; Transnet S24G Rectification process; Nyandeni Local Municipality's request for an Environmental Impact Assessment for the Ndayini Access Road.

CERTIFICATION

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

CARYN CLARKE Date: January 2019

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Caryn Lee Clarke

Registration number: 500022/14

is registered as a

Candidate Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective **23 July 2014** Expires **31 March 2019**

President

Executive Director

ROY DE KOCK
Curriculum Vitae

CONTACT DETAILS

Name of Company	**EOH Coastal & Environmental Services**
Designation	East London Branch
Profession	Principal Environmental Consultant
Years with firm	
E-mail	Roy.dekock@eoh.co.za r.dekock@cesnet.co.za
Office number	+27 (0)43 726 7809
Nationality	South African
Professional body	**SACNASP**: South African Council for Natural Scientific Profession **LaRRSA**: Land Rehabilitation Society of South Africa **SAAB**: South African Association of Botanists
Key areas of expertise	➢ Terrestrial Ecology ➢ Botanical specialist ➢ Agricultural & Soil specialist ➢ Conservation management ➢ Biodiversity Assessment ➢ Environmental management ➢ Mine management (new applications, site closure and annual auditing compliance) ➢ Financial accounting and project feasibility studies ➢ Environmental management systems, auditing and due-diligence

PROFILE

Roy is a Principal Consultant holding a BSc Honours in Geology and an MSc in Botany from the Nelson Mandela Metropolitan University in Port Elizabeth. His MSc thesis focused on Rehabilitation Ecology using an open-cast mine as a case study. He is based at the East London branch where he focuses on Ecological and

Agricultural Assessments, Geological and Geotechnical analysis, Environmental Management Plans, mining applications and various environmental impact studies. Roy has worked on numerous projects in South Africa, and Africa.

EMPLOYMENT EXPERIENCE

- October 2012 – Current: Senior Environmental Consultant (EOH Coastal & Environmental Services)
- April 2010 – October 2012: Environmental Consultant (Coastal & Environmental Services)
- June 2008 – March 2010: Laboratory Technician (Nelson Mandela Metropolitan University)
- March 1995 – November 2003: Financial Advisor (ABSA Bank)

ACADEMIC QUALIFICATIONS

M.Sc. Botany, NMMU, 2010
B.Sc. Hons. Geology, NMMU, 2008
B.Sc. Botany & Geology, NMMU, 2007
Diploma in Marketing, University of Witwatersrand, 2003
PHd Botany / Geology, Nelson Mandela University (current)

COURSES

Environmental Impact Assessment Course – Rhodes University (2010)

Attended numerous workshops through the Department of Environmental Affairs

CONSULTING EXPERIENCE

Environmental Impact Assessment, Feasibility and Pre-feasibility Assessments

- *Project Management*

Managed numerous projects of various sizes incluing

budget management, client liason, timeframe targets, managing junior consultans and sub-consultnts.

- *Report writing*

  Prepared environmental impact assessment (EIA) reports in terms of relevant EIA legislation and regulations for development proposals including: Infrastructure projects: bulk water and waste water, roads, electrical, mining, ports, aquaculture, renewable energy (solar and wind), industrial processes, housing developments, golf estates and resorts, etc. (2010 – present).

  Projects have also included preparation of applications in terms of other statutory requirements, such as water-use and mining license /permit applications.

- *Feasibility assessments*

  Managed projects to develop pre-feasibility and feasibility assessments for various projects, including various tourism developments, infrastructure projects, etc.

- *Specialist studies*

  Conducting specialist studies for various projects in both South Africa and the rest of Africa (Mozambique, Madagascar, Zambia, Malawi) including:
  - Ecological assessments
  - Agricultural and Soil potential
  - Land use assessments
  - Visual assessments
  - Biodiversity assessments
  - Botanical assessments

<u>Managed the following EIAs:</u>

- Eskom Melkhout 132kV Distribution EIA, Oyster Bay (2011)
- Bizana Mixed-use Development Scoping and full EIR, Bizana; Eastern Cape (2012)
- Toboshane Valley Estate EIA, East London (2011)
- Toboshane Valley Estate Visual Impact Assessment (2011)
- Lushington Park Windfarm Ecological Impact Assessment, East London (2011)
- Red Cap 66kV Power line EIA, St. Francis, Eastern

cape (2011)

- ADM Sleeper site basic Assessment Report and Soil Contamination Assessment (2012)
- Eskom Mfinizo, Taweni and Hombe Basic Assessment Reports (2011).
- Tsolwana Road upgrade EIA, Tarkastad EIA (2012)
- Centane Road road upgrade EIA, Mazeppa Bay, Eastern Cape (2012)
- Innowind Peddie Solar facility EIA, Eastern Cape (2012)
- Upgrade of the R61 between Baziya and Umtata BAR (2012)
- SANRAL R61 Mthatha to Umngazi EIA (Current)
- Berlin Beef Feedlot EIA (2013)
- SANRAL N2 road upgrade between Tetyana & Sitebe Komkulu; Eastern Cape EIA (2013)
- Cedarville to Mt. Frere road upgrade EIA - Inzame Engineering (2014)
- Amatola District Municipality Office building EIA - Stutterheim (2014)
- ACSA Vegetation removal Management, East London, Eastern Cape (2015)
- DWS Lusikisiki Dam EIA, Eastern Cape (2015)
- ENEL ECO x 4 sites (Eastern Cape, Western Cape, Limpopo)(Current)
- NCEDA SEZ EIA, Upington, Northern Cape (Current)
- SANRAL Heidelberg N2 EIA, Western Cape (Current)
- SANRAL King Williams Town N2 EIA, Eastern Cape (2016)
- SANRAL R56 Matatiele EIA, Eastern Cape (2016)
- SANRAL R72 Birah ECO, Eastern Cape (Current)
- SANRAL N2 Caledon EIA, Western Cape (2016)
- SANRAL Komga R61 EIA, Eastern Cape (Current)
- SANRAL R63 Fort Beaufort EIA, Eastern Cape (Current)

<u>Conducted specialist reports on the following projects:</u>

- Stone Vegetation Assessment, Kaizers Beach

(2010)
- Eskom 132kV Line Vegetation Assessment, Elloit-Ugie-Sappi (2010)
- Red Cap 66kV Power line Ecological Impact Assessment, St. Francis, Eastern cape (2011)
- N9 road upgrade in Middelburg EIA, Eastern Cape (2012)
- Ecological Impact Assessment in Hombe, Eastern Cape for a new Eskom 132kV power line (2012)
- Ecological Impact Assessment in Taweni, Eastern Cape for a new Eskom 132kV power line (2011)
- Ecological Impact Assessment in Mfinizo, Eastern Cape for a new Eskom 132kV power line (2011)
- Innowind Peddie Solar and Wind facility Agricultural Impact study, Eastern Cape (2012)
- Innowind Peddie Solar facility Visual Impact study, Eastern Cape (2012)
- Innowind Peddie Solar facility Ecological Impact study, Eastern Cape (2012)
- Innowind Qumbu Solar and Wind facility Agricultural Impact study, Eastern Cape (2012)
- Innowind Qumbu Solar facility Visual Impact study, Eastern Cape (2012)
- Kangankunde Rare Minerals mine, Malawi, Rehabilitation Management Plan and Mine Closure Plan (2011)
- Kenmare Moma Titanium mine, Mozambique, Weed Control Plan and Species of Special Concern Management Plan (2011)
- GS Cimentos limestone mine, Maputu, Mozambique, Rehabilitation Management Plan and Mine Closure Plan (2011)
- Upgrade of the R61 between Baziya and Umthatha Ecological Impact Assessment (2012)
- Amatola Water Bulk Water Pipeline Ecological Report - Port Alfred Borehole Extraction & Treatment (2012)
- Amatola Water Bulk Water Pipeline Ecological Report - Bushmansriver to Cannon Rocks (2013)
- Ndabakazi Mixed-use Development Ecological Report (2012)
- Ndabakazi Mixed-use Development Geotechnical

Assessment (2012)

- Goba water pipeline, Katberg, Eastern Cape Vegetation Assessment (2012)
- SSI Botanical Compliance for EA (2012)
- Terra Wind Middleton Wind Energy Facility Agricultural Impact Assessment (2012)
- SANRAL R61 Mthatha to Baziya Environmental Sensitivity Report (2014)
- SANRAL N2 road upgrade between Tetyana & Sitebe Komkulu; Eastern Cape Ecological Assessment (C2014)
- SANRAL N2 road upgrade between Tetyana & Sitebe Komkulu; Eastern Cape Sensitivity Assesssment (2014)
- Amatola District Municipality Office building Ecological Assessment - Stutterheim (Current) Amatola Water Bulk Water Pipeline Ecological Report - Cannon Rocks to Alexandria (2012)
- Ecofarm Sugar Cane expansion, Zambezia, Mozambique, Agricultural Assessment (2015)
- GS Cimmentos Mining, Maputo, Mozambique, Rehabilitation Plan (2016)
- ACSA East London Airport, Vegetation and forest removal (2015)
- SANRAL N2 Caledon EIA – Western Cape (2016)
- Triton Mining Agricultural Assessment – Ancuabe, Mozambique (2015)
- Tete Iron Ore Agricultural Assessemnt – Tete, Mozambique (2016)
- Tete Iron Ore RAP Land assessment - Tete, Mozambique (2017)
- Metal of Africa Graphite Mine – Agricultural Assessment – Pemba, Mozambique (2015)
- SANRAL Butterworth Ring Road – Ecological Assessment (2016)
- SANRAL iDutywa Ring Road - Ecological Assessment (2016)
- City of JHB Rietfontein Biodiversity Study, Gauteng (2017)
- City of JHB Little Falls Biodiversity Study, Gauteng (2017)
- City of JHB Ruimsig Biodiversity Study, Gauteng

(2017)
- City of JHB Mellville Koppies Biodiversity Study, Gauteng (2017)
- Chalmers S24 Rehabilitation Plan – East London (2016)
- SANRAL Thabazimbi road upgrade – Ecological Study (2016)
- Delta East London Airport – Biodiversity Study (2017)
- Rumdel Vegetation S&R – N2 Tetyana, Eastern Cape (2017)
- Gibb Vegetation S&R – R72 Birah, Eastern Cape (2017)
- Lokisa Palmietvlei S24 Management – Plettenberg Bay, Western Cape (2017)
- NCEDA SEZ Ecological Assessment, Upington Northern Cape (2016)
- Amatola Water, Ndlambe Pipeline, Ecological Assessment, Port Alfred (Current)
- SANRAL Heidelberg N2, Western Cape, Agricultural Assessment (Current)

Renewable energy:

Managed various renewable energy projects including:
- Thomas River Windfarm EIA, Cathcart (2010)
- Chaba Windfarm EIA, Komga; Eastern Cape (2010)
- Lushington Park Windfarm EIA, East London (2011)
- Langa Solar Facility EIA, Berlin (2011)
- Red Cap Kouga WEF, Humansdorp (2013)
- Red Cap Gibson Bay WEF, Tsitsikamma (2015)

Conducted various specialist studies for renewable energy projects including:
- Innowind Grassridge WEF, Groundtruthing Report (2012)
- Red Cap Kouga WEF, Botanical Assessment (2012)
- Innowind Waainek WEF, Management Programmes (2012)

- Innowind Dassiesridge WEF, Agricultural Assessment (2015)
- Innowind Riverbank WEF, Micrositing and Management Plans (2015)
- RES Oyster Bay WEF, Micrositing and Management Plans (2015)
- Enel Gibson Bay WEF, Micrositing and Management Plans (2016)
- Golden Valley WEF, Management Plans (2015)
- G7 Rietkloof WEF, Agricultural Assessment (2016)
- G7 Brandvlei WEF, Agricultural Assessment (2016)

Mining projects:

Managed various mining applications to the DMR including:

- Hard rock quarry licence and EMPr, Middelburg, Eastern Cape (2012)
- Cedarville to Mt. Frere road upgrade Mining licenses - Inzame Engineering (Current)
- Baziya 3 x quarries for SANRAL, Mthatha (2014)
- Tetyana 2 x quarries for SANRAL, Idutya (2015)
- Sand mine Borrow pit permit application, Port Alfred (2015)
- Centane Road borrow pit license applications, Mazeppa Bay, Eastern Cape (2013)
- EC Quarries, rock quarry outside East London License (2015)
- Laman Mining Rock quarry renewal of right (2015)
- SANRAL N2 Tetyana – Dumrana Quarry EIA & Mining, Eastern Cape (2016)
- SANRAL R56 Cedarville Quarry, Eastern Cape (Current)
- SANRAL R61 Komga Mining applications, Eastern Cape (Current)
- SANRAL Heidelberg Moning applications, Western Cape (Current)

Environmental auditing and compliance:

- TNPA Car Berth Dredging ECO, Port of East London (2010)

- Kenmare Moma Titanium mine, Mozambique. Development of Rehabilitation KPI's (2011)
- Eskom Zebra substation ECO, Cradock, Eastern Cape (2011)
- Tsolwana Road upgrade ECO, Tarkastad EIA (Current)
- Centane Road Upgrade ECO, Mazeppa Bay, Eastern Cape (Current)
- N9 road upgrade in Middelburg ECO, Eastern Cape (2015)
- Red Cap Kouga Windfarm ECO, St Francis Bay, Eastern Cape (2014)
- SANRAL R61 Mthatha to Umngazi road upgrade ECO, Eastern Cape (2015)
- Armstrong Transkei Schools Construction Environmental non-compliance & recommendations - Armstrong Engineering (2013)
- SANRAL All Saints to Mthatha road upgrade ECO. (Current)
- ENEL Paleisheuvel Solar farm ECO, Piketberg (Current)
- ENEL Tom Burke Solar farm ECO, Botswana border (Current)
- ENEL Gibson Bay Wind Farm ECO, Oyster Bay (Current)
- ENEL Nojoli Wind Farm ECO, Cookhouse (Current)
- Hatch-Goba R61 Mthatha to Port st Johns ECO (2017)

CERTIFICATION

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

ROY DE KOCK Date: 1st April 2017

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Roy de Kock

Registration number: 400216/16

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective **21 September 2016** Expires **31 March 2019**

President

Executive Director