



DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED CONSTRUCTION OF A DEDICATED ROAD-OVER-RAIL BRIDGE AND APPROACH ALIGNMENT AT THE MBAZWANA/SODWANA INTERSECTION OF ROUTE R22, HLUHLUWE, BIG 5 HLABISA LOCAL MUNICIPALITY, KWAZULU-NATAL PROVINCE.

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Prepared for



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TITLE: Draft Environmental Management Programme for the proposed construction of a Dedicated Road-Over-Rail Bridge and Approach Alignment at the Mbazwana/Sodwana Intersection of Route R22, Hluhluwe, Big 5 Hlabisa Municipality, Kwazulu-Natal.

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SYNOPSIS:

Draft Environmental Management Programme for The Proposed Construction of a Dedicated Road-Over-Rail Bridge And Approach Alignment At The Mbazwana/Sodwana Intersection Of Route R22, Hluhluwe, Big 5 Hlabisa Municipality, Kwazulu-Natal.

KEY WORDS:

R22, Environmental Management Programme, NEMA EIA Regulations, 2014, (as amended).

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QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.



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TABLE OF CONTENTS

1. INTRODUCTION	1
2. ENVIRONMENTAL ASSESSMENT PRACTITIONER	4
3. ACTIVITY INFORMATION.....	4
3.1. PROJECT LOCATION	4
3.2. PROJECT DESCRIPTION	4
4. ROLES AND RESPONSIBILITIES.....	8
4.1. DEPARTMENT OF FORESTRY, FISHERIES AND ENVIRONMENT (DFFE).....	8
4.2. AUTHORISATION HOLDER: SOUTH AFRICAN NATIONAL ROAD AGENCY SOC LIMITED (SANRAL)	8
4.3. THE SOUTH AFRICAN NATIONAL ROADS AGENCY ENVIRONMENTAL COORDINATOR.....	8
4.4. THE ENGINEER.....	8
4.5. THE DESIGNATED ENVIRONMENTAL OFFICER	9
4.6. ENVIRONMENTAL CONTROL OFFICER	9
4.7. CONTRACTOR	10
4.8. ORGANISATIONAL STRUCTURE	10
5. COMPLIANCE WITH THE EMPR	11
5.1. RECORD KEEPING	11
5.2. MONITORING AND REPORTING.....	11
5.3. AUDITING PROCESS	11
5.4. FAILURE TO COMPLETE CORRECTIVE ACTIONS	11
6. GENERAL EMPR REQUIREMENTS	13
6.1. METHOD STATEMENTS.....	13
6.2. PERMIT REQUIREMENTS	13
6.2. ENVIRONMENTAL AWARENESS TRAINING.....	13
7. SUMMARY OF SPECIALIST FINDINGS.....	15
7.1. WETLAND AND TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT	15
7.2. HERITAGE IMPACT ASSESSMENT.....	15
7.3. PALEONTOLOGICAL IMPACT ASSESSMENT	17
7.4. AGRICULTURAL IMPACT ASSESSMENT.....	18
7.5. AVIATION IMPACT ASSESSMENT.....	18
8. IMPACT MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES	20
9. EMPR ACKNOWLEDGEMENT FORM	57

TABLES

TABLE 1-1: TRIGGERED ACTIVITIES	1
TABLE 2-1: DETAILS OF THE EAP	4
TABLE 7-2: GPS CO-ORDINATES OF THE HIA FINDS NOTED DURING THE SITE VISIT	16
TABLE 8-1: PRE-CONSTRUCTION MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES.....	21
TABLE 8-2: CONSTRUCTION MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES.....	31
TABLE 8-3: POST-CONSTRUCTION AND REHABILITATION MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES	54
TABLE 8-4: OPERATIONAL PHASE OBJECTIVES, ACTIONS AND OUTCOMES	56

FIGURES

FIGURE 3-1: LOCALITY MAP INDICATING THE ALIGNMENT OF THE PREFERRED ALTERNATIVE	7
FIGURE 4-1: ORGANISATIONAL STRUCTURE.....	10
FIGURE 7-1: LOCATION OF THE HIA FINDS NOTED	16
FIGURE 7-2: MAP SHOWING THE PALEO-SENSITIVITY OF THE SITE	17

APPENDICES

APPENDIX 1: SANRAL ENVIRONMENTAL MANAGEMENT PLAN.....	58
APPENDIX 2: CV OF EAP	59
APPENDIX 3: DFFE S30 EMERGENCY INCIDENT PROCEDURE	60
APPENDIX 4: CHANCE FIND PROTOCOL	61

ABBREVIATIONS

CA	Competent Authority
CNS	Communication, Navigation, and Surveillance
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EDTEA	Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
FPD	Flight Procedure Design
GNR	Government Notice, Regulation
Ha	Hectare
HIA	Heritage Impact Assessment
IAP	Interested and Affected Party
NEMA	National Environmental Management Act (Act 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
OLS	Obstacle Limitation Surface
PoS	Plan of Study
RMAC	Radar Minimum Altitude Chart
RTCC	Radar Tracking and Control Centre
SACAA	South African Civil Aviation Authority

LEGISLATIVE REQUIREMENTS FOR AN EMPr

The table below provides the requirements for an Environmental Management Programme (EMPr) in terms of Appendix 4 of the 2014 EIA Regulations as amended, with reference to the relevant sections of this report or where these requirements are addressed.

SECTION	CONTENT	REFERENCE IN REPORT
AN EMPr MUST COMPLY WITH SECTION 24N OF NEMA AND INCLUDE-		
1(a)	Details of (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae	Chapter 2 & Appendix 2
1(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 1 & 3
1(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Chapter 3
1(d)	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Chapter 6 & 8
1(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Chapter 8
1(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; and	Chapter 8

	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	
1(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 8
1(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 8
1(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	Chapter 4 & 8
1(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Chapter 8
1(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Chapter 8
1(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Chapter 5
1(m)	An environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Chapter 6
1(n)	Any specific information that may be required by the competent authority.	-

ENVIRONMENTAL MANAGEMENT PROGRAMME

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1. INTRODUCTION

Terratest (Pty) Ltd. was appointed by Hatch (Pty) Ltd. on behalf of the South African National Roads Agency Limited (SANRAL) to undertake a Scoping and Environmental Impact Assessment (S&EIA) for the proposed construction of the R22 road-over-rail bridge and approach alignment which will tie into the already authorised realignment (14/12/16/3/3/2/1043, 14/12/16/3/3/2/1043/AM2 and 14/12/16/3/3/2/1043/AM4) that will bypass the town of Hluhluwe, within the Big 5 Hlabisa Local Municipality, KwaZulu-Natal. This report has been compiled based on the findings of the Scoping Report and the Plan of Study (PoS), which recommended a way forward in terms of undertaking the Environmental Impact Assessment in accordance with the requirements listed in GNR 982 of the EIA Regulations (2014, as amended).

The proposed road-over-rail bridge and alignment of the R22 around Hluhluwe town will assist in diverting traffic that is not destined for the town of Hluhluwe to the adjoining Mbazwana/Sodwana Bay Road. The diversion of traffic will reduce existing traffic volumes within the town, thereby reducing the risk to road users and pedestrians, reduce wear on town infrastructure and decrease road maintenance costs. In addition, travel time delays will be reduced for road users as a more direct route bypassing the town, will be available.

The requirements for the realignment are as follows:

- The proposed construction of a dedicated Road-Over-Rail Bridge,
- Construction of an approach alignment at the Mbazwana/Sodwana Intersection of Route 22, and
- A proposed Quarterlink access road into the town of Hluhluwe.

TABLE 1-1 presents the activities and relevant infrastructure that will thus be triggered by the proposed development.

TABLE 1-1: Triggered activities

ACTIVITY AND NOTICE NUMBER	LISTED ACTIVITY	DISCUSSION IN TERMS OF APPLICABILITY
Listing Notice 2 of GNR. 984, 2014 (as amended)		
Activity 27 Listing Notice 2 of GNR. 984, 2014 (as amended)	The development of a road-(iii) with a reserve wider than 30 metres; or	The total width of the road reserve is 60m. Total length of Road: 1.808km <u>Therefore, this activity will be triggered.</u>
Listing Notice 3 of GNR. 985, 2014 (as amended)		
Activity 12 Listing Notice 3 of GNR. 985, 2014 (as amended)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. <u>(d) In KwaZulu-Natal:</u> iv. Within any critically endangered or endangered	The approach alignment for Site Alternatives 1 and 2 pass through vegetation types which, according to Rutherford & Mucina are classified as "Vulnerable". The vegetation types are the Zululand Lowveld and Western Maputaland Clay Bushveld. These vegetation types have been

ACTIVITY AND NOTICE NUMBER	LISTED ACTIVITY	DISCUSSION IN TERMS OF APPLICABILITY
	ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004.	listed as an endangered ecosystem listed in terms of section 52 of the NEMBA. Approximately 121 700 square meters of indigenous vegetation will be cleared. <u>Therefore, this activity will be triggered.</u>
Activity 18 Listing Notice 3 of GNR. 985, 2014 (as amended)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre <u>(d) In KwaZulu-Natal:</u> xii. Outside urban areas: <u>(aa)</u> Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve	Part of the existing R22 on the eastern portion will be decommissioned, the remainder will be lengthened to join the western phase of the project which is currently under construction. The total extent of the road <u>to be lengthened is 1.808km</u> (chainage 4500 to chainage 3000). The proposed road-over-rail-bridge and the approach alignment is situated within 10 kilometres and to the west of the Isimangaliso Wetland Park, which is a World Heritage Site. <u>Therefore, this activity will be triggered.</u>
Activity 23 Listing Notice 3 of GNR. 985, 2014 (as amended)	The expansion of- (xii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more. <u>(e) In KwaZulu-Natal:</u> x. Outside urban areas: <u>(aa)</u> Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;	The existing road (MR2-8) will be widened by 5,6m to tie into the quarterlink road and the road-over-rail bridge. <u>The footprint of the MR2-8 and the new quarterlink has a footprint of more than 10 square metres.</u> The proposed construction is outside an urban area. The proposed road-over-rail-bridge and the approach alignment is situated <u>within 10 kilometres</u> and to the west of the Isimangaliso Wetland Park, a World Heritage Site. <u>Therefore, this activity will be triggered.</u>

Water Uses in terms of National Water Act, 1998

Section 21 of the National Water Act (Act No. 36 of 1998) (NWA) provides the list of water use activities that will require an authorisation or registration in accordance with the Act. The proposed project does not trigger any water use activities as defined in Section 21 of the NWA. The following has also been taken into consideration:

- According to a desktop screening, the proposed development site falls within 500m of an NFEPA Wetland. After ground truthing no wetlands or watercourses were observed along the route. Therefore, the proposed construction will not constitute water uses as defined in the National Water Act.

Compliance with the National Environmental Management Act, 1998

This EMPr has been compiled in accordance with Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (2014), as amended. In this regard, the EMPr provides mitigation measures for impacts identified in the Environmental Impact Assessment Report by defining the relevant objectives, outcomes and actions.

This EMPr is to be read in conjunction with the standard SANRAL Environmental Management Plan (EMP), attached as **Appendix 1** to this document. Any reference within this document made to the term EMPr, includes the appended SANRAL EMP document. However, where there may be a conflict in environmental management requirements this project specific EMPr takes precedent.

In accordance with the Integrated Environmental Management Guidelines published in 1992 by the Department of Environmental Affairs & Tourism (DEAT), now known as the Department of Forestry, Fisheries and the Environment (DFFE). The purpose of an EMPr is “to describe how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be maximised”.

Section 28 of NEMA (National Environmental Management Act, Act 107 of 1998) which pertains to “Duty of Care and Remediation of Environmental Damage” states that:

“(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment, must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot be reasonably avoided or stopped, to minimise and rectify such pollution or degradation of the environment.”

This EMPr must therefore form an integral part of the contract documents between SANRAL and the appointed Contractor during the planning and construction phases of the project, as it outlines the methodology and duties required, to ensure that construction can be achieved in an environmentally sustainable manner; with particular reference to the prevention and mitigation of environmental impacts that may be caused by construction activities associated with the project. Such mitigation measures will have a financial impact on the project’s costings.

This EMPr is a dynamic document that may need to evolve during its implementation period, such that it recognises any new issues that may arise; or changes in the parameters of identified issues which can be addressed with required / amended mitigation.

The following principles are to be adhered to, in conjunction with the EMPr, throughout the construction rehabilitation and operational phases of the project:

The Polluter-Pays Principle

The “polluter pays principle” holds that the person or organisation causing pollution is liable for any costs involved with the rehabilitation of its effects. According to the NEMA EIA regulations (as amended), “the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects, which must be paid for by those responsible for harming the environment.” The Polluter Pays Principle must be rigorously applied throughout the construction phase of this project.

Progressive Rehabilitation

Progressive rehabilitation must, where possible, be undertaken throughout the construction phase of the project where areas have been impacted upon. Rehabilitation should commence as soon as construction is completed in a specific area and not at the end of the entire project.

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

The EMPr was prepared by Terratest (Pty) Ltd. The details of the representative Environmental Assessment Practitioners' (EAPs) who prepared the report is detailed in **Table 2-1**. Further, the detailed **Curriculum Vitae** of the EAP is provided in **Appendix 2**.

TABLE 2-1: Details of the EAP

COMPANY NAME: TERRATEST (PTY) LTD		
EAP	QUALIFICATIONS & PROFESSIONAL AFFILIATIONS	CONTACT DETAILS
Mr Ryan Jonas <i>Senior Environmental Scientist</i>	MSc Environmental Science EAPASA – Reg. EAP (2019/1674) SACNASP – Pr. Sci. Nat (400159/15)	Terratest (Pty) Ltd. Tel: (033) 343 6700 Email: jonasr@terratest.co.za

3. ACTIVITY INFORMATION

3.1. Project Location

The proposed road-over-rail bridge and approach alignment is located northeast of the town of Hluhluwe, within the Big 5 Hlabisa Municipality, KwaZulu-Natal. The proposed road is approximately 1.808km in extent. Access to the site is from the southern side, via the R22. The approximate coordinates of the centre of the site are 28° 0'34.96"S and 32°17'5.89"E. Refer to **Figure 3-1**.

The proposed project is located on the National Road R22, Section 1 on the outskirts of Hluhluwe town. The predominant land use to the north of the town is agriculture and tourism. In the west, the agricultural activities are centred around pineapple farming. To the north and east of the municipal boundary, the farming activities consist of mainly game farms, which support the tourism industry. isimangaliso Wetland Park is located approximately 7.15km to the east of the realignment, and Bonamanzi Game Park is situated approximately 500m to the south-east of the proposed realignment.

3.2. Project Description

The proposed development is a part of / features in the upgrade and expansion of the road and rail network of the greater Lubombo Spatial Development Initiative (LSDI). The development comprises the realignment of the R22 around Hluhluwe town and the construction of the road-over-rail bridge and approach alignment at the intersection of the R22 with the Sodwana/ Mbazwana R22 Road.

The proposed road-over-rail bridge will eliminate the existing at-grade railway crossing on the National Route R22 at km5.5 and will tie into realignment of the R22 around Hluhluwe Town. The entire bypass system forms part of the long-term expansion vision of the regional rail network that will service the greater northern KwaZulu-Natal and surrounds.¹

Description of activities:

- The proposed construction of a Dedicated Road-Over-Rail Bridge.
- Construction of an approach alignment at the Mbazwana/Sodwana Intersection of Route 22.
- A proposed Quarterlink access road into the town of Hluhluwe.
- 121 700m² of natural vegetation is expected to be cleared.

¹ Mothilal, A., & Bradley, C., 2015: *Elimination of the at-grade Railway Crossing on R22 Section 1 at km5.5., Route Determination Report*, 2015: Hatch Goba (Pty) Ltd, Umhlanga.

The Approach Alignment will have the following dimensions:

- Total width of road reserve: 60m.
- Total length of Road: 1.808km (from chainage 3000 to chainage 4808).
- Total width of road excluding road reserve: 13.4m.

The Road over Rail Bridge will have the following dimensions:

- Total Bridge Width: 16.275m.
- Bridge Length: 8.1m.
- Bridge Lane Width: 3.8m wide in each direction.
- Shoulder width: 3m wide in each direction.
- Sidewalk: 1.5m wide on the southern side.

The bridge structure will be designed to accommodate future lane widening should this be required. The bridge openings will be designed to accommodate the anticipated doubling and electrification of the railway line as well as a future service road. The bridge structure will conform to both the SANRAL requirements as well as the requirements of Transnet as the bridge will be constructed over the railway line.

The Quarterlink Road:

A quarterlink is proposed to the east of the town linking the proposed bypass with MR2-7 (the portion of the R22 running in a north/south direction). The quarterlink enables vehicles from the north, south and the town centre to connect with the bypass. Vehicles from the town centre therefore have a choice to either:

- Travel eastwards along R22, northwards along the R22, turn left onto the quarterlink and right/left onto the bypass, or
- Travel westwards along R22 (MR453) and turn left/right onto the bypass.

The route vehicles would follow depends largely on which direction they wish to travel and their proximity to either route within the town centre.

The alignment of the Quarterlink will be parallel to the Hluhluwe airstrip in a north/south direction and will then curve to the left and tie in with a T-junction on the existing R22. The Quarterlink road will be required to provide an intersection 'Road over Rail' structure at the existing at-grade R22 and railway line. Access to Hluhluwe town will still be maintained from both the East and West approaches. Access will be accommodated by means of at-grade intersections and two short link roads.

Intersections:

Two (2) intersections are planned within this Application, and include the following:

- R22 / R22 (MR453) Priority Intersection (new intersection).
- Eastern Phase / Quarterlink Priority Intersection (new intersection).

Associated Infrastructure

Access Roads

Construction traffic will be placed on existing roads (including the existing R22 road and farm roads) or within the proposed road reserve. As such no agricultural land will be used as a transit for vehicles, unless access roads are existing or the applicable area has been surveyed to be included in the construction alignment. Access points onto the re-aligned road will be located at the most accessible points off the existing R22 road. These access roads will be based on the layout plan and will follow the proposed entry and exit points onto and off the existing R22 road. It is therefore anticipated that no new access roads will be required.

Traffic control and calming measures, including warning signage, points men and if necessary, rumble strips / speed bumps, will be located along the existing R22 at points of construction and at which access roads are located.

Site Camp

One site camp has been established for the construction of both the road-over-rail bridge and the authorised approach alignment projects. The current site camp is located adjacent to the town (of Hluhluwe) and not on agricultural land. The site camp is located within the vicinity of an old warehouse (28°1'25.27"S 32°16'52.00"E). No site clearing was undertaken as the camp was established on land that has already been transformed.

PROPOSED R22 ROAD-OVER- RAIL BRIDGE, ALIGNMENT AND QUARTERLINK ROAD AERIAL MAP

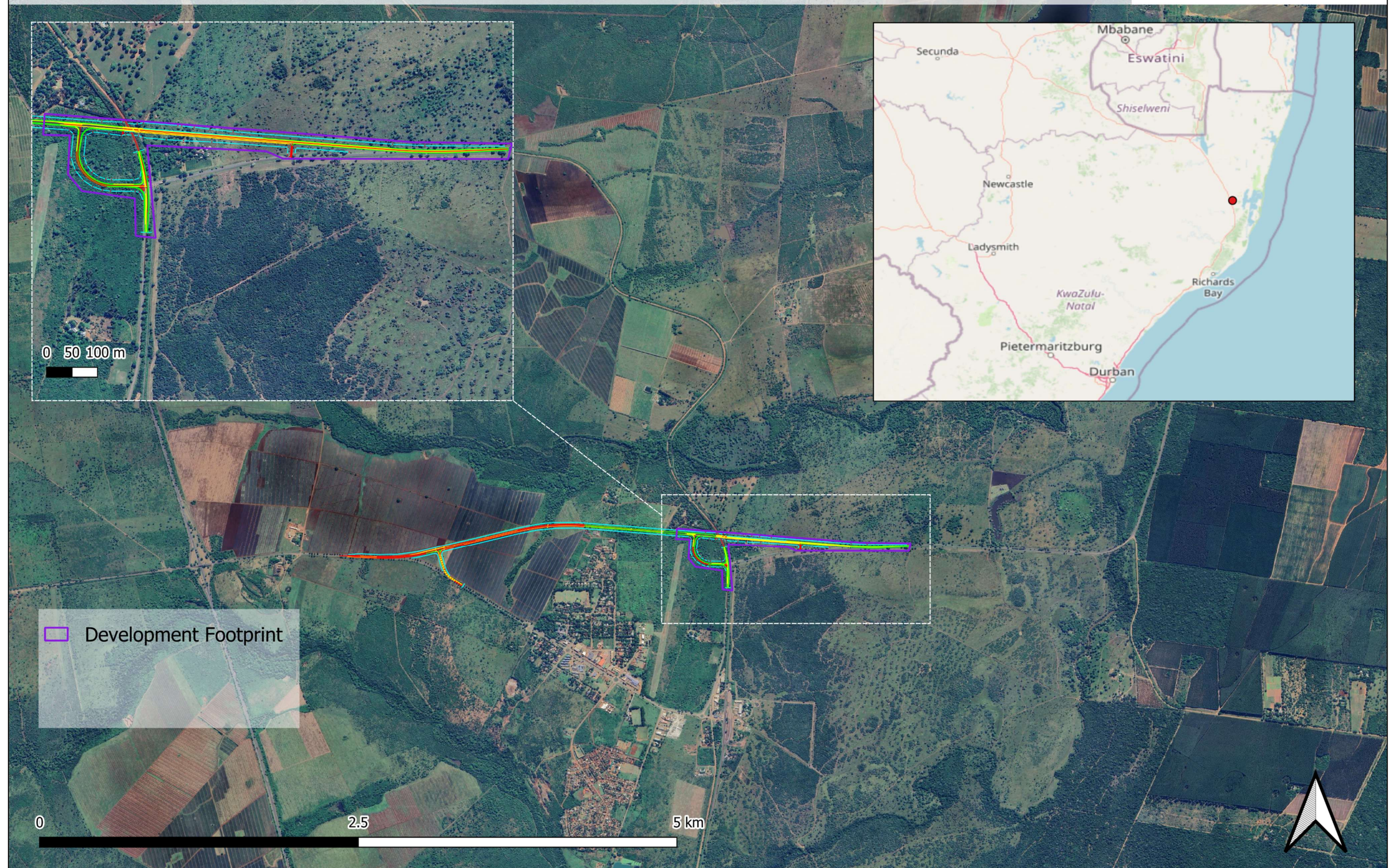


Figure 3-1: Locality map indicating the alignment of the Preferred Alternative

4. ROLES AND RESPONSIBILITIES

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase. The stakeholders are discussed below.

4.1. Department of Forestry, Fisheries and Environment (DFFE)

The DFFE is the designated National Environmental Authority responsible for approving the application for Environmental Authorisation and the associated project-specific EMPr. The DFFE has overall responsibility for ensuring that the Applicant complies with the conditions of the Environmental Authorisation and the EMPr.

4.2. Authorisation Holder: South African National Road Agency SOC Limited (SANRAL)

The South African National Roads Agency is the project applicant and will function as the primary employer for all other parties. The responsibilities of the applicant, as the authorisation holder include:

- Acceptance of all liabilities associated with environmental compliance;
- Enforcement of this EMPr and all environmental approvals obtained relevant to this road section;
- Ensuring the adoption of the EMPr in all tender documents associated with the project, and ensuring that the EMPr is binding on all Contractors;
- Ensuring that Contractors are compliant with the EMPr during planning, construction, and rehabilitation;
- Contracting a suitably experienced and independent Environmental Control Officer (ECO);
- Ensuring the implementation of environmental monitoring and audits during planning, construction, and rehabilitation; and
- Ensure Environmental Audit Reports are submitted to the relevant Competent Authority.

4.3. The South African National Roads Agency Environmental Coordinator

SANRAL's Environmental Coordinator will be responsible for ensuring that the EMPr and associated documents or requirements are complied with.. SANRAL's Environmental Coordinator will report functionally to the relevant parties.

The specific tasks during the construction stage will include:

- Liaison with the relevant protect team members (including authorities);and
- Conduct any environmental incident enquiries.

The Environmental Coordinator may delegate part or all of these responsibilities to the Project's DEO or other relevant party based on the merits of the particular task at hand.

4.4. The Engineer

The Engineer will be contracted by SANRAL to undertake the design and supervision of the project. The responsibilities of the Engineer will include:

- Preparation of a detailed site plan of the required construction localities which is to be included in the on-site Environmental File and submitted to the ECO for approval prior to construction.
- Ensuring that Contractors are in compliance with this EMPr and all Authorisations.
- To cease any work that is deemed to result in negative environmental impacts, or which is not in compliance with this EMPr.

- To consult with SANRAL's Environmental Coordinator or the ECO in terms of decisions and actions that may impact on the environment or that may require an amendment to this EMPr.

4.5. The Designated Environmental Officer

The Contractor shall appoint an appropriately qualified Designated Environmental Officer (DEO) who will be site based and whose primary role is to ensure compliance with the requirements of the Environmental Authorisation and EMPr, and conditions of other environmental approvals issued for the project. The Contractor shall submit the name and Curriculum Vitae of the DEO for SANRAL's approval in line with their internal requirements.

The responsibility of the DEO will include, but not be limited to:

- Collation of the Contractor's Environmental Site File which is to include at a minimum:
 - A copy of the approved EMPr.
 - A copy of the EA and other approvals.
 - A copy of the Environmental Plan detailed above.
 - Method Statements (as reviewed and approved by the ECO) for project specific works required by the approved Terratest (Pty) Ltd. EMPr and/or Employer.
 - An Incident Register.
 - Environmental Non-Conformance Register.
 - A Complaints Register which includes actions undertaken by the Contractor / Employer to address the complaint.
 - Copies of internal Environmental Audit Reports.
 - Copies of independent external ECO Audit Reports.
 - Site close-out reports of rehabilitated areas.
- Daily, weekly, and monthly inspections of the work area as per schedule.
- Commenting on Method Statements.
- Monitor compliance with the EMPr and Method Statements.
- Ongoing Environmental Awareness Training of the Contractor's site personnel.
- Reporting and recording of any environmental incidents caused by the Contractor and/or other parties.
- Close out of environmental incidents.
- Attendance at all Environmental related meetings, toolbox talks and induction programmes.
- Waste Management on the site.
- Ensure that environmental signage and barriers are correctly placed.
- Taking required corrective action within specified timeframes.

Should the DEO change from that person identified during any project stage, the Contractor shall submit a CV and any relevant supporting documents of a replacement DEO for approval to SANRAL.

4.6. Environmental Control Officer

The independent ECO appointed will monitor and review the on-site environmental management and implementation of this EMPr and other supporting approvals by the Contractor throughout the planning, construction and rehabilitation phases. This will be undertaken by conducting site audits and issuing monthly audit reports to the relevant parties.

DFFE requires that the ECO be at the forefront of all of the environmental management compliance and related issues.

The name and contact details of the ECO must be forwarded to the DFFE prior to construction commencement.

4.7. Contractor

The Contractor undertakes construction and/or rehabilitation activities associated with the overall project. The responsibilities of the Contractor include:

- To formally accept and comply with the EMPr, EA and other approvals as one of their conditions of their contract.
- To proactively implement the recommendations and actions required in the EA, EMPr and other Authorisations.
- To follow the spirit of good environmental management and comply with Section 28 of the National Environmental Management Act of 1998, as amended (Duty of Care of the Environment).

4.8. Organisational Structure

Details of the organisational structure are presented in **Figure 4-1**. The structure illustrates the reporting procedures for stakeholders responsible for the implementation of this EMPr.

An EMPr Acknowledgement Form is provided under **Section 9**, committing all parties involved to sound environmental practices during construction. All relevant parties must sign the form.

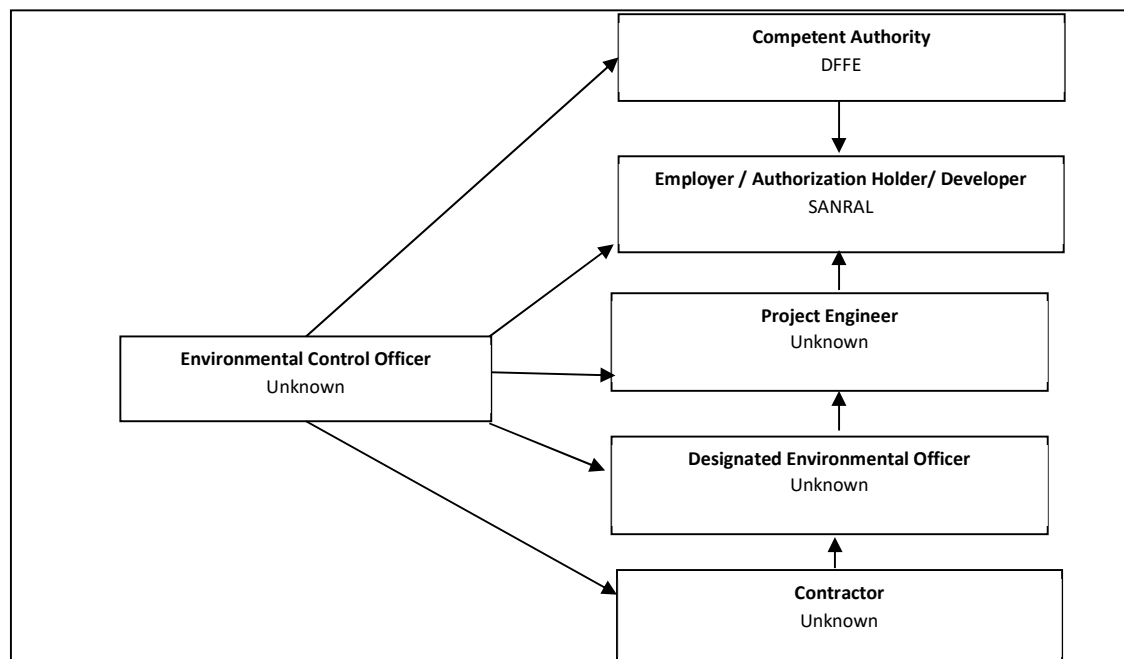


Figure 4-1: Organisational Structure

5. COMPLIANCE WITH THE EMPR

5.1. Record Keeping

The appointed ECO must monitor the Contractor's adherence to the requirements of the Environmental Authorisation, EMPr, approved Method Statements and other applicable environmental approvals at a minimum on a monthly basis and must ensure that any non-compliances are rectified and adequately addressed by the Contractor. The ECO must document the nature and magnitude of any non-compliance, the action taken to correct the non-conformance, the actions taken to mitigate its effects and the results of those actions. The records of monitoring must be reported to the Compliance and Monitoring Section of the DFFE in the form of an Audit/ECO Report, to be compiled by the ECO. Any S30A emergency incidents occurring during the Construction and Rehabilitation Phases must be reported to the DFFE Compliance, Monitoring and Enforcement Units, as well as other affected parties such as the Department of Water and Sanitation (DWS). Records relating to monitoring and auditing must be kept on site and made available for inspection by the DFFE, DWS and any other relevant Authorities.

5.2. Monitoring And Reporting

The monitoring of the construction and rehabilitation must take place as follows:

- The DEO must audit the site for compliance at periods agreed upon internally and submit the site audit reports to the relevant project team members.
- An independent, external ECO must audit the site from the pre-construction phase up until the rehabilitation phases of the project monthly, unless otherwise specified by the DFFE or SANRAL. During the audits, the main Contractor's DEO or other suitable personnel must avail themselves.
- A monthly Environmental Audit Report is to be compiled by the ECO and submitted to the Developer and Contractor Team for site implementation.
The independent ECO has the responsibility to submit the monthly site audit report to the relevant Authorities.

5.3. Auditing Process

The terms of reference for the audits must comprise the following:

- Develop a checklist against the requirements of the Environmental Authorisation, this EMPr and any other approvals obtained for the project.
- During the audit process, key individuals involved with the management of the site/project are to be given the opportunity to comment on issues being audited and will be invited to accompany the ECO and/or during the audit.
- Audit reports prepared by the ECO are considered to be the findings of the independent ECO.

5.4. Failure to complete Corrective Actions

The Contractor must comply with the environmental specifications and requirements on an on-going basis. In the event that a Contractor fails or refuses to complete the corrective action, either at all, or within the specified timeframes:

The ECO and/or relevant project team member must:

- Formally (in writing) inform other relevant project team members.

The relevant project team members must:

- Consult all available information and act accordingly to notify the Contractor, stating the nature and magnitude of the contravention and better understand the status of the non-compliance.

The Contractor must:

- Act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- Provide the relevant project team members in writing a description of the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the Contractor failing to remedy the situation within the predetermined timeframe, the following may be implemented: The Engineer/SANRAL has the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures; and / or
- Impose a monetary penalty based on the conditions of contract (if applicable).

In the case of a non-compliance giving rise to physical environmental damage or destruction, the relevant project team member must be entitled to undertake, or to cause to be undertaken, such remedial works as may be required to make good such damage and to recover from the contractor the full costs incurred in doing so.

The Authorisation Holder / Contractor are deemed not to have complied with the EMPr if any of the requirements are not adhered to:

- Within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention.
- Environmental damage ensues due to negligence on the Contractor's and/or his/her sub-contractor's part.
- The Contractor and/or their sub-contractor fail to comply with the corrective or other instructions issued by the EM/DEO/ECO within a specific time.

The Contractor and/or their sub-contractor fail to respond adequately to complaints from the public, authorities, or any other party. On receiving a notice of Non-compliance, the Contractor is required to promptly address the issue/s taking all corrective actions required to rectify the situation and prevent environmental damage as per conditions stipulated in their contract with SANRAL. Failing to do so may result in penalties and fines.

6. GENERAL EMPR REQUIREMENTS

6.1. Method Statements

Method Statements are written submissions by the Contractor in response to the requirements of this EMPr, or to a request by the ECO and/or SANRAL. The Contractor shall be required to prepare Method Statements for several specific construction activities and/or environmental management aspects.

Method Statements must be submitted at least 10 working days prior to commencement of work. The Engineer / ECO must in turn accept or reject the Method Statement within 5 working days of receipt.

The Contractor shall proceed with activities which do not require Method Statements with caution until the required Method Statements have been reviewed by the Engineer and the ECO.

Failure to submit a Method Statement for review may result in suspension of the activity concerned until such time as a Method Statement has been reviewed by the relevant parties.

A reviewed Method Statement shall not absolve the contractor from any of his obligations or responsibilities in terms of the contract. Any damage caused to the environment through activities undertaken without reviewed Method Statements shall be subjected to the mitigatory actions outlined in the EMPr in section 8.

Based on the specifications in this EMPr, the following Method Statements (MS) are required as a minimum:

MS 1: Site layout and establishment.

MS 2: Vegetation clearance.

MS 3: Emergency Response Procedures.

MS 4: Spill Contingency Plan.

MS 5: Alien Invasive Plant Management Plan.

MS 6: Traffic accommodation.

MS 7: Management, use and storage of hazardous goods / substances.

MS 8: Waste management (general and hazardous).

MS 9: Site Rehabilitation Plan, progressive and post construction.

MS 10: Stockpiling and rehabilitation methods.

The ECO and DEO must monitor the implementation of the approved Method Statements during construction and rehabilitation activities.

6.2. Permit Requirements

The necessary permits must be obtained by the Authorisation Holder and / or Contractor prior to the commencement of any activities requiring such a permit. These could include permits for activities such as: Protected tree or plant relocations and cutting or removal or destruction of protected trees and plants CAA approval for proximity to Hluhluwe Airdrome.

6.2. Environmental Awareness Training

The Contractor must ensure that adequate environmental awareness training of site personnel takes place and that all construction workers receive an environmental induction on the importance, requirements and implications of the EMPr, conditions of the Environmental Authorisation and any other environmental approvals obtained for the project. The presentation must be conducted, as far as possible, in the employees' language of choice.

As a minimum, the Environmental Awareness Training must include:

- Explanation of the importance of complying with the EA, EMPr and any other environmental approvals obtained for this section of the road;
- Authorities involved;
- Definition of the environment;
- Discussion of the potential environmental impacts of, and environmental risks presented by, construction activities;
- Employees' roles and responsibilities, including emergency preparedness;
- Explanation of the mitigation measures that must be implemented when carrying out their activities;
- Explanation of the specifics of this EMPr; and
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

The Contractor must keep records of all environmental training sessions on the site file, including names, dates and the information presented. These records must be presented to the ECO and other relevant parties upon request.

7. SUMMARY OF SPECIALIST FINDINGS

The following studies have been completed:

- Wetland and Terrestrial Biodiversity Impact Assessment.
- Heritage Impact Assessment.
- Palaeontological Impact Assessment.
- Agricultural Impact Assessment.
- Aviation Impact Assessment.

A summary of the findings from each of these are briefly presented below.

7.1. Wetland and Terrestrial Biodiversity Impact Assessment

A Wetland and Terrestrial Biodiversity Assessment was undertaken by Terratest (Pty) Ltd. The assessment was conducted in accordance with the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Environmental Impact Assessment (EIA) Regulations (2014).

Findings

The wetland and terrestrial biodiversity assessment for the eastern section of the R22 Hluhluwe town bypass found no wetlands will be affected.

Two veld types—Zululand Lowveld (SVI 23) and Western Maputaland Clay Bushveld (SVI 21)—are present, with their boundary crossing the proposed road-over-rail bridge site.

The area was heavily transformed for agriculture in the 1960s, abandoned in the 1990s, and has since shown uneven vegetation recovery. Western Maputaland Clay Bushveld has regrown into *Acacia tortilis* savanna, while Zululand Lowveld is dominated by invasive species such as *Chromolaena odorata* and *Dichrostachys cinerea*, likely due to its use as grazing land and later a game farm.

Recommendations

There were no fatal flaws identified within the proposed road corridor, provided all recommended mitigation measures are implemented and monitored. For this reason, monthly monitoring by an independent Environmental Control Officer (ECO) is recommended during the pre-construction, construction and rehabilitation phases of the project.

7.2. Heritage Impact Assessment

A Heritage Impact Assessment (HIA) and a desktop Palaeontological Impact Assessment (PIA) were undertaken by Umlando: Archaeological Surveys and Heritage Management. The assessment was undertaken in compliance with the requirements of the South African Heritage Resources Agency (SAHRA) requirements. The field survey assessed both the authorised realignment and the proposed road-over-rail alignment development areas.

Findings

The report notes that most of the route footprint passes through existing pineapple fields that have been extensively ploughed over the years. Six heritage finds were noted throughout the site and included a stone tool and flakes, while a pottery shard was noted on a portion of the site. The pottery shard indicates that there was potentially an Iron Age settlement on the hill at co-ordinates -28.009263914 32.274251431 in the past. The systematic ploughing of the land would have destroyed any grave markers, especially if they were subsurface. The bulldozed remains of a bricked structure were noted just west of the railway. However, the structure does

not appear on the older maps and appears to be recent and therefore is not considered to be of heritage importance.

The locations of the finds are listed in **Table 7-2** and illustrated in **Figure 7-1**.

Table 7-1: GPS co-ordinates of the HIA finds noted during the site visit

Finds	Co-ordinates	
Middle Stone Age (MSA) Flake	-28.010730075	32.259052048
MSA Flake	-28.008388665	32.262295273
MSA Flake	-28.009622306	32.268027951
MSA Flake	-28.010111288	32.274491558
Ruins	-28.009263914	32.274251431
Shard	-28.012686504	32.261018030



Figure 7-1: Location of the HIA finds noted

Recommendations

The HIA report notes that the heritage finds are not of significance and that no mitigation is required. No permit from Amafa KZN is therefore required. Due to the EIA low significance, these artefacts need not be removed / collected / cordoned off or buffered prior to construction taking place and do not affect the proposed alignment or the construction thereof.

However, a protocol for the finding and handling of human remains is required as these artefacts might occur due to the existence of a settlement in the general area.

The protocol is as follows:

- The construction should be made aware that archaeological human graves may occur on this hill, and if any are uncovered, then work in that area needs to cease immediately.
- The identified area needs to be demarcated with a 20m buffer and the ECO, Amafa KZN and the SAPS need to be informed. Construction activity may continue elsewhere.

7.3. Paleontological Impact Assessment

A Paleontological Impact Assessment (PIA) was conducted by AS Consulting in accordance with the National Environmental Management Act (Act 107 of 1998) and EIA regulations. The assessment aims to identify and manage significant palaeontological resources before development, ensuring protection of South Africa's fragile heritage while allowing responsible development.

Findings

The paleo-sensitivity underlying the proposed R22 upgrade site is illustrated in **Figure 7-2**. This area comprises Cretaceous-aged rocks, which are coded red. The proposed project is underlain by the Cretaceous-aged Zululand Group. The rock is very weathered and forms a flat featureless plain with little outcrop.

Recommendations

Fossils are likely to be present but are unlikely to be found during a pre-excavation paleontological field trip. It is recommended that a Paleontological Field Visit be undertaken, post road excavation and pre-road cladding. The results of this investigation will dictate any further palaeontological processes required. A pre-excavation field visit is unlikely to yield anything due to weathering and loose sand covering the rock. A "Chance Find Protocol" (**Appendix 4**) should be followed if any finds are uncovered when a paleontologist is not on site.



Figure 7-2: Map showing the paleo-sensitivity of the site

7.4. Agricultural Impact Assessment

An Agricultural Impact Assessment was conducted by Mzanzi Agriculture. The objective behind this assessment was to determine whether the soil quality and crop yield potential justify a change of land use from mixed savannah used for game farming to the proposed interchange. The report aims to comply with 'the Protocols' for specialist assessment and minimum report requirements for impacts on agricultural resources.

Findings

The project area consists entirely of Bonheim Soil Form, a high-potential agricultural soil, though its value is underutilized as the land is used solely as a game farm. No evidence of food or industrial crops, domestic livestock, or water sources was found. Vegetation is indigenous Zululand Lowveld bush in pristine condition, with typical tree density variation.

Recommendations

For all practical purposes the bypass site has a low economic output, at the same time rendering an important public service. Furthermore, the change of land use will have no impact whatsoever on the physical properties of the soil, impacting only on what is being currently grown on this soil. It is therefore recommended that the application be approved. This recommendation complies fully with the policy of the Institute for Soil, Climate and Water (ARC-ISCW), the ultimate authority on change of land use.

7.5. Aviation Impact Assessment

An Aviation Impact Assessment was conducted by Tsela Obstacle Safeguarding. The evaluation was conducted using the principles of Obstacle Limitation Surfaces (OLS) as contained in International Civil Aviation Organization (ICAO) Annex 14 documentation, Flight Procedure Design and CNS. The assessment focussed on the highest points of elevation in the road development (namely the rail over road bridge).

Findings

Assessment Focus Areas	Findings
Obstacle Limitation Surface (OLS)	All relevant points are underneath the OLS. Visual Intrusions / Penetrations as a result of the proposed development, were detected. <u>A safety margin is maintained; obstacles are within the buffer zone but do not intrude into the critical airspace.</u>
Flight Procedure Design (FPD)	The Obstacles are outside any pans ops areas. No penetrations were detected. A safety margin is maintained; obstacles are within the buffer zone but do not intrude into the protected areas as identified by the study.
Building Restricted Areas (BRA)	All relevant points are outside the BRA. No penetrations detected. A safety margin is maintained; obstacles are within the buffer zone but do not intrude into the critical airspace
Airspace	All relevant points are outside the airspace limits. No penetrations detected. A safety margin is maintained; obstacles are within the buffer zone but do not intrude into the critical airspace.
Communication, Navigation, and Surveillance (CNS)	There are no infringements on CNS Building Restricted Areas. The development will not interfere with the operational integrity of CNS systems.
RMAC (Radar Minimum Altitude Chart) and RTCC (Radar Tracking and Control Centre)	The proposed development does not impact the published Minimum Vectoring Altitudes. Air traffic control procedures can proceed without modification.

Recommendations

No modifications to existing flight procedures or minimum vectoring altitudes are required. The developments proximity to any airports OLS should be continuously monitored to ensure ongoing compliance with safety standards. Regular reviews of CNS facilities and operational procedures should be maintained to pre-emptively address any future concerns. Overall, the proposed development aligns with the regulatory requirements and does not threaten the safety or efficiency of aerodrome operations, flight procedures, or CNS systems.

No construction on the bridge may commence until receipt of approval from the SACAA.

8. IMPACT MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES

Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended), notes that the identified impacts of development are to be presented with the management actions and outcomes. **Tables 8-1, 8-2 and 8-3** present the required information, together with the responsible person and the frequency to which the management objectives must be monitored during the pre-construction, construction and rehabilitation phases. In this regard, the Contractor, a Designated Environmental Officer (DEO), an independent Environmental Control Officer (ECO) and the Employer are the custodians of this EMPr.

The impact management outcomes presented in **Tables 8-1, 8-2 and 8-3** will be managed in accordance with the stated impact management actions. Should revisions to the impact management actions be required, these will be dealt with at the discretion of the DEO and ECO between audit cycles. Revisions to impact management actions can be made as long as they do not alter the impact management outcome. Any impact management action put forward that will significantly alter the impact management outcome, but is deemed necessary to move forward with construction, will need to be discussed further with the competent authority and appropriate action (as agreed between the competent authority and the applicant) will be taken. The proposed R22 Road Over Rail Bridge project will comprise the following phases:

- Pre-construction phase (during which the Contractor's site camp will be established).
- Construction phase (during which the actual construction of the Road Over Rail Bridge will commence).
- Post-Construction and rehabilitation phase (during which the actual construction of the Road Over Rail Bridge has been completed and the surrounding areas, impacted by the construction phase, are rehabilitated).
- Operational phase (the Road Over Rail Bridge has been commissioned and safe for use by vehicles).

All specialist recommendations have been included in this EMPr.

TABLE 8-1: PRE-CONSTRUCTION MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
Aviation Safety, Aerodromes, flight procedure designs & Communication, Navigation and Surveillance (CNS) equipment	Engage with CAA and the Hluhluwe Aerodrome I&AP to determine appropriate street light heights and lighting technologies along sections of the new road (130m either side of the centre line of the airstrip).	- To ensure ongoing compliance with safety standards. - To accommodate for aviation flight path and pilots using night vision.	<u>Implementation:</u> Developer <u>Inspection:</u> Relevant Specialist <u>Verification:</u> EAP	<u>Implementation:</u> As and when required <u>Inspection:</u> As and when required <u>Verification:</u> As and when required
PRE-CONSTRUCTION PHASE				
Avoidance of environmental damage during the pre-construction phase	- The project team must develop a communication protocol with Interested and Affected Parties and directly affected adjacent landowners. - The Contractor must prepare a Construction Site Development Plan for the ECO's comment and the Engineer's approval prior to site establishment. This plan must indicate: - The boundaries of the site that encompasses all construction related activities taking into consideration the limit of construction as per the EA; - Vehicle and pedestrian access points and routes;	- Limit construction impacts on the receiving environment. - Ensure that the contractor, construction workers and site personnel are aware of the relevant provisions of the EMPr.	<u>Implementation:</u> Contractor (unless otherwise stated) <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Once off <u>Inspection:</u> <i>Ad hoc</i> <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	○ Laydown area/s, offices, stockpile areas, storage areas, toilets etc. ○ The establishment of specific temporary infrastructure (e.g... site camp, stockpile areas, storage areas, toilets).The establishment of specific temporary infrastructure outside of sensitive areas outside the approved working area of the project. Where avoidance of the establishment of specific temporary infrastructure outside of the sensitive areas is not possible, the ECO must be consulted for guidance. • A Waste Management Plan to effectively manage all waste generation during the project activities, inclusive of all domestic waste generation from the construction camps must developed. The relevant method statement is also to be developed. • Timeous notification (at least 30 calendar days) must be given to landowners in respect of each land parcel which is not owned by SANRAL, but is affected by the project, including the construction start date and the duration of construction; • Haulage roads and turning areas must be identified and clearly demarcated and sign posted were appropriate; • Appropriate temporary traffic control and warning signage must be erected and implemented on all affected roads in the vicinity of the site; • Methods of dust suppression must be formalised;	• Establish and maintain a record of all complaints and claims against the project and ensure that these are timeously and effectively verified and responded to. • Education of the construction staff with regards to environmentally sensitive areas on site.		

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	- An Emergency Method Statement (MS 3) must be drafted and submitted to the ECO for comment and must detail fire management as well as accidental leaks and spillage containment procedures. The Method Statement must also indicate emergency contact numbers and DFFE S30 Emergency Incident Procedures (Appendix 3), - Adequate spill kits and containers for spilled and contaminated material must be sourced; - Waste bins with lids must be procured; - Plans for an appropriate number of chemical portable toilets (1 toilet for each gender and one toilet for every 15 persons) must be put in place to ensure that these are provided for labourers during the construction phase. These toilets must be maintained in a satisfactory (sanitary) condition and be located at least 100m away from any water resources (namely rivers, drainage lines and wetlands) or outside of the 1:100-year floodline. No pit latrines are to be constructed; - Hazardous materials/dangerous goods should be stored in a clearly marked, lockable, designated storage area; - Material Safety Data Sheets (MSDS's) must be readily available on site for all chemicals and hazardous substances to be used. Where possible and available, MSDS's should additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes;			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	- Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste shall be strictly prohibited in identified no-go areas during all phases of construction; - A Complaints Register shall be maintained by the Contractor detailing complaints and issues raised by any party and the manner in which the complaints were resolved; - An Incidents Register and associated Incident Reports where applicable must be maintained by the Contractor and be kept at the site camp; - Environmental training must be held to ensure all construction personnel are aware of the provisions contained in the EMPr and all environmental approvals related to this section of the road. A record of environmental training undertaken must be kept at the site camp. - A minimum of monthly toolbox talks/Environmental Awareness Training is to be undertaken by the Contractor and a record of attendees are to be filed in the Environmental File. - Ensure all relevant permits and approvals have been obtained. For example, Water Use License for abstraction of water during construction. Associated studies accompanying the application must be conducted - Method Statements (MS 1- MS 10) must be drafted and submitted to the Engineer for approval and the ECO at least 10 working days <u>prior</u> to any works being undertaken.			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	<u>No construction on the bridge can commence prior to receiving approval from the SACAA.</u>			
No-Go Areas and Construction Corridors	- Prior to the commencement of any construction activities, the construction limits and associated working areas must be staked out by a surveyor/the contractor and demarcated using suitable material. - Demarcations are to remain in place until construction and rehabilitation activities are complete. All areas outside of this demarcated working servitude must be considered no-go areas for the entire construction phase; - Access to and from the project site should be either via existing roads or within the construction servitude. Where this is not possible, an assessment of the area that will be affected must be undertaken by parties with relevant experience as far as possible. Efforts must be made to avoid the triggering of additional approvals that were not identified prior to construction - A rehabilitation plan must be developed to ensure all disturbed areas must be rehabilitated to the satisfaction of the ECO as per the relevant rehabilitation plan;	- Sensitive areas are protected from degradation due to construction activities. - Work is kept within footprint approved as per the EA. - The possibility of damage to the natural environment is mitigated.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc <u>Verification:</u> Monthly
Protection of plants	A search and rescue for protected plants and trees must be undertaken by the DEO if they have knowledge of plants or the relevant specialist through a site walk about prior to construction activities and where such are found and where removal is unavoidable, a permit for the removal of these	To avoid unnecessary removal of plants.	<u>Implementation:</u> Contractor/ Developer <u>Inspection:</u>	<u>Implementation:</u> As and when required

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	along with measures to translocate these must be undertaken by the DEO through guidance of the specialist or other relevant party, where necessary . - Protected and indigenous trees which are located within the road reserve, but which need not be felled, must be marked by means of hazard tape or another suitable measure and their positions must be recorded by means of a co-ordinate location. - A count should be made of protected trees felled and, in the rehabilitation phase, a similar number of saplings of the same or similar species should be planted around the same area in which they were discovered or close proximity. - Clearing of vegetation should only be limited to large trees and shrubs (that are not protected species and which are not part of a group of indigenous trees occurring within a natural forest as well as all invasive plant species within the area planned for rehabilitation. - All relevant permits for the felling of protected trees must be obtained prior to removal.		DEO <u>Verification:</u> ECO	<u>Inspection:</u> Weekly <u>Verification:</u> Monthly
Site clearing and sensitive areas	- A Method Statement (MS 10) is to be developed, which will provide the details of how site clearing, and consequent stockpiling will be executed; - All existing infrastructure and structures are to be identified and taken cognisance of;	Manage environmental impact associated with site clearing.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	- Sensitive areas including wetlands and drainage lines / streams must be demarcated prior to commencement of construction activities; - The construction corridor is to be demarcated prior to construction works; - A photographic record of the state of the terrestrial ecosystems prior to the commencement of clearing/construction must be kept for reference and rehabilitation monitoring purposes.	- Ensure that only areas that are specifically identified for the construction purposes are cleared. - Ensure employees are aware of ecological sensitivities of the greater site.	<u>Verification:</u> ECO	<u>Verification:</u> Monthly
Construction camp establishment	- The construction camp/s must as far as possible be located within an existing disturbed area or within the authorised construction limit; - The location of the camp site should be reviewed and approved by the relevant project team members and the appointed ECO. - The construction camp must be located outside of the 1:100 year floodline, or 50m from a watercourse / wetland, whichever is greater. - Before the commencement of any construction activities within the development area, the recommended construction buffers must be surveyed and be clearly demarcated. No construction or materials storage should be allowed within these construction buffers.	Minimise environmental impact associated with construction camp establishment.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	• Appropriate stormwater management plans must be developed for the construction camp to prevent ponding of water or erosion; • Suitable waste bins must be provided within the construction camp; • Storage areas / containers containing hazardous substances / materials must have clear signage and fire extinguishers must be located in close proximity to these materials; • Designated areas for stockpiling of raw material must be provided. All stockpiling areas must be approved by the DEO and ECO; • Spill kits must be readily available at the construction camp and at appropriate areas along the construction route; • Drip trays must be procured at the construction camp and at construction site and , for every piece of plant / machinery on site; • Adequate toilet facilities must be provided at the construction camp for all staff (1 toilet for each gender) and for every 30 workers; • Site camp chemical toilets must be situated at least 50m away from the edge of the nearest watercourse; • Water for human consumption must be available at the construction camp and at other convenient locations on site;			

Draft Environmental Management Programme: R22 Road-Over-Rail Bridge

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
DESIGN PHASE				
	- The Contractor must provide designated smoking areas for construction workers. Fire extinguishers and an outdoor ashtray or similar suitable container must be provided in all smoking areas; and - The contractor must further affix a suitable and conspicuous no smoking sign notice at all entrances to areas prone to fire.			

TABLE 8-2: CONSTRUCTION MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
Access and traffic	- The Contractor must compile a Traffic Management Plan indicating the routes that construction vehicles must adhere to, the speed limits of the vehicles, as well as the locations for the placement of road warning signs. These routes must be communicated to all sub-contractors. This is to accompany MS6. - Signs must be placed along the road, and side access roads to identify speed limits, travel restrictions and other standard traffic control information. - Adherence to speed limits must be strictly enforced; - Flagmen and other traffic control measures must be implemented during the construction phase; - Contractor must communicate road safety to community members through the Community Liaison Officer (CLO)/ Project Liaison Officer (PLO); - Any clearing for access or haul roads outside the Approved limit of construction shall only be undertaken after approval from the relevant Project Team Members and ECO; - Existing roads shall be used as far as possible for construction purposes.	- Ensure that construction vehicles use only dedicated access route to construction site. - Safety of road users, community members and construction employees are maintained.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- Written permission of the affected landowner/s must be obtained for the use of any other roads; - Access roads are to be maintained in a suitable condition; - If damaged during construction, all utilised access roads are to be reinstated to a state that is as close as possible to their original condition (to be actioned during the post construction phase). - Construction vehicles must not dispose of soil of other material on roads. Where this occurs, the material must be removed before the end of the working day. - Construction activities must be limited to daytime hours. Where this must extend to any time after dark, the Contactor must ensure that parties that are most likely to be affected are informed of this no later than 24 hours prior and proof of their consultation kept; - Repairs of construction vehicles must not be undertaken on site. Minor repairs that will not lead to possible environmental harm such as the changing of tyres are permissible; Only minor maintenance will be done on site, and a designated area must be set aside for this, which must occur on a hardened surfaced which is bunded.			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- Construction vehicles which require emergency repairs while still on site must have drip trays placed beneath temporarily until the vehicle is removed from the site for repairs; - Any vehicles that are leaking must not be allowed entry to site;			
Protection of existing infrastructure and services	- Where infrastructure is damaged due to construction activities, e.g., movement of construction vehicles, the owner of the infrastructure must be consulted and arrangements for repairs must be made with the Contractor; - No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted, the applicant must give at least seven working days prior notice of the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued. - Should any of ESKOM's underground cables be exposed, the contractor is to notify ESKOM at KZNOU-LandR@eskom.co.za. - A Specialist or the Project's Safety Agent must monitor the proposed development's proximity to	Minimise environmental impacts associated with damaged and/or disrupted services	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> <i>Ad hoc</i> <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	the Hluhluwe airport's OLS to ensure ongoing compliance with safety standards. Review of CNS facilities and operational procedures should be maintained to pre-emptively address any future concerns.			
Management of construction camp and eating areas	- Stormwater management must be implemented and maintained at the construction camp to avoid erosion. - Waste bins / skips must be utilised at all times. - Bins must be emptied on a regular basis and slips for safe disposal are to be filed within the on-site environmental file. - Spill kits must be readily available. - Refuse bins must be placed at all eating areas, site camp and points of construction; - The site of the construction camp must be discussed and agreed to by all parties and the ECO must provide comments.	Minimise environmental impacts associated with the construction camp and eating areas.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc <u>Verification:</u> Monthly
Preservation of flora and fauna	- The extent of the construction site must be demarcated, and no plants must be removed outside of the construction site. - Construction activities must be restricted to the approved development footprint area.	- Protect fauna and flora found within and adjacent to the construction footprint. - Prevention of the introduction and spread of	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO & ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- The movement of Construction personnel must be limited to areas under construction within the approved development footprint area. - No animal will be intentionally killed or destroyed and poaching and hunting is not permitted on site; Any construction personnel found to be poaching in the area must be subjected to appropriate action. - Employees must be trained on how to deal with faunal species as intentional killing and setting of traps is not permitted. In the case of a problem animal e.g., snake, a specialist must be called in to safely relocate the animal; - Trenches must be inspected regularly for animals that will have fallen in and become trapped.) All animals found in trenches must be rescued; - No clearing of plants outside of the approved development footprint area is permitted for any reason (i.e., for firewood or medicinal use; - Bank slopes must be graded to the lowest possible angle and must be well below the slip angle of the material concerned; - Along the working areas, a rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the trenches is well established and complete.	alien invasive species in the area due to construction activities. Preservation of existing fauna and flora.	<u>Verification:</u> ECO	<u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- The soil excavated from any trenches must be retained and be returned in the reverse order to which it was removed in order to re-establish the original soil profile. - No tree clearing or vegetation removal is permitted without the necessary permissions of the ECO, and where necessary, the relevant authority. It must further be determined if the identified tree required for clearing is a protected species and the necessary applications made if relevant prior to felling; - Vegetation clearing/stripping must only be done as the construction activities progresses. - In order to avoid uprooting of indigenous plants, where there are no trees or shrubs but groundcovers, these must be trimmed to a height of at no less than 10cm to allow for the movement of construction vehicles whilst also catering for natural rehabilitation after the end of construction activities. - Construction workers must not remove plants or collect seed from any plants outside the areas on which vegetation clearing will be undertaken. - There must be prevention of erosion, and where necessary rehabilitation of eroded areas.			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	Rehabilitation of disturbed areas as soon as construction has ended in the area that has been disturbed.			
Alien plants/invasives/weeds monitoring and control	- All alien invasive vegetation that colonises the construction site must be removed, preferably by uprooting. The contractor should consult the ECO regarding the method of removal should the DEO and the SANRAL Environmental Coordinator not be able to provide guidance. - Herbicides should be utilised where hand pulling/uprooting is not possible. Only herbicides which have been certified as safe for use by an independent testing authority are to be used. - All bare surfaces across the construction site must be checked for Invasive Alien Plants every two weeks and these should be removed by hand pulling/uprooting and disposed of at a landfill.	- The absence of alien vegetation throughout the Construction camp and site footprint. - Alien invasives are properly eradicated from the site and suitably disposed of. - Mitigate impact on native fauna and flora	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Weekly/Bi-weekly <u>Verification:</u> Monthly
Prevent soil contamination	- Hazardous materials / dangerous goods must be stored in a clearly marked, lockable, designated storage area; - Hazardous materials / dangerous goods must be stored within a bunded area with a capacity of at least 110% of the total goods stored;	- Avoidance of soil contamination. - Re-use of viable soils in rehabilitation.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> <i>Ad hoc</i> <u>Verification:</u> Monthly

Draft Environmental Management Programme: R22 Road-Over-Rail Bridge	38
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IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- All temporary erosion and sediment control measures must be monitored for the duration of the construction phase and repaired immediately when damaged. - All temporary erosion and sediment control structures must only be removed once vegetation cover has successfully recolonised the affected areas; - After every rainfall event, the Contractor must check the site for erosion damage and rehabilitate this damage immediately.; - All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding; - The unnecessary removal of soil from slopes must be prevented, especially on steep slopes which will not be developed; - All exposed earth must be rehabilitated promptly with suitable vegetation to stabilize the soil; - If re-vegetation of exposed surfaces cannot be established, temporary erosion and sediment control measures must be maintained until such a time that re-vegetation can commence. Excavated soil must be retained, with topsoil and subsoil being stockpiled separately;		<u>Verification:</u> ECO	<u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	• Topsoil (top $\pm 30\text{cm}$) and subsoil are to be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. • Erosion/sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment runoff from stockpiles; • Soil, or any other stockpiles should be stored at least 100m away from watercourses; • Trenches, once filled and stabilised, must be rehabilitated with a vegetation cover which matches that of the surrounds; • Stockpiled soil must be replaced in the reverse order as to which it was removed (subsoil first followed by topsoil); • Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; • If erosion has occurred, soil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Only the designated access routes are to be used to reduce any unnecessary compaction;			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	• Compacted areas are to be ripped to loosen the soil structure; • The following measures must be adopted for topsoil protection: ○ Topsoil stockpiles are to be kept to a maximum height of 2m; ○ Topsoil is to be stripped when the soil is dry, as to reduce compaction; ○ The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate significantly; ○ Compaction of the removed topsoil must be avoided by prohibiting traffic, walking and storage on stockpiles; ○ All temporary earth banks must be protected against soil erosion by means of a cover and/or silt curtains and/or other suitable material. The cover can be either an impervious sheeting or grass grown in situ from seed. Recommended grass species are Couch Grass (<i>Cynodon dactylon</i>) or Coastal Buffalo Grass (<i>Stenotaphrum secundatum</i>); • Topsoil Stockpiles must be protected from wind and rain, as well as contamination from oil, diesel, petrol, concrete, wastewater, or any other material, which may inhibit later growth of vegetation.			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
Cement/ concrete product management	- Any cement / concrete must not be mixed directly on the ground. Mixing trays and/or impermeable sumps must be used at all mixing and supply points. Cement mixing must be done on an impermeable surface with bunding to prevent spills - Unused cement bags are to be stored under cover as not to be affected by rain or runoff events. - Used cement bags must be stored in weather-proof containers to prevent windblown cement dust and water contamination. Used cement bags must be disposed of on a regular basis via the solid waste management system and must not be used for any other purpose. - All remains of excess/un-used cement or concrete must be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as soil contamination and groundwater pollution will occur. - Empty cement bags will not be burned or otherwise disposed of anywhere at the project site, but they must instead be removed to an approved disposal site.	Ensure no adverse environmental impacts due to cement/concrete	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> <i>Ad hoc</i> and weekly as a minimum <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
Material handling, hazardous substances and storage	- Hazardous substances and materials are those that are potentially poisonous, flammable, carcinogenic or toxic. Examples of these include diesel, petroleum, oil, bitumen, solvent based paints and lubricants. Such substances must be managed appropriately; - A Method Statement (MS 7) is to be developed detailing hazardous materials storage, handling, transfer etc.; - It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). - Hazardous substance storage must not take place within 50m of a watercourse or within the 1:100 year floodline, whichever is greater; - MSDS' for hazardous materials are to be easily accessible on site and the relevant personnel are to be familiar with their content; - All stationery vehicles, equipment and receptacles of hazardous waste must be supplied with drip trays to prevent spills and soil contamination;	- Ensure all hazardous substances are handled in accordance with the material safety data sheets (MSDS). - Prevent impacts to the receiving environment.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc and weekly as a minimum <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- All refuelling of vehicles should be done in the construction camp or at a nearby filling station; - When decanting hazardous substances, drip trays must be used. Drip trays are to be cleaned out regularly and material must be collected and disposed of as hazardous waste; - Drip trays are to be stored in containers / under roofed facilities so as not to fill with rainwater, creating a contaminant; - Should a spillage occur, absorbent materials such as sawdust (or appropriate alternative as supplied in spill kit) should be spread on the affected areas. Soil is not considered the preferred absorbent material, and alternatives are preferred. The contaminated soil must be lifted and placed within an impermeable container or a high-density plastic bag and disposed of at a recognised disposal site; - Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums, and must not be allowed to enter into natural drainage systems; - An Incident Report must be completed for all major hazardous / dangerous goods spills or leakages on site;			

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- Significant spills must be reported to the relevant Competent Authority and the ECO, and must follow significant spillage events to determine specific risks, impacts and mitigation actions; - Spill kits must be clearly marked and visible to ensure that all spills are immediately contained and removed; - All stationery vehicles must be supplied with drip trays to prevent soil contamination; - Generators and fuel storage bowsers must be contained within drip trays or be appropriately bunded; - Bituminous stockpiles and working areas must be at least 50 m away from any drain, wetland, or watercourse. - Ideally the area under the bituminous material will be covered by an impervious sheet. At the completion of operations, the sheet must be lifted and be properly disposed of at an approved disposal site.			
Prevent the spread of waste	A method statement for waste management (MS 8) must be compiled by the Contractor and approved by the Engineer. The MS must be submitted to the ECO.	Prevent environmental contamination associated with waste.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO & ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u>

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- All construction waste must be disposed of off-site at a licensed landfill site. - Efforts at the reduction of waste generation must be made - Separation of different waste materials must be promoted to cater for reuse and recycling. - A dedicated area for the placement of waste that will either be removed or reused must be identified and demarcated and must not allow for waste to become windblown, be accessible to animals, or be placed in piles adjacent to the skips / bins: - Remove all waste, including cleared vegetation from site as soon as possible unless the material will be reused on site. - Domestic waste generated from the site camp must be kept in bins with lids and removed as the need arises and be disposed of at a registered landfill. - Proof of removal and/or disposal must be kept; - All waste receptacles must have lids; - Adequate rubbish bins/skips must be available on site and at the construction camp; - No burying, dumping, or burning of waste materials, vegetation, litter, or refuse shall occur on site;		<u>Verification:</u> ECO	Ad hoc and weekly as a minimum <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- Contaminated soil must be treated as hazardous waste and disposed of at a permitted waste disposal site. The affected area is to be rehabilitated no later than 7 days after the removal of the contaminated soil. - Containers with lids and a clear label regarding the contents must be kept in a designated area on site to collect contaminated soil or other material. The contents of these should be disposed of at a registered hazardous waste site. A copy of the waste manifest (if the waste is collected is by a service provider) or waste disposal (if the Contractor disposes of the waste at the waste disposal site themselves). - Handling of hazardous liquids shall be done over drip trays to intercept spills.			
Preserve air quality	- Construction vehicles must not exceed speeds of 10km/h within the construction site; - All construction vehicles transporting friable materials such as sand must be covered by a tarpaulin or wetted down should the need arise; - Heavy vehicles and machinery should be serviced regularly to minimise exhaust fumes;	- Reduce air quality impacts. - Reduce on-site dust.	<u>Implementation:</u> Contractor & Engineer <u>Inspection:</u> DEO <u>Verification:</u>	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc and weekly as a minimum <u>Verification:</u>

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	• Soil stockpiles must be located in designated areas that limit the erosive effects of wind. This will serve to limit dust impacts; • Removal of vegetation must be avoided until such time as soil stripping is required. This will serve to limit dust impacts; • Water or an appropriate environmentally friendly soil stabiliser, must be utilised to suppress dust; • Equipment must be operated within its specifications and capacity; • Vehicles/ machinery must not be overloaded so that material cannot be dispersed into the air during transportation; and • Water trucks or other methods will be required to suppress dust by spraying water on affected areas producing dust. This will likely be required daily. Dust suppression must also be undertaken during windy and dry weather conditions.		ECO	Monthly
Prevent noise pollution	• The working hours stipulated in the Construction permit, where applicable, must be adhered to. Where this is not applicable, work must be limited between sunrise and sunset. Working hours during weekends must be agreed between the SANRAL, the Contractor, CLO/PLO, Ward Cllr and any other relevant stakeholders;	• No ambient noise impacts relating to plant operations. • Compliance to municipal by-laws.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO & ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc and weekly as a minimum

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- All construction vehicles must be in a good working order to reduce possible noise pollution; - Noisy activities must take place only during working hours. The Contractor must inform all directly affected persons in writing 24 hours prior to any planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the neighbouring residents, e.g., rock blasting; and - Ensure that the potential noise source will conform to the South African Bureau of Standards recommended code of practice, SANS Code 0103:1983, so that it will not produce excessive or undesirable noise.	No nuisance conditions created.	<u>Verification:</u> ECO	<u>Verification:</u> Monthly
Prevent visual unsightliness	- Shadecloth or similar/alternative material must be utilised to conceal and minimise the visual impact of the construction site; - Clearly demarcate the construction site to limit the area of disturbance; and - There must be rehabilitation of any disturbed areas once the road is ready for operation	The prevention or the mitigation of unsightliness.	Implementation: Contractor Inspection: DEO & ECO Verification: ECO	Implementation: Ongoing Inspection: Ad hoc and weekly as a minimum Verification: Monthly
Health, safety and security	First aid must be available at the site camp as a minimum and where possible construction areas;	Prevent unnecessary incidents	<u>Implementation:</u> Contractor	<u>Implementation:</u> Ongoing

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- Smoking is prohibited in the vicinity of flammable substances; - Fire extinguishers must be available and easily accessible at all times; - Emergency contact details must be displayed in a conspicuous location at the site camp as a minimum - Open trenches must be adequately demarcated and must be checked daily to ensure the adopted demarcation method is still operational. The use of warning signs is also encouraged; - The working corridor must be demarcated with a temporary warning barrier, such as danger netting, and to prevent livestock and public ingress; - Open trenches must be demarcated with a temporary warning barrier, such as danger netting, to prevent ingress of animals and human safety threats; and - Material stockpiles must be stable to avoid collapse and possible injury to workers.		<u>Inspection:</u> DEO & ECO <u>Verification:</u> ECO	<u>Inspection:</u> Ad hoc and weekly as a minimum <u>Verification:</u> Monthly
Fire Management	- No open fires are permitted on construction sites without approval from the DEO and/or the ECO. - Ensure adequate fire-fighting equipment is available and that workers are trained on how to use and operate it;	Prevent unnecessary incidents	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO & ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u>

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	- Ensure that all workers on site know the proper procedure in case of a fire occurring on site; - The Contractor is to ensure that no person smokes in any place in which a flammable liquid is used or stored; - The Contractor must provide designated smoking areas for construction workers. - Fire extinguishers and an outdoor ashtray or similar suitable container must be provided in all smoking areas; and - The Contractor must further affix a suitable and conspicuous no smoking sign notice at all entrances to areas prone to fire.		<u>Verification:</u> ECO	Ad hoc and weekly as a minimum <u>Verification:</u> Monthly
Socio-economics	- All construction activities must be limited to daylight hours unless otherwise agreed with the Affected parties as well as the Applicant, CLO/PLO or Ward Councillor; - Inform the surrounding communities, public and private business of the proposed activity as soon as possible. This will serve to ease potential social anxiety; - Local community members must be employed where possible; - A CLO/PLO must be employed to assist in capturing and addressing / complaints raised by the affected	- Creation of job opportunities for skilled and non-skilled personnel. - Skill development of the local community through employment opportunities. - Protect agricultural practices.	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO & ECO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc and weekly as a minimum <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	community and business / landowners to the Contractor; - The Contractor must replace any damaged infrastructure as a result of construction activities; - Inform affected adjacent landowners and other parties timeously in order to allow for a construction timeframe which does not impact on or hamper on normal agricultural/cultural practices; - Photographs must be taken before and after construction activities to ensure that infrastructure (e.g., fencing or driveways) is reinstated to the same or better condition post construction; - Ensure that adequate lines of communication are implemented to deal with any public grievances.			
Protect heritage and palaeontological artefacts	- All operations exposing archaeological, historical residues or graves must cease immediately pending an evaluation by a heritage specialist and/or authorities; - The protocol for human finds is as follows: - The area needs to be demarcated with a 20m buffer, and the DEO or ECO must be informed. The DEO or ECO will engage with SANRAL to ensure that the Kwa-Zulu Natal Amafa and Research Institute and/or a Heritage Specialist	Protection of heritage and palaeontological resources	<u>Implementation:</u> Contractor <u>Inspection:</u> DEO & ECO <u>Verification:</u> ECO	<u>Implementation:</u> Ongoing <u>Inspection:</u> Ad hoc and weekly as a minimum <u>Verification:</u> Monthly

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING	
A thing aimed at or sought, a goal	The process of doing something, typically to achieve an aim	The way a thing turns out; a consequence	Responsibility	Frequency
CONSTRUCTION PHASE				
	is notified of the matter and guidance on the way forward is obtained. - Construction activities may continue elsewhere. - Any extension of the project beyond its current approved footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, considering all information gathered during this initial heritage impact assessment. - A Paleontological Field Visit must be undertaken, post road excavation and pre-road cladding. - A “Chance Find Protocol” should be followed if any finds are uncovered when a paleontologist is not on site.			

TABLE 8-3: POST-CONSTRUCTION AND REHABILITATION MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility and Frequency</i>
POST-CONSTRUCTION			
Rehabilitation	- On completion of the project, the appointed Contractor must ensure that all necessary infrastructure contained within the construction camp, including the construction plant, equipment, storage containers and temporary services used during construction are removed. - Rehabilitation of the construction camp must commence immediately after completion of construction activities. - Any areas that have been disturbed must be rehabilitated by appropriate landscaping, topsoil dressing, alien plant eradication and vegetation establishment; - Soils, including backfill material, are to be compacted to match the porosity of the surrounds as best as possible, during post construction; - The Contractor must clear and completely remove all general waste, construction plant, equipment, surplus rock, and other foreign materials from the site once construction has been completed. - Undertake progressive rehabilitation as far as possible if this will not result in the damage of rehabilitated areas - Any bare soil around the road or other working areas must be covered by a grass sward as soon as possible. In the moist and humid areas at the road site this can be done at any time of the year.	Rehabilitation to avoid soil loss and erosion	<u>Implementation:</u> Contractor <u>Inspection:</u> Weekly until completion by DEO <u>Verification:</u> Monthly by ECO until close-out.

IMPACT MANAGEMENT OBJECTIVES OF AN EMPR	IMPACT MANAGEMENT ACTIONS OF AN EMPR	IMPACT MANAGEMENT OUTCOMES OF AN EMPR	MONITORING
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility and Frequency</i>
POST-CONSTRUCTION			
	• Soil or other stockpiles which are to stand for longer than eight weeks should be planted over with grass. • Grass species which may be used include the following: ○ Couch Grass (<i>Cynodon dactylon</i>) ○ Coastal Buffalo Grass (<i>Stenotaphrum secundatum</i>) ○ Finger Grass (<i>Digitaria eriantha</i>) ○ Love Grass (<i>Eragrostis curvula</i>) or <i>E. capensis</i> ○ NOTE: Kikuyu Grass may NOT be used. • A weed control programme should be initiated. It will not be possible to control all species in the long term, but it should be kept out until such time as there is a good grass cover. • Rehabilitation is required throughout the construction footprint and is not limited to the construction site only, but includes stockpiling areas, new access roads, etc. i.e. any area impacted upon by construction activities. Rehabilitation measures include shaping, landscaping, topsoil dressing, alien plant clearance and vegetation establishment; • Where necessary, topsoil must be imported to the site in question, prior to regrassing of the site. It is preferred that the topsoil used is excess topsoil from another portion of the site.		

TABLE 8-4: OPERATIONAL PHASE OBJECTIVES, ACTIONS AND OUTCOMES

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility and Frequency</i>
OPERATIONAL PHASE			
Administration	Relevant notice must be given to DFFE regarding the proposed operational phase start date, as stipulated in the EA.	Keep the Competent Authority informed and up to date with regards to the project progress.	<u>Implementation:</u> ECO/SANRAL <u>Verification:</u> SANRAL communication with authorities.
Operational Requirements	Operational requirements will be the responsibility of SANRAL and any maintenance and management will be undertaken according to their specifications.	To ensure that all maintenance is carried out timeously and no Environmental Impacts occur.	<u>Implementation:</u> SANRAL <u>Inspection:</u> To be stipulated by DFFE. <u>Verification:</u> SANRAL
Protection of infrastructure and services	- Monitor the proposed development's proximity to Hluhluwe airport's OLS to ensure ongoing compliance with safety standards. - Review of CNS facilities and operational procedures should be maintained to pre-emptively address any future concerns.	Ensure safety of users of both road and aviation is managed effectively.	<u>Implementation:</u> SANRAL <u>Verification:</u> SANRAL

9. EMPR ACKNOWLEDGEMENT FORM

The Proposed R22 Hluhluwe Road-Over-Rail Bridge and Alignment.

Record of signatures providing acknowledgment of being aware of and committed to complying with the contents of this Environmental Management Programme (EMPr), which relates to the environmental management, mitigation and rehabilitation measures for the project outlined above, and the environmental conditions contained in the civil and other construction contract documents.

APPLICANT / DEVELOPER

Signed:

Date:

IMPLEMENTING AGENT:

Signed:

Date:

CONTRACTOR:

Signed:

Date:

CONTRACTOR'S ENVIRONMENTAL MANAGER/ DESIGNATED ENVIRONMENTAL OFFICER

Signed:

Date:

SUB - CONTRACTOR:

Signed:

Date:

APPENDIX 1: SANRAL ENVIRONMENTAL MANAGEMENT PLAN

SECTION C: ENVIRONMENTAL MANAGEMENT PLAN

TABLE OF CONTENTS	PAGE
C1001 SCOPE	C3-57
C1002 DEFINITIONS.....	C3-57
C1003 LEGAL REQUIREMENTS	C3-58
C1004 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS.....	C3-60
C1005 TRAINING	C3-61
C1006 ACTIVITIES/ASPECTS CAUSING IMPACTS.....	C3-62
C1007 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES.....	C3-65
C1008 AREAS OF SPECIFIC IMPORTANCE	C3-72
C1009 REHABILITATION	C3-72
C1010 RECORD KEEPING.....	C3-73
C1011 COMPLIANCE AND PENALTIES	C3-73
C1012 PROJECT SPECIFIC CONDITIONS	C3-73

C1001 SCOPE

The South African National Roads Agency SOC Limited (SANRAL) recognises environmental management as a key component of road infrastructure development and as part of its Environmental Sustainability Framework has developed this Environmental Management Plan (EMP) as a tool for continual improvement in environmental performance.

This EMP prescribes the methods by which proper environmental controls are to be implemented by the Contractor for construction and maintenance projects. The duration over which the Contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the Conditions of Contract for Construction for Building and Engineering Works Designed by SANRAL published by the Federation Internationale des Ingenieurs-Conseils (FIDIC) as the Defects Notification Period (maintenance period).

The provisions of this EMP are binding on the Contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract, particularly the conditions of any environmental authorisation and associated site-specific Environmental Management Programme (EMPr). In the event that any conflict occurs between the terms of the EMP and the project specifications or environmental authorisation, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any changes to the EMP and/or environmental authorisation cannot occur without being submitted to SANRAL who will manage the process of amending the EMP.

The EMP identifies the following:

- Relevant parties and their responsibilities;
- Construction activities that will impact on the environment;
- Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

C1002 DEFINITIONS

Alien Vegetation: undesirable plant growth which includes but is not limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA), 1983 and the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). Other vegetation deemed to be alien are those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Construction Activity: any action taken by the Contractor, his sub-contractors, suppliers or personnel during the construction process as defined in the contract documents.

Environment: the surroundings within which the contract exists and comprises land, water, atmosphere, micro-organisms, plant and animal life (including humans) in any part or combination thereof as well as any physical, chemical, aesthetic or cultural inter-relationship among and between them.

Environmental Aspect: any component of a contractor's construction activity that is likely to interact with the environment.

Environmental authorisation: a written statement from a Competent Authority, with the general and specific conditions and the EMPr recording its approval of an application for a planned undertaking that triggers listed activities in the Environmental Impact Assessment (EIA) regulations of the National Environmental Management Act (NEMA).

Environmental Impact: any change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment (EIA): a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and scoping and environmental impact reporting.

Environmental Management Plan: An Environmental Management Plan (EMP) is an environmental management tool used to ensure that adverse impacts of the construction and operation and decommissioning of a project are prevented and/or minimised, and that the positive benefits are enhanced.

Environmental Management Programme (EMPr): A project-specific Environmental Management Plan approved by a competent authority through an environmental impact assessment process.

Road Reserve: a corridor of land, defined by co-ordinates and/or proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Site; the site is defined in the FIDIC Conditions of Contract and in the scope of works. It is bound by the limits of construction as shown in the drawings or the title of the project and extends to also include the following:

- Areas outside the construction zones where accommodation of traffic is placed;
- All borrowpits defined in the applications approved by the Department of Mineral Resources (DMR);
- All haul roads constructed by the Contractor for purposes of access;
- Any non-adjacent sites specified in the contract documentation;
- The Contractor's and his subcontractors' camp sites.

For the purposes of this EMP, the site includes areas outside of, but adjacent to, the road reserve that may be affected by construction activities.

Spoil material: is material that is unsuitable for construction of the road pavement and for which no other useful purpose can be found in additional works on the project (e.g. for the provision of protection berms). Such material requires spoiling at convenient areas to be identified by the Engineer and/or Contractor within the Site. Spoil material does not require removal to a designated landfill site unless it contains identifiable hazardous contaminants.

C1003 LEGAL REQUIREMENTS

(a) General

Construction shall be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the Contractor as to his 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 EMP are legally binding in terms of this contract. In the event that any rights and obligations contained in this EMP contradict those specified in the standard or project specifications then the latter shall prevail.

(b) Statutory and other applicable legislation

The Contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

Major environmental legislation, as amended from time to time, includes but is not limited to the following:

(i) Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This act provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

(ii) The Constitution (Act 6 of 1996)

The Constitution states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

(iii) Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)

This act makes provision for equitable access to, and sustainable development of, minerals and petroleum resources.

(iv) National Environmental Management Act (NEMA), (Act No. 107 of 1998)

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also sets the stage for the EIA Regulations.

(v) National Environmental Management: Air Quality Act (Act No. 39 of 2004)

This act provides reasonable measures for the prevention of pollution and ecological degradation; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management and control by all spheres of government.

(vi) National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. SANRAL may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister.

Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner. Thus SANRAL may be directed to remedy harm caused by listed invasive species.

(vii) National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

This act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.

(viii) National Environmental Management: Waste Act (Act No. 59 of 2008)

This act aims to regulate waste management practices through provision of national norms and standards, specific waste measures, licensing and control of waste activities, remediation of contaminated land as well as providing for compliance and law enforcement.

(ix) National Forests Act (Act No. 84 of 1998)

This act makes provision for promoting the sustainable management and development of forests, and for the protection of certain forests and trees for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

(x) National Heritage Resources Act (Act No. 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources.

(xi) National Water Act (Act No. 36 of 1998)

This act makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations.

(xii) The South African National Roads Agency Limited and National Roads Act (Act No. 7 of 1998)

This Act makes provision for a National Roads Agency for the Republic to manage and control the Republic's national roads system and take charge, amongst others, of the development, maintenance and rehabilitation of national roads within the framework of government policy.

C1004 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS

Copies of this EMP shall be kept at the site office and must be distributed to all senior contract personnel who shall familiarise themselves with its contents.

Implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role as outlined herein, to ensure sound environmental management during the construction phase of a project.

(a) SANRAL

SANRAL and anyone acting on SANRAL's behalf is accountable for the potential environmental impacts of any activities that are undertaken and is responsible for managing these impacts.

(b) The Engineer

The Engineer has been appointed by, and acts for, SANRAL as its on-site implementing agent and carries the responsibility to ensure that the Contractor undertakes its construction activities in such a way that SANRAL's environmental responsibilities are not compromised.

The Engineer will, within seven days of receiving a contractor's request for approval of a nominated Designated Environmental Officer (DEO), approve, reject or call for more information on the nomination. The Engineer will be responsible for issuing instructions to the DEO where environmental considerations call for action to be taken.

If in the opinion of the Engineer the DEO is not fulfilling his/her duties in terms of this EMP, the Engineer may, after discussion and agreement with SANRAL, exercise his powers under FIDIC general conditions of contract and instruct replacement of the DEO in writing and with stated reasons.

(c) The Contractor

The Contractor is responsible for project delivery in accordance with the prescribed specifications, among which this EMP shall be included.

The Contractor shall receive and implement any instruction issued by the Engineer relating to compliance with the EMP including the removal of personnel or equipment.

Compliance with the provisions contained herein or any condition imposed by the environmental approvals shall become the responsibility of the Contractor through an approved Designated Environmental Officer (DEO). The Contractor shall nominate a person from among his site personnel to fulfil this function and submit to the Engineer for his approval the *curriculum vitae* of the proposed DEO. This request for approval shall be given, in writing, at least fourteen days before the commencement of any construction activity clearly setting out reasons for the nomination, and with sufficient detail to enable the Engineer to make a decision.

(d) The Designated/Dedicated Environmental Officer (DEO)

Once a nominated representative of the Contractor has been approved, he/she shall become the DEO and shall be the responsible person for ensuring that the provisions of this EMP are complied with during the life of the contract. The DEO shall submit regular written reports to the Engineer, but not less frequently than once a month.

The DEO may undertake other construction duties unless Section B: Specification Data, prescribes this position as 'Full-time' or 'dedicated' as opposed to the standard position being 'designated'. However, the DEO's environmental duties shall hold primacy over other contractual duties and the Engineer has the authority to instruct the Contractor to reduce the DEO's other duties or to replace the DEO if, in the Engineer's opinion, he/she is not fulfilling his/her duties in terms of the requirements of this EMP. Such instruction will be in writing clearly setting out the reasons why a replacement is required.

As a minimum the DEO shall have an accredited National Qualifications Framework (NQF) level 6 qualification in environmental or natural sciences or equivalent and a minimum of 2 years' experience in a similar role in construction or other environmental regulatory field.

In addition to the compliance duties relating to EMP the DEO shall also provide full cooperation whenever the Contractor is subjected to environmental audits.

(e) Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is an independent environmental specialist appointed by SANRAL or the Engineer to objectively and regularly monitor the Contractor's compliance with the conditions of the authorisations issued for the project and the approved EMP (that is this EMP augmented with specifics of the project). These are external audits and the regularity is determined by the environmental authorisations.

C1005 TRAINING

(a) Qualifications

The (DEO) shall have the minimum qualifications as prescribed above and must be conversant with all legislation pertaining to the environment applicable to the contract. He/she must be appropriately trained in environmental management and possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The Contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees.

(b) Content

Apart from induction environmental training should, as a minimum, include the course content below and no induction or course should be given until the Engineer has been afforded the opportunity to appraise it and provide comment.

- (i) The importance of conformance with all environmental policies and the consequences of departure from standard operating procedures;
- (ii) Environmental impacts, actual or potential, caused by work activities, prevention measures to avoid them and mitigation measures when they occur;
- (iii) Work force roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- (iv) The environmental benefits of improved personnel performance and
- (v) Consequences of non- compliance

(c) Induction

In the case of permanent staff the Contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the Contractor shall inform the Engineer when and how he intends concluding his environmental training obligations.

C1006 ACTIVITIES/ASPECTS CAUSING IMPACTS

Typical environmental aspects and impacts associated with road construction are listed in Table 1: Aspects and Impacts Associated with Road Construction. Actual impacts will differ from project to project and, therefore, so may the mitigation measures employed. The most common aspects and impacts are addressed separately, and typical avoidance and/or mitigation measures described. The list and descriptions are not by any means exhaustive, and they shall be used for guideline purposes only.

Table 1: Aspects and Impacts Associated with Road Construction

Aspect	Potential Impact
Waste generation/storage	Water pollution; nuisance; visual impact
Water use and stormwater discharge	Change in flow regime and/or reduction in downstream availability; soil erosion: water pollution
Vehicle use and maintenance	Air pollution; noise
Chemical/fuel storage	Water/air/soil pollution; health impacts; accidents e.g. spills, fire
Site clearing; earthworks; layer-works; seal works	Change in landform; impact on heritage resources; noise; soil erosion; air pollution
River bridges; installing drainage structures	Water pollution; impact on river flows; noise
Land acquisition	Loss of land and/or livelihood; change in land use;
Acquisition of building material from borrow pits	Change in landform and use

(a) General approach

The role of the DEO cannot be underestimated and once approved he/she shall be on the site at all times, and before the Contractor begins each construction activity, he/she shall give to the Engineer a written statement setting out the following:

- (i) The type of construction activity about to be started.
- (ii) Locality where the activity will take place.
- (iii) Identification of the environmental aspects and impacts that might result from the activity.

- (iv) The methodology of impact prevention for each activity or aspect.
- (v) The methodology of impact containment for each activity or aspect.
- (vi) Identification of the emergency/disaster potential for each activity (if any) and the reaction procedures necessary to mitigate impact severity.
- (vii) Treatment and continued maintenance of impacted environment.

The Contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified, and the activity planned so as to prevent any impact from happening and shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce method statements for each construction activity in compliance with the provisions of these project specifications.

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

The Engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the Contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the Contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

(b) Spillages

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage, the Contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill containment and treatment (whether hazardous or not) lies with the Contractor. The individual causing a spill, or who discovers a spill, must report the incident to his/her DEO or to the Engineer. The DEO will assess the situation in consultation with the Engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil/water shall be determined by the Contractor in consultation with the DEO and the Engineer. Areas cleared of hazardous waste shall be re-vegetated according to the Engineer's instructions.

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Engineer. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input as well as the sampling and testing of the water quality upstream and downstream of the spill. Water quality sampling and testing, and further treatment shall continue until upstream and downstream results correspond with each other.

(c) Water use and control

The Contractor's use of water shall take into consideration that it is a scarce commodity and shall be optimised. Authorisation shall be obtained from the Department of Water and Sanitation (DWS) before water is drawn from streams or new boreholes developed.

The Contractor shall also ensure that any stream deviations or diversions are undertaken in such a manner that the impact on the environment is minimised. Method statements shall be submitted to the Engineer for comment, detailing how the work will be undertaken, what risks are foreseen and what measures will be employed to minimise such risks. Notwithstanding any comments by the Engineer, no work on stream deviations or diversions shall be undertaken in accordance with GN 509 in GG 40229 of 26 August 2016 - General Authorisation in terms of Section

39 of the National Water Act, 1998 (Act No. 36 Of 1998) for Water Uses as defined in sections 21(c) and (i) .

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users/receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and flooding by dredging, daylighting, removal of debris and vegetation, etc. These shall also be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.

The Contractor shall submit to the Engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions up to 1:5 year severity.

The Contractor shall submit to the Engineer the results of the baseline water quality test taken above and below the site of the proposed activity, and thereafter monthly testing results or at the frequency as may be specified by the Water Use Licence/General Authorisation, where applicable. No taking-over can be authorised until the water quality is shown to be at pre-construction levels or better.

(d) Vegetation management

The Contractor shall be responsible for the management of vegetation by protection of indigenous vegetation, especially identified protected species, and the prevention of alien vegetation germinating in areas disturbed by road construction activities within and outside the road reserve. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily. This responsibility shall continue for the duration of the defects notification period. The project specification may instruct the removal of CARA and/or NEMBA-listed category 1 and 2 alien species and planting of specified indigenous species.

(e) Dust control

Dust caused by construction activities shall be controlled by appropriate means and applied at sufficient frequency so as not to cause nuisance to adjacent habitation or affect farming activities or natural vegetation. Vegetation cover should also be kept for as long as possible to reduce the area of exposed surfaces. Dust emissions from batching and screening plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant authorities.

(f) Noise control

The Contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during the hours prescribed by the conditions of contract (i.e. normal hours). Should such noise generating activities have to occur at any time outside normal hours the people in the vicinity of the noise-generating activity shall be warned about the noise well in advance and the activities kept to a minimum. Relevant legislation shall also be taken into consideration, and any practical mitigation measures adopted. No noise generating activity outside of normal hours, regardless of its proximity to residences, can take place without

application to the Engineer for approval. The application shall be accompanied by the noise containment measures proposed.

(g) Energy consumption

The Contractor shall take into consideration the impacts of high energy consumption, both from a cost and emissions point of view. Energy use shall be minimised, and where possible, alternative energy sources such as solar utilised.

Furthermore, the Contractor shall measure and keep records of the consumption of carbon units his chosen method of construction produces in the execution of his programme. In conjunction with the Engineer who will provide complete cooperation, a month by month output shall be compiled and efforts made to see how these outputs can be curtailed and reduced.

C1007 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

The Contractor shall undertake “good housekeeping” practices during construction as stated in the COTO Standard Specifications for Roads and Bridges and the FIDIC conditions of contract. 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 that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

The construction activities addressed below shall become part of the Contractor’s obligations regarding his programme of work and incorporated into the required method statements for workmanship and quality control.

a) Site establishment

i) Site Plan

The site refers to an area with defined limits on which the project is located. The Contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before any site establishment can begin, the Contractor shall submit to the ECO for his comments and to the Engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste management facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course. No camp establishment, including satellite camps, can be placed within 150 metres of an identified watercourse unless the Contractor has applied to DWS and received authorisation to do so. Regardless of the chosen site, the Contractor’s intended mitigation measures shall be indicated on the plan. The site plan shall have been submitted and approved before establishment commences. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the ECO and the Engineer for consultation during rehabilitation of the site in order that rehabilitation is, as a minimum, done to a standard similar to pre-construction activities.

ii) Vegetation

The Contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the Engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the Engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring shall be re-established. Protected trees may not be removed without a permit from the Department of Forestry, Fisheries and Environment.

Contravention of a notice of listed protected tree species under the National Forests Act, 1998 is regarded as a first category offence that may result in a fine or imprisonment for a period up to three years, or to both a fine and imprisonment. The DEO must be conversant with the latest gazette of declared protected trees.

Rehabilitation shall be undertaken using only indigenous tree, shrub and grass species. Special attention shall be given to any search and rescue operation identified during the environmental assessment process and any removal to an on-site nursery for continuous nurturing and protection and later replanting.

Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.

Fires shall only be allowed in facilities or equipment specially constructed for this purpose. The need for a firebreak shall be determined in consultation with the Engineer and the relevant authorities, and if required a firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

iii) Water management

Water for human consumption shall be available at the site offices and at other convenient locations on site.

All effluent water from the camp/office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans, dams etc.). Only domestic type wastewater shall be allowed to enter this system.

iv) Heating and cooking fuel

The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

b) Sewage management

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the Engineer, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are supplied and maintained by a specialist service provider. The type of sewage management will depend on the

geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the Engineer. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system and shall be approved by the Engineer in consultation with the ECO.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the Engineer.

c) Waste management

The Contractor's intended methods for waste management shall be outlined and implemented at the outset of the contract and shall be to the satisfaction of the Engineer. A waste inventory shall be drawn up of all waste streams that will possibly be generated by the site/project and an integrated approach shall be taken to its management. Records shall be kept of all waste disposed. Opportunities for avoiding, reducing, reusing and recycling of materials should be identified upfront, as should constraints for their implementation. All personnel shall be instructed to dispose of all waste in the proper manner.

i) Solid waste

Solid waste shall be stored in an appointed area in covered, tip-proof metal drums or similar container for collection and disposal. Disposal of solid waste shall be at a licensed landfill site or at a site approved by the relevant authority in the event that an existing operating landfill site is not within reasonable distance from the project area. No waste shall be burned or buried at or near the project area.

ii) Litter

No littering by construction workers shall be allowed and particular emphasis on litter control measures shall apply at stop/go facilities.

During the construction period, the various contractors' facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. At all places of work the Contractor shall provide litter collection facilities for later safe disposal at approved sites.

iii) Hazardous waste

Hazardous waste such as oils shall be disposed of at an approved landfill site and proof of such disposal kept by the Contractor. Special care shall be taken to avoid spillage of bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating surface water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be returned to the supplier's production plant. Any spillage of bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the Engineer.

iv) Construction and demolition waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'.

The Contractor is encouraged to actively engage with authorities and landowners adjacent to the site and identify where such materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

d) **Control at the workshop**

The Contractor's management and maintenance of his plant and machinery will be monitored according to the criteria given below.

i) Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials such as bitumen binders shall be stored in a secured, appointed area that is suitably fenced, bunded and has restricted entry. Storage of bituminous products shall only take place using suitable containers to the approval of the ECO and the Engineer.

The Contractor shall provide proof to the Engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the Engineer with details of the preventative measures he proposes to install in order to mitigate pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

ii) Fuel and gas storage

The Contractor shall take cognisance of the limits set by legislation for the storage of fuels and acquire the necessary authorisation for storage capacity beyond these. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

Gas welding cylinders and LPG cylinders shall be stored chained in a secure, well-ventilated area exterior to any building wall.

iv) Oil and lubricant waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by a specialist oil recycling company.

Drip trays shall be used to collect any lubricants or fuel spilled where any vehicle and machinery are repaired or refuelled. The lubricants and fuel collected shall be handled as specified above.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

e) Clearing the site

In all areas where the Contractor intends to or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the Engineer for his approval. Working areas shall be clearly defined and demarcated on site to minimise the construction footprint. 'No-go- areas' and other sensitive areas shall also be clearly demarcated on site, and staff must be made aware of them.

The plan of action shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the Engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during inspections.

f) Soil management

i) Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include all storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved waste disposal site. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water.

The Contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the Engineer. The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

ii) Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the Engineer, and if not used for road building it shall be stored and maintained separately from the topsoil so that neither stockpile is contaminated by the other. This soil shall be used for rehabilitation purposes by first spreading it over the excavated slopes without interfering with or contaminating the stockpiled topsoil.

Whilst in stockpile it shall be maintained free from erosion and weed infestation in the same way as for topsoil stockpile maintenance.

g) Earthworks and layerworks

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the Contractor shall have complied with the requirements of this EMP. In addition, the Contractor shall take cognisance of the requirements set out below.

i) Quarries and borrow pits

The Contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, an Environmental Authorisation for the establishment, operation and closure of a quarry or borrow pit shall have been approved by the Department where applicable. It is the responsibility of the Contractor to ensure that he is in possession of the authorisation prior to entry into the quarry or borrow pit. The conditions imposed by the relevant authorisation are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific authorisation and this EMP, the former shall apply.

ii) Excavation, hauling and placement

The Contractor shall provide the ECO and the Engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The Contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition.

iii) Spoil sites

The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the ECO for his/her comments and to the Engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the ECO and the Engineer. No spoil site shall be located within 50m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of any waste shall be prohibited. Spoil sites will be shaped to fit the natural topography. Depending on availability these sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Appropriate grassing measures to minimise soil erosion shall be undertaken by the Contractor. This may include both strip and full sodding. The Contractor may motivate to the Engineer for other acceptable stabilising methods. The Engineer may only approve a completed spoil site at the end of the defects notification period upon receipt from the Contractor of a landowner's clearance notice.

iv) Stockpiles

The Contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary

stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Engineer for his approval. The Contractor's proposed measures for prevention of environmental damage, containment and subsequent rehabilitation shall also be submitted.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are positioned and sloped to create the least visual impact, constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment and kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated/deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the Contractor's cost until clearance from the Engineer and the landowner is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the Engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in situ milling or any leftover material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract documentation or under instruction from the Engineer.

The ECO shall comment on and the Engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their closure only when they have been satisfactorily rehabilitated.

v) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the Contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives.

h) **On site plant**

i) Crusher, screening plants and concrete batching plants

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section C1007(g)(i) of this EMP, with the exception that the Contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the Contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant authority, as shall approval of closure. The Engineer will assist the Contractor in his applications to the relevant authority.

Screening activities shall be undertaken so that dust and noise is minimised. This can be done by carefully choosing the site for the activity, and by using slightly damp material.

Effluent from concrete batch plants and crusher plants shall be reused where possible or treated in a suitable designated sedimentation dam to the legally

required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the Engineer for approval.

ii) Asphalt Plant

Asphalt plants shall be subject to the applicable legislation that governs establishment and operation of batching plants. The Contractor shall be responsible to obtain the necessary permit from the relevant authority.

Operation of the plant shall conform to the same requirements as for a crushing plant or concrete batching plant under C1007(h)(i) above.

C1008 AREAS OF SPECIFIC IMPORTANCE

Any area, as determined and identified within the project documents as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the specific environmental authorisation, as well as the approved EMPr. The Contractor may offer alternative solutions to the Engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection should not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall receive ad hoc treatment.

a) Archaeological sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Engineer of such discovery. The South African Heritage Resource Agency (SAHRA) is to be contacted, and a SAHRA-registered archaeological consultant may undertake the necessary work involved in confirming the find and advising on how it should be preserved or removed. Work may only resume once clearance is given in writing by the archaeologist. (Read with FIDIC condition of contract clause 4.24)

If a grave or midden is uncovered on site then all work in the immediate vicinity of the graves/middens shall be stopped, and the Engineer informed of the discovery. The South African Heritage Resource Agency and the South African Police Services (SAPS) should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with SAHRA, be responsible for attempts to contact family of the deceased and for the place where the exhumed remains can be re-interred.

C1009 REHABILITATION

The Contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, construction has to be stored temporarily, and designated or instructed areas outside the road reserve. It also includes the area where site offices were erected which may require rehabilitation at the end of the contract. All construction material, including concrete slabs and barbecue (braai) areas shall be removed from the site on completion of the contract unless written approval from the relevant landowner demonstrates it is to be left in place.

Responsibility for re-establishment of vegetation shall extend until expiry of the defects notification period. However, SANRAL reserves the right to continue holding retention monies (or not releasing guarantees in lieu of retention) depending upon the state of cover at the end of the defects notification period. Such extension may continue until closure of the relevant quarry or borrow pit has been secured,

Rehabilitation of affected areas should be undertaken as early as possible when the relevant activities are done in order to reduce further environmental damage. All re-vegetation should be undertaken using indigenous vegetation. The standard of rehabilitation should be to the satisfaction of the Engineer and the relevant authorities. The Department of Minerals Resources will only issue closure certificates for borrow pits and quarries when they are satisfied with the rehabilitation undertaken. It should also be noted that in some cases there is a requirement for a final environmental audit covering the extent of the project.

C1010 RECORD KEEPING

The Engineer and the DEO will continuously monitor the Contractor's adherence to the approved impact prevention procedures and the DEO shall submit regular written reports to the ECO and to the Engineer at least once a month. The DEO will report the environmental compliance performance of the project at regular site meeting. The Engineer shall issue to the Contractor a notice of non-compliance whenever transgressions are observed. The DEO shall 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 shall be documented and reported to the Engineer in the monthly report.

Copies of all authorisations shall be kept on site and made available for inspection by visiting officials from SANRAL, relevant authorities or internal/external auditors.

C1011 COMPLIANCE AND PENALTIES

The Contractor shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

Any non-compliance/omissions with the procedures in this EMP, environmental authorisations and the approved EMPr constitute a breach of the Conditions of Contract. Regulatory financial penalties imposed on SANRAL shall be passed onto the defaulting parties.

C1012 PROJECT SPECIFIC CONDITIONS

The contractor shall make allowance for debris fall nets and/or other approved methods to prevent any pollution of the Mtamvuna river, and damages to passing traffic during the construction period. The contractor shall provide and discuss the proposed debris pollution preventative plan in the method statements of all construction activities which may pose a pollution risk, for approval by the Engineer.

APPENDIX 2: CV OF EAP

RYAN EMSLIE JONAS



Profession	Environmental Scientist
Position in Firm	Senior Environmental Scientist
Area of Specialisation	Environmental Impact Assessments, Environmental Management Programmes, Environmental Monitoring & Compliance, Water Use Authorisations, Waste Management Licences
Qualifications	M.Sc (Environmental Science) B.Sc (Natural Sciences)
Years of Experience	17
Years with Firm	3

SUMMARY OF EXPERIENCE

Ryan Emslie Jonas is a professionally registered Environmental Scientist and works in the field of environmental management for large infrastructure-related developments, mining and Renewable Energy projects (solar and wind energy facilities) within Africa. He has acquired 17 years (full time) consulting experience in managing and executing various application processes for a diverse range of large infrastructure developments, mining and renewable energy (solar and wind energy facilities) projects in order to obtain environmental authorisations, licenses for waste management, water uses, air emissions release and compiling and implementing environmental management programmes.

Ryan has also fulfilled numerous environmental compliance monitoring functions for infrastructure-related developments (e.g. roads, pipelines, airport developments, housing and mixed-used projects), renewable energy and various mining and industrial sites throughout Southern Africa. His project management experience includes client liaison, scheduling, professional services contract (i.e. NEC3) management, progress reporting, managing sub-consultants and junior staff, invoicing and ensuring the quality of deliverables to a Client. Also proficient in tender, expression of interest and proposal writing for local as well as IFC / World Bank projects. Ryan has gained an excellent working knowledge of African (i.e. South Africa, Zambia, Kenya, Lesotho, Mauritius, Namibia) and International Finance Corporation / World Bank environmental legislative requirements for major infrastructure, renewable energy and mining developments.

EDUCATION

2008 – M.Sc (Environmental Science), North-West University, South Africa.

2002 - BSc (Natural Sciences), North-West University (formally PU vir CHO), South Africa

EMPLOYMENT RECORD

Date (from – to)	2022 - present
Location	Cape Town, Western Cape, South Africa
Employer	Terratest (Pty) Ltd
Position	Senior Environmental Scientist
Date (from – to)	2021 – 2022
Location	Cape Town, Western Cape, South Africa
Employer	CES (EOH Group)
Position	Principal Environmental Consultant
Date (from – to)	2019 – 2021
Location	Cape Town, Western Cape, South Africa
Employer	Terramanzi Group
Position	Senior Environmental Consultant
Date (from – to)	2015 - 2018
Location	Cape Town, Western Cape, South Africa
Employer	Advisian -Worley Parsons
Position	Senior Environmental Consultant
Date (from – to)	2012 - 2015
Location	Cape Town, Western Cape, South Africa
Employer	GIBB
Position	Senior Environmental Scientist
Date (from – to)	2010 - 2012
Location	Pretoria, Gauteng, South Africa
Employer	Clean Stream Environmental Consultants
Position	Environmental Scientist
Date (from – to)	2008 - 2010
Location	Pretoria, Gauteng, South Africa
Employer	Aurecon
Position	Environmental Specialist
Date (from – to)	2007 - 2008
Location	Rustenburg, North West, South Africa
Employer	K2M Technologies
Position	Environmental Consultant
Date (from – to)	2006 - 2007
Location	Potchefstroom, North West, South Africa
Employer	North West University
Position	Research Assistant, Persistent Organic Pollutants & Toxicants (POPT) Group
Date (from – to)	2002 - 2006
Location	Potchefstroom, North West, South Africa
Employer	North West University
Position	Practical Demonstrator (Microbiology)

SPECIFIC EXPERIENCE

Coastal Water Discharge Permits

- Compilation and submission of Coastal Water Discharge Permits for the Strandfontein, Monwabisi and V&A site Desalination Plants, City of Cape Town, 2017 – 2018
- Coastal Water Discharge Permit Amendment for the OTMS Oil Terminal, MOGS (Pty) Ltd, 2018

Environmental Authorisation Amendment applications / EA conditions review

- Langhoogte Wind Energy Facility Part 2 Substantive EA Amendment, Ceres, SAGIT, 2019 – 2020
- Wolseley Wind Energy Facility Part 2 Substantive EA Amendment, Caledon, SAGIT, 2019 - 2020
- 150MW Haga Haga Wind Energy Facility EA Conditions review, WKN Windcurrent 2019 – 2020

Environmental Feasibility Assessments

- Water Resilience project: Site selection for the Strandfontein, Monwabisi and V&A Desalination Plants. City of Cape Town, 2017
- Simons Town Housing Development. Department of Rural Development & Land Reform, 2018

Environmental Liability Closure & Rehabilitation quantification

- Calculation of financial provision for rehabilitation activities upon mine closure for LA FARGE Tygerberg, Peak, Dortsberg and Saldanha quarries, LA FARGE, 2012-2014

Environmental Impact Assessments

- ESIA for the Network Reinforcement and Access Project (NRAP). Eswatini Electricity Company, 2021 – 2022
- Mine Residue Facilities Expansion project. Glencore, 2022 -Current
- EIA for Wind Energy Facility Cluster, Northern Cape. Client – Confidential 2022 – Current
- 230MW Doornfontein PVSEF project, Veldrift, Bergrivier Local Municipality, Western Cape. GPIPD Holding (Pty) Ltd, 2019 -2020
- 150MW Kruispad PVSEF project, Bergrivier Local Municipality, Western Cape. GPIPD Holding (Pty) Ltd, 2019 – 2020
- Expansion of the Saldanha Bay oil jetty and the construction of new crude oil pipeline system for the crude oil storage facility, Saldanha Bay, MOGS, 2017 – 2018
- HDPE Pipeline for Crude Oil Storage Tank Farm, Saldanha Bay, MOGS, 2017
- Blanco 400/132kV substation and powerline project, Eskom, 2015
- EIA for the Leeuwenkuil Vineyard Waste Water Treatment Works, Leeuwenkuil Family Vineyards, 2013-2014
- EIA for the Pearly Beach Sewage Treatment Works, GIBB, 2013-2014
- Xstrata Vekeerdepán Coal Mine Extension project, Xstrata, 2010-2012
- Waste Management Licence and assistance with completion of an Air Emissions Licence for the Flexilube Meyerton Oil Re-refinery expansion project, Flexilube, 2010-2012
- Construction of Ekangala Waste Water Treatment Works, Department of Water Affairs, 2009-2010
- Upgrade (expansion) to the Sunderland Ridge Waste Water Treatment Works, City of Tshwane, 2008-2009
- Construction of Morgenzon Waste Water Treatment Works, Lekwa Municipality, 2009-2010
- Tembisa-link gas pipeline realignment project, SASOL, 2009-2010
- Gas pipeline realignment through Ekurhuleni and Mogale City, SASOL, 2009-2010
- Soland Park residential development, Masingita Developments, 2008-2010
- Construction of Mankwe Hotel and Conference Centre, Mankwe Hotels, 2007-2008

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- Construction of Particle Board Manufacturing Plant, William Tell 2007-2008

Basic Assessments for the following projects:

- Witzenberg Regional Cemetery Sites, Witzenberg Municipality. 2021 - Current
- Borrow Pits project, Clarkebury, Eastern Cape, Eastern Cape Department of Transport, 2021
- 140 MW Wind Energy Facility project, Western Cape Client – Confidential, 2020
- Car Park Extension at Koeberg Nuclear Power Station, Eskom, 2017
- Hout Bay Dune area rehabilitation, City of Cape Town, 2014- 2015
- Sea Point and Mouille Point promenade upgrade, City of Cape Town, 2014 -2015
- Paardevlei Integrated Storm Water & Ecological Management System (ISW&EMS), Somerset West, Paardevlei Properties, 2013-2014
- Eskom Wolfkop 66/22kV substation and powerline, Eskom 2012-2013
- Rehabilitation of Blaauwpan and associated stormwater channel, Airports Company South Africa, 2008-2009
- Northern Access Road Development at OR Tambo International Airport, Airports Company South Africa, 2008-2009
- Cradle of Pilanesberg Lodge, Pilanesberg National Park, 2007-2008
- Construction of Staff Houses in Pilanesberg National Park, 2007-2008
- Bellevue residential development in GeelhoutPark, Rustenburg, Private Developer, 2007-2008
- Villa Del Country Estate, Private Developer, 2007-2008
- Marang Motor Retail, Hotel and Residential Development, Marang Estate, 2007-2008
- Olifants River Bridge upgrade, Aurecon, 2015

Environmental Management Plans / Programmes

- ESMP for the Network Reinforcement and Access Project (NRAP). Eswatini Electricity Company, 2021 – 2022
- Water Resilience project: Environmental Management Programme, City of Cape Town, 2017 –2018
- Simandou Port and Infrastructure (IFC/ World Bank) Bank Feasibility project, Guinea. WorleyParsons, 2015
- Anglo Greenside Colliery Environmental Management Programme Amendment for an expansion to the existing Co-Disposal Facility, Anglo American, 2012
- De Beers Kimberley Mines Environmental Management Programme Revision, De Beers Mines Consolidated, 2012
- Environmental Management Programme compilation for Xstrata Tweefontein Mine Optimisation project, Xstrata, 2010-2012
- Annual revision (update) of Exxaro's Zincor Industry Environmental Management Master Plan Upgrade, Exxaro, 2010-2012

Environmental Project Management

- Bird and Bat Monitoring for Wind Energy Facilities, Eastern Cape. Client Confidential 2022
 - Mine Residue Facilities Expansion project. Glencore, 2022 -Current
 - EIA for WEF Cluster, Northern Cape. Client Confidential, 2022
 - Witzenberg Regional Cemetery Sites, Witzenberg Municipality, 2021
 - Borrow Pits project, Clarkebury, Eastern Cape, Eastern Cape Department of Transport, 2021
 - 230MW Doornfontein PVSEF project, Veldrift, Bergrivier Local Municipality, Western Cape. GPIPD Holding (Pty) Ltd, 2019 -2020
 - 150MW Kruispad PVSEF project, Bergrivier Local Municipality, Western Cape. GPIPD Holding (Pty) Ltd, 2019 - 2020
 - 140 MW Wind Energy Facility project, Western Cape Client – Confidential 2020
 - Langhoogte Wind Energy Facility Part 2 Substantive EA Amendment, Ceres, SAGIT, 2019 – 2020
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- Wolseley Wind Energy Facility Part 2 Substantive EA Amendment, Caledon, SAGIT, 2019 – 2020
 - Expansion of the Saldanha Bay Oil Jetty and the construction of new crude oil pipeline system for the crude oil storage terminal, Saldanha Bay, MOGS, 2018
 - Koeberg Nuclear Power Station Wellfields Optimisation project & WULA, Eskom, 2018
 - Transient Interim Storage Facility project at Koeberg Nuclear Power Station, Eskom, 2015 – 2018
 - Car Park Extension at Koeberg Nuclear Power Station, Eskom, 2017
 - Coastal Water Discharge Permit at Koeberg Nuclear Power Station, Eskom, 2017 – 2018
 - Geotechnical & Land surveyor assessment of the Car Park Extension at Koeberg Nuclear Power Station project, Eskom, 2018

Gap Analysis

- A comparative analysis of New Denmark Colliery's existing environmental authorization applications with regards to current environmental legislation and new FEL3 requirements, specifically for the North Shaft Re-opening project. Anglo American, 2010

Waste Management Licence applications

- Compilation and submission of waste management licence applications and Basic Assessment Process for the closure of seven landfill sites within the Matzikama Local Municipality and three landfill sites in the Overstrand Local Municipality, Department of Environmental Affairs, 2013-2014

Water Use Licence applications

- Magareng, Thorncliffe & Helena Mines WUL Amendments, Glencore, 2022
- SANRAL Olifants River Bridge upgrade project, Aurecon, 2015
- Eskom's Vierfontein – Viljoenskroon 88kV Refurbishment project, Eskom, 2014
- Apollo Brick Manufacturing Plant, Apollo Brick, 2014
- Eskom's Wolfkop 66/22kV substation and powerline project, Eskom, 2014
- Proposed Langeberg Residential Development, C5I, 2015
- Atlantis Housing Development, City of Cape Town, 2015
- Pearly Beach Sewage Treatment Works, GIBB, 2015
- Proposed Beacon Valley Housing Development, City of Cape Town, 2015
- Proposed Erf 3418 Industrial Development, VDMV Property Group, 2014
- Inyanda Mine Siding development, Exxaro, 2011

Air Emission Licence Process

- Compilation of an Air Emission Licence application (AEL) for the Gascon combustion installation, Gascon, 2022
- Compilation of an Air Emission Licence application (AEL) for the Maitland Crematorium, City of Cape Town, 2014

Environmental Compliance monitoring

- Project oversight of ECO services for Copperton Wind Energy Facility, Northern Cape, Elawan, 2019 -2020
 - Annual IFC external compliance audit for operational Wind Energy Facility, Worcester, Client – Confidential, 2019 -2020
 - Project oversight of ECO services for Val De Vie Estate, Paarl, Val De Vie Estate, 2019 -2020
 - Upgrade to SANRAL National Road 7 between Melkbos and Atlantis, SANRAL, 2013-2015
 - Housing Development on ERF 934, Pelican Park, Cape Town, POWER Development, 2014-2015
 - MR302 road realignment and upgrade project, Aurecon, 2012-2015
 - De Velde Residential Development, Somerset West, Balwin Properties, 2012-2015
 - Elgin Anaerobic Digester Installation project, Bau Afrika Engineers, 2014
-

- Construction of a retaining wall structure for the Silwerstroom Resort, C2C Engineers, 2014
- Construction and installation of a 66kV electrical cable within the Stellenbosch municipal area, Aurecon, 2013-2014
- Construction of a 66kV underground electrical cable from an existing substation to the proposed 66/11kV substation, Hermanus, Aurecon, 2014 -2015
- Audit of Xstrata Alloys Carbon Division five industrial site operations situated between Witbank and Middelburg, Xstrata, 2012
- Audit of the Exxaro Tshikondeni mine clean and dirty water management measures as per Regulation GN704 of NWA, 1998 and the issued Water Use Licence, Exxaro, 2011
- Auditing for the construction of remote aprons on Taxiway Papa, Northern Ring Road, extension of Charlie Taxiway and extension of Golf Apron at OR Tambo International Airport. Airports Company South Africa, 2008-2010
- Auditing for Sunderland Ridge Waste Water Treatment Works upgrade project. City of Tshwane, 2008-2009
- Auditing for Dan Nkabinde Bridge reconstruction, Tembisa, City of Johannesburg, 2008-2009
- Auditing for PetroNet St James Transfer Station construction, PETRO SA, 2008
- Pre-construction monitoring to establish an environmental baseline of the biophysical environmental aspects (namely baseline geophysical, geotechnical, geohydrological, surface water and ecological survey) and to compile an Environmental Management Plan as input into the Construction Specification for the TCTA Mokolo Crocodile Water Augmentation Project (MCWAP), Trans Caledon Tunnel Authority, 2009-2010

CONTINUED PROFESSIONAL DEVELOPMENT

Courses, Conferences & Workshops

- Master's project poster presentation at Zoological Society of South Africa (Rhodes University)
- IAIA Annual Conference attendance

PERSONAL DETAILS

Nationality – South African

Date of Birth – 1979-11-20

Domicile – Cape Town, South Africa

Languages

English – Fluently spoken and written

Afrikaans – Fluently spoken and written

isiZulu - Basic comprehension

Spanish - Basic comprehension

German- Basic comprehension

PROFESSIONAL REGISTRATION AND INSTITUTE MEMBERSHIP:

IAIA - International Association of Impact Assessment (Membership number: 5065)

SACNASP - Professional Natural Scientist (Environmental Science) Registration no: 400159/15

EAPASA - Environmental Assessment Practitioner Association (Membership number: 2019/1674)

**Environmental Assessment
Practitioners Association
of South Africa**



Registration No. 2019/1674

Herewith certifies that

RYAN JONAS

is registered as an

Environmental Assessment Practitioner

**Registered in accordance with the prescribed criteria of Regulation 15. (1)
of the Section 24H Registration Authority Regulations
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the
National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).**

Effective: 01 March 2025

Expires: 31 March 2026

Chairperson

Registrar



APPENDIX 3: DFFE S30 EMERGENCY INCIDENT PROCEDURE

HAZARD CODE	HAZARD STATEMENT	PROPOSED RQ (KG)
H310	Fatal in contact with skin	0.5
H311	Toxic in contact with skin	5
H330	Fatal if inhaled	0.5
H331	Toxic if inhaled	5
H400	Very toxic to aquatic life	0.5
H401	Toxic to aquatic life	5
H402	Harmful to aquatic life	50

ANNEXURE 1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 107 OF 1998 - SECTION 30

30. Control of incidents

(Heading substituted by section 13(a) of Act 30 of 2013)

(1) In this section-

(a) —incident” means an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property;

(Section 30(1)(a) substituted by section 13(b) of Act 30 of 2013)

(b) “responsible person” includes any person who-

- (i) is responsible for the incident;
- (ii) owns any hazardous substance involved in the incident; or
- (iii) was in control of any hazardous substance involved in the incident at the time of the incident;

(c) “relevant authority” means-

- (i) a municipality with jurisdiction over the area in which an incident occurs;
- (ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which incident occurs;
- (iii) the Director-General;
- (iv) any other Director-General of a national department.

(2) Where this section authorises a relevant authority to take any steps, such steps may only be taken by-

(a) the person referred to in subsection (1)(c)(iv) if no steps have been taken by any of the other

persons listed in subsection (1)(c);

(b) The person referred to in subsection (1) (c)(iii) if no steps have been taken by any of the persons listed in subsection (1)(c)(I) and (c)(ii);

(c) The person referred to in subsection (1) (c) (ii) if no steps have been taken by the person listed in subsection (1)(c) (I):

Provided that any relevant authority may nevertheless take such steps if it is necessary to do so in the circumstances and no other person referred to in subsection (1)(c) has yet taken such steps.

(3) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available-

(a) the nature of the incident;

(b) any risks posed by the incident to public health, safety and property;

(c) the toxicity of substances or by-products released by the incident; and

(d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to-

(i) the Director-General;

(ii) the South African Police Services and the relevant fire prevention service;

(iii) the relevant provincial head of department or municipality; and

(iv) all persons whose health may be affected by the incident.

(4) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident-

(a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;

(b) undertake clean up procedures;

(c) remedy the effects of the incident;

(d) assess the immediate and long-term effects of the incident on the environment and public health;

(5) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director-General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including-

(a) The nature of the incident;

(b) The substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;

(c) Initial measures taken to minimise impacts;

(d) Causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and

(e) Measures taken and to be taken to avoid a recurrence of such incident.

(6) A relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following:

(a) The principles set out in section 2;

(b) The severity of any impact on the environment as a result of the incident and the costs of the measures being considered;

(c) Any measures already taken or proposed by the person on whom measures are to be imposed, if applicable;

(d) The desirability of the state fulfilling its role as custodian holding the environment in public trust for the people;

(e) any other relevant factors.

(7) A verbal directive must be confirmed in writing at the earliest opportunity, which must be within seven days.

(8) Should-

(a) The responsible person fail to comply, or inadequately comply with a directive under subsection (6);

(b) There be uncertainty as to who the responsible person is; or

(c) There be an immediate risk of serious danger to the public or potentially serious detriment to the environment,

a relevant authority may take the measures it considers necessary to-

(i) contain and minimise the effects of the incident;

(ii) undertake clean up procedures; and

(iii) remedy the effects of the incident.

(9) A relevant authority may claim reimbursement of all reasonable costs incurred by it in terms of subsection (8) from every responsible person jointly and severally.

(10) A relevant authority which has taken steps under subsections (6) or (8) must, as soon as reasonably practicable, prepare comprehensive reports on the incident, which reports must be made available through the most effective means reasonably available to-

(a) the public;

(b) the Director-General;

(c) the South African Police Services and the relevant fire prevention service;

(d) the relevant provincial head of department or municipality; and

(e) all persons who may be affected by the incident.

(11)...

(Section 30(11) added by section 13 of Act 14 of 2009)

(Section 30(11) deleted by section 13(c) of Act 30 of 2013)

APPENDIX 4: CHANCE FIND PROTOCOL

Appendix 1: CHANCE FIND PROTOCOL

This Chance Find Protocol must be included in the site EMPr.

If any fossils are found, a Palaeontologist must be notified immediately by the ECO and/or EAP and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material:

- Images must be captured and sent to a competent geologist
- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological

sections, and by providing aid in the surveying of positions where significant fossils are found.

4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.

5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.

6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.

7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.

8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.

9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.