





DELTA
built environment consultants

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE IMPROVEMENT OF NATIONAL ROAD N11 SECTION 11 FROM GROBLERSDAL (KM 0.00) TO MARBLE HALL (KM 29.50)

FINAL REPORT
REVISION 00

MAY 2023

Prepared by:
Delta Built Environment Consultants (Pty) Ltd

Contact person:
Neelan Maduray

Tel: (012) 368 1850
Fax: (012) 348 4738
Email: neelan.maduray@deltabec.com

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY OF TERMS AND ABBREVIATIONS

CQA	Construction Quality Assurance
Delta BEC	Delta Built Environment Consultants
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
I&APs	Interested and Affected Parties
PPE	Personal Protective Equipment
Pty	Proprietary Company
RE	Resident Engineer
SHEQ	Safety, Health, Environment and Quality
AEL	Atmospheric Emission Licence
CARA	Conservation of Agricultural Resources Act, 1989 (Act No. 43 of 1989)
COLTO	Committee of Land Transport Officials
DAFF	Department of Agriculture, Forestry and Fisheries
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
ECA	Environment Conservation Act, 1989 (Act No. 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Programme
EMPR	Environmental Management Programme Report
EMS	Environmental Management System
I&AP	Interested and Affected Party
IEA	Independent Environmental Auditor
KPI	Key Performance Indicator
NBI	National Botanical Institute
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OHSA	Occupational Health & Safety Act, 1993 (Act No. 85 of 1993)
ROD	Record of Decision
SAHRA	South African Heritage Resources Agency
SANRAL	The South African National Roads Agency SOC Limited
SECO	Site Environmental Control Officer
TOPS	Threatened or Protected Species

1 INTRODUCTION

1.1 BACKGROUND

The South African National Roads Agency SOC Ltd (SANRAL) is proposing the improvement of the National Road N11 Section 11 form Groblersdal km 0.0 to Marble Hall km 29.50. The scope of work entails improvement and construction of a Bridge–B1050 and two Major Culverts (Culvert – C010 and Culvert – C011). CinfraTec Consulting Engineers has been appointed by SANRAL as the project managers who subcontracted Delta BEC as the Environmental Assessment Practitioner (EAP).

The Environmental Management Programme (EMPr) provides a description of the methods and procedures for mitigating and monitoring impacts. The EMPr also contains environmental objectives and targets which the project proponent needs to achieve to reduce or eliminate negative environmental impacts. Monitoring methods and performance indicators are also included.

It is the duty of the client to implement this EMPr on the project site and it is recommended that copies of this EMPr must always be kept at the site office. Copies thereof must be distributed to all senior contract personnel. All senior personnel involved in the operation of the development must familiarise themselves with the content of the EMPr.

A detailed induction protocol, incorporating the conditions of the EMPr must be developed, and all Contractors and future permanent staff must be subjected to stringent training on these environmental (biophysical and socio-economic) requirements and responsibilities.

Where possible, broad cost estimates have been included to provide an indication of the resources required to successfully implement the control measures. These can be used for planning purposes or will assist in prioritising the implementation and can be further refined by the project team. Additional management plans may be required at a later stage to provide detail on specific aspects of the project (e.g., stormwater management plan). The mitigation measures that form part of the Construction Phase should be incorporated into the contractual conditions of the Contractor as part of the contract agreement.

The roles and responsibilities for the implementation and enforcement of environmental and social controls (including health and safety) will need to be designated to individuals with the capacity and capabilities to undertake the work. The EMPr has been outlined in the following sub-sections:

- Pre-construction Phase
    - This section of the EMPr provides management principles for the planning and design phase of the project. Environmental actions, procedures and responsibilities as required from SANRAL during the planning and design phase are specified. These specifications will form

part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfaction of the Project Coordinator and Environmental Control Officer.

- Construction Phase
  - This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Project Coordinator and Environmental Control Officer.
- Operational Phase.
  - This section of the EMPr provides management principles for the operation phase of the project. Environmental actions, procedures and responsibilities as required from SANRAL during the operation phase are specified.

1.2 PURPOSE OF THE REPORT

This EMPr provides a description of the methods and procedures for mitigating and monitoring impacts. The EMPr also contains environmental objectives and targets which the project proponent needs to achieve in order to reduce or eliminate negative environmental impacts. Monitoring methods and performance indicators are also included.

The purpose of the EMPr is to provide specifications for "good environmental practice" for application during construction. This EMPr informs all relevant parties (the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by SANRAL at the site) as to their duties in the fulfilment of the legal requirements for the construction and operation of the proposed project with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

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

The objectives of an EMPr are to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Verify environmental performance through information on impacts as they occur;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;

- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures that could optimize beneficial impacts;
- Create management structures that address the concerns and complaints of I&APs with regards to the development;

1.3 EMPR ADMINISTRATION

Copies of this EMPr must be always kept at the site office. Copies thereof must be distributed to all senior contract personnel. All senior personnel involved in the operation of the development and must familiarise themselves with the content of the EMPr.

A detailed induction protocol, incorporating the conditions of the EMPr must be developed and all contractors and future permanent staff must be subjected to stringent training on these environmental (bio-physical and socio-economic) requirements and responsibilities.

1.4 STRUCTURE OF REPORT

The report comprises the following sections:

- Section 2: Description of receiving environment
- Section 3: Definitions
- Section 4: Proposed activity
- Section 5: Organisational requirements
- Section 6: Roles and responsibilities
- Section 7: Method statements
- Section 8: Environmental awareness training
- Section 9: Legislation
- Section 10: Pre-construction phase
- Section 11: Construction phase
- Section 12: Operational phase
- Section 13: Conclusion

2 DEFINITIONS

Table 2-1: Definitions

Contractor (C)	A person or company appointed by the client to carry out stipulated activities.
Domestic Waste	Waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreational purposes.
Emergency	An undesired event that does result in significant environmental impacts and requires the notification of relevant statutory body such as a local or provincial authority.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project.
Environment	The surroundings within which humans exist and that are made up of: • The land, water and atmosphere of the earth • Micro-organism, plant and animal life • Any part or combination of the above and the interrelationships among and between them, and • The physical, chemical, aesthetic, and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental Control Officer (ECO)	A person appointed by the client to monitor environmental compliance of the contractor and produce monthly environmental compliance reports.
Environmental Impact	A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.
Hazardous Waste	Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health and the environment.
Mitigation	The implementation of practical measures to reduce the adverse effects or enhance the beneficial effects of an action
Rehabilitation	Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way.

Run-off	The total water yield from a catchment, including surface and subsurface flow.
Stormwater	Water resulting from natural precipitation and/or the damming up or accumulation thereof and includes groundwater and spring water ordinarily conveyed by the stormwater system, but excludes water in a drinking water or waste water reticulation system.
Surface Water	Permanently or seasonally flooded areas characterized by the absence (or low abundance) of emergent plants.
Topsoil	The upper soil profile irrespective of the fertility, appearance, structure, agriculture potential and composition of the soil, usually containing organic material and which is colour specific.
Watercourse	A geomorphological feature characterized by the presence of a stream flow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water.

3 PROPOSED ACTIVITY

Environmental Management Programme (EMPr) must include:

- A detailed description of the aspects of the activity that are covered by the draft environmental management programme as identified by the project description;
- A map at an appropriate sale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;

3.1 DESCRIPTION OF PROPOSED ACTIVITY

CinfraTec Consulting Engineers (Pty) Ltd has appointed Delta Built Environment Consultants on behalf of the South African National Roads Agency SOC Limited to conduct Environmental Authorisation (Basic Assessment) for proposed improvements to Bridge B1050, Major Culvert C010, and Major Culvert C011, General Authorisation for proposed improvements to Bridge B1050, Major Culvert C010, and Major Culvert C011 and Environmental Authorisation (Basic Assessment) for a Mining Permit for a Borrow Pit approximately to 2ha for the proposed the improvement of the National Road N11 Section 11 from Groblersdal (km0.00) to Marble Hall (km29.50). Location of the proposed project is in Limpopo Province, Sekhukhune District Municipality within Ephraim Mogale and Elias Motsoaledi Local Municipality.

The project is defined as an improvement project. The objective of this project is to relieve congestion to acceptable levels of service, improve road safety, and adequate pavement capacity for the design period.

Figure 3-1: Locality Map proposed infrastructures

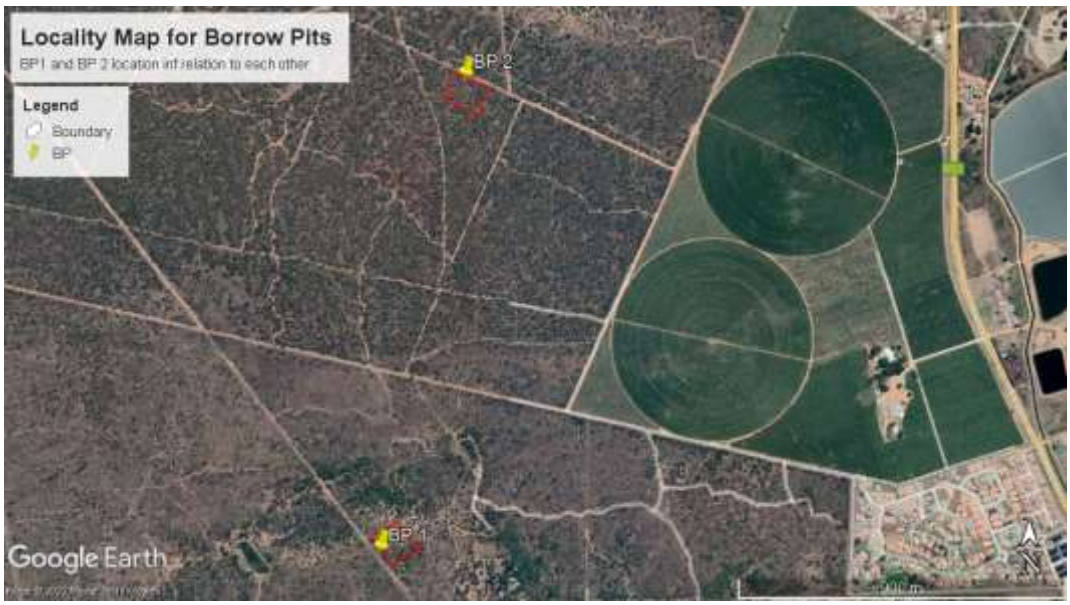

Figure 3-2: Locality for the proposed borrow pits

4 ORGANISATIONAL REQUIREMENTS

During construction, all instructions and official communications regarding environmental matters shall follow the organisational structure shown in Figure 4-1. The organisational structure identifies and defines the authority's structure, and the communication structure for the various parties involved in the construction of the proposed development.

The client shall appoint an independent ECO to oversee the implementation of the EMPr onsite. It will be the responsibility of the ECO to consult with the RE regarding instructions pertaining to contravention, corrective actions, and penalties or working methods.

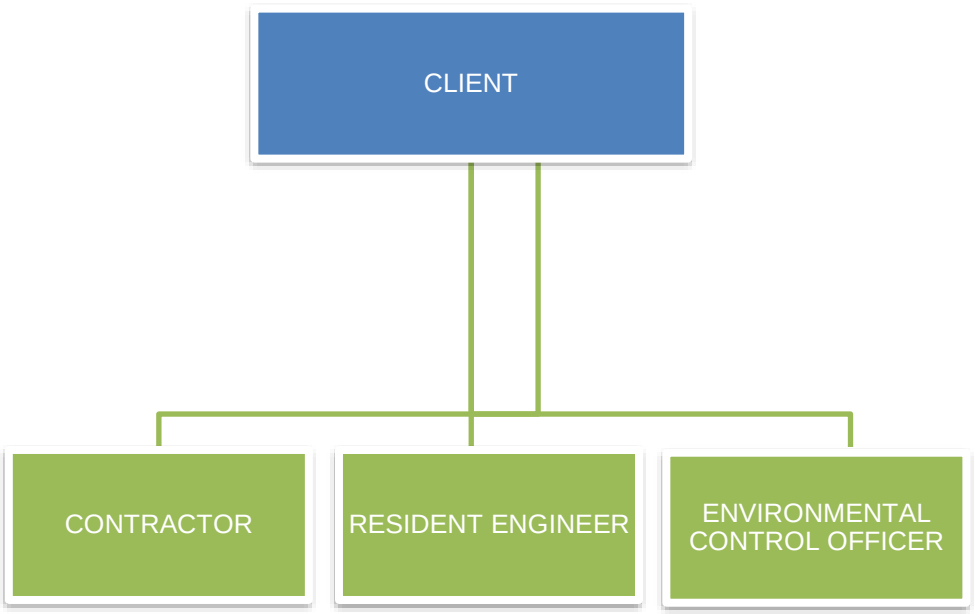

Figure 4-1: Organisational Hierarchy

5 ROLES AND RESPONSIBILITIES

The following list of roles and responsibilities is required for the successful implementation of the EMPr.

5.1.1 ENVIRONMENTAL AUTHORITY (DFFE)

DFFE is the designated authority responsible for approving this EMPr and has overall responsibility for ensuring that the Applicant complies with the EMPr and shall also be responsible for approving any substantive amendments that may be required to the EMPr and may also perform random site inspections to check compliance with the EMPr.

5.1.2 CLIENT (SANRAL)

The Client (SANRAL) will be responsible for the overall implementation, administration, and enforcement of the EMPr. The department shall:

- Ensure that the EMPr specifications are included in all tender documents issued for the development works and activities on site, and shall ensure that the prospective Tenders / Contractors abide by the provisions thereof,
- Appoint an ECO to monitor implementation of and compliance with the EMPr for the duration of the works. The resident engineer (RE) may be required to fulfil this function when the ECO is not available,
- Be liable / accountable, to the relevant authority, for any contravention / non-compliance by any Contractor under their supervision, and
- Through the RE issue fines or stop works orders for contravention of the EMPr and give instruction regarding corrective action.

5.1.3 ENVIRONMENTAL CONTROL OFFICER

The ECO will be responsible for monitoring, reviewing, and verifying compliance with the EMPr by the Contractor. In particular, the ECO shall:

- Be appointed by the Client to monitor all activities on site.
- Visit / inspect the site regularly, to ascertain the level of compliance of works
- Assist the RE in ensuring that necessary environmental authorisations and permits have been obtained.
- Review and approve construction Method Statements together with the RE
- Assist the Contractor in finding environmentally responsible solutions to problems.
- Provide material/manuals and assistance for the environmental awareness courses.
- Maintain a photographic record of the site before, during and after construction.
- Ensure that activities on site comply with legislation of relevance to the environment.

- Helping individual employees to meet their immediate responsibility for environmental management within his or her area of work, albeit that managers and supervisors of line functions are ultimately responsible for environmental management.
- Report to the PEM, the Environmental Monitoring Committee (EMC) and the ACC on a regular basis as decided by these parties in the form of an Environmental Management Compliance Report (EMCP).
- Advising the Contractor and/or the RE on environmental issues within defined construction areas.
- Undertaking regular site visits to ensure compliance with the EMPr and verifying that environmental impacts are avoided or kept to a minimum throughout the contract;
- Completing environmental checklists during site visits;
- Keeping a photographic record of progress on site from an environmental perspective;
- Assisting the Contractor and/or the RE in finding environmentally acceptable solutions to construction problems;
- Recommending additional environmental protection measures should this be necessary;
- Giving a report back on any environmental issues at site meetings;
- Reporting any incidents that may or have caused damage to the environment or breaches of the EMPr; and
- Prepare an environmental audit report at the conclusion of the construction phase.

The ECO shall communicate directly with the RE and PEM. Should problems arise on site that cannot be resolved between the ECO, RE and PEM, the ECO shall take the matter up with SANRAL. If SANRAL does not respond the ECO shall refer the matter to the DFFE.

5.1.4 RESIDENT ENGINEER

The Engineer shall assign a Resident Engineer (RE) to act as on-site implementing agent. The RE shall ensure that the Engineer's responsibilities are executed in compliance with the EMPr. Any on-site decisions regarding environmental management are ultimately the responsibility of the RE.

The RE will be responsible for monitoring, reviewing and verifying compliance with the EMPr by the Contractor when the ECO is not available. The RE's duties, over and above his contractual obligations, will include the following:

- Comply with the contents of this document as well as with the EMPr specifications in the Contract Document to ensure that the requirements of the EMPr are met.
- Monitor and verify that the EMPr is adhered to at all times and take action if the specifications are not followed.

- Monitor and verify that environmental impacts are kept to a minimum.
- Review construction Method Statements in conjunction with the ECO.
- Assist the Contractor in finding environmentally responsible solutions to problems with input from the ECO.
- Inspect the site and surrounding areas regularly with regard to compliance with the EMPr.

The Engineer shall address any site problems pertaining to the environment at the request of the PEM and/or ECO. The Engineer shall also be responsible for ensuring that any contraventions of the EMPr are addressed in the most appropriate manner.

5.1.5 PROJECT ENVIRONMENTAL MANAGER (PEM)

PEM must be appointed by the client for planning and construction phases of the project. The PEM must be an independent consultant and must be permanently on the site to support and assist the ECOs during the period of construction. The qualifications and terms of reference of the PEM shall include the following:

- Have a tertiary qualification in the natural sciences and a proven track record in environmental contract management on large projects. Assist the ECOs to formulate the most effective and structured monitoring and reporting strategy, tailored to the conditions of the contract;
- With the ECOs, review the Method Statements prepared, in terms of compliance with the final construction EMPr, and ensure that these are sufficient to meet the outcomes that are required;
- Assist the ECOs to prepare the monthly monitoring reports;
- Report to and discuss with the relevant authorities any significant non-compliance and the steps to be taken to rectify this;
- Interact with and provide all necessary assistance to the environmental auditor to complete the tasks required for the quarterly independent audits;
- Serve as secretariat of the ACC;
- Be responsible for the further development and finalisation of this EMPr in consultation with SANRAL;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of DEA;
- Ensure that adequate and competent environmental staff is on site at any construction activity during construction works;
- Ensure that all third parties who carry out all or part of SANRAL's obligations comply with the requirements of the EMPr;
- Ensure that any further environmental approvals/licences/permits required for the design, construction and operation of the proposed improvement of N11 Section 11 are obtained, as appropriate.

5.1.6 CONTRACTOR

The Contractor shall:

- Ensure that the environmental specifications contained in the EMPr are effectively implemented. This includes the on-site implementation of steps to mitigate environmental impacts.
- Ensure that all employees and co-Contractors employed comply with the requirements and provisions of the EMPr.
- Monitor environmental performance and conformance with the specifications contained in this document during daily site inspections.
- Discuss implementation of and compliance with the EMPr with staff at routine site meetings.
- Report progress towards implementation and all non-compliances with the EMPr at site meetings.
- Notify the ECO of the detailed anticipated programme of works to take place.
- Ensure all required records are kept and all documentation is available to the ECO.
- Notify the ECO of all incidents, accidents, and transgressions on site with respect to the environmental management as well as the requirements of the EMPr.
- Inform the ECO of problems arising when implementing the EMPr and recommended ways of improving it.
- Inform the ECO of any complaints received.

5.1.7 ENVIRONMENTAL MONITORING COMMITTEE (EMC)

SANRAL shall establish an EMC for the duration of the construction phase.

- The EMC must meet on a quarterly basis or as decided by the members of the EMC;
- The EMC must be chaired by an independent chairperson appointed by the EMC and must consist of representatives of the key authorities (i.e. DEA, relevant provincial environmental authorities, DWS and relevant local municipalities etc.), the ECO(s), a representative of the Tribal Authorities and the main contractor;
- SANRAL must supply the secretariat services for the EMC;
- The EMC must report to the Director: Environmental Impact Management at DEA from the start of the project until completion of the construction phase; and
- All costs associated with the functioning of the EMC and secretariat services shall be borne by SANRAL.

The purpose of the EMC would be to execute the following:

- To monitor and audit the project compliance with specific conditions of the environmental authorisation and the requirements of the approved EMPr;
- To make recommendations to the Director at DEA on issues related to the monitoring and auditing of the project implementation; and
- To advise DFFE on issues related to non-conformance reports raised against SANRAL by the ECO(s).

5.2 PENALTIES

- Tolerance with respect to environmental matters applies during construction as well as day-to-day operations required in completing the work.
- The Contractor will comply with the environmental requirements on an ongoing basis, and any failure on their part to do so will entitle the Project Manager, in consultation with the Environmental Manager and ECO, to certify the imposition of a fine subject to the details set out in the EMPr.
- The Project Manager, Environmental Manager and any other specific personnel as designated by the Project Manager may alter the Schedule of Fines for this specific project.
- Fines may be issued per incident at the discretion of the Site Manager. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the requirements of the EMPr and documents supporting thereof. Fines may be omitted from construction guarantees as supplied by the contractor.
- The Site Manager and ECO will be the judge as to what constitutes a transgression in terms of the above clause. Further, note that in the event that transgressions continue to an unacceptable level the applicant may cancel the contract.
- Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental requirements, he will be liable to pay a penalty fine over and above any other contractual consequence. This may also lead into a Rectification Application in terms of Section 24G of the NEMA, which could lead to certain fines and / or prosecution.
- The Contractor is deemed NOT to have complied with this specification if: -
    - Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr.
    - Environmental damage ensues due to negligence.
    - The Contractor fails to respond adequately to complaints from the public.
    - Legal action is instituted against the developer in terms of Environmental laws due to any action / activities undertaken by the Contractor.
- Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.

- A record of penalties will be maintained within the procurement department and may influence later commissions awarded to the contractor.
- The following, inter alia, represents a list of offences that could result in penalties:
    - Soil erosion is uncontrolled.
    - Inadequate and poor dust control.
    - Illegal activities.
    - On-going, repeated non-conformances.
    - Damage to no-go areas, specifically and most importantly, topsoil and the riparian buffer-zones.
    - Failure to provide adequate waste disposal certificates.

5.3 REPORTING

5.3.1 LINES OF COMMUNICATION (REPORTING)

Open and clear lines of communication shall be established and maintained between the contractor, client, and any further parties to be appointed by the applicant (e.g., Independent ECO, etc.).

5.3.2 COMPLIANCE MONITORING

The contractor is to ensure that employees and all sub-contractors onsite are familiar with the requirements of the EMPr, and conditions stipulated in the relevant environmental authorisations (i.e., NEMA EA) issued for the project. Therefore, the contractor should implement a management system reviewing compliance to these.

The applicant must appoint an internal, permanent ECO on site who will be monitoring the site and submitting monthly monitoring reports to the applicant.

Monitoring reports are to be sent to the relevant authorities by the client or the appointed independent ECO, as per the specific requirements set in the project's environmental authorisations.

5.3.3 COMMUNICATION WITH AUTHORITIES

Only the client and the appointed independent ECO are to liaise with Authorities, except if the contractor has to report Occupational Health and Safety incidents / accidents to the Department of Labour (OHS-related aspects will be dealt with in a separate OHS Plan to be audited by an accredited safety agent. It is not the mandate of the ECO to administer the OHS Plan or OHS-related aspects).

5.3.4 INCIDENTS REPORTING

The contractor is to conduct incident investigations immediately after occurrence. If an incident is identified as being a major incident, the contractor is to inform the applicant without delay.

The contractor is to ensure all employees are made aware on the relevant incident reporting procedures. The contractor must ensure that all relevant appointments are in place. An Incident Register must be kept on site and up to date at all times.

5.3.5 LEGAL NON-COMPLIANCE

Any legal non-compliance which may have a significant detrimental impact on the environment must be reported by the client to the relevant Authority within 24 hours, unless otherwise stipulated.

5.3.6 NON-COMPLIANCE WITH CONDITIONS

Any legal non-compliance that may have a significant detrimental impact on the environment with conditions stipulated in any Authorisation / License / Permit, to be reported by the applicant to the relevant Authority within 24 hours, unless otherwise stipulated.

5.3.7 COMPLIANCE MONITORING

Compliance monitoring will be done against, inter alia:

- Conditions of any authorisations acquired;
- The current and historical EMPr;
- Specialist Reports;
- Applicable Environmental Legislation:
    - National Environmental Management Act, 1998 (Act No. 107 of 1998);
    - National Heritage Resources Development Act, 1999 (Act No. 25 of 1999);
    - National Water Act, 1998 (Act No. 36 of 1998);
    - Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
    - Hazardous Substances Act, 1973 (Act No. 15 of 1973)
    - Hazardous Chemical Substances Regulations, 1995
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
    - Regulation 1031; and
- Procedures and policies prescribed and amended from time to time by the applicant.

The responsibilities in terms of Environmental Compliance Monitoring are as follows:

- The client will be responsible for the appointment of a suitably qualified Environmental Assessment Practitioner (EAP) as an independent

Environmental Control Officer (ECO) for the construction phase of the project.

- A management team must be appointed to ensure compliance with the Environmental Management Programme (EMPr) during the operational phase.
- The PM will be responsible to ensure all contractors receive a copy of this document and understand its contents.
- The ECO will ensure that all contractors / subcontractors / employees are fully aware of their environmental responsibilities.
- Contractors must ensure that all the environmental and safety precautions contained in the Environmental Authorisation, mitigating measures included in the Specialist Studies as well as this EMPr are adhered to, at all times.
- Compliance monitoring will take place by means of regular site visits and reporting by the ECO, for onwards transmission to the applicant and the relevant Government Departments for their information and record keeping.

6 METHOD STATEMENTS

The contractor / operator shall submit written method statements to the ECO and Resident Engineer for approval.

The method statements should provide a step-by-step description in order for the ECO and the Engineer to understand the contractor's proposed actions.

Method statements should indicate the following:

- **What**: A description of the work to be undertaken
- **How**: A description of the process of work, methods and materials to be used
- **When**: An estimate of the commencement and end dates
- **Who**: The people that will be undertaking the activity

The method statement should also detail the control measures that will be put in place to ensure correct environmental management.

The Method statement should be approved by the ECO and Resident Engineer prior to works being carried out.

The following Method Statements should be provided by the contractor and submitted to the ECO and Resident Engineer at least seven days prior to site establishment.

6.1 SITE CLEARANCE

The method to be undertaken during vegetation clearance for site establishment.

6.2 TOPSOIL

Method of clearing topsoil and location of topsoil stockpiles and the methods that will be implemented to avoid erosion.

6.3 FUEL STORAGE

The location and specifications of the fuel storage area where re-fuelling will be undertaken.

6.4 WASTE DISPOSAL

Expected solid waste types, quantities, disposal procedures.

6.5 HAZARDOUS MATERIALS STORAGE

Specifications of the hazardous materials to be used and the storage, handling and disposal of such materials. The location of cement and concrete mixing areas and the methods that will be used to undertake this.

6.6 EMERGENCY PROCEDURES

The emergency procedures that will be followed in the event of fire, accidental leaks and the spillage of hazardous substances (firefighting equipment, spill kits, etc.)

7 ENVIRONMENTAL AWARENESS TRAINING

Construction personnel shall be adequately trained with regard to the implementation of the EMPr, as well as regarding environmental legal requirements and obligations. All construction personnel shall attend an induction course presentation on environmental awareness.

Where possible, presentations need to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

The Environmental awareness training should cover topics such as:

- What is the environment?
- Why the environment needs to be protected.
- The regulatory implications of detrimental actions to the environment.
- How proposed construction can impact on the environment.
- Measures to mitigate against environmental impacts.
- Awareness of emergency spill procedures.

Environmental awareness should be provided as part of toolbox talks.

- Topics to be covered include, inter alia:
    - Reason for conservation and protection of the environment (EMPr objectives)
    - Identified impacts of construction activities on the environment.
    - Mitigation measures in respect of these impacts.
    - Emergency spills, awareness thereof and response there to.
    - Hydrocarbon spills and clean-up procedures.
    - Potential environmental emergencies.
    - Various sections of the EMPr.
    - Roles and Responsibilities.
- Attendance registers and training material must be filed for every session.
- Training must be given prior to commencement of construction regarding safety for dealing with wild animals such as snakes, scorpions etc.

Environmental awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. The Contractor shall ensure that records of all training interventions are kept as set out in this EMPr. The training records shall verify each of the targeted personnel's training experience.

8 LEGISLATION AND GUIDELINE

Table 8-1: Legislation and Guideline

LEGISLATION/GUIDELINE	DESCRIPTION
Constitution of the Republic of South Africa [CARA], 1996 (Act No. 108 of 1996)	Section 24 places people and their needs at the forefront of environmental management. The Constitution provides a right to "an environment that is not harmful to human health or well-being" and to have the environment protected, for the benefit of present and future generations, through reasonable legislative measures. These measures include the prevention of pollution and ecological degradation, the promotion of conservation, the securing of ecologically sustainable development and the utilization of natural resources while promoting justifiable economic and social development.
National Environmental Management Act [NEMA], 1998 (Act No. 107 of 1998)	The NEMA EIA Regulations, 2014 (as amended) list activities which require environmental assessment and authorisation prior to construction. These activities are known as 'listed activities', and must be authorised by the Department of Forestry, Fisheries and the Environmental (DFFE).
National Environmental Management: Waste Act [NEM:WA], 2008 (Act No. 59 of 2008)	The National Environmental Management Waste Act seeks to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
National Heritage Resources Act [NHRA], 1999 (Act No 25 of 1999) and regulations	The South African Heritage Resources Act, Act No. 25 of 1999 deals with aspects concerning the conservation of cultural resources. The Act stipulates that all cultural and heritage resources are the property of the State and may not be disturbed without authorization from the relevant heritage authority. Cultural and heritage resources include graves, paleontological and archaeological remains, structures older than 60 years and other items of historical significance.
National Environmental Management: Air Quality Act [NEM:AQA], 2004 (Act No 39 of 2004)	The National Environmental Management Air Quality Act seeks to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development.

LEGISLATION/GUIDELINE	DESCRIPTION
National Environmental Management: Biodiversity Act [NEM:BA], 2004 (Act No. 10 of 2004)	The purpose of the National Environment Management Biodiversity Act (NEM BA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act (107 of 1998). This includes: the protection of species and ecosystems, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources, and the establishment of a South African National Biodiversity Institute.
Limpopo Land Use Guidelines for Mining	Several of the conservation planning datasets and plans, at a national and provincial level, provided guidelines for different land uses, which need to be taken into account during the planning or pre-construction phase of new projects and where potential environmental impacts have been identified. In this case, the relevant land management objectives related to CBAs and aquatic ecosystems were reviewed and the relevant guidance/mitigation measures provided
Land Use Guidelines in terms of the Limpopo Conservation Plan	The Limpopo Conservation Plan is a spatial tool that forms part of a broader set of national biodiversity planning tools and initiatives that are provided for in national legislation and policy. The existing spatial biodiversity planning products; and, involves skills transfer through working with LEDET staff on the development of the CBA map and GAP assessment
Land Use Guidelines for Aquatic Ecosystems in terms of NFEPA	Specific guidelines are also provided for FEPAs in terms of the NFEPA project (CSIR, 2011). These include: • Mining or prospecting for mining in any form should not be permitted in freshwater CBAs or within 1km of a freshwater CBA or its buffer. • Where this does take place, care should be taken to reduce the risks of aquifer penetration when drilling and drill cores should be properly plugged after prospecting. • The potentially harmful effects of acid mine drainage (which may occur at locations far from mines and so impact on CBAs) should be considered and appropriate mitigation and compaction measures implemented.

9 PLANNING AND DESIGN PHASE

Table 9-1: Planning and Design Phase

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
Planning and Design	Notify all stakeholders of the proposed project.	• Notify all key stakeholders of the project. • The local Chief and municipality must be engaged so that a resolution can be found which does not leave the affected party in a worse-off social or economic state.	Contractor	Prior to the start of the works
	Ensure compliance with legal and other permitting requirements.	• Ensure that relevant legal requirements have been met. • It is the duty of the responsible person to ensure that all requirements pertaining to the operation of the facility are complied with. • Resources should be made available to ensure the operation of the site is carried out as per the relevant legislative requirements. • This EMPr is binding and should form part of all agreements between the applicant and Contractors.	Contractor	Prior to the start of the works
	Schedule site preparations	• Prepare a project schedule to coordinate vehicle movements, deliveries and construction activities to minimise noise emissions and minimise traffic congestion.	Contractor	Prior to the start of the works

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
Method statements	Draft and approve method statements	The following method statements are required: • Site layout and establishment. • Site clearance, preparation and earthworks. • Storage and use of hazardous substances. • Storage and release/collection of effluent. • Solid waste control system. • Equipment and vehicle maintenance. • Construction stormwater management. • Incident response and management. • Fire control and emergency procedures. • Rehabilitation and landscaping.	Contractor	Prior to the start of the works
General compliance reporting	Correct reporting of compliance	• The Client must appoint an occupational health and safety officer (OHSO) and environmental control officer (ECO) to oversee the safety and environmental aspects of the project, respectively. • The OHSO and ECO must form part of the project management team and must attend all project meetings. • They will both be required to supply the project manager with a monthly report on the compliance or non-adherence of the Contractors and subcontractors to the environmental and safety guidelines contained in this EMPr. An incident log must be used to keep record of non-compliance.	Contractor	Continuous

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
Loss of Fauna Species of Conservation Concern	Disturbance of natural habitat	• Any lighting must not point outwards toward any natural habitat and should be focused downwards or towards the development.	Contractor	Continuous
	Site layout and establishment.	• Site camps and/ or laydown areas should not be established out of the delineated watercourses and their associated buffers as per the Aquatic Biodiversity Impact Assessment •	Contractor/SANRAL/ ECO	Continuous
	Killing of any animals	• No fishing within any of the rivers or wetlands must be tolerated. • The killing of any fauna must not be tolerated.	Contractor/SANRAL/ ECO	Continuous
	Site access	• All access to site must be limited to existing access roads and pathways. No ad hoc roadways should be permitted, without first being authorised by the ECO.	SANRAL/Contractor	Continuous
Loss of Plant Species of Conservation Concern	Control loss of plants	• No plant species (SCC or common) must be harvested or removed from site without approval from the ECO or Applicant in writing.	Contractor/SANRAL/ ECO	Continuous
Limit footprint of construction	Reduce the compaction and destruction of natural vegetation	• The approved method statement must be available on site for reference purposes. • Ensure that a copy of this and other applicable documents are available on site and that all workers and Contractors are aware of it. Implementation thereof should be monitored by the appointed Environmental Control officer (ECO).	Contractor/ECO	Once-off

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
	Restrict on Movement	• Construction activities must ensure that connectivity within nearby rivers and the on-site watercourses. • Construction activities must not restrict movement of fauna both within these ecosystem and the ability for fauna to access these ecosystems from outlying areas such as grasslands or fields where water sources may be limited.	Contractor/SANRAL	Continuous
Limit footprint of access roads and construction camps	Reduce the compaction and destruction of natural vegetation	• Make use of existing roads in such a way as to minimise impact on the surrounding environment.	Contractor/ECO	Once-off
Traffic	Control of traffic	• Appropriate planning should take place to control the traffic (flagmen and temporary speed bumps).	Contractor	Continuous
Ecological Environment	Removal and management of alien vegetation	• A Rehabilitation and Alien Vegetation Management Plan must be designed to reduce the establishment and spread of undesirable alien plant species. • Alien vegetation management must be ongoing during all phases of the development.	Contractor/ECO	As and when is required/Continuous
Stormwater	Stormwater management and control	• An in-depth Stormwater Management Plan (SWMP), which must be driven by a risk-averse approach, must be drafted for all aspects of the proposed development and over different hydrological cycles.	SANRAL/Contractors	Once of

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• This is specific to the temporary access roads, site camp, service roads and upgrades to the Bridge and Major Culverts which will remain post-construction. • All temporary access and service roads must contain mitre drains every 20 m or less depending on the topography to control the stormwater wash down the roads. • All stormwater infrastructure must contain flow dissipation structures/measures, as the reduced groundcover within the study area is prone to high velocity surface wash that may encourage preferential flow-paths to form, and thus rill/gully erosion occurring. • No stormwater infrastructure must be directed into a watercourse, but instead towards a section of vegetated land, or flow dissipators, adjacent to the watercourse.		
Site Layout	Site camp management	• Locate site camps, laydown areas, stockpile areas, construction material, equipment storage areas, vehicle parking areas, bunded vehicle servicing areas and re-fuelling areas in designated areas of already hardened surface or disturbed areas on site. • The site areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO).	Contractor/ECO/SANRAL	Once

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Cut and fill must be avoided where possible during the set-up of the construction site camp. • No temporary infrastructure must be situated within delineated watercourses and their associated no-go buffer zones. • Fuel, chemicals and other hazardous substances should preferably be stored offsite, or in suitable secure weatherproof containers with impermeable and bunded floors onsite to limit pilferage, spillage into the environment, flooding or storm damage. No contaminated runoff or grey water is allowed to be discharged from the construction site camp. • The SWMP must detail how stormwater runoff from cleared and compacted surfaces will be controlled. Clearly defined clean and dirty systems must be developed and maintained around the site camp. • Erosion control measures including silt fences, low vegetated soil berms and/or shutter boards should be put in place around the temporary site camp and laydown areas to limit sediment ladened runoff and contaminants traveling into the surrounding environment. • Restrict the movement of construction vehicles and personnel to designated access roads to avoid soil disturbance. It is recommended that the footprint of the final site camp be fenced, or		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		marked to avoid indiscriminate movement of construction personnel. • Hazardous material storage areas must not be within 50 m of any watercourse or within the 1:100-year flood line. The furthest threshold must be adhered to. Hazardous storage areas are to be hard surfaced and bunded with an impermeable liner to protect groundwater quality and undercover. The bunded catch pit must have at least 110% the storage capacity of the total stored quantity. • All delineated watercourses and other no-go areas must be demarcated with danger-tape and dropper poles to ensure that site works and external parties do not traverse within the no-go areas.		
Bridge, Culvert and Road Crossing	Bridge, Culvert and Road Crossing Design	• Watercourse road crossings should be minimised as far as practically possible and crossings of important systems should be avoided to avoid or minimize direct habitat impacts, hydrological impacts and ecological fragmentation impacts. • All road crossings should be aligned and designed to minimise the extent of wetland habitat directly impacted by construction activities and permanent structures. In this regard the crossings should be aligned at right angles to flow and along existing or planned		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		areas / corridors of disturbance wherever possible. • For all crossing types and designs, flow through road crossings should not be unnecessarily concentrated and flow velocity should not be increased. In this regard, wetland crossings should be either spanned with a bridge or crossed using box / portal culverts established across the entire width of the wetland to avoid flow narrowing and concentration. Pipe culverts should be avoided. • The selection decision between bridges and box culvert crossings should be a trade-off between the cost, importance and sensitivity of the wetland and predicted impact to hydrology. • Erosion protection and energy dissipation measures should be established at all road crossing outlets e.g., stilling basins and reno-mattresses. • The key impact minimisation measure for watercourse crossings (both existing and new) is the establishment of an adequate number of box culverts to ensure that the culverts span the entire width of the channel being crossed to minimise flow concentration / constriction as far as practically possible.		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Culverts should ideally be sized to transport not only water, but the other materials that might be mobilized (i.e. debris). • The base (invert) of the new portal/box culvert should be at the exact same elevation as the existing culvert to be replaced so that there are no significant upstream and downstream adjustments in the rates of channel erosion and deposition. In this regard, the levels should be accurately pegged out by an engineer and the engineer should be onsite to guide the settling of the foundation. • The inlet of the culvert base should match the elevation of the stream bed so that there is no culvert base perching (if culvert inlet higher than river bed) or a drop into the culvert (if culvert inlet lower than bed). • Erosion protection structures should be established at all culvert outlets to reduce bed erosion / scour. Such structures include Reno-mattresses and/or stilling basins established at the current stream bed surface		

10 CONSTRUCTION PHASE

Table 10-1: Construction Phase

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
Employment	Empower local employment	• The Contractor/applicant shall ensure that local labour is used where possible in order to improve the local economy of the area. • The Contractor/applicant shall adequately train all personnel on the project to promote skills development.	Contractor	Once-off
Environmental educational and Training	Environmental training	• Environmental Training should be provided to the staff members through toolbox talks. • Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. Proof of training to be kept on file. • The Environmental Site Agent must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract. • Environmental awareness training must be conducted by the ECO before any new staff commence with work on site. The awareness training must include teaching staff to deal with encounters with animals (such as snakes or frogs).	Contractor/ECO	Continuous

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
Site clearing and establishment	Designated site areas	• The location of the site camp should be agreed on by the Contractor and ECO. • The site camp should not be located on any incline slopes; it should be further away from any water resources and should not be located anywhere near environmentally sensitive areas. All areas that are environmentally sensitive, including the site camp should be demarcated. • The construction camp should contain waste storage areas and should be able to accommodate all other equipment required or to be used for the construction activities. • All no-go areas within an outside the boundary should be indicated and the personnel on site should be made aware of such areas. • There should be an area designated for maintenance of construction vehicles. However, this area should have an impermeable lining so as to contain any spillages during servicing and to prevent soil contamination as well. • A suitable area should be allocated where personnel should take their breaks. • Prior to excavation, topsoil should be removed and stockpiled in a designated area not susceptible to erosion. • All excavated areas should be stabilised to avoid erosion.	Contractor/ECO	Once-off

ACTIVITY/ASPECT	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/ TIMING
DESCRIPTION		COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
		• Waste should be properly managed to keep the area aesthetically pleasing. • All construction activities should take place within the dry season for the region (Mid-April to September), where reasonably possible. • No Threatened and/or Protected Species (TOPS) should be cut or disturbed without a permit being granted from the DFFE. • Sediment netting or similar should be erected around all open excavations to avoid sediment travelling into the surrounding environment. These should be inspected by the ECO on a daily basis to ensure that they are fit for purpose. • Concurrent rehabilitation of the construction footprint, specifically the pipeline servitudes, should be conducted. All disturbed areas should be tilled and revegetation with a mixture of indigenous grass species subsequent to backfilling. • All excavation of hydric soil within the outer boundaries of watercourses must be done by hand using spades and picks as far as possible to avoid unnecessary disturbance of watercourse by heavy machinery. The hydric soil removed must be placed in a designated spoil site in sequence, and replaced in inverted sequence directly after each section has been laid. • All hydrophilic plant species within the direct path of the		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		proposed development must be dug up at the roots and placed within a designated storage area and watered on a daily basis using commercially sourced water (unless an existing abstraction WUL has been obtained) until such time as the species are transplanted back postconstruction		
General		• All site personnel must undergo environmental induction prior to construction commencing. The watercourse delineation and associated buffer zones should be presented therein and it should be communicated that these areas should be considered no-go, aside from when within the pegged out footprint. • A preconstruction walkthrough should be conducted by a suitably qualified botanist to mark any TOPS within he pegged out construction footprint. These species should be translocated if possible. • Excess dust observed in the vicinity of the proposed development must be noted and the appropriate dust suppression techniques implemented to ensure no excess sediment input into the surrounding freshwater resources. • The digging of pit latrines is not allowed under any circumstances. • None of the open areas or the surrounding environment may be used as ablution facilities. • No open fires are permitted on site.	Contractor/SANRAL	Continuous/As and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Adequate waste receptacles which are both wind and scavenger proof must be placed throughout the site		
Waste management	Proper management of waste material on site	• Some of the construction waste (excavated material) can be used as fill material at other sites where required or disposed of at the licensed landfill site. • Construction waste, for instance unused concrete, must be disposed of at a licensed waste disposal facility or landfill site. • No construction phase waste must be stockpiled on site.	Contractor	As and when required
	Rubble	• Rubble shall be disposed of in pre – agreed, demarcated spoil dumps that have been approved by the local Municipality.	Contractor	Continuous/As and when required
	Litter management	• Sufficient waste bins shall be provided on site for different types of waste disposal and for recycling purposes. • Refuse bins shall be placed at strategic positions to ensure that litter does not accumulate on site. • The ESA shall monitor the neatness of the work sites as well as the Contractor campsite. • All waste shall be removed from the site and transported to a landfill site as approved by the Department of Water Affairs and Local Municipality. • Littering by the employees of the Contractor shall not	Contractor	Continuous/As and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		be allowed under any circumstances. • Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected weekly from the site by the local municipality		
	Hazardous substances management	• All hazardous waste materials shall either be stored in a bunded or lined area or then disposed off at a licensed landfill site. Hazardous waste may not be stored on site in excess of a 90 calendar day period. • Contaminants are to be stored safely to avoid spillage. • Machinery shall be properly maintained to keep oil leaks in check. • Labelled containers shall be provided to store used oils, as well as hazardous waste containers for oily rags; oil filters etc. and shall be disposed of at a suitable approved register dumpsite. • Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater. • Drip trays should be utilised at all dispensing areas. • No refuelling, servicing or chemical storage should occur within 30m of any watercourse. • No vehicles transporting concrete, asphalt or any other	Contractor	Continuous/As and when is required

ACTIVITY/ASPECT	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/ TIMING
DESCRIPTION		COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
		bituminous product may be washed on site. • Vehicle maintenance should not take place on site unless a specific bunded area is constructed for such a purpose. • Hazardous storage and refuelling areas must be bunded prior to their use on site during the construction period following the appropriate SANS codes. The bund wall should be high enough to contain at least 110% of any stored volume. The surface of the bunded surface should be graded to the centre so that spillage may be collected and satisfactorily disposed of. • All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. Spills must be cleaned up immediately and contaminated soil/material disposed of appropriately at a registered site. • Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site. • Spills must be cleaned up immediately and contaminated soil/material disposed of appropriately at a registered site.		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
	Sanitation	• The Contractor shall install mobile chemical toilets on the site. • Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. • Ablution facilities shall be within 100m from workplaces but not closer than 100m from any natural water bodies. • Toilets shall be serviced regularly and the ESA shall inspect toilets regularly.	Contractor	Continuous
	Remedial actions	• Depending on the nature and extent of the spill, contaminated soil shall be either excavated or treated on-site. • Spillages on site should be contained immediately. • Excavation of contaminated soil shall involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. • The ESA shall determine the precise method of treatment of polluted soil. This could involve the application of soil absorbent materials or oil-digestive powders to the contaminated soil. • If a spill occurs on an impermeable surface such as cement or concrete, the surface spill shall be contained using oil absorbent materials.	Contractor/ECO	Continuous/As and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Contaminated remediation materials shall be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.		
Runoff, erosion and sediment control	Ensure no pollution or degradation of geology or soil	• Proper design, monitoring and management. • Building foundations must be reinforced. • Topsoil removed must not be used for building or maintaining access roads but must be imported. • Existing vegetation cover on the development site should be maintained during the construction phase. • The unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes which will not be developed. • Clearing activities must only be undertaken during agreed working times and permitted weather conditions. • Sediment barriers (e.g.: silt fences/sandbags/hay bales) must be installed immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during construction. • All bare slopes and surfaces to be exposed to the elements during clearing and earthworks must be protected against erosion using rows of hay-bales, sandbags and/or silt fences aligned along the contours and spaced at regular intervals (e.g. every 2m) to break the energy of surface flows. • Once shaped, all exposed/bare surfaces and embankments must be re-vegetated immediately. • If re-vegetation of exposed surfaces cannot be	Contractor	As and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		established immediately due to phasing issues, temporary erosion and sediment control measures must be maintained until such a time that re-vegetation can commence. • 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. Erosion rills and gullies must be filled-in with appropriate material and silt fences or fascine work must be established along the gulley for additional protection until vegetation has re-colonised the rehabilitated area.		
Surface and groundwater	Prevent pollution of water resources	• Construction vehicles must be serviced to avoid leakages of fuels and lubricants to the soil. No servicing of construction vehicles must take place within the site, to avoid soil contamination with hydrocarbons or oils. • Chemical portable toilets provided by Contractors must be maintained for the duration of the construction phase. • Mixing of cement must take place on impervious surfaces and the areas for mixing must be controlled by berms. • Used oil must either be collect by a registered oil collector. Receipts must be kept on file. • Contaminated wastewater shall be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from	Contractor/ECO	Continuous

ACTIVITY/ASPECT	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/ TIMING
DESCRIPTION		COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
		the site for appropriate disposal at a licensed commercial facility. • Any hazardous substances shall be stored at least 100m from any of the water bodies on site. The bund wall shall be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events. • Temporary cut-off drains and berms may be required to capture storm water and promote infiltration. • Contaminated wastewater shall be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility. • The contractor should take steps to ensure that littering by workers does not occur and no washing or servicing of vehicles on site. • Should the needed arise to wash machinery on site, a suitable area must be established and approved by the ECO. • Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of washing of clothing or for any construction or related activities. • Municipality water should instead be used for activities such as washing of equipment and dust suppression measures. • Any accidental spillages that occur on site or entering the water body must be reported to the ESA for remediation.		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Repair and servicing of equipment should be performed 50m from the water body to prevent contamination of soil and run-off. • Stormwater runoff should be channelled through natural grass and sedges surrounding the borrow pits.		
Air quality/dust	Mitigate excess dust	• All surfaces that are not paved and generate dust should be sprayed using a water tank continuously, or other dust suppressing agents can be used to limit the generation of dust. • Vehicular speed to the construction site should be regulated, in order to limit the generation of dust on houses along the access route to site. • A dust monitoring process needs to be undertaken during the construction phase. • Any rubble generated during construction should not be left on site for more than two weeks as it will become susceptible to wind action. • Unnecessary movement of construction vehicles must be avoided. • Vehicles that will be transporting building materials such as sand or rubble need to be covered or wet down to avoid the material being blown by air during windy conditions. • The topsoil removal must be done in a phased manner so that large areas of unconsolidated soils are avoided.	Contractor	as and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• A register must be made available for reporting any excess dust from construction activities.		
Noise management	Reduce noise levels	• Activities which involve excessive noise must be prohibited at certain times during construction. • All construction work must be conducted only during regular business hours. • When required, the community must be made aware of any planned noise disturbances outside of normal working hours. • Construction activities must be limited to working hours (from 07:00 to 17:00) during the week, not including public holidays. • Should it happen that construction takes place after working hours, the neighbours need to be notified. • On-site personnel should be provided with PPE to assist in reducing noise level impacts. • Machines and equipment will be maintained in good working condition and inspected regularly as per a schedule. • Equipment and vehicles will be selected in accordance with best available techniques for noise reduction.	Contractor/ECO	as and when required
Visual	Ensure the works area is maintained in a neat and tidy condition	• Construction camps and stockyards should be located out of the visual field of highly sensitive visual receptors such as residents and communities. • The construction sites and camps should be kept neat, clean and organised in order to portray a general tidy appearance.	Contractor/ECO	Continuous

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Rubble and other building litter should be removed off site as soon as possible or placed in a container in order to keep the construction site free from additional unsightly elements. • If construction is necessary during night time, light sources should be directed away from residents and roads to prevent glare. • Dust suppression measures should be implemented; this includes regulating speeds along access routes to site. • Regular clean-up of illegal dumping and littering around the site will mitigate eye sores and improve the environment.		

Fire management	Ensure proper fire management and equipment are on site	• No fires are permitted on site.
		• Burning of waste on site is prohibited.
		• Compliance reports must be compiled regularly by both ECO and OHSO to ensure full compliance with the EMPr.
		• The facility must be equipped with firefighting equipment which will include:
		  ○ Flame arresters.
		  ○ Water sprinklers.
		  ○ Gas/fire detection equipment.
		  ○ Nitrogen and carbon dioxide blanketing equipment.
		  ○ Foam spraying.
		• The fire-fighting equipment should be satisfactory to the local fire services.
			Contractor/ECO/OHSO	as and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Key personnel should be allocated (and trained) to manage fire emergencies.		
Heritage resources	Ensure proper heritage protocols	• Any heritage resources encountered during the construction phase of the proposed development should be reported to the relevant Heritage Agency. • All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures. • All activities should stop for further indication in terms of commencement from the competent authority after investigations have been commissioned and concluded with recommendations. • All personnel should be made aware of any existence of heritage resources and the procedure to follow when encountering such resources. • Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. The penalties are described below : o Fine or imprisonment for a period not exceeding five years or to both such fine and imprisonment o Fine or imprisonment for a period not exceeding three years or to both such fine and imprisonment o Fine or imprisonment for a period not exceeding two years or to both such fine and imprisonment.	Contractor/ECO	As and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		○ Fine or imprisonment for a period not exceeding one year or to both such fine and imprisonment. ○ Fine or imprisonment for a period not exceeding six months or to both such fine and imprisonment. ○ Fine or imprisonment for a period not exceeding three months or to both such fine and imprisonment.		
Loss of Plant Species of Conservation Concern	Control of alien vegetation	• Implement an alien plant control plan. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed. • Rehabilitate or revegetate disturbed areas. • Indigenous vegetation, including dead trees, outside the limits of disturbance indicated in site plans, must not be removed from the site. • An Alien Invasive Plant Species Control Plan must form part of the rehabilitation plan developed for the project. This plan must be developed to include both construction and operational phase requirements.	Contractor/ECO/SANRAL	Once-off; as and when required
	Control of Plant Species	• No plant species (SCC or common) must be harvested or removed from site without approval from the ECO or Applicant in writing. • If any protected plant species are found within the proposed development footprint, permits must be	SANRAL/Contractor/ECO	Continuous: as and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		applied for and received before removing these plants from the footprint.		
Loss of Vegetation Communities	Control of vegetation communities	• The construction and operational footprint of the development must not be allowed to extend past the assessment area (PAOI). • All highly sensitivity habitat (e.g. wetlands or rivers and streams) must be sign-posted and delegated as "no-go" areas". Having lunch breaks, or social (after work hour) activities must be prohibited adjacent to these areas. • All access to site must be limited to existing access roads and pathways. No ad hoc roadways should be permitted, without first being authorised by the ECO. • A Rehabilitation Plan, encompassing an alien vegetation control plan, must be compiled prior to construction, and implemented to ensure that all rehabilitation and operational management regimes are well coordinated and budgeted for. • No dumping of cleared alien vegetation must be allowed on site. All cleared material must be appropriately disposed of at a registered landfill.	SANRAL/Contractor/	Continuous
Control of Invasive Alien Plant	Invasive Alien Plant Management	• All alien invasive plants (AIPS) that colonise the construction site must be removed, preferably by uprooting. • All bare surfaces across the construction site must be checked for AIPS every two weeks and AIPS removed by hand pulling/uprooting and adequately disposed.	Contractor/ECO	Continuous/As and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Herbicides should be utilised where hand pulling/uprooting is not possible. ONLY herbicides which have been certified safe for use in wetlands by independent testing authority are to be used. The ECO must be consulted in this regard. The herbicide contractor must be certified to apply/utilise the herbicide in questio		
Loss of wildlife	Wildlife Management	• The handling and/or killing of any animal species present is strictly prohibited and all staff/personnel must be notified of such incidents. • Wetland fauna (e.g. snakes, frogs, small mammals) that are encountered during the construction phase must be relocated to other parts of the wetland under the guidance of the EO or ECO. • Poaching/snaring is strictly prohibited	Contractor/ECO	Continuous/As and when required
Construction footprint	Limit the footprint, reduce compaction and destruction of vegetation	• Contractors should refrain from impacting areas beyond the demarcated construction area. • The Contractor must avoid traffic or storing of equipment and material in vegetated areas that will not be cleared.	Contractor	Once-off
Pollution	Prevention of pollution	• Drip trays (minimum of 10 cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised. • Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total	Contractor/ECO	Once-off; as and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		amount/volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle. • Provision of adequate sanitation facilities throughout the site.		
Stormwater management	Maintaining proper stormwater management	• The velocity of stormwater discharges must be attenuated. • Stormwater leaving the development area must in no way be contaminated by any substance, whether such substance is a solid, vapour, gas or a combination thereof which is produced, used, stored or spilled on the premises.	Contractor/ECO	Once-off
Traffic and Transportation Activity	Ensuring an efficient flow of traffic and transportation.	• Only designated roads and routes must be used within the facility. • These areas should be cordoned on site for easy visibility. • The transportation of large equipment must be done in a safe manner and all site personnel must be made aware of this occurrence. • Access of construction material delivery vehicles should be strictly controlled especially during wet weather to avoid compaction and damage to the topsoil structure • Planning of temporal access route to the site shall be discussed and agreed between the ECO Contractor and Project Manager. • The access routes on the private land shall be negotiated with the landowner in advance. • The condition of exiting access roads should be documented with photographs.	Contractor/OHSO	Once-off; as and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		• Temporary access roads that might be required shall be rehabilitated prior to the contractor leaving the site. • Strategic positioning of entry and exit points to ensure as little impact/ effect as possible on the traffic flow. • Unnecessary traversing of agricultural and natural open land is not permitted. • Where required, speed limits shall be indicated on the roads (30km). All speed limits shall be strictly adhered to at all time		
Social Environment	Social environment monitoring and management	• All contact with affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. • A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings. • No interruptions other than those negotiated shall be allowed to any essential services. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site. • Where possible unskilled job opportunities should be afforded to local community members. • Employment opportunities should be made known through a corporate communication function, and locally via the Local Council offices and Residents Forum. • A contractor Procurement policy must be maintained and marketing and advertising campaigns to be actively	Contractor/ECO	Continuous/As and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/ TIMING
		pursued in an effort to procure goods first from local producers/ suppliers. • At no point should the removal of graves be considered. • Care should be taken during construction to not interfere with the grave sites. It is recommended that the local community be consulted and the grave site be fenced off. • It is recommended that the Municipality put strategies in place to curb the expansion of informal settlements. • Establish safe user zones (particularly for pedestrians, cyclists, etc 11. Erect proper signage, preferably with light warnings indicating road works. • Construction Code of Conduct should be prepared and implemented among construction workers to enforce and monitor appropriate relationships between construction workers and community members. • It is recommended that the Contractors Code of Conduct include HIV/AIDS counselling and prevention measures. • Contractors must develop and implement a Recruitment and employment policy, and a goods and services procurement policy that will promote fair access to jobs and procurement opportunities, through an objective and transparent process. • A proper security strategy must be put in place for site specific crimes. Community policing would need to be increased.		

11 OPERATIONAL PHASE

Table 11-1: Operation Phase

ACTIVITY/ASPECT	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/TIMING
DESCRIPTION	COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
General requirements	• The records and administration process should be maintained, this must include but not be limited to: ○ Emergency preparedness plan, rehabilitation plan, operational plan, service plan, health safety and security plan. • Records of environmental awareness trainings should be kept. • The EMPr is a dynamic document that can be amended when a need arises, thus should be reviewed and amended/updated when a need arises. • No alien vegetation planting should be allowed on site. • Internal and external audits should be performed annually or as and when required by the competent authority. • The audit reports should be submitted to the competent authority. • The operational plan must be in place and complied with.	Contractor/ECO	Continuous
Employment	• Local labour employment should be encouraged, provided that personnel have the appropriate qualifications.	Contractor	As and when required
Air quality/dust	• All surfaces that are not paved and generate dust should be sprayed using a water tank continuously, or other dust suppressing agents can be used to limit the generation of dust.	Contractor	As and when required

ACTIVITY/ASPECT	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/TIMING
DESCRIPTION	COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
	• Vehicular speed to the construction site should be regulated, in order to limit the generation of dust on properties along the adjacent to the site. • A dust monitoring process needs to be undertaken. • Unnecessary movement of construction vehicles must be avoided. • Vehicles that will be transporting building materials such as sand or rubble need to be covered or wet down to avoid the material being blown by air during windy conditions. • The topsoil removal must be done in a phased manner so that large areas of unconsolidated soils are avoided. • A register must be made available for reporting any excess dust from operational activities. • Measures to collect methane for further use or handling such as flaring must be investigated.		
Vehicle, equipment maintenance and fuelling	• Minor maintenance of equipment and/or vehicles must be restricted to designated areas which are established and managed for maintenance, i.e. workshops. No major maintenance must be carried out on site. • All designated maintenance areas must be equipped, designed and constructed to facilitate vehicle and equipment maintenance, e.g. maintenance to be carried out on a concrete slab, and refuelling must be done above drip trays to reduce the risk of contamination of soil by harmful chemicals and oil. • The vehicular and equipment service plan must be adhered to.	Contractor/ECO/OHSO	Once-off; as and when required

ACTIVITY/ASPECT	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/TIMING
DESCRIPTION	COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
Waste management	• No waste should be dumped indiscriminately on site. • All vehicles transporting waste should be well suited for the transportation of the class and type of waste. • There must be sufficient waste bins around the site which must be easily accessible. • A waste collection schedule should be implemented for general and construction waste to ensure the site is always clear of excess waste build up. • Any general waste generated on site during maintenance works must be stored in a bin until such time that it can be disposed of a registered landfill site. • Reuse, recycling and separation-at-source of waste should be promoted. • If any hazardous waste that is generated on site it must be stored in an impermeable container until such time as it can be disposed at a registered hazardous landfill site or be collected by the appropriate service provider.	Contractor/ECO	Daily

Fire management	• Fires must be made in designated areas only, thus away from any flammable material or an area with a high fire risk.
	• Open fires must not be left unattended.
	• Burning of waste on site is prohibited.
	• Compliance reports must be compiled regularly by both the ECO and OHSO to ensure full compliance with the EMPr.
	• The plant must be equipped with firefighting equipment which will include.
	  ○ Flame arresters.
	  ○ Water sprinklers.
		Contractor/ECO/OHSO	Once-off; as and when required

ACTIVITY/ASPECT	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/TIMING
DESCRIPTION	COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
	○ Gas/fire detection equipment. ○ Nitrogen and carbon dioxide blanketing equipment. ○ Foam spraying. • The fire-fighting equipment should be stored to the satisfactory of the local fire services. • Key personnel should be allocated for fire emergencies. • All staff should be trained on the operation of safety equipment.		
Noise management	• The service plan for all vehicles and equipment on site should be maintained. • All construction work must be conducted only during regular business hours. • When required, the community must be informed of any planned noise disturbances outside of normal working hours. • A register for all noise complaints should be kept and corrective actions need to be applied to issues raised.	Contractor/ECO	Continuous
Management of flora	• Any landscaping implemented in the development must make use of indigenous vegetation to limit or eliminate the introduction of alien and/or invasive species.	Contractor	Continuous
Loss of soil within the area	• Stormwater management plan must be implemented on site to avoid erosion and sedimentation. • Culvert maintenance must be implemented to reduce blockages.	Contractor	Continuous

ACTIVITY/ASPECT	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/TIMING
DESCRIPTION	COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
Visual and aesthetic impact	• Areas should be landscaped using indigenous vegetation. • All litter that gathers around the fence should be regularly cleaned. • The site must be fenced with walls or palisade to obscure the inside operations and contain any windblown litter. • Operation activities must observe good housekeeping principles and the site must be kept neat at all times.	Contractor	Daily, as and when required
Environmental awareness	• Environmental awareness and training should be provided to all personnel on site. • All fauna on site should be relocated; however, this should be communicated to the competent authority prior to relocation taking place (the necessary permits should be obtained, as applicable). • Health awareness programmes should be implemented and held on site.	Contractor	Once-off
Heritage resources	• Any heritage resources encountered during the construction/operational phase of the proposed development should be reported to the relevant heritage agency. • All activities should stop for further indication in terms of commencement from the competent authority after investigations have been commissioned and concluded with recommendations. • All personnel should be made aware of any existence of heritage resources and the procedure to follow when encountering such resources.	Contractor	As and when required
Safety and security	• During operation the area must be fenced off or demarcated, with a security personnel managing the access point(s).	Contractor	Continuous

ACTIVITY/ASPECT	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT	RESPONSIBILITY	FREQUENCY/TIMING
DESCRIPTION	COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS		
	• Any unauthorised entry of the public to the site must be restricted. • The fence must be inspected, and its integrity maintained on a daily basis. • The operational plan must be implemented.		
Ecological environment	• All road maintenance activities must be limited to the road and pipelines reserve. • No activities must occur outside the road and pipelines reserve without prior approval. • All cleared areas must be continuously rehabilitated with indigenous vegetation for 6 months into the Operational Phase of the project begins or after construction, or until such time that the ECO is satisfied the all affected areas have been rehabilitated.	Contractor/SANRAL	
Maintenance and Monitoring	• A Maintenance and Monitoring Programme should be composed for all infrastructure and implemented by a suitably qualified professional to ensure that all defects or leakages are identified timeously. • Monitoring for erosion and AIPS encroachment within watercourses should be conducted during routine monitoring of the infrastructure components. • The control of AIPS must be guided by a AIPS control plan to ensure compliance with the NEM:BA (Act no. 10 of 2004).	ECO/SANRAL	Continuous/ As and when required

12 DECOMMISSIONING AND CLOSURE PHASE

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/TIMING
Rehabilitation	Rehabilitate all affected areas back to its natural state.	• After the completion of construction activities all construction material must be removed by hand. • Topsoil that has been stockpiled during construction must be applied on the affected areas to undergo rehabilitation. • Areas which have been seeded must be regularly watered directly after seeding	Contractor	As and when is required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/TIMING
		until grass cover becomes established. Watering is to be done in a manner which ensures that no erosion of the topsoil and seed mix takes place. • If the grass has not been established after two months after seeding, the areas should be applied prior to seeding. • Slope stabilisation measures may be necessary in places where grass has not been able to establish and where there is erosion risk.		
Decommissioning	Removal of equipment post-construction	• The construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up.	Contractor	Once-off/As and when is required
	Temporary services	• The Contractor must arrange the cancellation of all temporary services, e.g. chemical toilets. • A copy of all waste disposal certificates is to be presented to the ECO. • Temporary roads must be closed and access across these, blocked. • All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. • Associated infrastructure	Contractor/ECO	Once-off/As and when required

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/TIMING
		• Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the SANRAL. • All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. • All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on site is prohibited. • The site is to be cleared of all litter. • The main contractor and site agent are to check that all watercourses are free from building rubble, spoil materials and waste materials. • Fences, barriers and demarcations associated with the construction are to be removed from the site. • All residual stockpiles must be removed to spoil or spread on site. • All leftover building materials must be returned to the construction camp where they will be disposed of appropriately. • The Contractor must repair any damage that the construction works has caused		

ACTIVITY/ASPECT DESCRIPTION	OBJECTIVE	ACTIONS TO BE UNDERTAKEN TO MITIGATE ENVIRONMENTAL IMPACT COMMITMENT/ACTIONS REQUIRED/KEY CONTROLS	RESPONSIBILITY	FREQUENCY/TIMING
		to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.		
	Borrow pits	• After the completion of mining and excavation activities the Borrow pits will act as reservoirs for surrounding runoff. • Erosion preventative mechanism and natural succession of vegetation must be implemented around Borrow pits. • Borrow pits acts as potential sediment traps reducing sedimentation in surrounding seasonal tributaries. • Indigenous tree species removed from the road reserve should be replaced. • Borrow pits must be appropriately rehabilitated and revegetated with indigenous plants after completion of mining activities.	Contractor	Once-off/As and when is required

13 MONITORING PLAN

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the environmental authorisation (once issued). Where this is not clearly dictated, the client will determine and stipulate the frequency of monitoring required in consultation with the relevant authority. The contractor project manager will work with the site manager of the contractor to ensure that monitoring is conducted and reported.

The monitoring of the watercourses will be essential for the maintenance and/or improvement of the PES scores that were calculated for the at-risk watercourses and the natural terrestrial biodiversity of the study area. The mitigation / rehabilitation recommendations stated above must be incorporated into the project-specific EMPr and compliance with the requirements/recommendations must be audited by a suitability qualified independent ECO. The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. Monitoring for non-compliance must be undertaken on a daily basis during the construction phase by the contractors under the guidance of the Project Manager / ECO / Engineer. An appropriately timed audit report should be compiled by the independent ECO. Paramount to the reporting of non-conformance and incidents is that appropriate corrective and preventative action plans are developed and adhered to. Photographic records of all incidents and non-conformances must be retained. This is to ensure that the key impacts on the receiving aquatic and terrestrial habitats are adequately managed and mitigated against and that the rehabilitation of any disturbed areas within any system is successful.

A monitoring programme must be in place not only to ensure compliance with the EMPr throughout the construction phase, but also to monitor any environmental issues and impacts during the rehabilitation phase. Compliance against the EMPr must be monitored during the construction phase monthly by an ECO. The period and frequency of monitoring required post-construction must be determined by a suitably qualified specialist and approved by the ECO. Once the initial transplants / plugs / seeds are planted during the rehabilitation phase, a suitably qualified professional, or the ECO must conduct weekly site visits to remove AIPS (in accordance with the latest revised NEM:BA requirements) and address any revegetation concerns until revegetation is considered successful (i.e., >80% indigenous cover). A generally accepted monitoring period of revegetated areas after this initial period is monitoring every 3 months for the first 12 months and every 6 months thereafter until the vegetation has successfully been established. If the revegetated areas have inadequate surface coverage (less than 30% within 9 months after re-vegetation) the disturbed areas should be prepared and revegetated again.

The cost-effective qualitative monitoring of the rehabilitation area may be time based through the use of periodic photographs taken from permanent photo viewpoints. These points are required to be established during site inception. The timeline created between the pre- and post-rehabilitation photos will provide an invaluable visual representation of the progress that is conveyed in a straightforward manner. The photographer should be an environmental scientist (may be the site ECO), therefore allowing an expert assessment of the site adding to the qualitative information gathered from the photographs.

The below mentioned criteria must be adhered to, ensuring the quality of the information collected:

- Establishment of the photo points must be completed during site inception/establishment. This will allow for pre-rehabilitation imagery spanning more than a once off photograph.
- These points should be permanently marked and assigned a unique identify number to ensure continual relocation and accuracy of the photographs. GPS coordinates should be recorded of each site. This is to ensure if any markers are removed or vandalised then they can be replaced.
- Photo point locations should be easily relocated and accessible and must not be obscured by future vegetation growth.
- The level of detail captured must be appropriate to the area that has undergone rehabilitation.
- Photo record forms must be development and utilised for every photo taken. The information required will be project name, location, unique identity number, directional point (e.g. North, South), date, time, photographers name and additional comments.
- Qualitative ecological information that must be visually interpreted and recorded at the same time as taking the photograph include:
    - Extent of the site vegetation ground cover.
    - General level of plant growth, substrate levels and water levels
    - General observations of water quality such as clarity and presence of litter
    - Vegetation condition, extent of AIPS; and
    - Evidence of erosion and close monitoring of the post-construction erosion-control measure which must be implemented.
    - Evidence of anthropogenic presence and bird species.

It is also recommended that monthly water quality monitoring take place during the construction and operational phases to ensure that any surface water complies with Target Water Quality Ranges (TWQR). Should it be identified that water quality

exceeds any TWQR parameter, it must be immediately investigated and remediated.

This is to ensure that the key impacts on the aquatic and terrestrial habitats are adequately managed and mitigated against and that rehabilitation of any disturbed areas within the study area is successful.

An independent ECO must be appointed to carry out monitoring and auditing against the conditions in the EMPr. The ECO will undertake site inspections on a monthly basis or as specified in the environmental authorisation once issued. The ECO will report all non-compliances to the Site Manager and submit such reports to the competent authority. This will ensure the environmental compliance of the site.

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

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

Table 13-1: Monitoring Plan

ACTIVITY/ASPECT	OBJECTIVE	KEY CONTROLS	RESPONSIBILITY	FREQUENCY
Employment	Provide opportunities to local communities to enhance income levels and skills/employability and improve quality of life.	• Ensure local labour is employed. • Ensure local vendors are contracted for goods and services.	Contractor	Quarterly reports
Waste Management	Ensure that all site areas are clear of general and construction waste.	• Weekly inspections of site areas. • Daily clean-up of litter. • Ensure that all bins are emptied on a regular schedule to avoid spilling. • Ensure all construction waste is collected and disposed of appropriately. • Ensure that there are adequate portable toilets and that they are regularly serviced.	Contractor	Weekly inspections and monthly reports
Construction footprint	Ensure that all construction activities occur only within the designated construction footprint.	• Corden off the site to illustrate the footprint. • Demarcate no-go areas. • All trenches must be demarcated, and appropriate signage must be placed.	Contractor	Start of project; on-going
Dust and erosion control	Ensure no excess dust on site during the construction phase.	• Dust suppression measures such as watering the site must be instilled. • Loose areas must be compacted. • Erosion control measures, such as gabions and reno mattresses, must be installed at steep embankments and erosion prone areas.	Contractor	Continuous

ACTIVITY/ASPECT	OBJECTIVE	KEY CONTROLS	RESPONSIBILITY	FREQUENCY
Noise management	Ensure that noise during the construction and operational phases are kept to a minimum.	• Ensure that construction works occur only within the designated working hours (07:00 to 17:00). • Site personnel to have ear plugs during operations involving loud noises. • Vehicles and equipment must be well maintained to ensure their efficient working order.	Contractor	Continuous
Visual	Ensure the works are aesthetically pleasing.	• The site must be continuously cleared of debris and litter. • Indigenous vegetation must be used for any landscaping post-construction.	Contractor	Daily inspections
Fire management	Ensure proper fire management and equipment are on site.	• Ensure that no fires are lit on site. • No waste is permitted to be burnt on site. • All fire equipment must be regularly inspected. • All site personnel must be trained for fire related emergencies.	Contractor	Monthly inspections for equipment with reports; continuous inspections for site operations
Safety and security	Ensure the safety of all site personnel.	• All site personnel must be adequately trained in OHS protocols. • Daily toolbox talks on OHS protocol must occur. • An emergency contact list must be placed at multiple, easily accessible locations around the site.	Contractor	Daily toolbox talks with registers; weekly fence inspections

ACTIVITY/ASPECT	OBJECTIVE	KEY CONTROLS	RESPONSIBILITY	FREQUENCY
		• The site must have 24-hour security for not only the site personnel but also the equipment. • Fences around the site must be regularly inspected for weaknesses and breakages. • All site personnel must wear appropriate PPE at all times.		
Alien invasive vegetation	Ensure that no alien invasive vegetation grow within the site.	• Regularly inspect the site to identify any occurrence of alien invasive vegetation. • Remove these identified species and dispose of them according to the alien invasive control plan. • Once removed these areas should be revegetated with indigenous vegetation and closely monitored for any recurrences.	Contractor	Monthly inspections
Vehicle and equipment maintenance	Ensure that all vehicles and equipment are well maintenance.	• All vehicles and equipment must be serviced at the necessary intervals. • All vehicles and equipment must be inspected regularly to ensure that they efficient enough to carry out the tasks. • Any vehicle or equipment must never be used if it does not pass the inspections and must be repaired immediately.	Contractor	Weekly inspections with report
Stormwater management	Ensure that stormwater is efficiently managed on site.	• A stormwater management plan is recommended to manage this aspect.	Contractor	Weekly inspections with report

ACTIVITY/ASPECT	OBJECTIVE	KEY CONTROLS	RESPONSIBILITY	FREQUENCY
		• Any hazardous materials should be kept away from stormwater flow as this could contaminate the water. • All stormwater infrastructure must be regularly inspected for damages and blockages.		
Independent ECO	Monitor the site and compile audit report.	• Ensure all conditions of the EMPr and environmental clearance certificate are adhered to. • Inform the applicant and Contractor of potential environmental issues and propose mitigation measures. • Compile audit report of findings and recommendations.	Contractor/Applicant	Monthly inspections with report or as required by the competent authority

14 CLOSURE PLANNING

14.1 FINAL SITE RESTORATION

The Contractor must clear and restore the site and ensure that all excess building material and construction debris is removed from site once the construction phase has been completed.

14.2 REHABILITATION

The Contractor (landscape architect/horticulturist) will be responsible for the rehabilitation and revegetation of all disturbed areas earmarked for conservation during construction to the satisfaction of the Applicant's Project Manager and/or the ECO.

- Concurrent rehabilitated should be implemented. All disturbed areas must be rehabilitation within 30days of the end of each construction activity.
- All post-construction building material and waste must be cleared in accordance with the EMPr, before revegetation of the disturbed footprints take place.
- Erosion features that have developed as a result of construction related disturbances are required to be stabilised. This may also include the need to deactivate any erosion head cuts/rills/gullies that may have developed by either compacted soil infill, rock plugs, gabions or any other suitable measures.
- Slopes that have been altered due to construction/operation must be reshaped to replicate the original condition and contours.
- If the gradient of the banks is greater than 1:1.75, the banks must be stabilised with a biodegradable cover such as Geojute which must be secured to the steep slope with wooden (biodegradable) pegs. This will reduce soil erosion potential.
- Any areas, which fall outside the site, that have been compacted are required to be ripped to allow for the establishment of vegetation. This ripping must not result in the mixing of sub- and topsoil.
- No imported soil material may be utilised for rehabilitation, unless it can be ensured that it is free of any alien vegetation seeds. In situ earthen material is preferred.
- Additional stabilisation of cleared areas to prevent and control erosion must be actively managed. The method of stabilisation should be determined in consultation with the ECO and engineer. The following methods (or a combination) may be considered, depending on the specific conditions of the site:
    - Brush packing
    - Mulch or chip cover
    - Terracing o Straw stabilising (at the rate of one bale/m² and rotated into the top 100mm of the completed earthworks)
    - Watering

    - Planting / sodding
    - Hand-seeding / Hydro-seeding
    - Mechanical cover or packing structures (Geofabric, Hessian cover, Armourflex, Log / pole fencing)
- A suitably qualified ECO/botanist/horticulturist must supervise the handling, maintenance and planting of the plant/trees. No AIPS may be utilised during the rehabilitation process.
- Rapidly germinating indigenous species (e.g. fast growing, deep rooting, rhizomatous, stoloniferous) known to bind soils in terrestrial, riparian and/or wetland areas must be utilised where there is a strong motivation for stabilisation over reinstating similar plant communities to that being disturbed. This should be informed by a suitably qualified specialist.
- Exposure of plant root systems to drying winds, high temperatures or water logging must be avoided.
- Where possible, revegetation must take place at the start of the spring rains to maximise water availability and minimise the need for irrigation. This will ensure optimal conditions for germination and rapid vegetation establishment.
- If this is not possible, watering of planted areas may be necessary during dry periods (external sources of water must be utilised e.g. Joe-Joe tanks).
- Water utilised for irrigation must be free of any chlorine or contaminants that may negatively affect the plant species.
- All alternative roads, tracks and footpaths created during the construction phase should be appropriately rehabilitated (e.g. tillage and revegetation of the affected areas). This rehabilitation should result in improved surface roughness and increased infiltration along with reduced stormwater flow and consequently reduced rill erosion.
- All construction waste materials must be removed, and temporary structures (e.g. offices, workshops, storage containers, ablution facilities) dismantled, from site and the surrounding environment, this will need to be checked by the ECO and the various contractors.
- All banks where there is exposed soil, with the potential for rill/gully erosion to take place, must be stabilised. Gabion structures or geotextiles must be implemented upslope of the proposed development.

It is recommended that a comprehensive Mine Rehabilitation and Closure Plan be developed prior to the decommissioning and closure of the borrow pit operation, according to the requirements of the MPRDA and DMRE.

The closure/rehabilitation plan would need to aim to restore the mined landscape within the footprint of the borrow pit impacted area and property, to align with the final approved end use option. End-use alternatives need to be identified and considered for the borrow pit and these ultimately will be decided upon jointly together with the relevant environmental and regulating authorities (i.e. DMRE).
A comprehensive mine decommissioning, closure & rehabilitation plan for the borrow pits would need to be compiled prior to decommissioning being initiated,

based on the key objectives and actions outlined below (**Table 21**) (note these should be refined based on the findings of any other relevant specialist studies recommendations considered in the mining application):

Aspect	Keys Objectives & Activities
Communication	• All interested and affected parties must be consulted on the planned approach and expectations prior to formal decommissioning taking place. • Information on measurements and/or quantification, undertaken to comply with statutory requirements, will be submitted as required.
Mine infrastructure	• All structures on-site are to be demolished, all waste produced from the demolition are to be disposed of at either a general or hazardous waste landfill site, depending on the waste type. • Safe disposal certificates are to be retained and kept on record. • All pipes and related infrastructure will be removed, all related structures such as trenches, any return water dams will be demolished and the area rehabilitated by the methods described in the mine and rehabilitation closure plan, any scrap steel is to be recycled. • All engineering infrastructure constructed for the management of surface / storm water on the property should be properly rehabilitated prior to closure of the operations. Engineering infrastructure such as berms and silt traps require periodic maintenance to ensure they operate properly and without causing other risks such as erosion and failure. These elements should be removed/demolished from site to ensure the ponding of water does not occur post-closure. • All diesel and petrol storage tanks (above and below ground) are to be removed and contaminated soil is to be disposed of at a hazardous landfill site. If there is heavy contamination a contamination specialist should be consulted. • All debris will be gathered, removed and disposed of at a general waste landfill site
Residue deposits	• All tailings will need to be graded, a suitable growth medium will be placed over tailings and re-vegetation is to be undertaken. • The stability of any residue deposits (slimes dumps) will be checked regularly, the re-vegetated surfaces are expected to curb and control erosion and dust pollution. • Sediment control dams/ponds are to remain operational to capture any sediment washed off the quarry area or potential contaminants from the mine, the length of time that it is to remain operational as well as frequency of monitoring is to be determined by a specialist.

Aspect	Keys Objectives & Activities
Excavations	• All potentially dangerous excavations, will, where practicable, be shaped to a safe upper surface as explained in mine and rehabilitation closure plan and will be securely fenced, or made safe to the satisfaction of the Department of Mineral Resources & Energy (DMRE).
Haul roads and ramps	• All haul ramps and roads must be ripped reshaped as necessary and re-vegetated.
Mine pit	• Where practicable all upper slopes of the final void will at the termination of operations, be graded to a safe angle or the upper benches will be left with maximum height of 2m and minimum width of 3m. • The floor of the mine pit will be levelled where necessary to allow re-vegetation. • Alternatively, the quarry pit will be retained as an artificial open water body where relevant
Landscaping	• The rehabilitated landscape should be aesthetically acceptable. • All remaining surfaces disturbed by mining operations will be treated with available topsoil and re-vegetated as necessary. • All soil stockpiled material will be used in the rehabilitation process as backfill or for shaping of rehabilitation surfaces, which will then be covered with topsoil and the surfaces re-vegetated. • Areas where infrastructure is removed should be rehabilitated with topsoil and grass covering which requires proper maintenance until vegetation has been fully established and the effectiveness of the rehabilitated areas to be self-draining and free of erosion has been confirmed prior to full closure of the works. • Silt that has remained in silt traps should be finally removed to the designated stockpile and the stockpile should be shaped, covered with topsoil and vegetation using best practice methodologies.

All rehabilitated land, including any rehabilitated residue deposits, will need to be maintained and monitored until vegetation is fully established and self-sustaining. Any temporary water pollution control structures such as sediment dams, which might have to be erected or constructed, as well as the slimes dam will be checked regularly for structural stability, for any signs of deterioration and to establish rehabilitation progress.

Maintenance of the decommissioned site, as set out above, will continue until such time as closure is achieved and approved by the DMRE in terms of the MPRDA.

14.3 POST-CONSTRUCTION AUDIT

A post-construction audit must be carried out for submission to the Applicant. Objectives should be to audit compliances with the key components of the EMPr, to identify the main areas requiring attention and recommend priority actions. The audit should be undertaken annually and should cover a cross section of issues, including implementation of environmental controls, environmental management and environmental monitoring. Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on site and have not been dealt with in the current document.

15 CONCLUSION

This Environmental Management Programme (EMPr) must be used as an on-site reference document during all phases of this development, and auditing must take place in order to monitor compliance with the EMPr. Parties responsible for transgression of this EMPr must be held liable for any rehabilitation that may be required. Parties found liable for environmental degradation through irresponsible behaviour, negligence and/ or non-compliance with the EMPr must receive penalties such as an order to cease activities, withdrawal of the authorisation and/or civil or criminal proceedings to enforce compliance with the environmental authorisation and this EMPr.

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental and social standards that would be required to minimise the negative impacts and maximise the positive benefits of the construction and operational activities.

The EMPr will be reviewed by the ECO on an on-going basis. Based on observations during site inspections and issues raised at site meetings, the ECO will determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on-site. Any such changes or updates will be registered in the ECOs records, as well as being included as an annexure to this document.