



Environmental Management Programme

Proposed new housing development along
Heatherbank Road in Theesecombe, Port Elizabeth
in the Eastern Cape Province

Date submitted:

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1. Report details

1.1. Scope of an EMPr

An Environmental Management Programme (EMPr) ensures that any potential environmental impacts are minimized, monitored and mitigated throughout the different project development stages. As a basic requirement, the EMPr complies with Regulation 33 of the 2010 Environmental Impact Assessment (EIA) Regulations as contained in GN R. 543, promulgated under the National Environmental Management Act (Act 107 of 1998 - NEMA) Thus, the EMPr aims to:

- 1) Reduce as far as possible any negative impacts, disturbance to environments and ecosystems;
- 2) Avoiding waste and where it is unavoidable, finding responsible methods of disposal including mitigation in the form of recycling;
- 3) Avoiding pollution, destruction or degradation of environment;
- 4) Keep in mind the environmental rights of people;
- 5) Promote sustainability;
- 6) Delegate responsibility of all mitigation and monitoring actions;
- 7) Ensure compliance with regulations and legislations;
- 8) Respond to future changes and provide continual feedback for improvement especially in the context of environmental impacts;
- 9) Verify environmental performance throughout the duration of a development;
- 10) Optimize environmental performance and ensure sufficient resource use that aligns with environmental goals and project financial constraints; and
- 11) Adhere to safety and time constraints throughout the development.

The EMPr is dynamic in that it should be updated as necessary with changes in technology, management methods or unforeseen impacts coming to light. An EMPr is legally binding, as it is submitted to a Competent Authority (CA) for decision-making purposes and will be considered in processes for Environmental Authorisation (EA). With the dynamic nature of the EMPr, any significant changes or alterations to the EMPr needs to be submitted and approved by the CA before being executed.

1.2. Environmental legislation

The following legislation is directly relevant when assessing the terrestrial environment relating to the proposed new housing development in the Eastern Cape Province:

National Legislation

Title of legislation or guideline	Administering authority	Applicability to the project
National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations 2014 as amended (Act No. 107 of 1998)	DEDEAT	The activity triggers activities listed in NEMA EIA Regulations GN R. 327 and GN R. 324.
National Water Act, 1998 (Act No. 36 of 1998)	Department of Water & Sanitation (DWS)	Infrastructure may impact on existing surface water systems. This impact is only mentioned in this report (if relevant) and NOT discussed in detail.
National Environment Management: Biodiversity Act (NEMBA) (No. 10 of 2004)	DEDEAT	The proposed development must: <ul style="list-style-type: none"> - Conserve endangered ecosystems and protect and promote biodiversity. - Assess the impacts of the proposed

Title of legislation or guideline	Administering authority	Applicability to the project
		<p>development on endangered ecosystems.</p> <ul style="list-style-type: none"> - No protected species may be removed or damaged without a permit; and - The proposed site must be cleared of alien vegetation using appropriate means.
National Forest Act (84 of 1998)	Provincial Department of Forestry	Requires that a permit be obtained should any forests or protected trees be removed during the construction phase of the project.

Regional/Provincial legislation

Title of legislation or guideline	Administering authority	Applicability to the project
Nelson Mandela Bay Municipality Bioregional Plan (NMBM BP; 2014)	DEDEAT	Map of biodiversity priorities and accompanying guidelines to inform land-use planning, environmental assessments and authorisations and natural resource management.

2. Project overview

2.1. Project description

The new housing development, "The Heath", is proposed for development on a 1.78 hectare of Erf 4087 along Heatherbank Road in Theescombe, Port Elizabeth (Figure 2.1). The land is currently utilized as part of an equestrian ranch. The housing development will consist of 29 units of upmarket, free-standing homes in a secure estate on plots 300-700 square meters in size (Figure 2.2).

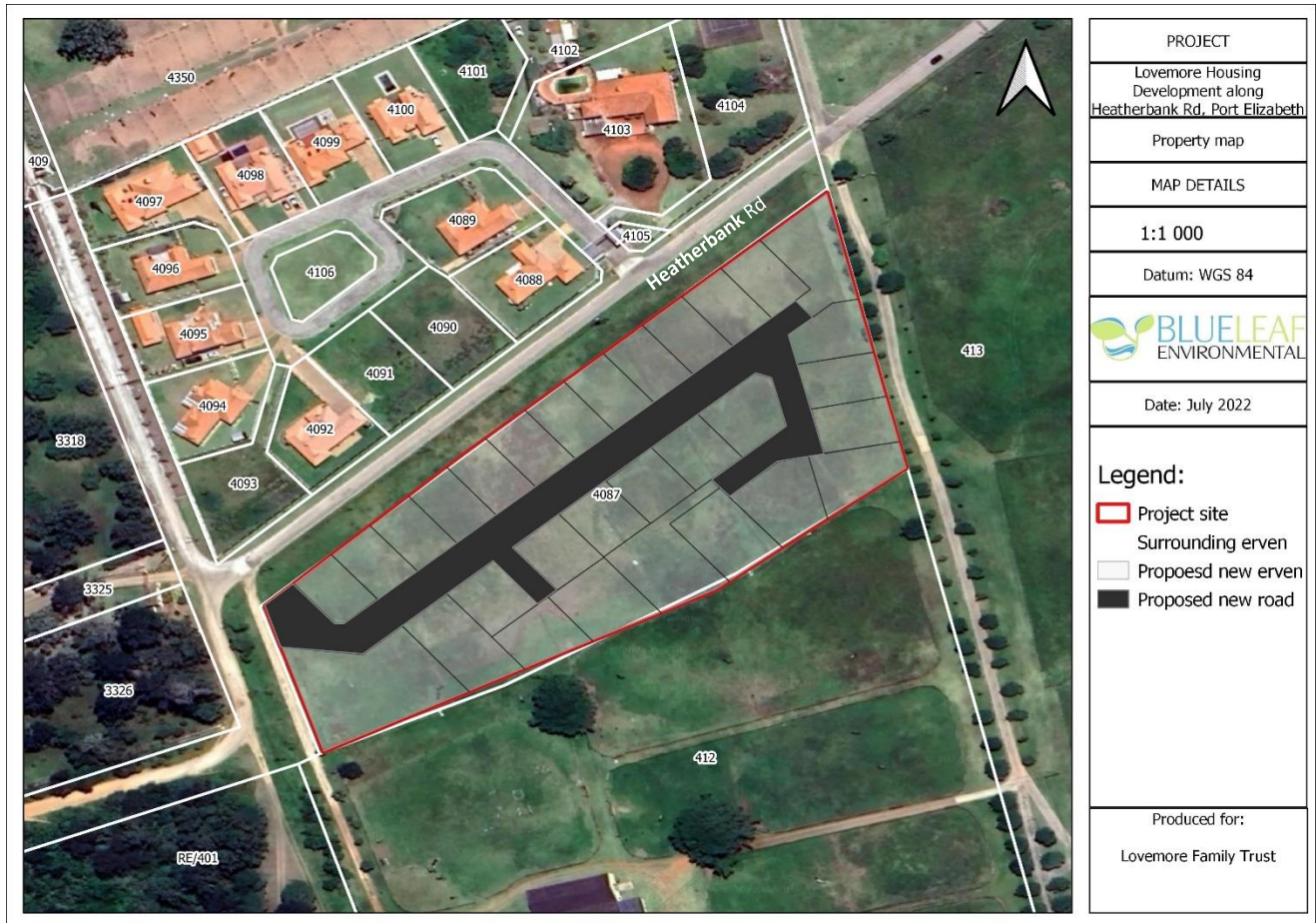


Figure 2.1 Location of the Project site along Heatherbank Road in Port Elizabeth

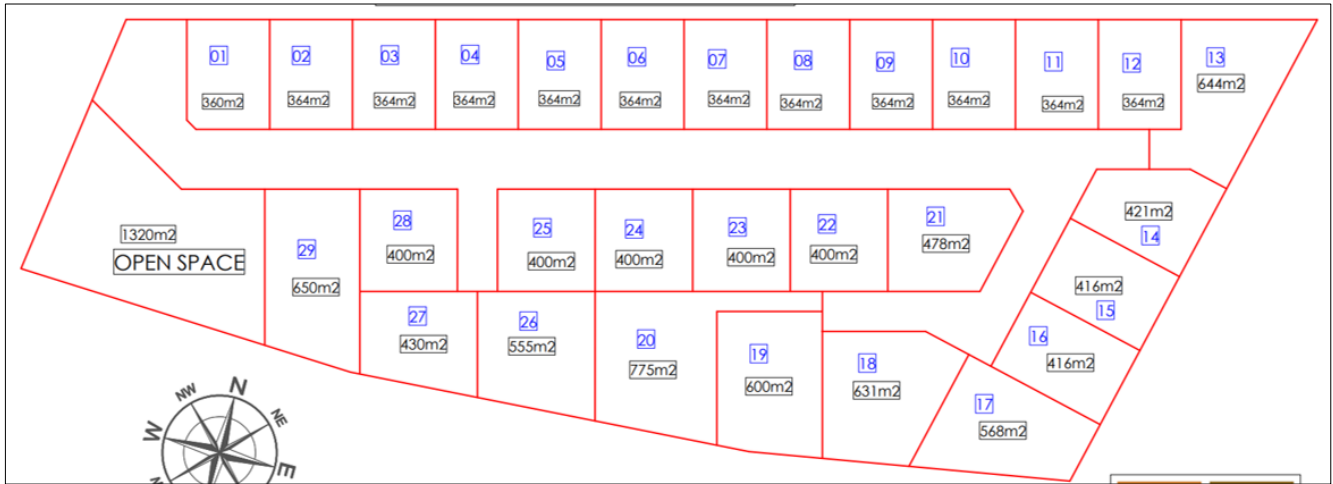


Figure 2.2: Plots within the proposed development showing plot numbers and sizes.

2.2. Project environment

Geology and Soil: Mostly flat, sloping only gently with an altitude of 175m above sea level.

Climate: Subtropical oceanic climate with mild winters, warm summers and occasional wind. Temperatures average at 15°C

Land Use: The project area is surrounded by agricultural land and some scattered infrastructure, most land is cleared, used for pastures and housing. The project site is already cleared and designated by a fence bordering the site.

Surface hydrology: The site is not located near any river, stream, drainage system or wetland.

Vegetation: According to the SA Vegmap (Mucina and Rutherford; 2006) the site is in Algo Sandstone Fynbos vegetation. This vegetation is considered as an endangered ecosystem. However, the site is mostly transformed to grassland with no remnants of the original fynbos vegetation other than some scattered individual species. None of these are considered as plant SCC.

Biodiversity: The project area and immediate surroundings does not fall into a critical biodiversity area according to the Nelson Mandela Bay Metropolitan (NMBM) Critical Biodiversity Areas (CBA).

3. Roles and responsibilities

Roles, responsibilities, and authority shall be defined, documented, and communicated to facilitate effective environmental management through implementation of the EMPr. The following responsibilities shall be assigned for the housing development.

Function	Responsibility
Environmental Manager (EM)	<ul style="list-style-type: none"> ➤ Overall management of project and EMP implementation. ➤ Oversees site works, liaison with Contractor/Suppliers, ESO and ECO.
Environmental Control Officer (ECO)	<ul style="list-style-type: none"> ➤ Implementation of EMPr and liaison between Lovemore Family Trust and the local authorities. ➤ Auditing of the site on a regular basis.
Environmental Site Officer (ESO)/ SHE Officer	<ul style="list-style-type: none"> ➤ Interaction with ECO, landowners, and laborers. ESO must understand the content of the EMP.
Contractors/Suppliers	<ul style="list-style-type: none"> ➤ Compliance with recommendations and conditions of the EMPr.

Below is a detailed description of each roleplayers function:

3.1. Environmental Manager

The Environmental Manager (EM; proponent's representative) will act as the employer's on-site implementing agent and has the responsibility to ensure that the Client's responsibilities are executed in compliance with the relevant legislations. Any on-site decisions regarding environmental management are ultimately the responsibility of the EM. The EM shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:

- Be fully knowledgeable with the contents of this EMPr.
- Review and authorize updates to the EMPr.
- Ensure resource allocation for implementation of the EMP requirements.
- Ensure that environmental requirements are integrated into project plans, work method statements, tender and contract documents.
- Ensure necessary support to the ESO for implementation of the EMPr.
- Undertake environmental system reviews, site inspections, audits, and other verification activities to assure that the EMPr implementation is at an optimal level.
- Participate in environmental performance verification activities to verify the level of compliance with the EMPr in delivering the legal and environmental obligations.
- Assess the efficacy of the EMPr and identify possible areas of improvement or amendment required within the EMPr.
- Participate in incident investigations (as required).
- Initiate external audits (as required)

3.2. Environmental Control Officer

The Environmental Control Officer (ECO) for the site is an independent environmental consultant appointed by Lovemore Family Trust (Pty) Ltd to monitor and review the on-site environmental management and implementation of this EMP during any construction activities.

The duties of the ECO:

- Ensure that all operational activities on site are undertaken in accordance with the EMPr;
- Undertake compliance audits against the EMPr (where required).
- Provide support and advice to the project team, contractors, and all suppliers in the implementation of environmental management procedures and corrective actions.
- Ensure that monitoring programs, which assess the performance of the EMPr, are implemented.
- Assist in the investigation of incidents and non-conformances and confirm in conjunction with the ESO that corrective and preventive action is taken and is effective.
- Assess the efficiency of the EMPr and identify possible areas of improvement or amendment required within the EMPr.
- Facilitate the amendment of the EMPr in conjunction with the EM (as required).
- Provide environmental training for key project personnel (in communication EM).
- Reviewing and approving method statements in consultation with the EM.
- Prepare audit reports (and submit reports to the relevant authority as required).

3.3. Environmental Site Officer

The Environmental Site Officer (ESO or SHE Officer) is expected to administer and control all environmental matters relating to the operational activities of the housing development. The ESO will conduct the following:

- Ensure that the latest EMPr documents are on site and readily accessible as required.
- Monitor all appointed contractors' activities (during any construction activities) for compliance with the various environmental requirements contained in this EMPr.
- Identify areas of non-compliance and recommend measures to rectify them in consultation with the ECO and the EM as required.
- Ensure communication of EMPr requirements to relevant projects, contractors and sub-contractor as required for EMPr implementation.
- Perform ongoing environmental awareness training of the housing development and all appointed contractor's site personnel.
- Ensure that environmental problems are remedied timeously and to the satisfaction of the ECO and the EM as required.
- Request the removal of people and/or equipment not complying with the specifications of EMPr.
- Facilitate environmental induction of all project staff and either deliver or coordinate delivery of all such training that would be required for the effective implementation of the EMPr.
- Set up activity-based method statements prior to the start of relevant construction activities and submit these to the EM and the ECO as required.
- Maintain environmental incidents and stakeholder complaints register.
- Undertake environmental system reviews, site inspections, audits, and other verification activities to assure that the EMPr implementation is at an optimal level.
- Report significant incidents internally and externally as required by law and the conditions of authorization.
- Investigate incidents and recommend corrective and preventative actions.

3.4. Contractors

Contractors conducting work at the housing development shall ensure that all their staff and employees are familiar with, understand and adhere to the EMPr. Failure by any contractor to show adequate consideration to the environmental aspects of this contract shall be considered sufficient cause for the ECO to instruct the EM to have the employee removed from the site. The EM will also order the removal

of equipment from the site that is causing continual environmental damage (e.g. building material pollution and rubble). Such measures will not replace any legal proceedings the client may institute against the Contractor.

The EM shall order the contractor to suspend part or all of the works if the contractor and/or any sub-contractor, suppliers, etc., fail to comply with both the EMPr and procedures supplied by the ESO or EM. The suspension will be enforced until such time as the offending procedure or equipment is corrected and/or if required remedial measures are put in place.

By virtue of the environmental obligations delegated to contractors through the Contract Document, all workers (including subcontractors, suppliers, and service providers) appointed for the project would be responsible for:

- Ensuring adherence by providing adequate staff and provisions to meet the requirements of the EMPr.
- Ensuring that Method Statements are submitted to the EM for approval before any work is undertaken and monitor compliance with the EMPr and approved Environmental Method Statements.
- Ensuring that any instructions issued by the ESO and/or EM are adhered to.
- Ensuring the representation of a report at each site meeting, documenting all incidents that have occurred during the period before the site meeting.
- Undertake daily, weekly, and monthly inspections of the work area(s).
- Ensuring that a register of all the transgressions issued by the ESO is kept in the site office.
- Ensuring that a register of all public complaints is maintained.
- Ensure that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the success full implementation of the environmental requirements of the Contract.
- Report and record any environmental incidents caused by the Contractor or due to the Contractor's activities.
- Obtain required corrective action within specified time frames and close out of environmental incidents.
- Provide weekly checklists to the EM and ESO

4. Environmental Management Programme

4.1. Training and Induction

The Lovemore Family Trust (Pty) Ltd is bound to be responsible for ensuring that environmental awareness education of all employees and contractors is done satisfactorily. Lovemore Family Trust (Pty) Ltd should ensure that employees and contractors are made aware of the environmental requirements of the project.

The EMPr should form part of the Terms of Reference for all contractors, sub-contractors, and suppliers. All contractors, sub-contractors and suppliers will have to sign an agreement to assure that they understood the EMPr and that they will comply. All senior staff should familiarize themselves with the full contents of the EMPr and its implications. Senior staffs (Housing development Manager/Supervisor) are expected to train and assist the rest of the employees on the contents of the EMPr.

4.2. Environmental Incident Reporting

All environmental incidents occurring at the facility shall be recorded. The incident report should include time, date, location, and nature of the incident, extent of the incident, actions taken, and personnel involved.

All complaints received from the neighboring properties/communities should be directed to the manager of the Markman Housing development and channeled to the EM. Lovemore Family Trust (Pty) Ltd Management should be able to respond to the complainant within a week (even if pending further investigation). It is important that the issues raised are considered and that the complainant feels that their concerns have been addressed to and wherever possible actions taken to address these. All complaints should be entered in the environmental register and all responses and actions taken to address these should be recorded.

4.3. Environmental Monitoring

Periodic environmental monitoring must be taken on a regular basis. Monitoring should be done to ensure compliance with all aspects of the EMPr. Findings should be liaised to all responsible officers as chain command.

4.4. EMPr Administration

Copies of this EMPr shall be kept at the site office and should be distributed to all senior staff members, including those of the contractors.

4.5. EMPr Amendments

The EMPr amendments can only be made with the approval of the EM and ultimately DEDEAT. Amendments to the EMPr should be liaised to all employees and contractors.

4.6. Non-compliances to the EMPr

Problems may occur in carrying out mitigation measures or monitoring procedures that could result in non-compliance of the EMPr. The responsible personnel should encourage staff to comply with the

EMPr, and address acts of non-compliance and penalties.

Lovemore Family Trust (Pty) Ltd is responsible for reporting non-conformance with the EMPr, to the EM. The management of Lovemore Family Trust (Pty) Ltd, in consultation with the EM must, thereafter, undertake the following activities:

- Investigate and identify the cause of non-conformance.
- Implement suitable corrective action as well as prevent recurrence of the incident.
- Assign responsibility for corrective and preventative action.
- Any corrective action taken to eliminate the causes of non-conformance shall be appropriate to the magnitude of the problems and commensurate with the environmental impact encountered.

4.7. Environmental register

An environmental register should be kept on site in which incidents related to actual impacts are recorded. This will include information related to incidents as spillages, dust generation and complaints from adjacent neighbours. It should also contain information relating to actions taken. Any party on site may complete the register, however, it is envisaged that the Housing development Manager and the EM will be the main contributors, and who will also be the main parties involved in suggesting mitigation measures.

4.8. Site manager

Areas outside this designated working zone shall be considered "no go" areas. The offloading zones must be clearly demarcated when offloading goods to enhance safety around the proposed development.

4.9. Fire and Safety Management

Hydrocarbons are volatile under certain conditions and their vapors in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

No fire, whether for cooking or any other purpose, is to be made at the facility. All housing development personnel and contractors shall take all reasonable measures and active steps to avoid increasing the risk of fire through activities on site and prevent the accidental occurrence or spread of fire; and shall ensure that there is sufficient fire-fighting equipment on site at all times. This equipment shall include fire extinguishers. All housing development personnel and contractors should be prepared for such events.

Lovemore Family Trust (Pty) Ltd management together with all housing development personnel and contractors shall take all reasonable measures to avoid increasing the risk of fire and shall ensure that there is sufficient fire-fighting equipment on site at all times.

4.10. Staff Management

Lovemore Family Trust (Pty) Ltd and its contractors must ensure that all their employees have suitable personal protective equipment and professionally trained in firefighting and first aid.

4.11. Waste Management

All waste shall be removed off-site to designated waste disposal site. Sufficient bins or containers on-site to store any solid or liquid waste produced should be provided by Lovemore Family Trust (Pty) Ltd. The bins and containers should be weatherproof and scavenger-proof.

4.12. Hydrocarbon Management

If any spillage occurs, contaminated soil shall be collected in a holding tray or drum, and which will then be disposed of at a licensed hazardous waste site. Any spillage of more than 200 liters must be reported to the DEDEAT as per the Petroleum Products Act.

Lovemore Family Trust (Pty) Ltd and its contractors shall take all reasonable measures to prevent surface or groundwater pollution from the release of oils and fuels.

Sufficient space should be left in fuel storage tanks to allow for fuel expansion and to prevent leakage of fuel from the fuel storage facility.

4.13. Flood Management

Stormwater management of the site should be a key aspect of flood management on site. All stormwater systems, culverts and waterways should be kept clean to allow storm water to flow freely.

4.14. Accidents on site

Lovemore Family Trust (Pty) Ltd and its contractors shall comply with the Occupational Health and Safety Act and any other national, regional, or local regulations regarding safety on site. The Contractor shall ensure that contact details of the local medical services are available to the relevant construction personnel prior to commencing works.

4.15. Emergency advisory procedures

Contractors shall ensure that there is an emergency advisory procedure on site before commencing any operations that may cause damage to the environment. The Contractor shall also ensure that site staffs are familiar with all emergency procedures to be followed.

The Contractor shall ensure that lists of all emergency telephone numbers/contact people are kept up to date, and that all numbers and names are always posted at the site

6. Project phases

The project phases can be categorized into the Planning and Design Phase (Pre-Construction), Construction Phase and Operational Activities.

6.1. Planning and Design Phase

The Planning and Design Phase is a pre-construction phase and will consist of planning for the proposed development and will include, amongst others, the following activities:

- Purchasing of construction materials;
- Obtaining relevant municipal approvals and service connections; and
- Demarcation of development area.

6.2. Construction Phase

Site preparation and construction entails the following:

- Site camp establishment, which includes the placement of a standard shipping container for material storage;
- Clearance of approximately 1.78 hectares of vegetation with a bulldozer;
- Site works including water, sewer, electrical connections and access roads;
- Construction of twenty-nine (29) residential units will be done by the Purchasers and NOT the Developer over an extended period of time.

Construction materials utilized will be those typically associated with road building and service infrastructure and will include amongst others, concrete, steel, bitumen, pipelines & cables and bricks. There will be one main entrance road within the complex with an estimated width of 3.5m.

6.3. Operational Phase

At the completion of site construction, the plots will be available for purchase. The purchaser can then construct their own dwelling as per the complex building guidelines.

7. Infrastructure and Services

7.1. Water supply

It is envisaged that approximately 500 litres of water will be required on a daily basis (15 kilolitres per month) during the construction phase of the development. During the operational phase it is estimated that 29 occupied units would require up to a maximum of 6 kilolitres of water on a daily basis (180 kilolitres per month). The proposed water supply will be provided via existing municipal connections. Additional water during the operational phase may be stored by the unit owners in rainwater harvesting tanks (e.g., Jojo tanks) that will intercept rainwater from the buildings.

7.2. Solid waste

The construction and operational phase of the proposed activity will result in the generation of general and hazardous waste. The construction phase will generate general solid waste (rubble, cement bags, general domestic waste etc.) which will be disposed by the appointed contractor at a registered landfill site (e.g., Arlington landfill). Construction phase activities will generate hazardous waste such empty chemical containers and oil rags as well as building rubble. These will be disposed by the contractor at the nearest permitted landfill site. The operational phase will generate general domestic waste from each of the residential units. The waste will then be disposed of via the municipal collection services on a weekly or bi-weekly basis.

7.3. Effluent waste

During the construction phase, liquid effluent will be handled via the implementation of portable/temporary toilets for construction staff. The facilities will be serviced by an external service provider to remove the waste to a sewage treatment facility. The operational phase of the proposed development will generate effluent comprised of wash water, cleaning, and sewage. All effluent produced daily will be channeled into the municipal sewer system.

7.4. Energy sources

Electricity will be sourced from the national grid via the existing electricity infrastructure available in the area.

7.5. Stormwater infrastructure

Adequate stormwater infrastructure should be implemented to ensure that the erosion risk is not increased within the study area.

8. Environmental impact mitigations

Mitigation guidelines are addressed through three phases namely Pre-construction (Site Establishment) Phase; Construction Phase (and associated rehabilitation of affected environment); Operational Phase (Post-Construction) and Decommissioning Phase.

Each phase has specific issues unique to that period of the development and operation of the proposed infrastructure. Each is identified and given a brief description. The three phases of the development are then identified and addressed below:

8.1. Pre-construction management

IMPACT	MITIGATION REQUIRED
Site preparation	Appoint an Environmental Control Officer
	The Main Contractor must draw up method statements for relevant construction activities.
	The ECO must approve all the method statements before they become operational.
	Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable.
	The ECO must ensure compliance with conditions described in the EA.
	All no-go areas on site must be properly fenced off / demarcated and signage placed prior to the onset of construction.
	Records of compliance / non-compliance with the conditions of the EMP must be kept on-site and be available on request. A copy of these records must be made available to the provincial department on request throughout the project execution.
Site clearing	Areas which are not to be constructed on must not be cleared to reduce erosion risks.
	The area to be cleared must be clearly demarcated and this footprint strictly maintained. Footprint of clearance should not exceed the required footprint.
	Soil (including excavated sub-soils and topsoil) that is removed from the site must be removed to an approved spoil site.
Dust	Damping down of the un-surfaced access roads must be implemented to reduce dust and nuisance.
Soil erosion	The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.
Avifaunal Protected species	Any protected bird species (classified as an SCC or protected by CITES) found when preparing site for construction need to be recognized and potentially a permit obtained for removal by a qualified individual.
Fauna Protected species	Any protected non-avian animal species found when preparing site for construction need to be recognized and potentially a permit obtained for removal by a qualified individual.

8.2. Construction phase management

IMPACT	MITIGATION REQUIRED
Laydown Areas	Choice of site for the Contractor’s laydown area requires the Project Manager and ECO’s permission and must consider location of residents and/or ecologically sensitive areas, including flood zones. A site plan must be submitted to the Project Manager for approval. The size of the Construction
	Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion.
	Suitable control measures over the Contractor’s yard, plant, and material storage to mitigate any visual impact of the construction activity must be implemented.
	All laydown areas are to be fenced off in such a manner that unlawful entry is prevented, and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction laydown must be controlled by a guard or otherwise monitored, to prevent unlawful access.
	The construction laydown area layout plan must be provided to the ECO for approval prior to the construction of the laydown area.
	Site establishment shall take place in an orderly manner and all required amenities shall be installed at the construction laydown areas before the main workforce move onto site.
	All construction equipment must be stored within the construction laydown area.
	All associated oil changes etc. (no servicing) must take place within this camp on a sealed surface such as a concrete slab.
	An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment
	The Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.
	The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed.
	All imported materials (e.g. sand) must be stockpiled within the site boundary/Construction Zone. Sand and excavated material stockpiles should be protected against wind using temporary screens, and from water erosion using tarpaulins where necessary.
	No fires will be allowed, and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of fires, caused by activities at the campsites. These measures include appropriate instruction of employees about fire risks.
Storage of hazardous material	Impervious surfaces must be provided where necessary. Storage areas must be designated, demarcated, sign posted and fenced if necessary.
	Storage areas must be secure to minimize the risk of crime. They must also be safe from access by unauthorized persons i.e. children/animals etc.
	Fire prevention facilities must be present at all storage facilities.
	Proper storage facilities for the storage of oils, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the

	<p>temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events.</p> <p>All necessary approvals with respect to fuel storage and dispensing (if required on site) shall be obtained from the appropriate authorities.</p> <p>Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site.</p> <p>Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.</p> <p>General waste management protocols must always be implemented.</p> <p>All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.</p> <p>All harmful materials must be safely stored in a dry, secure environment, with concrete or sealed flooring and a means of preventing unauthorised entry. Furthermore, it must be ensured that material storage facilities are cleaned/maintained on a regular basis, and that leaking containers are disposed of in a manner that allows no spillage onto the bare soil. The management of such storage facilities and means of securing them shall be agreed.</p> <p>All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately, and the cause of the spill investigated. Preventative measures must be identified and submitted to the EM for information. Emergency response procedures to be followed and implemented.</p>
Traffic	<p>All equipment moved onto site or off site is subject to the legal specifications for the transport of such equipment.</p> <p>The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident.</p>
Soil and Geology	<p>Implement effective erosion control measures</p> <p>Ensure that the mixing /decanting of all chemicals and hazardous materials must take place on a tray or impermeable surface.</p> <p>Ensure all storage tanks are designed, bunded and managed to prevent pollution of drains, groundwater and soils.</p> <p>Ensure that use and storage of fuels and chemicals that could potentially leach into the ground be controlled. Adequate spillage containment measures shall be implemented, such as cut off drains, etc. Fuel and chemical storage containers shall be set on a concrete plinth. The containment capacity shall be equal to the full amount of material stored, plus 10%.</p> <p>Appoint appropriate contractors to remove any residue from spillages from site. Handling, storage and disposal of excess or containers of potentially hazardous materials shall be in accordance with the requirements of the above-mentioned Regulations and Acts.</p>
Water use and pollution	<p>Water must be reused, recycled or treated where possible</p> <p>Efficient oil and grease traps or sumps must be installed and maintained at re-fueling facilities, workshops, fuel storage housing developments, and containment areas and spill kits must be available with emergency response plans.</p> <p>Promote a water saving mind set with construction workers to ensure less water wastage.</p>

	<p>Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site (i.e. these materials must not be placed in stormwater channels, drainage lines or rivers).</p> <p>There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p>
Surface water management	<p>Municipal water must be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.</p> <p>Storm water management and storm water infrastructure must be enforced by monitoring runoff levels. At the start of erosion, accelerated run-off must be diverted away from bare soil.</p>
Waste management	<p>Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</p> <p>Where considerable quantities of waste are generated, this must be placed in 200-liter bins or skip containers and removed once full.</p> <p>The Contractor shall supply waste collection bins where such is not available, and all solid waste collected shall be disposed of at registered/licensed landfill.</p> <p>In general, any litter must be cleared immediately.</p> <p>Littering by the employees shall not be allowed under any circumstances.</p> <p>The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.</p> <p>It is important that the contractors and workers must be informed of the facilities and procedures available for the disposal of waste.</p>
Spills and contamination	<p>Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>The ECO/EM must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. Contaminated remediation materials must be carefully removed from the area of the spill to prevent further release of petrochemicals to the environment and stored in adequate containers until appropriate disposal.</p>
Dust Control	<p>The EO must monitor weather forecasts relating to periods of expected high winds; dust control methods such as damping down must be undertaken regularly when high winds are forecast for the study area.</p> <p>The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to sensitive receptors such as the surrounding landowners and the neighboring communities.</p> <p>Dust generation must be kept to a minimum and suppressed on access roads and construction areas during dry periods. This can be accomplished by the regular application of water.</p>
Noise management	<p>The construction phase must aim to adhere to the relevant noise regulations (SANS 10328:2008) and limit noise to within standard working hours and acceptable industrial limits (61 dBA for an industrial noise) in order to reduce disturbance of dwellings in close proximity to the development.</p>

	Construction activities are to be contained to reasonable hours during the day and early evening (weekdays from 06:00am to 18:00pm). Night- time activities near noise sensitive areas must not be allowed.
	Construction workers to wear necessary Personal Protection Equipment (PPE).
	Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order
Occupational health and safety	Safety measures for work procedures must be implemented.
	First aid kits must be available and accessible on site.
	A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up by the Contractor and approved by the ECO to ensure worker safety.
	Workers must be thoroughly trained in using potentially dangerous equipment.
	Contractors must ensure that all equipment is maintained in a safe operating condition.
	A safety officer must be appointed.
	A record of health and safety incidents must be kept on site.
	Any health and safety incidents must be reported to the Project Manager immediately.
	First aid facilities must always be available on site and several employees trained to carry out first aid procedures.
	Workers have the right to refuse work in unsafe conditions.
	The Contractor shall take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc.
	Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / residents.
	Working areas must be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels.
	Eye wash and emergency shower systems must be provided in areas where there exists the possibility of chemical containment of workers and the need for rapid treatment.
	All sources of hazardous energy or hazardous substances must have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe.
	Use of contrast coloring on equipment/machinery including the provision of reflective markings to enhance visibility.
	Use of moving equipment/machinery equipped with improved operator sight lines.
	Issuing workers with high visibility clothing.
	Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must always be worn, and other PPE worn where necessary i.e. dust masks, ear plugs etc.
	No person is to enter the site without the necessary PPE.
	Emergency numbers for local police and fire department etc. must be placed in a prominent area.
	All equipment used for construction must be in good working order with up to date maintenance records.
	From the construction phase, an emergency evacuation plan must be drawn up to

	ensure the safety of the staff and surrounding land users in the case of an emergency.
	All permanent staff must undergo safety training.
Avifaunal Protected species	Any protected avian animal species (classified as an SCC or protected by CITES) found when preparing site for construction need to be recognized and potentially a permit obtained for removal by a qualified individual.
Fauna Protected species	Any protected non-avian animal species found when preparing site for construction need to be recognized and potentially a permit obtained for removal by a qualified individual.
Visual	Stockpiles need to be removed before commencement of the operational phase.
	Construction of development needs to be done in accordance with architectural and development guidelines such that the development is integrated into surroundings in terms of environment and land use and does not stand out.

8.3. Operational phase management

IMPACT	MITIGATION REQUIRED
Decommissioning of construction site	All structures comprising the construction camp are to be removed from site.
	The area that previously housed the construction camp is to be checked for spills of substances such as oil etc, and these shall be cleaned up.
	Surfaces are to be checked for waste products from activities such as concreting and cleared in a manner approved by the Engineer.
	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. Burying of rubble on site is prohibited.
	The construction camp site is to be cleared of all litter.
	Fences, barriers, and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.
	All residual spoil and topsoil stockpiles must be removed to spoil or spread on site as directed by the Engineer.
Soil erosion	All residual building materials must be removed from the site.
	All damaged areas shall be rehabilitated upon completion of the contract.
	Rehabilitation must take place in a phased approach as soon as possible.
	Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.
Waste management	The site needs to be monitored monthly to identify the emergence of alien species and any erosion concerns.
	The site must be kept clear of litter all the time
	All waste must be removed promptly to ensure that it does not attract vermin or produce odors.
Health and Safety Visual	Solid waste must be collected on a regular basis.
	Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.
	The site is to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.
	Firefighting equipment in the form of fire hydrants or fire extinguishers must be available on the site. These must be regularly maintained by an appropriate company.

	<p>A spill kit needs to be kept on site to address any unforeseen spillages.</p> <p>Transport of all hazardous substances must be in accordance with the relevant legislation.</p>
Visual	<p>Lighting must be kept to a minimum and restricted to low level, downward facing lights to reduce light spill.</p> <p>Lighting must be inward and downward pointing to reduce glare in surrounding areas.</p> <p>The site and surrounds must be kept clean, tidy and well maintained to reduce negative visual impacts;</p> <p>Roads must be well maintained;</p> <p>Regular maintenance of the associated infrastructure must be undertaken.</p>
Stormwater management	<p>Storm water management and storm water infrastructure must be enforced by monitoring runoff levels. At the start of erosion, accelerated run-off must be diverted away from bare soil.</p>
Avifaunal Protected species	<p>Any protected avian animal species (classified as an SCC or protected by CITES) found when preparing site for construction need to be recognized and potentially a permit obtained for removal by a qualified individual.</p>
Fauna Protected species	<p>Any protected non-avian animal species found when preparing site for construction need to be recognized and potentially a permit obtained for removal by a qualified individual.</p>

9. Conclusions

If the above-mentioned management recommendations are properly implemented, it is anticipated that most of the adverse impacts on the environment can be mitigated. An appointed ECO will need to monitor or audit the site throughout construction and possible decommissioning phase to ensure that the EMPr is fully implemented and complied with. The EMP caters for operational and maintenance phases (including possible decommissioning) but will need to be reviewed during all phases of the project, especially when revisions are made to the development and/or operations of the facility.

The EMPr should be used as an on-site tool during all phases of the development. Parties responsible for contravention of the EMPr should be held responsible for any rehabilitation that may need to be undertaken.

9.1. Pre-construction phase

The first site activities, before mobilization of equipment, will be a survey for final development designs. There will be negative impacts on land associated with the construction of laydown areas (temporary loss) and storage of construction materials. Expectations of improvement in livelihood among locals must be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

9.2. Construction phase

This phase of the project could result in both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other laborers who will be hired to provide his/her services during the construction phase. The negative impacts would include wastes generated, accidents, health and safety, air, dust and noise pollution, soil erosion, contamination of geohydrology and soils. Most of the negative impacts are minor and temporary. However, on mitigating negative impacts, the contractor shall ensure that all staff have adequate protective clothing and are adequately trained. The whole range of mitigation measures are however, outlined in the EMPr in this regard.

9.3. Operational phase

The proposed project will have minimal negative effects which mainly relates to health and safety and contamination of geohydrology and soils. These negative impacts are highly unlikely to occur. Mitigation measures stipulated in this EMPr outline procedures should contamination occur.

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