Appendix F

Environmental Management Plan Report

Shanduka Coal (Pty) Ltd Road Deviation Basic Assessment Report

10/29/2013

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1 DECLARATION OF CONSULTANT'S INDEPENDENCE

The author of this report, EndemicVision Environmental Services Pty(Ltd), does hereby declare that it is an independent consultant and has no business, financial, personal or other interest in the activity, application or appeal in respect of which it was appointed other than fain remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of the consultant performing such work. All opinions expressed in this report are its own.

2 DEFINITIONS

Specification: A technical description of the standards of materials and workmanship that the Contractor is to use in the Works to be executed, the performance of the Works when completed and the manner in which payment is to be made.

Works: The construction operations and all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc., in connection with the execution and carrying to completion of the facility.

Topsoil: Means the top 300 mm of soil and may include vegetation and rocks.

Potentially hazardous substance: A substance which, in the reasonable opinion of the Engineer, can have a deleterious effect on the environment.

Reasonable: Means, unless the context indicates otherwise, reasonable in the opinion of the Engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management programmes" (both as defined in the National Environmental Management Act (No 107, 1998).

Site: The boundary and extent of facility works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the facility to proceed successfully.

Environment: The surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth, *viz*.:

- micro-organisms, plant and animal life;
- any part or combination of the above and the inter-relationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Engineer: A person representing the Facility Owner on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorized by the Facility Owner to fulfil this role.

1. INTRODUCTION

This Chapter identifies and presents the extent of issues created and mitigation measures required during the construction, operational and decommissioning phases of the proposed project: "the realignment of a portion of Provincial Road R575 (P127-2)". This Environmental Management Plan (EMP) is required in accordance with the EIA Regulations (2010) in terms of Chapter 5 of the National Environmental Management Act (No 107, 1998), as amended.

It should be noted that the EMP will remain a draft document until it has been updated with the conditions stipulated in the environmental authorization.

The aim of an EMP is to facilitate appropriate environmental controls during all phases of the project and to fulfill the objectives of the EMP that confirms the reason for the EMP. The EMP is required in order to:

- Assist in ensuring continuing compliance with South African legislation and applicable policies/guidelines;
- Provide a mechanism for ensuring that measures identified in the Basic Assessment Report designed to mitigate potentially adverse impacts, are implemented;
- Provide a framework for mitigating impacts that may be unforeseen or unidentified until construction is underway;
- Provide assurance to regulators and stakeholders that their requirements with respect to environmental and socio-economic performance will be met; and
- Provide a framework for compliance auditing and inspection programs.

1. LEGAL REQUIREMENTS

Obligations imposed by the EMP are legally binding in terms of environmental statutory legislation (i.e. the Environmental Authorization in terms of the National Environmental Management Act No.107 of 1998, as amended) and in terms of amendments to the Particular Conditions of Contract that pertain to this project.

The requirements of this EMP are the responsibility of the facility owner, specifically during the operational phase and possible decommissioning / closure phase should this become applicable. The requirements of this EMP do not release the Facility Owner from the requirements of any other legislation that may be applicable to the project.

Legislation applicable to the project (although not limited to those listed) has been provided below for guidance:

Constitution of the Republic of South Africa (No. 108, 1996):
The Constitution is the supreme law of South Africa, against which all other laws are measured. It sets out a number of fundamental environmental rights, which include:

The Environmental Clause:
Section 24 of the Constitution outlines the basic framework for all environmental policy and legislation:
It states that everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Access to Information:
Section 32 of the Constitution provides that everyone has the right of access to any information held by the State or another juristic person, and that is required for the exercise or protection of any rights.

Fair Administrative Action:
Section 33 of the Constitution provides for the right to lawful, reasonable and procedurally fair administrative action.

Enforcement of Rights and Administrative Review:
Section 38 of the Constitution guarantees the right to approach a court of law and to seek legal relief in the case where any of the rights that are entrenched in the Bill of Rights are infringed or threatened.

National Environmental Management Act (No. 107, 1998):
The National Environmental Management Act (NEMA) is South Africa's overarching environmental legislation. The Act gives meaning to the right to an environment that is not harmful to health or well-being, entrenched in Section 24 of the Constitution of the Republic of South Africa, Act 108 of 1996. The National Environmental Management Act (NEMA, Act No. 107 of 1998) establishes a set of principles, which all authorities (organs of State) have to consider when exercising their powers, for example during the granting of permits. These include the following:

- Development must be sustainable.
- Pollution must be avoided or minimised and remedied.
- Waste must be avoided or minimised, reused or recycled.
- Negative impacts must be minimised.
- Responsibility for the environmental consequences of a policy, project, product or service applies throughout its life cycle.

NEMA further provides for an equitable access to natural resources, environmental protection and the formulation of environmental management frameworks. The Act is underpinned by the global concept of sustainable development. The interpretation, administration and application of NEMA are guided by fundamental principles of sustainable development, provided in Chapter 1 of the Act. "Development must be socially, environmentally and economically sustainable" (s 2(3)) and requires the consideration of all relevant factors, which are elaborated by eight sub-principles".

These principles include:

- The polluter pays principle (s 2(4) (p)).
- The public trust doctrine (s2 (4) (o)).
- The equitable access to natural resources (s 2(4) (d)).

Section 24 of the Act states that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to their approval.

The Act goes on to list the requirements for an assessment. These include:

- The environment likely to be affected by the activity and viable alternatives.
- Cumulative effects and their potential significance.
- Mitigation measures including the "no go" option.

Section 28(1) states that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment.
- Informing and educating employees about the environmental risks of their work and ways of minimizing these risks.
- Ceasing, modifying or controlling actions which cause pollution/degradation.
- Containing pollutants or preventing movement of pollutants.
- Eliminating the source of pollution.
- Remedying the effects of the pollution.

National Water Act (No. 36, 1998):
The Act details the management of South Africa's water resources in terms of utilisation and duty of care to prevent water pollution. The act further details the legislation pertaining to the pollution of water reserves (surface and ground water) and the remediation/rehabilitation thereof.

Mpumalanga Nature Conservation Act (No. 10, 1998):
An Act to consolidate and amend the laws relating to nature conservation within the Province and to provide for matters connected therewith. This Act makes provision with respect to nature conservation in the Mpumalanga Province. It provides for, among other things, protection of wildlife, hunting, fisheries, protection of endangered fauna and flora as listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the control of harmful animals, freshwater pollution and enforcement. The Mpumalanga Parks Board, established by section 2 of the Eastern Transvaal Parks Board Act, 1995, shall be responsible for the administration of the Act.

Conservation of Agricultural Resources Act (No. 43, 1983):
This Act provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

National Environmental Management: Biodiversity Act (No.10, 2004):
To provide for, inter alia, the management and conservation of South Africa's biodiversity, to protect species and ecosystems. The Act also covers alien and invasive species and genetically modified organisms that pose a threat to biodiversity.

The objectives of this Act are to within the framework of the National
Environmental Management Act to provide for:

- The management and conservation of biological diversity within the Republic and of the components of such biological diversity.
- The use of indigenous biological resources in a sustainable manner.
- The fair and equitable sharing among stakeholders of benefits arising.
- To give effect to ratified international agreements relating to biodiversity.
- To provide for co-operative governance in biodiversity management and conservation.
- To provide for a South African national biodiversity institute to assist in achieving these objectives of this act.

National Roads Act (No. 7. 1998):
To make provision for a national roads agency for the Republic to manage and control the Republic's national roads system and take charge, amongst others, of the development, maintenance and rehabilitation of national roads within the framework of government policy; for that purpose to provide for the establishment of The South African National Roads Agency Limited, a public company wholly owned by the State; to provide for the governance and management of that company (''the Agency'') by a board of directors and a chief executive officer, respectively, and to define the Agency's powers and functions and financial and operational accountability, and regulate its functioning; to prescribe measures and requirements with regard to the Government's policy concerning national roads, the declaration of national roads by the Minister of Transport and the use and protection of national roads; to repeal or amend the provisions of certain laws relating to or relevant to national roads; and to provide for incidental matters.

Advertising on Roads and Ribbon Development Act (No. 21, 1940)
To regulate the display of advertisements outside certain urban areas at places visible from public roads, and the depositing or leaving of disused machinery or refuse and the erection, construction or laying of structures and other things near certain public roads, and the access to certain land from such roads.

National Heritage Resources Act (No. 25, 1999):

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA). In terms of the Act, historically important features such as graves, trees, archaeology and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection.

In terms of Section 38 of the National Heritage Resources Act, SAHRA can call for a Heritage Impact Assessment (HIA) where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

Legal Requirement to Comply with:

According to the National Heritage Resources Act (Section 38(8)), such an assessment has to meet the requirements of the relevant heritage authority.

The following requires the approval of SAHRA:

- Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised
- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length.
- Any development or other activity which will change the character of a site-
- Exceeding 5 000 m2 in extent; or involving three or more erven or divisions thereof which have been consolidated within the past five years.
- The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.
- The re-zoning of a site exceeding 10 000 m² in extent.
- Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Occupational Health and Safety Act (No. 85, 1993):

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

Promotion of Access to Information Act (No 2, 2000):

To give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.

Electricity Regulation Act (No. 4, 2006):

To establish a national regulatory framework for the electricity supply industry; to make the National Energy Regulator the custodian and enforcer of the national electricity regulatory framework; to provide for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated; and to provide for matters connected therewith.

National Environment Management: Waste Act, 2008 (No 59 of 2008):

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.

- To provide for institutional arrangements and planning matters.
- To provide for national norms and standards for regulating the management of waste by all spheres of government.
- To provide for specific waste management measures.
- To provide for the licensing and control of waste management activities.
- To provide for the remediation of contaminated land.
- To provide for the national waste information system.
- To provide for compliance and enforcement.
- To provide for matters connected therewith.

Section 24 of the National Environmental Management Act (1998) requires that activities that require authorization or permission by law which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity. The EIA process is the tool used to apply for authorization from the regulating authority for the relevant activities identified that may impact on the environment.

2. ROLES AND RESPONSIBILITIES

Roles and Responsibilities are assigned to ensure this EMP is implemented adequately. The following roles are identified as important to ensure appropriate responsibilities of this EMP are performed.

The key role-players during the construction phase of the infrastructure, for the purposes of environmental management on site, include but are not limited to:

- The owner: the provincial authority
- The funder: Shanduka Coal (Pty) Ltd
- The engineer: Jeffers and Green
- The contractor: to be determined during tender process
- The Independent Environmental Quality Control: Appointed Environmental Site Officer

3 COMMUNICATION

3.1 MEETINGS

Communication meetings should take place at least with final approval of the designs; any amendments of the designs; during the construction phase and at handover of the project into operational phase. This meeting is important to facilitate the transfer of information and to update consequential requirements to ensure project sustainability.

The following people should attend these meetings:

- Facility Owner's Representative;
- Engineer;
- The Funder;
- Contractor(s) Representative.

In addition to the above meetings, employee orientation will be provided to all contractor staff.

3.2 TRAINING

The Contractor, in consultation with the funder, shall arrange for a presentation to site staff to familiarize them with the environmental aspects of the construction phase of the EMP within seven days from the (re-)commencement date of construction. This presentation should take cognizance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental "do's and don'ts" and how they relate to the site.

3.3 METHOD STATEMENTS

The Contractor shall provide Method Statements for the proponents of the management meetings (funder, engineer and owner) prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment or the project.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the management team, as circumstances unfold. Changes to, and adaptations of, Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description, in order for the Engineer to understand the Contractor's intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact or construction impacts while executing specific tasks.

For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer, the format should clearly indicate the following Statements:

- *What* - a brief description of the work to be undertaken;
- *How* - a detailed description of the process of work, methods and materials;
- *Where* - a description/sketch map of the locality of work (if applicable);
- *When* - the sequencing of actions with due commencement dates and completion date estimates;
- *Who* – The person responsible for undertaking the works described in the Method Statement; and
- *Why* – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the Engineer and where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the DEAT and DWA where this may be formally requested.

3.4 Dispute Resolution

Any disputes or disagreements between role players on site (with regard to environmental management) will firstly be referred to the Engineer during the construction phase, or to a DEAT environmental officer during the operational phase. If no resolution on the matter is possible, the matter will be referred to the National Department of Environmental Affairs for consideration and clarification.

3.5 Community Engagement

Communication and liaison with local communities should continue throughout the project to achieve the following objectives:

- To provide residents in the vicinity of the proposed infrastructure and other interested stakeholders with regular information on the progress of work and its implications;
- To monitor implementation of mitigation measures and the impact of construction on communities via direct monitoring and feedback from those affected, in order to ensure that mitigation measures are implemented and the mitigation objectives achieved; and
- To manage any disputes the Contractors and local people if this may arise.

3.6 Complaints Register and Grievances

It is recommended that the EMP Issue and Response Report be used as a Living Complaints Register and continual updating will take place from community input supplied to the Department of Environmental Affairs or the owner (Nkangala District Municipality) of the facility.

The complaints register will be updated during the project with:

- the date which the action or decision was taken;
- all and any communication with the stakeholder should be recorded (date, method, and purpose);
- person/s responsible for the action or decision;
- nature of the action or decision; and
- date on which the complaint was escalated or finalized.

- All complainants will be offered an option of requesting confidentiality. The personal details of complainants will only be made available to those involved in the resolution of the grievance in question, and all parties involved must follow policies related to protecting personal data when handling grievances.

- The facility owner will ultimately have to accept record and seek to address grievances that are contained in anonymous complaint forms. Due to the (possible) anonymous source of the grievance, the funder and/or contractor will not be able to respond directly to the complainant.

The Municipality will prepare responses to grievances in a timeous manner; an initial acknowledgement will be made within five working days and a timeframe provided for resolution, not exceeding two weeks unless the grievance warrants additional time for investigation. The response should consider the complainants' views about the process, as well as provide specific remedies. Where needed, a relevant manager will communicate with the stakeholder to better understand the nature of the complaint before formulating a response. If the case is complex and the stated resolution timeframe cannot be met, an interim response will be provided (oral or written) that informs the stakeholder of the delay, explains the reasons, and offers a revised date for next steps.

In the case of a particularly sensitive complaint, the facility owner will engage an external organization / third party in a joint investigation, in order to demonstrate transparency in the process being taken to resolve the issue.

4 ENVIRONMENTAL MANAGEMENT PLAN ACTIONS

The allocation of specific roles and responsibilities should be finalized at the first management meeting (as described above) at the (re-)commencement of the construction phase to ensure the following items are addressed by allocating Responsible Persons; Frequency and Monitoring Indicators to each item. An independent facilitator with adequate environmental background should be sought to facilitate this initial meeting to ensure the best possible allocation of roles and responsibilities to the following actions.

ENVIRONMENTAL MANAGEMENT ACTIVITIES TO MITIGATE ENVIRONMENTAL IMPACTS
Dust
Mitigation objective To avoid and/or reduce the extent to which increased levels of dust emissions are created by activities related to the construction and operational phases of the project. Mitigation measures The following methods should be employed to reduce dust generation during the construction and operational phases of the project: • Vehicles travelling on gravel roads at the site and directly to and from the site (5 km radius) will not exceed a speed of 30 km/h. • Overburden spoil of dusty materials will be covered by suitable shade cloth or netting to prevent escape of dust during loading and transfer from site. • Any directly affected individuals including neighboring landowners will be able to lodge grievances according to the grievance procedure. Complaints can be lodged with the Steve Tswete local municipality using the complaints procedure of the municipality or by lodging complaints with the Shanduka Coal social project manager (included in the EMP) regarding dust emissions that could be linked to the project. The Contractor will take preventative measures to minimize complaints regarding dust nuisances by employing: - Covering stockpiles - Dust control by wetting with water and dust suppression chemicals - Timing dust generating work to have least impact on receptors (outside peak traffic periods and not after working hours) - Pre-notification of directly affected parties of the period of construction and construction hours. - Covering or sufficient wetting of materials stored over periods that construction will not take place (weekends). • Additional appropriate dust suppression measures or temporary stabilizing mechanisms should be used when dust generation increase to levels affecting operation and traffic movement around the site by means of: - Being aware of prolonged periods of dry weather and/or high wind speeds and be prepared on site to increase dust management measures - Dampening with water and dust suppression chemicals • It must be ensured that all temporary access roads and construction areas are regularly sprayed with water in order to curb dust generation. This is particularly necessary during the dry season when increased levels of dust generation can be expected. These areas should not be over-sprayed causing water run-off and subsequent sediment loss into waterways and wetland lines in the vicinity of the proposed linear development.

AIR QUALITY

Mitigation objective

To avoid and/or reduce the extent to which increased levels of air emissions are created by activities related to the construction and operational phases of the project.

Mitigation measure

The following method(s) should be employed to reduce emissions during the construction and operational phases of the project:

- Vehicles are to be kept in good working order and serviced regularly to minimize emissions.
- Fuel efficient machinery should be considered where possible.
- Internal reporting during construction of smoking / mal functioning vehicles and immediate fixing

NOISE

Mitigation objective

To reduce the extent to which construction activities will create noise that has an adverse effect on humans and the environment within the project area.

Mitigation measure(s)

- Working hours to be agreed upon with Project Manager, so as to minimize disturbance to landowners and community members. The noise generating construction phase activities shall be restricted to normal working hours, between 08h00 and 17h00.
- Adjacent landowners to the proposed activity will be notified of commencement of construction and expected timing for construction activities that would result in significant noise generation (i.e. blasting).
- Construction activities generating output levels of 85 dB or more will be confined to normal working hours.
- Construction site yards and other noisy fixed facilities should be located well away from noise sensitive areas (landowners).
- The responsible engineer should ensure that municipal regulations relating to noise generation are observed.
- Truck traffic will be confined to existing roads.
- It must be ensured that employees and contractors working conditions comply with the requirements of the Occupational Health and Safety Act (OHSA, Act No 85 of 1993). Where necessary, workers will be required to wear ear protection equipment.
- Noise / visual barriers in the form of vegetation (hedges) should be considered post construction. The noise barrier constructed /grown should be at least 1.2 meters high when fully grown and at least two rows of plants. The location and length of the hedges should be done in consultation with an independent practitioner.

WASTE

Mitigation objective

To avoid and/or reduce the extent to which increased levels of waste residue generated during the construction and operational phase of the proposed project will impact on soil, habitat and surface water in close proximity to the source.

Mitigation measure(s)

- Wastes produced from project activities on site will be transferred to designated temporary storage areas and where possible into secure containers.
- Storm water run-off will be discharged away from any identified drainage lines.
- The construction contractor will remove refuse collected from the designated waste storage areas at the site at least once a week.

General Waste

- Wastes produced from project activities on site will be placed in drums and removed weekly; thereafter it is transferred to either the registered municipal waste site of Middelburg or transferred to designated temporary storage areas at the contractor office from where it will be transferred a municipal waste site.
- Littering and other waste will be placed in waste bins and be dumped in a registered land fill site.
- No dumping of waste material should be allowed within any sensitive area at any stage of the development. No temporary storage of construction material should be allowed within sensitive areas.

Hazardous Waste

- Appropriate sanitary facilities must be provided for the duration of the construction and rehabilitation activities and all waste removed to an appropriate waste facility.
- Mobile toilets will be used during the construction phase for the employees to use. Mobile toilets will be cleaned regularly. Final disposal of sanitary waste will be at the Middleburg Waste Water Treatment Works.
- All hazardous and liquid waste materials (e.g. fuel for generators, including any contaminated soils) will be stored in a bunded area of 110 percent of the stored material's capacity and disposed of by a licensed contractor.
- All hazardous and liquid waste materials (e.g. fuel for generators, including any contaminated soils) will be stored in a bunded area of 110 percent of the stored material's capacity and disposed of by a licensed contractor.
- All hazardous wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and/or disposal.
- Material Safety Data Sheets for all applicable materials present on site will be readily available to on site personnel.
- Fuels on site will be stored in a locked container within a fenced and secure temporary staging area.

Construction Waste

Construction waste will most likely consist of concrete waste, site clearance waste, and vegetation debris, building rubble, barricading tape, barriers & bags, cement. All cement mixing will be undertaken on impermeable plastic lining to prevent contamination of the soils and surrounding areas. Construction solid waste will be managed and will incorporate reduction, recycling and re-use principles. Tar and bitumen will be contained in closed containers or tanks and stored with secondary bunding at all times. The impacts from tar and bitumen beyond the road surface will be contained and minimized at all times. Spillages of tar and/or bitumen will be seen as a hazardous spill where it interacts with the environment and cleaned up immediately.

- All vegetation debris removed for site clearance will be stockpiled for road verge re-vegetation and rehabilitation.

All waste that cannot be reused or recycled will be appropriately disposed of. All construction debris will be placed in appropriate on site storage containers and periodically disposed of by a licensed waste contractor in accordance with applicable South African regulations. The construction contractor will remove refuse collected from the designated waste storage areas at the site at least once a week. Rubble generated during the construction phase will be removed from the site regularly to a licensed landfill site.

Construction waste management will incorporate reduction, recycling and re-use principles.

- Concrete/tar mixing will be undertaken on impermeable plastic lining or a suitably sealed surface to prevent contamination of the subsurface.

Effluent from the washing-down of concrete/tar mixing and handling equipment will be contained within a bunded area of 110 percent capacity of the stored material. This effluent will then be contained and dry residue used for backfilling as far as possible. Material not used for backfilling will be removed from site.

- Trucks and construction vehicles will be serviced off-site.
- It must be ensured that construction related waste or spillage and effluent do not affect the sensitive habitat areas.

Maintenance Waste

Maintenance of the road may require the repair when required. It is anticipated that this will happen at a low frequency. The main waste from road maintenance includes grass cuttings, debris removed from storm water drains and construction waste from road patching. The maintenance actions are required to adhere to all construction mitigation measures.

- The frequency of pipe cleaning maintenance activities will be monitored to indicate if this becomes a regular and constant source of additional waste generation on site.

CULTURAL & ARCHEOLOGICAL

Mitigation objective

To ensure any possible archaeological and/or heritage findings are managed properly.

Mitigation measures

As precautionary measure, any man-made or out of place item found during construction should:

- Be reported to the site manager
- The client should be informed immediately
- A suitable specialist should be contacted and details of the finding provided.
- Result in all construction work ceasing until approval for continuation is granted by the client and the site manager.

- The nearby graveyard should be fenced off during construction activities. The graveyard must also be fitted with a gate in order to provide access to family and friends.

BIODIVERSITY - FLORA

Mitigation objective

To avoid and/or reduce the extent to which plant species and diversity is negatively affected by activities related to the construction and operational phases of the project, and to promote positive impacts on vegetation diversity by implementing certain practices during construction the phase that will benefit the ecosystem post operational phase.

Mitigation measures

The following methods should be employed to reduce impact on plant species and diversity in the three main areas of concern during the construction and operational phases of the project:

- All indigenous species should be retained as far as possible and where alien species are removed, these be replaced with indigenous species. (The area left exposed from removing an alien tree should be covered with topsoil and reseeded with grasses indigenous to the area.)
- In order to minimize the disturbed area and disturbance impact the project should be completed as soon as possible in order for the vegetation to return to a state of recovery before the next rain season.
- All construction staff should undergo an environmental induction from a suitably qualified person to make sure they understand the difference between exotic and indigenous vegetation and the importance of footprint management.
- The relatively intact patch of grassland in the bridge area should be undisturbed as far as possible by construction activities.
- Alien trees with possible timber value may be harvested by a professional contractor to the benefit of the local community.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the wetland. Any accidental chemical, fuel and oil spills that occur in the area should be cleaned up in the appropriate manner as related to the nature of the spill.
- All construction vehicles to remain on demarcated roads and access routes to avoid unnecessary disturbance, compaction and/or pollution.
- The road and all other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may transport topsoil, reducing suitable conditions for vegetation growth.
- Regular monitoring for erosion during construction to ensure that no erosion problems have developing as result of the construction disturbance.
- Compacted areas should be suitably rehabilitated post construction, using appropriate techniques such as ripping, topsoil layering and reseeding.
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and re-vegetation techniques.
- Construction vehicles and machinery working in the wetland area should employ measures to prevent hydrocarbon pollution such as: using secondary bunding for spills; having a spill kit onsite at all times to deal with different spills (i.e. oil, bitumen etc.); and by making sure all machinery are properly maintained to prevent leakages.
- Construction vehicles and machinery may not be serviced on site.
- Quality control checks should be done by an Environmental Site Officer on site. At least once during each phase of the project.

BIODIVERSITY - FAUNA

Mitigation objective

To avoid and/or reduce the extent to which faunal species, diversity and habitat is negatively affected by activities related to the construction and operational phases of the project, and to promote positive impacts on habitat recovery by implementing certain practices during construction the phase that will benefit the ecosystem post operational phase.

Mitigation measures

The following methods should be employed to reduce impact on vegetation diversity during the construction and operational phases of the project:

- In order to minimize the disturbed area and disturbance impact the project should be completed as soon as possible in order for the habitat to return to a state of recovery before the next rain season.
- No trapping or hunting of fauna is to take place, with specific reference to construction phase activities when an increase in human activity is expected.
- It must be ensured that all areas of increased ecological sensitivity are taken into account during all development phases. No activities are to needlessly infringe upon these areas.
- All areas of increased ecological sensitivity should be marked with a buffer area around it as such and be off limits to all vehicles and personnel.
- It must be ensured that as far as possible all infrastructures, including temporary facilities is placed outside of sensitive faunal habitat areas
- All faunal habitat areas, where disturbed, are to be rehabilitated to ensure that faunal ecology is re-instated upon completion of construction works.
- All construction staff should undergo an environmental induction from a suitably qualified person to make sure they understand the difference between exotic and indigenous fauna and the importance of their conservation.
- Any fauna directly threatened by the construction activities such as earthworks should be removed to a safe location by a person suitable to do so (Search and Rescue).
- All areas of increased ecological sensitivity should be marked as such and be off limits to all vehicles and personnel.
- No fires should be allowed on-site. However, the relatively intact patch of grassland in the bridge area should be burned pre-construction under controlled conditions by an appointed professional. A search and rescue effort must be made to ensure all faunal species escape the effects of fire.
- All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises, as well as to minimize dust generation.
- All construction vehicles to remain on demarcated roads and access routes.
- Existing and planned road verges should be cleaned up as part of the road upgrading and waste / littering removed to permitted landfill site.
- Any road kills found during construction should be reported to the Environmental Site Officer.

LANDSCAPE CONNECTIVITY AND BROAD SCALE ECOLOGICAL PROCESSES

Mitigation Measures

- If any parts of the infrastructure need to be fenced-off, this should be in a manner which does not pose a threat to fauna, and as such no electrical stands should be placed within 30cm of the ground.
- Regular monitoring for alien plants within the development area during operation.
- All alien plants present at the site should be controlled at least biannually using the best practice methods for the species present and make out part of operational maintenance management.
- Regular monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. All erosion problems observed should be rectified as soon as possible, using the appropriate flow management and erosion control structures.
- All maintenance vehicles to remain on the demarcated access roads.

HEALTH AND SAFETY

Mitigation objective

To manage construction activities so that impacts on health and safety risks to local residents, contractors, employees and animals are reduced and where possible all together avoided.

Mitigation measure(s)

- Develop or apply standard Health and Safety Precautions which will include specific procedures on chemical hazards, fire and explosions, heavy lifting, work at heights, confined spaces and on site-traffic hazards. The implementation of practical health and safety procedures would reduce the risk of injury and promote a culture of safe working practices. This plan must be adhered to by the appointed construction contractors and meet OHS Act, requirements. These requirements should be implemented by the designated Health & Safety Officer.
- Potentially hazardous areas must be clearly demarcated (i.e. unattended foundation excavations).
- Appropriate Personal Protection Equipment (PPE) must be worn by construction personnel and site visitors (e.g. footwear, masks, protective clothing and goggles) where necessary.
- Undertake a job safety analysis to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards.
- Develop a Traffic Management Plan which provides procedures and guidelines for the safe management of on-site traffic.
- Adapt the existing Emergency Preparedness and Response Plan, where necessary.
- For public safety, the following mitigation measures are provided:
- The correct beacons must be placed at the site of construction prior to the commencement of construction.
- The beacons that will be placed must be visible during the day and night time.
- In the event that pedestrians will be crossing the designated road, guidelines must be provided on site to ensure their safety.
- The management plan must stipulate that the old R575 road may not be closed until the construction phase has ceased at the new road and it is in working order, to ensure an alternative is provided to motorists.

Mitigation objective

The objective of mitigation is to manage operational activities so that impacts on health and safety risks to local residents, contractors, employees and animals are reduced and where possible all together avoided.

Mitigation measure(s)

- Develop a Health and Safety Plan which will include specific procedures on chemical hazards, fire and explosions, heavy lifting, work at heights, confined spaces and on site-traffic hazards. The implementation of health and safety procedures would reduce the risk of injury and promote a culture of safe working practices. This plan must be adhered to by the appointed construction contractors and plant operations staff and meet OHS Act requirements.
- Firefighting equipment (e.g. fire hydrants, fire hose reels and an automatic sprinkler system) shall be installed to meet the minimum requirements of the OHS Act.

TRAFFIC

Mitigation Objectives

To reduce the inconvenience and safety risks associated with traffic deviation during construction phase.

Mitigation Measures

- Ensure that construction activities are staggered and vehicular activities are kept to a minimum, during daylight hours and as far as possible outside of peak traffic times.
- The contractor must ensure that half the road remains open or a bypass is available at all times when constructing bridge sections across the road.
- Adequate traffic signage and barricading guiding road users will be present at all times during construction.
- The transport of fuels on public roads is governed by the National Road Traffic Act and as such vehicles and drivers must meet stringent safety controls.
- A Traffic Management Plan should be developed to provide procedures and guidelines for the safe management of on-site traffic.
- It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.

LOCAL ECONOMY

Mitigation objective

The objective of enhancement is to optimize opportunities for employment and procurement of local labor and services, wherever possible, or alternatively that procurement at a regional or national level should take place.

Mitigation Measures

- For this project a recruitment and procurement procedure will be followed which sets reasonable targets for the employment of local residents and South African, suppliers (originating from the local municipalities) and promote the employment of women as a means of ensuring that gender equality is attained. Criteria will be set for prioritizing local (local municipalities) residents/suppliers over regional or national residents/suppliers.
- All contractors will be required to recruit and procure in terms of standard recruitment and procurement processes according to the Public Finance Management Act (No 1 of 1999) (PFMA).
- Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the Project. This will help to ensure that they have future opportunities to provide goods and services to the sector.

WETLANDS

Mitigation objective

To protect wetlands in the area.

Mitigation measures

- The nature of the proposed development (road) means that it is necessary to cross the wetland areas within the project footprint, especially during bridge construction; disturbance to any wetland crossing must be minimized and suitably rehabilitated.

- Ensure that bridge structures which may be upgraded do not alter stream flow patterns to ensure that flow is maintained and that movement of wetland faunal taxa is afforded.

- Connectivity of the wetland features in the system need to be maintained in order to ensure linear protection of water quality within these systems as well as ensuring the continuity of the habitats and resources.

- It must also ensure that obstruction of flow does not take place or for very short periods if this cannot be avoided.

- Any activities occurring within the wetland boundary, including rehabilitation, must be authorized by the DWA in terms of Section 21 (c) & (i) of the National Water Act (Act 36 of 1998).

- No vehicles should be allowed to drive through designated sensitive wetland areas during the eradication of alien and weed species.
- The boundaries of footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas.
- It must be ensured that flow connectivity along the wetland features is maintained.
- Reprofiling of the banks of disturbed wetland areas.
- Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles.
- All vehicles should remain on designated roads with no indiscriminate driving through area.
- Rehabilitate the wetland zone to ensure that the watercourse functions are re-instated.
- Implement alien vegetation control program within wetland zone.
- Re-vegetate all disturbed areas with indigenous wetland species.
- If it is absolutely unavoidable that wetlands will be affected, especially during construction, disturbance to any wetland crossings must be minimized and suitably rehabilitated.
- Reprofiling of the banks of disturbed wetland areas.
- Restrict construction to the drier months if possible to avoid sedimentation of the wetland features.
- Edge effects of activities including erosion and alien/ weed control need to be strictly managed in the wetland area.
- As much vegetation growth as possible should be promoted within the Wetland in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, wetland and rehabilitation planting (where applicable) are to be implemented.
- Planning of temporary roads and access routes should take the site sensitivity plan into consideration. If possible, such roads should be constructed a distance from the more sensitive wetland areas and not directly adjacent thereto.
- Areas of increased ecological importance and sensitivity, such as the wetland areas should be considered during all phases of development planning, construction and operations.
- It must be ensured that as far as possible all infrastructures, including temporary facilities is placed outside of sensitive potential RDL faunal habitat areas, with special mention of wetland areas.