
KRIEL LIME PLANT UPGRADE MPUMALANGA PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

February 2019

Prepared for:

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PROJECT DETAILS

Title	:	<u>Final</u> Environmental Management Programme: Kriel Lime Plant Upgrade, Mpumalanga Province
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Client	:	Eskom Holdings SOC Limited
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DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process, or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows/occur in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

- (i) The land, water and atmosphere of the earth;
- (ii) Micro-organisms, plant and animal life;
- (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- (iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental assessment practitioner: An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Incident: Section 30 of NEMA defines an 'incident' as "an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed."

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances).

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister.

ABBREVIATIONS AND ACRONYMS

AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BA	Basic Assessment
COC	Cycle of Concentration
CWT	Cooling Water Treatment
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DME	Department of Minerals and Energy
DOT	Department of Transport
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ELM	eMalahleni Local Municipality
EMPr	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
Ha	Hectare
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km ²	Square kilometres
km	Kilometres
KPS	Kriel Power Station
kV	Kilovolt
m ²	Square meters
m ³	Cubic meters
MDEDET	Mpumalanga Department of Economic Development and Tourism
MW	Mega Watt
NDM	Nkangala District Municipality
NDMSPDF	Nkangala District Municipality Spatial Development Framework
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency

SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SOC	State Owned Company
SDF	Spatial Development Framework
TDS	Total Dissolved Solids
UWS	Usuthu Water Scheme
VWS	Vaal Water Scheme
WWTP	Waste Water Treatment Plant

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LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS

An overview of the contents of the Environmental Management Programme, as prescribed by Appendix 4 of the 2014 EIA Regulations (GNR 326) as amended, and where the corresponding information can be found within the reported is provided in **Table 1.1**

Table 1.1: Legal requirements in terms of the EIA regulations

EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)	Cross-reference in this Environmental Management Programme
Content of environmental management programme (EMPr)	
(1) (a) An EMPr must comply with section 24N of the Act and include: <ul style="list-style-type: none"> i. Details of the EAP who prepared the EMPr; and ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae. 	Chapter 4, Section 4.1 Appendix A
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2, Section 2.1 Chapter 3
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Chapter 2, Section 2.1 Appendix C
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through environmental impact assessment process for all phases of the development including- <ul style="list-style-type: none"> (i) planning and design (ii) pre-construction activities (iii) construction activities (iv) rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities; 	Chapter 5, 6 and 7
(f) a description of proposed mitigation management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to- <ul style="list-style-type: none"> (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation 	Chapter 5, 6 and 7
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f)	Chapter 5 Section 5.2.1-5.2.8 Chapter 6 Section 6.1 Chapter 7 Section 7.1
(i) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 5, 6 and 7
(j) an indication of the persons who will be responsible for the implementation of the impact management actions;	Chapter 5 Section 5.1
(k) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Chapter 2 Section 2.5.3

EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)	Cross-reference in this Environmental Management Programme
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 5.2.6, 5.2.7 and 5.2.8
(m) an environmental awareness plan describing the manner in which- <ul style="list-style-type: none"> i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and ii. risks must be dealt with in order to avoid pollution or the degradation of the environment; and. 	Chapter 6
(n) any specific information that may be required by the Competent Authority	
(2) where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	

CHAPTER 1: INTRODUCTION

This final Environmental Management Programme has been compiled for Kriel Power Station Lime Plant Upgrade. The project site is located within the confines of the Kriel Power Station, and is located approximately 8km west of Kriel, 27km south of Ogies and 34km north-west of Bethal, in the Mpumalanga Province. In addition, the proposed development falls within the jurisdiction of the eMalahleni Local Municipality and the greater Nkangala District Municipality.

The EMPr has been developed on the basis of the findings of the Basic Assessment (BA), and must be implemented to protect on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all Kriel Power Station employees and contractors working on the pre-construction, construction, operation, and decommissioning of the Kriel Power Station Lime Treatment plant, and forms a binding contract with those parties involved. The document must be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the BA report of the project.

In terms of the Duty of Care provision in S28(1) of the NEMA, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised. In terms of the NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts. While no permitting or licensing requirements arise directly by virtue of the Kriel Power Station Lime Plant upgrades this section will find application throughout the life cycle of the project.

CHAPTER 2: PROJECT DETAILS

Eskom SOC Holdings Ltd is proposing the expansion of the existing Cooling Water Treatment (CWT) Facility at the Kriel Power Station in Mpumalanga. The proposed development will consist of two (2) clarifiers and associated infrastructure being added onto the existing Lime Treatment plants in order to increase the treatment and throughput capacity of these plants at the station. Furthermore, a preferred site, consisting of a single affected property has been identified by Eskom for the expansion of the two lime plants located on the northern and southern sections of the Cooling Towers. The proposed expansion is anticipated to be approximately 1.96ha in extent within a broader study area of 700ha.

The proposed Kriel Lime Plant upgrades will be located on the following property:

- » Kriel Power Station 65 IS.

The proposed expansion of the lime plants will be undertaken within the existing footprint of the station and will consist of the following infrastructure components:

- » Clarifiers, with a capacity of 1 750m³;
- » A pipeline, with a 600mm width and 500m length; and
- » Desludge Pumps.

A site selection process was undertaken by Eskom Holdings SOC Limited to locate and identify potential sites for the development footprint for the proposed Lime Plant upgrades. Due to the nature of the proposed development, the location of the project site is largely dependent on several factors which include:

- » The location in relation to the existing Lime Treatment plants;
- » Size of the property to undertake upgrades on the Lime Treatment plants;
- » Availability of the site for development;
- » Existing Lime Treatment Plant infrastructure is already available (proposed development footprint will consist of add-ons to the existing infrastructure (i.e. clarifiers)); and
- » Accessibility to major road infrastructure.

Based on the above set of factors taken into consideration, Eskom Holdings SOC Limited identified these areas (refer to **Figure 2 and 3**) as the most suitable from a technical and environmental perspective for the proposed Lime Plant upgrades. Thus, the site assessment/site selection matrix was undertaken within the existing development footprint of the Kriel Power Station, as the proposed upgrades are to be constructed on existing lime plants located within the boundaries of the station.

In the view of the above, the Kriel Power Station as a project site adheres to the characteristics considered in the site selection process in the following ways:

- » The aerial extent of the station is considered sufficient enough to accommodate infrastructure (i.e. clarifiers) associated with the proposed Lime Treatment plant upgrades.
- » The project site(s) are adjacent to the existing cooling water infrastructure. Therefore, there will not be a great need for an additional lengthy pipeline network within the power station.

- » Accessibility to the Kriel Power Station is possible via the D356 and R545 roads. These routes connect to other local and provincial routes within the region allowing for widespread accessibility.
- » The property on which the proposed development will be undertaken is already owned by the applicant, Eskom Holdings SOC Limited.

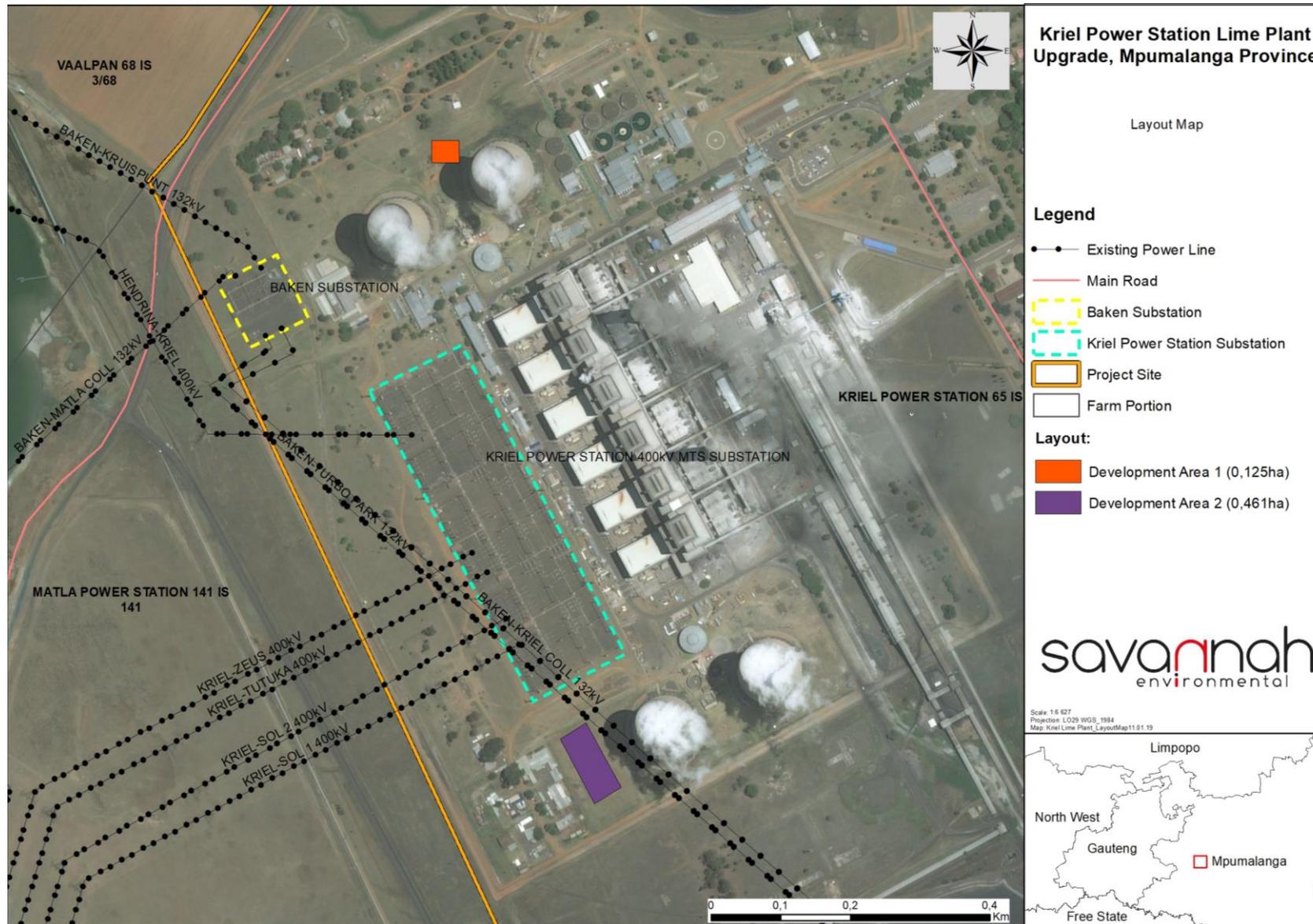


Figure 1: Locality map showing the location of the proposed Kriel Lime Plant upgrades at the Kriel Power Station.

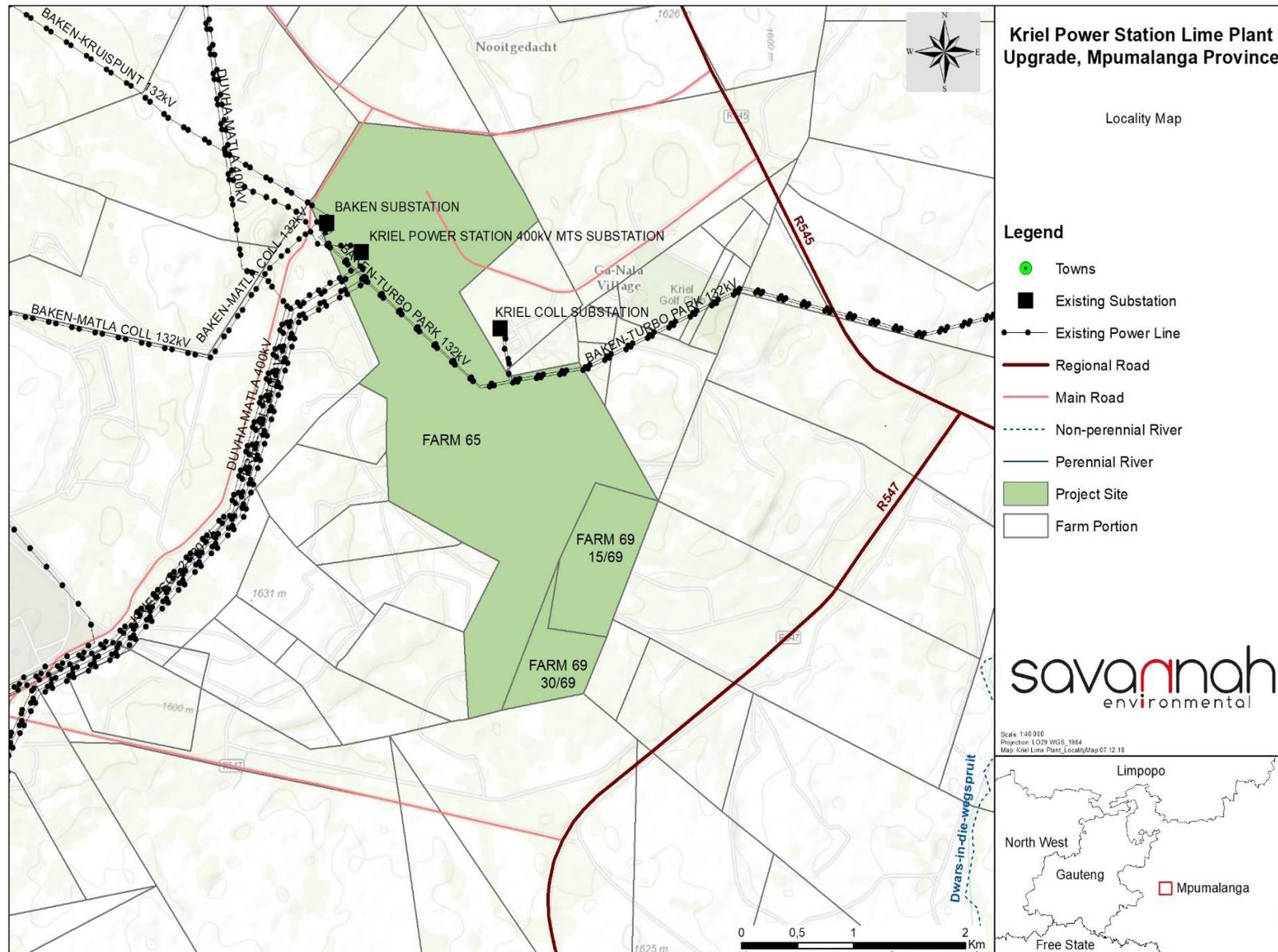
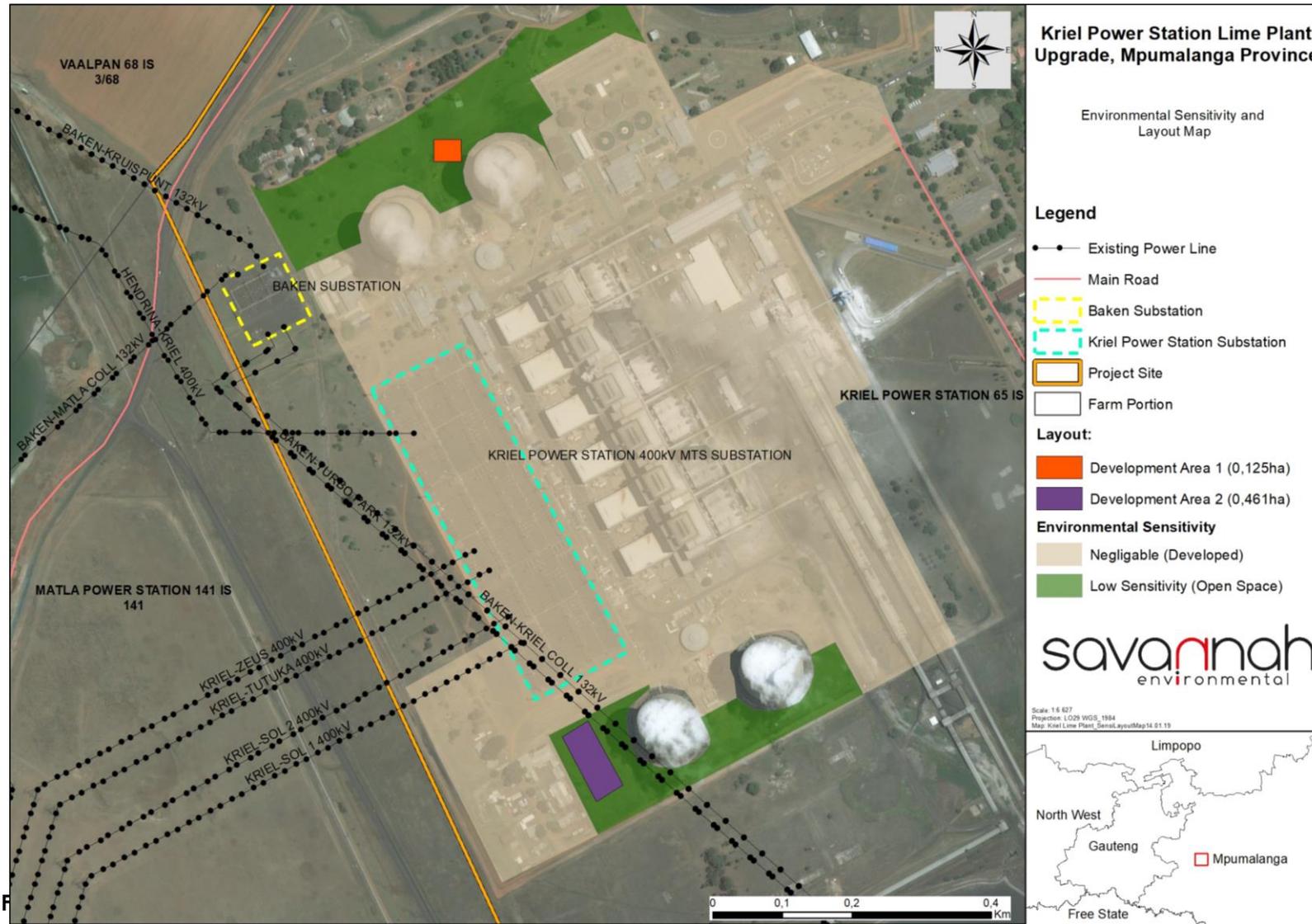


Figure 2 : Layout map showing the location of the project site.



osed upgrades.

Table 1.2: A detailed description of the Kriel Power Station Lime Plant Upgrade

Province	Mpumalanga Province	
District Municipality	Nkangala District	
Local Municipality	eMalahleni Local Municipality	
Ward number(s)	23	
Nearest town(s)	Kriel, Ogies and Bethal	
Affected Properties: Farm name(s), number(s) and portion numbers	Kriel Power Station 65 IS, Portion 0	
SG 21 Digit Code (s)	T0IS00000000006500000	
Current zoning	Agriculture	
Site co-ordinates (centre of affected properties)	Latitude	Longitude
North Cooling Towers	29°10'31.16"E	26°15'5.95"S
South Cooling Towers	29°10'46.42"E	26°15'32.31"S

2.1. Findings of the Environmental Impact Assessment

The findings of the BA report provide a detailed assessment of the potential impacts that may result from the development of the Lime Treatment Plant upgrades. This section provides a conclusion to the environmental assessment of the proposed development by providing a summary of the conclusions of the assessment of the project site and development footprint for the Lime Treatment Plant upgrades. In so doing, it draws on the information gathered as part of the BA process and the knowledge gained by the environmental assessment practitioner (EAP), Specialists and presents an informed opinion of the environmental impacts associated with the proposed development.

From the conclusions of the detailed BA process undertaken no environmental fatal flaws were identified to be associated with Kriel Power Station Lime Plant upgrade provided that the recommended mitigation measures are implemented, specifically in terms of avoidance of sensitive features within the development footprint and the undertaking of the construction and operational monitoring as specified by the EAP and Specialists. The development footprint was designed by the Developer in order to respond to and avoid any sensitive environmental and social features located within the project site. This approach ensured the application of the mitigation hierarchy (i.e. avoid, minimise and offset) to the Kriel Lime Plant Upgrade project which ultimately ensures that the development is appropriate from an environmental perspective and is suitable for development within the project site and its environmental challenges. The application of the mitigation hierarchy was undertaken by the developer prior to the commencement of the BA process for Environmental Authorisation, as detailed in the BA report. Therefore, it is concluded that the development footprint is suitable and appropriate from an environmental perspective for the access road and will not have a detrimental impact on any sensitive features present.

The potential environmental impacts associated with the Kriel Lime Plant Upgrade identified and assessed through the BA process include:

- » Impacts on vegetation.

- » Impacts on the Ecology
- » Soil compaction and erosion impacts.
- » Impacts on air quality.
- » Heritage and Palaeontological Impacts
- » Domestic and Hazardous Waste impacts.
- » Positive and Negative socio-economic impacts.
- » Traffic impacts.

2.1.1 Impacts on the Ecology

The proposed development footprint presently consists of cultivated and manicured lawns. Thus, during the construction and decommissioning phases of the lime plants, the lawns will be cleared of to make way for the commencement of these phases. This impact is considered as negligible taking into consideration that the proposed development will be undertaken on a brownfields location, the Kriel Power Station.

In the view of the above, from an ecological perspective, the proposed Kriel Lime Plant Upgrade project site is thus considered to represent a broadly suitable environment for the proposed expansion of the lime treatment plants at the station. Furthermore, there are no specific long-term impacts, residual impacts or fatal flaws from a terrestrial ecological perspective likely to be associated with the expansion of the lime treatment plants. Therefore, it is the view of the EAP that the Kriel Lime Plant Upgrade project be authorised, subject to the implementation of the recommended mitigation measures included in the Basic Assessment & EMPr.

2.1.2 Soil compaction and erosion impacts

Site clearing activities such as earthworks on site will create soil compaction and erosion impacts during the construction and decommissioning phases of the project. This follows the removal of the manicured lawns on the project development footprint, which will expose the soil to effective erosion agents such as wind and surface water run-off, thus increasing the soil's susceptibility to erosion.

In the view of the above, the anticipated impacts on soil due to the compaction of surfaces and erosion are considered negligible, provided the mitigation measures included in this EMPr are implemented. Therefore, it is the view of the EAP that the Kriel Lime Plant Upgrade project be granted authorisation by the Competent Authority on the grounds that mitigation measures included in the EMPr are implemented.

2.1.3 Heritage and Palaeontological Impacts

The proposed development footprint lies atop the fossiliferous Vryheid Formation, however, low significance impacts are only anticipated within the construction phase of the project life-cycle. Findings from the heritage impact assessment exemption letter indicate that there are no historic, Stone Age, or Iron Age heritage sites within the project site and the proposed development footprint. Nevertheless, the findings of the palaeontological desktop study indicate that impacts associated with the possible finds of fossils within the area are anticipated during the construction phase, and a **Fossil Find Procedure** has been included as part of this final EMPr within this Report. However, the impacts anticipated with respect to fossil finds are during the construction phase of the lime plant upgrades. No impacts are anticipated during the operation phase of the development.

2.1.4 Domestic and Hazardous Waste impacts

The construction, operation and decommissioning phase of the proposed Lime Plant upgrades has the likelihood to generate domestic and hazardous waste during the life cycle of the project. The construction phase will entail the generation of solid waste, namely litter and cement rubble. However, the effect of these are considered negligible provided the mitigation measures included in the EMP are implemented.

The operation phase of the Lime Treatment plants will involve the generation of hazardous waste in the form of sludge, however it is anticipated that the sludge will be disposed of in accordance with the station's waste management procedures. Furthermore, the decommissioning of the plants will involve the stripping of the various plant components, which will be transported and disposed of at a licensed waste disposal facility.

Taking into consideration the mitigation measures included in this EMP regarding domestic and hazardous waste, the EAP is of the view that the Kriel Lime Plant Upgrade be authorised provided the mitigation measures included in the report are implemented.

2.1.5 Noise Impacts

Site clearing activities during the construction phase of the Lime Plant upgrades could increase the ambient noise levels at the station following the presence of heavy construction machinery on site (i.e. graders and tippers). However, it is anticipated that construction activities will be restricted to day time hours only.

Therefore, the construction phase of the Lime Treatment Plant upgrades in terms of the noise impacts are considered negligible, with a medium to low significance. This follows the fact that the turbines at the station already generate a substantial amount of noise, thus the presence of heavy construction machinery is insignificant from a noise perspective.

In the view of the above, the EAP concluded that the Kriel Lime Plant upgrades could result in an increase in ambient noise levels, however, the impacts can be mitigated to a low significance provided the mitigation measures are implemented (provision of PPE and restriction of activities to day time hours). Therefore, a potential increase in the noise levels is not considered a fatal flaw and it is on these grounds that the proposed development is considered acceptable from a noise perspective.

2.1.6 Impacts on Air Quality

The proposed development has a likelihood of generating dust emissions as a result of site clearing activities, and movement of construction machinery at the station. However, this impact has a medium to low significance provided the mitigation measures included in this EMP are implemented. Therefore, from an air quality perspective, the dust emissions are negligible (provided mitigation measures are implemented), and do not pose a fatal flaw to the proposed development.

2.1.7 Health and Safety Impacts

Negative impacts due to health and safety aspects are possible for the during the construction, operation and decommissioning phases of the proposed development. However, the significance of these possible impacts from a health and safety perspective are considered medium to low, provided the mitigation measures included in this EMP are implemented. Recommended mitigation measures include, the

implementation of the Emergency Preparedness Plan (RIR013) available at the station by the Contractor and sub-contractors, and the issuance of Personal Protective Equipment (PPE) to workers on site.

2.1.8 Positive and Negative socio-economic impacts

The detailed BA process undertaken by the EAP identified positive and negative impacts from a socio-economic perspective in terms of the proposed development. Typical examples of positive socio-economic impacts associated with the proposed development include, the creation of employment opportunities for Kriel residents, attainment of household income, and skills development and transfer. The negative socio-economic impacts associated with the construction phase of the Lime Plant upgrades includes a possible influx of migrant labour and job seekers, a change in the sense of place and potential security issues for the station (i.e. possibility of theft).

During the operation phase of the Lime Treatment plants, only positive impacts are expected to occur. No negative impacts have been identified or assessed. The positive operation phase impacts include stimulation of the economy, the creation of long-term employment (i.e. lime plant operators), increase in household income, skills development and an increase in government revenue (i.e. PAYE taxes).

In the view of the above, the EAP concluded that the socio-economic benefits associated with the proposed development outweigh the negative socio-economic effects that the development of the Lime Treatment Plant upgrades could create. Therefore, from a socio-economic perspective, the proposed development should be authorised by the Competent Authority.

2.1.9 Impacts on Traffic

During the construction phase, Contractors will take delivery of various components required for the construction of the clarifiers and pipelines. This includes, the transportation of heavy construction equipment (i.e. graders and back-hoe loaders/tractors) to the station. In addition, workers employed for the duration of the construction phase will be transported to and from the station by road transport. Therefore, taking into consideration the location of the project site, the scale of the development and the road infrastructure already in place, the project presents no fatal flaws from a traffic perspective.

The operational phase of the Lime Treatment plants will generate limited vehicle trips, as negligible traffic on the station is expected during periods of maintenance and refurbishment of the plants, and during lime powder delivery times. However, during the decommissioning phase of the plant, an increase in traffic is anticipated following the transportation of plant components from the station to licenced waste disposal sites.

2.1.10 Overall Impact

Overall, the impacts associated with the expansion of the Lime Treatment plants and associated infrastructure are considered to be of an acceptable significance and can be mitigated successfully in order to ensure that the development will not create any detrimental environmental impacts that will be long-term and unacceptable. Therefore, through the undertaking of the Basic Assessment process, the EAP and Specialists identified areas of high and low sensitivity to be associated with the development of the Lime Treatment plant upgrades and associated infrastructure situated within the study area of ~700ha in extent.

In the view of the above, refer to **Figures 4 and 5** for a sensitivity map of the Lime Treatment Plant upgrades development areas.

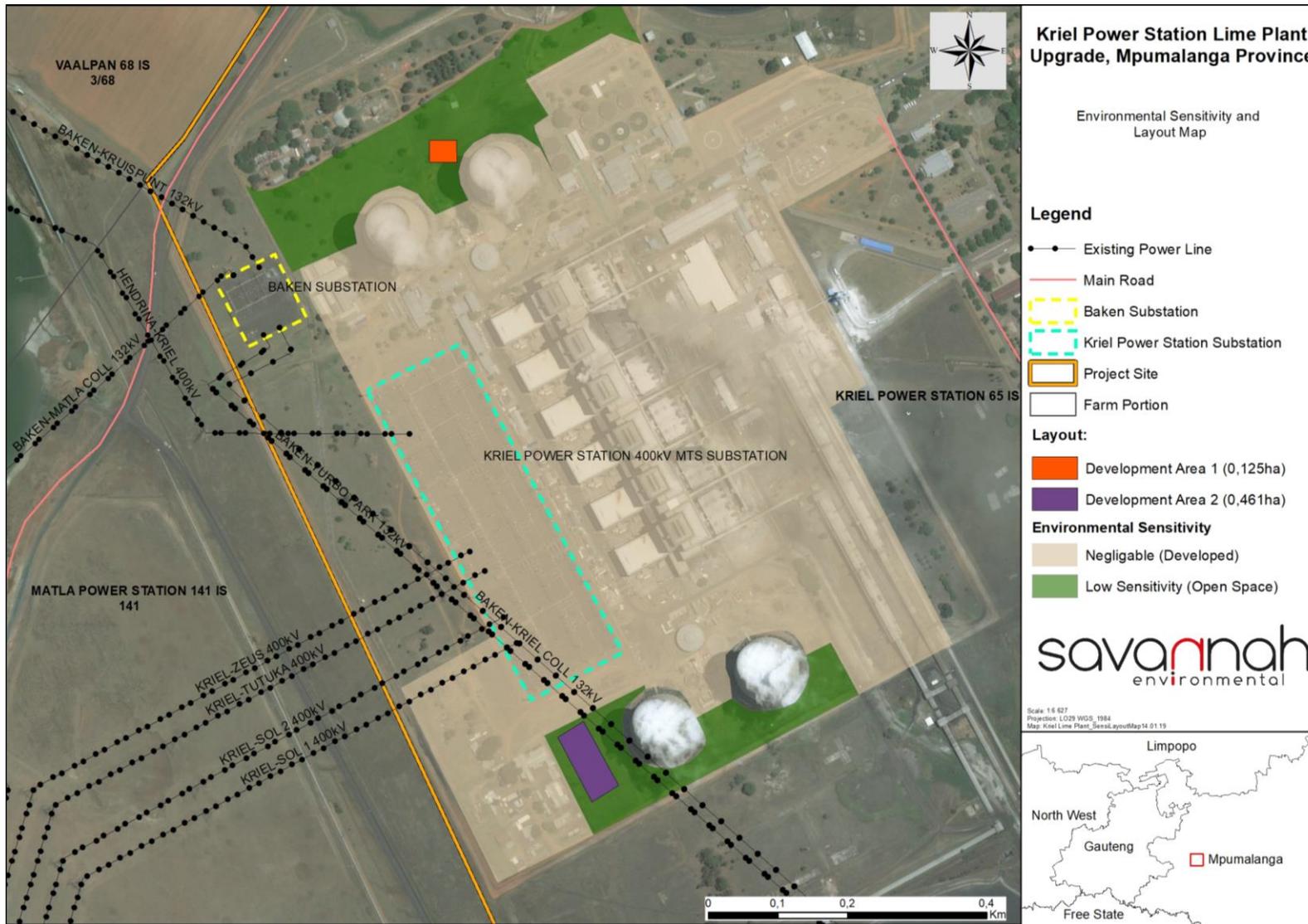


Figure 4: Map illustrating the ecological sensitivity of the proposed Lime Treatment Plant upgrades project site overlain with the identified development areas

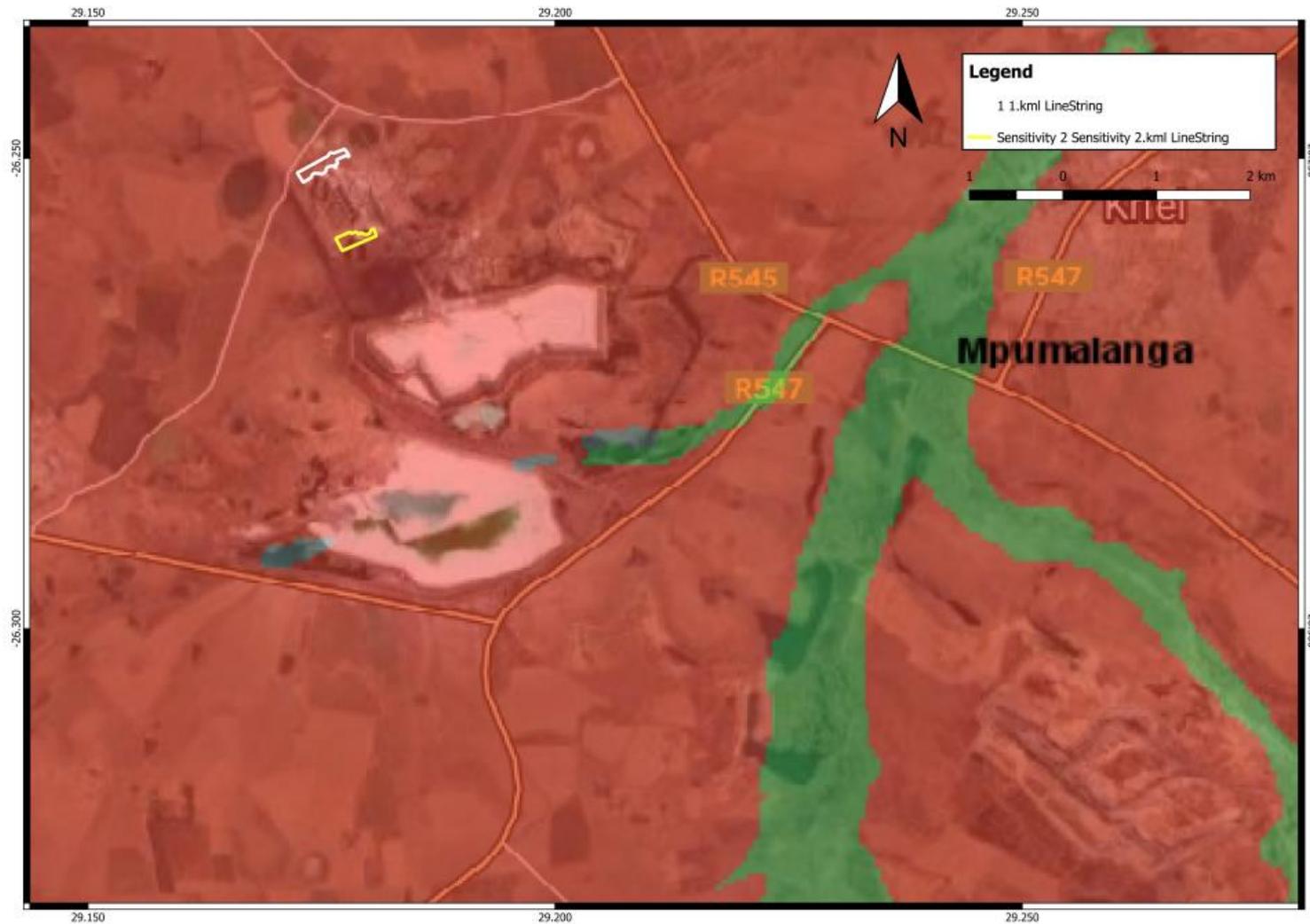


Figure 5: A Map showing the palaeontological sensitivity associated with the Kriel Power Station Lime Treatment Plant upgrade development. A key is found in **Table 1.3** which includes descriptions of a SAHRIS Palaeontological Sensitivity Map

Table 1.3: Descriptions of a typical SAHRIS Palaeontological Map as shown above

Colour	Sensitivity	Required Action
Red	Very High	field assessment and protocol for finds is required
Orange/Yellow	High	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
Green	Moderate	desktop study is required
Blue	Low	no palaeontological studies are required however a protocol for finds is required
Grey	Insignificant/Zero	no palaeontological studies are required
White/Clear	Unknown	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Table 1.4: Activities Associated with Planning, Construction, Operation and Decommissioning phase of the Lime Plant upgrades

<u>Design and Planning Phase</u>	
Requirements	» Conduct technical surveys prior to initiating construction.
Activities to be undertaken	
Conduct surveys	» Including, but not limited to: a geotechnical survey, site survey and confirmation of the clarifier and pipeline location and any other ancillary infrastructure related to the project.
<u>Construction Phase</u>	
Requirements	<ul style="list-style-type: none"> » Create direct construction employment opportunities for a 16 month period. » No on-site labour camps. Employees to be accommodated in the nearby areas such as Kriel, Ogies and Thubelihle, and transported to and from site on a daily basis. » Waste removal and sanitation will be undertaken in accordance with the Kriel Power Station Waste Management Procedure. In addition, containers for hazardous and domestic waste will be strategically positioned at conspicuous locations on site. » Water will be required for the construction phase, will be sourced from existing reservoirs within the station.
Activities to be undertaken	
Undertake site preparation	<ul style="list-style-type: none"> » Including the clearance of vegetation at the footprint of each clarifier, establishment of the laydown areas, and the establishment of trenches for the pipelines (where possible). » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site, and will be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion.
Establishment of Laydown Areas.	» A laydown area for the storage of clarifier and pipeline components, including the civil engineering construction equipment required.

	<ul style="list-style-type: none"> » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding area.
Transport of components and equipment to and within the site	<ul style="list-style-type: none"> » Components to be transported to the station in sections on flatbed trucks by via the N12, N11, R545 and the D356 to the station. » Transportation will take place via appropriate National and Provincial roads, and the dedicated access road to the site. » Components considered as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989), will be transported once a valid permit from the traffic department has been obtained. » Specialised construction and lifting equipment to be transported to site. » Civil engineering construction equipment to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, site offices etc.).
Construction of clarifiers and associated infrastructure	<ul style="list-style-type: none"> » Construction of clarifiers and associated infrastructure as per the engineering designs and specifications
Undertake site rehabilitation	<ul style="list-style-type: none"> » Commence with rehabilitation efforts once construction is completed around all affected areas by the construction of the clarifiers and pipeline. Ensure all construction material including Contractor site offices are removed from the station. » Areas on site that will not be required for the operation phase will be closed and prepared for rehabilitation.
<u>Operation Phase</u>	
Requirements	<ul style="list-style-type: none"> » Duration will be 20-25 years. » Current Eskom engineers and technical staff will undertake maintenance activities as and when required. » Employment opportunities relating mainly to operation activities.
Activities to be undertaken	
Operation and Maintenance	<ul style="list-style-type: none"> » Full-time operators and control room staff. » Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation phase of the plant.
<u>Decommissioning Phase</u>	
Requirements	<ul style="list-style-type: none"> » Decommissioning of the Lime Treatment Plant infrastructure at the end of the economic life of the power station in 2038. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	<ul style="list-style-type: none"> » Confirming the integrity of site access to accommodate the required equipment. » Preparation of the site (e.g. laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble/demolish clarifiers and remove the pipeline.	<ul style="list-style-type: none"> » Components to be reused, recycled, or disposed of in accordance with regulatory requirements. » All parts of the pipeline would be considered reusable or recyclable. » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. » Cables will be excavated and removed, as may be required.

Components to be disposed of or recycled.	<ul style="list-style-type: none">» Pipeline» Steel components of the clarifiers» Pumps» Control Room Components (electrical wires etc.).» Regarding the foundation body and sub-base of the tower, the concrete will undergo crushing and be used as combined base/wearing course» Reinforcing steel will go through cleansing and milling to re-melt the components
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CHAPTER 3: PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced”. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the Lime Treatment plants. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Kriel Power Station Lime Treatment Plant upgrades. The document will be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations ,2014 (as amended). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the Kriel Lime Plant upgrades and/or as the project develops. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

The EMPr has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Kriel Lime Treatment Plant upgrades.
- » Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the BA process.

The mitigation measures identified within the BA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Eskom SOC Holdings Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the BA process for the Kriel Lime Treatment Plant, it is important that this document be read in conjunction with the BA report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle.

CHAPTER 4: STRUCTURE OF THIS EMPr

The first three chapters provide background to the EMPr and the Kriel Lime Plant upgrades, while the chapters which follow consider the following:

- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

These chapters set out the procedures necessary for Eskom SOC Holdings Ltd as the project owner, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMPr has been structured in a table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below in **Table 1.3**. Furthermore, the objectives and EMPr tables are required to be reviewed and possibly modified throughout the life of the Lime Treatment Plant whenever changes, such as the following occur:

- » Planned activities change (i.e. in terms of the components of the Lime Treatment Plant upgrades).
- » Modification to or addition to environmental objectives and targets.
- » Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent further degradation of the environment.
- » Relevant legal or other requirements are changed or introduced.
- » Significant progress has been made in achieving an objective or target such that it should be re-examined to determine if it is still relevant or should be modified, etc.

4.1. Project Team

In accordance with the requirements of Appendix 4 of the EIA Regulations of 2014 (as amended in 2017), the details of the consulting team from Savannah Environmental (Pty) Ltd responsible for the BA process and compilation of this EMPr are as follows:

- » **Reuben Maroga**, is responsible for the compilation of this EMPr. He holds a Bachelor degree in Environmental Management and has 2 years of experience in the environmental management field. His key focus is on environmental impact assessments, public participation, environmental management programmes and programmes, water use licence applications, as well as ECO work for a variety of projects.
- » **Gideon Raath**, is the principal EAP for this project. He has 4.5 years of work experience in the environmental consulting industry. Furthermore, Gideon has an MSc in Environmental Management and Geography and is registered with SACNASP (11718), and his particular focus is on environmental impact assessments mainly within the renewable energy (wind and solar) sector, as well as for infrastructure (roads, pipelines and power line) related projects.

- » **Nicolene Venter**, a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). Her line of work pertains to managing the public participation process of Environmental Impact Assessments and Basic Assessments undertaken by Savannah Environmental (Pty) Ltd.
- » **Jo-Anne Thomas**, is a Director at Savannah Environmental (Pty) Ltd. Jo-Anne has a Master of Science Degree in Botany (M.Sc. Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP). She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past 20 years. She has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **Appendix A**, and those of the Specialists in **Appendix B** of this EMPr,

The Savannah Environmental team has extensive knowledge and experience in environmental impact assessment and environmental management, having been involved in EIA processes for more than twelve (12) years. They have managed and drafted Environmental Management Programmes for various waste water treatment infrastructure development projects throughout South Africa

Table 1.3: An example of the detailed EMPr table for the proposed Lime Treatment Plant upgrades at the Kriel Power Station.

PHASE									
Project Component/s									
No	Aspect	Potential Impact	Outcome	Mitigation measures/management actions	Responsible Persons	Time period for implementation	Implementation indicator (KPI)	Monitoring Mechanism & staff responsible	Monitoring Method & Frequency

This table is completed in the sections below to address each of the impacts identified through the Basic Assessment process, in accordance with the specifications of Appendix 4: Content of environmental management programme (EMPr), of GNR 326, EIA Regulations (as amended, 2017).

CHAPTER 5: MANAGEMENT PROGRAMME: CONSTRUCTION PHASE

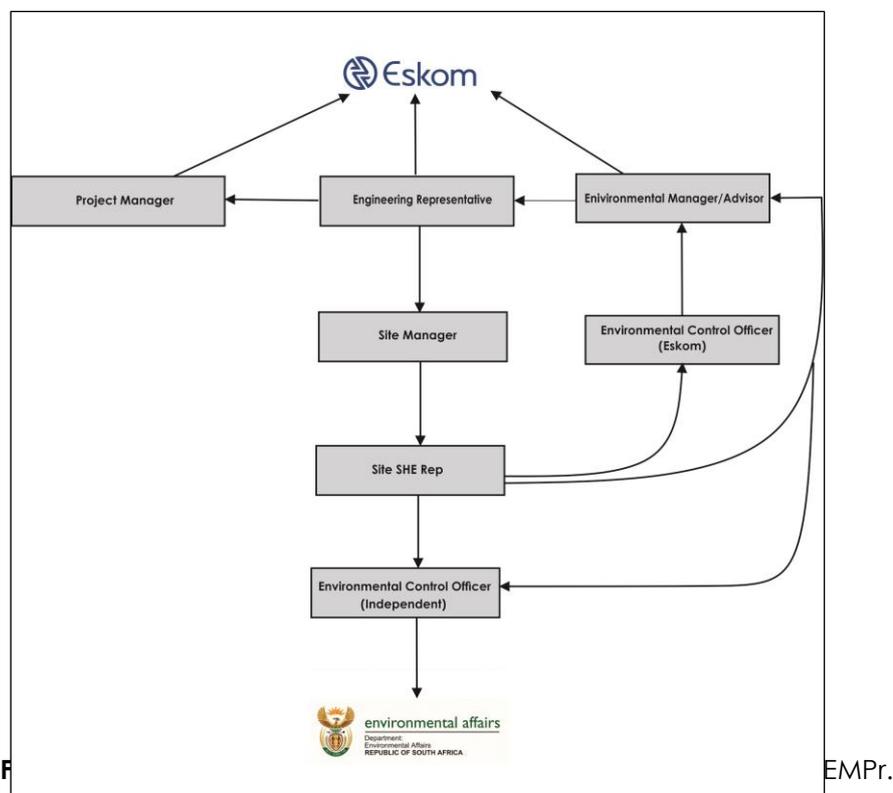
Overall Goal: undertake the pre-construction (planning and design) phase in a way that:

- » Ensures that construction activities are properly managed in respect of environmental aspects and impacts.

5.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Eskom Holdings SOC Limited must ensure that the implementation of the Lime Plant upgrades complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. Eskom will retain various key roles and responsibilities during the construction of the facility.

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager; Engineer Representative; Environmental Manager; Environmental Officer; Environmental Control Officer; SHE Representative and the Contractor for the construction phase of this project are detailed below. Therefore, **Figure 5** provides an organogram indicating the organisational structure for the implementation of the EMPr.



Project Manager (PM) will:

- » Be responsible for managing the proposed Lime Plant Upgrade development, contractors and consultants, as well as ensuring that the environmental management requirements are met. All decisions pertaining to environmental procedures must be approved by the PM. Authority is bestowed on the PM to stop any construction-related activity in contravention of the EMPr in accordance with an approved disciplinary procedure.
- » Ensure that all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these before commencing with any activity on site.
- » Ensure that Eskom Holdings SOC Ltd and its Contractor(s) are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be fully conversant with the contents of the BA report compiled for this project; the EMPr, the conditions stipulated in the EA (once issued), and all relevant environmental legislation; and
- » Also be fully knowledgeable with the contents of all relevant licences and permits issued for the Kriel Power Station (KPS).

Engineer Representative (ER) will:

- » Be responsible for issuing instructions to the Contractor(s) including variation orders (VOs) as and when required subsequent to requests by the EM, EO or ECO.
- » Oversee site works, liaise with Contractor(s) and the ECO.

Environmental Manager/Environmental Officer (EM/EO) will:

- » Be appointed by Eskom as their representative at the KPS. He/she is not independent but must act on behalf of Eskom with the mandate to enforce compliance under the proposed Lime Plant Upgrade project contract which must include the EMPr.
- » Possess the relevant qualifications and preferably competent in construction related methods and practices.
- » Be part of the project team and be an active participant in all aspects of the proposed project planning that can potentially influence environmental conditions at the KPS.
- » Be present during relevant project meetings and provide feedback on potential environmental issues associated with the proposed Lime Plant Upgrade.
- » Ensure contents of the EMPr are clearly communicated to the Contractor(s) and ensure all site staff attend a site-specific induction programme and an environmental awareness training session prior to site handover to Contractor(s).
- » Conduct regular inspections to monitor compliance in terms of the EMPr
- » Issue non-compliances and hazard certificates.

Site Manager (SM) (Contractor's on-site Representative) will:

- » Be fully knowledgeable with the contents of the BA and risk management;
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued);
- » Be fully knowledgeable with the contents of the EMPr;
- » Have overall responsibility of the EMPr and its implementation;

- » Ensure that no actions are commissioned which potentially harm or may indirectly cause harm to the environment, and take steps to prevent pollution on site;
- » Confine activities to the demarcated construction site;
- » Ensure that all employees and co-contractors are compliant with the requirements and provisions of this EMPr;
- » Prepare method statements;
- » Discuss implementation and compliance with this document with staff at routine site meetings;
- » Report progress regarding the implementation of non-conformances in terms of this document at site meetings with the EM, EO and ECO;
- » Ensure appropriate documentation and records are available to the EM/EO and ECO;
- » Notify the ECO of all incidents, accidents and transgressions on site pertaining to the requirements stipulated in this document as well as of any corrective actions/remedial actions taken;
- » Inform the EM/EO and ECO of any issues arising from the implementation of the EMPr; and
- » Inform the EM/EO and ECO of any complaints received.

An independent, suitably experienced **Environmental Control Officer (ECO)** must be appointed by Eskom Holdings SOC Limited prior to the commencement of any authorised activities. The ECO will be based at the KPS and will be responsible for monitoring, reviewing and verifying compliance by the Contractor in terms of the requirements provided in the EMPr and the Environmental Authorisation. Therefore, the ECO will:

- » Be on site before the commencement of any construction-related activities. He/she must endeavour to form an integral part of the proposed project team.
- » Be fully knowledgeable with the contents of the conditions of the Environmental Authorisation (once issued), EMPr, and any environmental permits issued at the Kriel Power Station (i.e. WUL, AEL etc.)
- » Conduct compliance audits in terms of the EMPr, EA and any other applicable environmental legislation.
- » Liaise with relevant authorities (i.e. DEA, DWS and the project team).
- » Communicate contents of the EMPr to the Contractor(s) site staff and visitors.
- » Ensure that the Site Manager and co-contractors are continuously made aware of EMPr contents through discussion.
- » Ensure that the compliance of the EMPr, EA and the relevant environmental legislation is monitored through regular and comprehensive inspections of the site and surrounding areas.
- » Ensure that if the EMPr, EA and/or the legislation provisions, regulations or specifications are contravened, then appropriate corrective and remedial actions are undertaken to address non-compliances.
- » Ensure that the Site Manager has provided input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site adhere to and comply with all applicable environmental legislation.
- » Undertake periodic environmental monitoring and verification to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- » Keep record of all activities on site, issues identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Ensure that the compilation of progress reports for submission to the PM, ER and EM, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.

- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

The ECO shall remain employed and undertake compliance audits until all rehabilitation measures, as may be required, are completed and the site handed over for operation.

Contractors and Service Providers: It is important that contractors are aware of their duties & responsibilities in terms of applicable environmental legislation and the contents of this EMPr. The contractor is hereby responsible for informing employees and sub-contractors of their environmental obligations in terms of the applicable environmental provisions, and for ensuring that employees are adequately experienced and properly trained in order to execute tasks in a manner that will minimise environmental impacts and risk. The contractor's obligations in this regard will include the following:

- » Ensure that all employees and sub-contractors have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » Ensure a copy of the EMPr is easily accessible to all on-site staff members.
- » Ensure that all employee and sub-contractors are conversant with the requirements of this EMPr and the environmental specifications as they apply to the construction of the Lime Plant upgrades.
- » Ensure prior to commencing of any site works, all employees and sub-contractors have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Ensure staff is timeously informed of environmental issues as deemed necessary by the ECO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications
- » Ensuring that Method Statements are submitted to the Site Manager for approval before any work is undertaken
- » Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO
- » Ensuring that a register of all public complaints is maintained
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations)

Contractor's Safety, Health and Environment Representative: The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE Rep must act as liaison and advisor on all environmental and health related issues. He

or she must ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor. In some instances, a separate EO may be appointed to support this function.

The Contractor's Safety, Health and Environment Representative and/or Environmental Officer should:

- » Be well versed in occupational health and environmental matters.
- » Understand the relevant environmental legislation and processes.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.
- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
- » Keep accurate and detailed records of all EMPr-related activities on site.

5.2 Construction Phase Impacts

CONSTRUCTION PHASE									
Project Component/s		Lime Treatment Plant Infrastructure, including all associated, ancillary infrastructure such as pipes and pumps.							
No	Aspect	Potential Impact	Outcome	Mitigation measures/ management actions	Responsible Persons	Timeframe	Implementation indicator (KPI)	Monitoring Mechanism & staff responsible	Monitoring Method & Frequency
1	Clearing of Vegetation	Impacts on Biodiversity	Total rehabilitation of areas on-site affected by the construction phase.	<ul style="list-style-type: none"> » Contractors should rehabilitate areas that were affected by the proposed development. » Existing service roads within the station should be used. » Only areas within the development footprint must be cleared. » Strict control over the movement of heavy equipment/machinery must be maintained. 	» Contractor	» After the completion of the construction phase and before the commencement of the operation phase	» 100 % of rehabilitated areas affected by the construction of the Lime Plant upgrades are revegetated and reinstated in the same condition as prior to construction	<ul style="list-style-type: none"> » Audits and Inspections by the Site Manager, Eskom EM and EO,; » Audits by Independent ECO. 	<ul style="list-style-type: none"> » Inspections-Weekly (Internal staff) » Audits-Monthly (Independent ECO)
2	Movement of machinery, trenching and excavation of foundations.	Soil Compaction and Erosion	Total rehabilitation of areas on-site affected by the construction phase.	<ul style="list-style-type: none"> » Contractors should rehabilitate areas that were affected by the proposed development in accordance with the EMPr. » Existing service roads within the station must be used. » Bare areas should be suppressed for dust (using a water tank/bowser) in accordance with the EMPr. Therefore, this will reduce the likelihood of wind being an effective erosion agent for the duration of the 18-month construction phase. » Only areas within the development footprint must be cleared. » Removed soil should be used as infill material for any voids created during the construction phase. » Drivers and operators of any equipment being used should adhere to the prescribed speed limits within the station. 	» Contractor	» After the completion of the construction phase and before the commencement of the operation phase.	» 100 % of rehabilitated areas affected by the construction of the Lime Plant upgrades are revegetated and reinstated in the same condition as prior to construction	<ul style="list-style-type: none"> » Audits and Inspections by the Site Manager, Eskom EM and EO,; » Audits by Independent ECO. 	<ul style="list-style-type: none"> » Inspections-Weekly (Internal staff) » Audits-Monthly (Independent ECO)
3	Generation of dust emissions	Impacts on Air Quality	Reduction of dust emissions on-site	<ul style="list-style-type: none"> » Clearance of areas with cultivated lawn grass must be kept to a minimum. » Regular dust suppression of dusty construction areas by a water bowser tank or any appropriate 	» Contractor	<ul style="list-style-type: none"> » Pre-construction » Construction phase 	» Less than two complaints from construction workers, KPS staff and surrounding landowners per month concerning dust emissions	<ul style="list-style-type: none"> » Audits and Inspections by Site Manager. » Audits and Inspections Eskom EM and EO. » Audits by Independent ECO. 	<ul style="list-style-type: none"> » Analysis of dust through gravimetric studies as part of monitoring-Monthly conducted at present for the air quality studies at Eskom KPS » Inspections-Weekly (Internal staff) » Audits-Monthly (Independent ECO)

				<p>absorbent material at construction areas.</p> <ul style="list-style-type: none"> » Bare surfaces should be re-planted with lawn during the rehabilitation phase in accordance with the EMPr. » Low emission equipment and machinery should be used. » Ensure that construction vehicles are maintained to keep emissions within possible limits. » Construction vehicles should adhere to the station's prescribed speed limit. » Workers should be provided with PPE (i.e. dust mask etc.). 					
4	Presence of improperly disposed solid waste, i.e. litter, cement rubble and any surplus material generated during the clearance of the site	Generation of Solid Waste (General & Hazardous)	To minimise the production of general and hazardous waste.	<p>General waste:</p> <ul style="list-style-type: none"> » Where possible, waste should be recycled. » General waste should be disposed of an approved waste disposal facility. » All unused or used concrete or brick rubble must be removed on completion of the construction activities. » No dumping of waste material must be permitted in the surrounding open areas. » Records of all waste being taken off site must be recorded and kept as evidence. » Management of solid waste should be handled according to KPS's Waste Management Procedure (RER0221) <p>Hazardous waste:</p> <ul style="list-style-type: none"> » Spillages during construction should be cleaned up using absorbent material. » Absorbent materials used to clean up spillages should be disposed of in a separate and labelled hazardous waste bin. » The storage area for hazardous material must 	» Contractor	<ul style="list-style-type: none"> » Pre-construction » Construction phase 	<ul style="list-style-type: none"> » Zero complaints received regarding waste on site or indiscriminate dumping » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately » Provision of all appropriate waste manifests for all waste streams during auditing events. 	<ul style="list-style-type: none"> » Audits and Inspections by Site Manager » Audits and Inspections Eskom EM » Audits by Independent ECO 	<ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout construction phase through daily inspections and monthly audits (internal staff) » Waste collection to be monitored on a weekly basis (internal staff) » Waste documentation completed by Site Manager in accordance with the KPS Waste Management Procedure. » An incident reporting system will be used and implemented by the EM and EO to record any non-conformances to the EMPr as and when an incident occurs.

				<p>be concreted, banded, covered, labelled and well ventilated.</p> <ul style="list-style-type: none"> » All hazardous waste must be disposed at an appropriately registered hazardous waste disposal facility. » Records of all waste being taken off site must be recorded and kept as evidence. » Management of hazardous waste should be handled according to KPS's Waste Management Procedure (RER0221). 					
5	Impacts on the health and safety of the Contractors and staff is anticipated during the construction phase.	Health & Safety Impacts	Zero occurrence of incidents and fatalities	<ul style="list-style-type: none"> » All Health and Safety regulatory frameworks must be complied with. » Areas near generators and fuel storage tanks must be clearly demarcated as no-smoking areas. » Workers should conduct and complete a job-specific risk assessment before commencing with any task. » The Contractor should implement the Emergency Preparedness Plan (RIR0113) available at the station. » Fire extinguishers must be placed (and serviced regularly) at conspicuous locations so they can be easily accessible. » All staff must be provided with adequate PPE gear. 	<ul style="list-style-type: none"> » Contractor » Site SHE Rep 	<ul style="list-style-type: none"> » Pre-construction » Construction 	<ul style="list-style-type: none"> » Zero incidents or fatalities recorded on-site during the construction phase. 	<ul style="list-style-type: none"> » Audits and inspections by the Site SHE Representative. 	<ul style="list-style-type: none"> » Weekly or bi-weekly toolbox talks held by Site SHE Representative. » Daily site inspections by the SHE Representative. » Monthly internal safety audits by the Site Manager, SHE Rep and Eskom HSE Department.
6	Impacts on fossils within the development footprint	Impact on Palaeontology Resources	Compliance with Chance Fossil Finds Procedure	<ul style="list-style-type: none"> » <u>If a fossil chance find is made, the person responsible for the find must immediately stop working and all work must cease in the immediate vicinity of the find.</u> » <u>The person who made the find must immediately report the find to his/her direct Supervisor which in turn must report the find to his/her Manager, and the ECO or Site Manager.</u> » <u>A preliminary report must be submitted to the SAHRA within 24 hours of the find.</u> 	<ul style="list-style-type: none"> » <u>Project Manager</u> » <u>Environmental Manager</u> » <u>Eskom ECO</u> » <u>Independent ECO</u> » <u>Site Manager</u> » <u>Workers</u> 	<ul style="list-style-type: none"> » <u>Pre-Construction</u> » <u>Construction</u> 	<ul style="list-style-type: none"> » <u>Fossil Finds (if any found), with correct implementation of the mitigation measures and the adherence by all stakeholders to the Fossil Chance Find Procedure.</u> 	<ul style="list-style-type: none"> » <u>Weekly site inspections during the pre-construction and construction phase of the development.</u> 	<ul style="list-style-type: none"> » <u>As and when a fossil is found within the development footprint, the ECO must notify SAHRA immediately and prepare the preliminary report of the find in accordance with SAHRA's reporting guidelines.</u>

				<p>and must include the following:</p> <ul style="list-style-type: none">* <u>Date of the find;</u>* <u>Description of the find;</u> <u>and</u>* <u>A description of the fossil and its context (depth and position of the fossil), and GPS co-ordinates.</u>* <u>Photographs (the more the better) of the find must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) of where the fossil was found.</u> <p><u>Upon receipt of the preliminary report, the Heritage Agency will inform the ECO or Site Manager whether a rescue excavation or rescue collection by a palaeontologist is necessary.</u></p> <ul style="list-style-type: none">» <u>The site must be secured to protect it from any further damage. No attempt should be made to remove any material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. SAHRA will also be able to advise on the most appropriate method of protection for the site.</u>» <u>In the event that the fossil cannot be stabilized, the fossil may be collected with extreme caution by the ECO/Site Manager. Fossil finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.</u>» <u>Once the Heritage Agency has issued a written authorization, the Developer may continue with the Development.</u>					
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				<ul style="list-style-type: none"> » <u>The ECO must implement the prescriptions of the Fossil Chance Finds Procedure.</u> » <u>An appointed Palaeontologist by the Developer must draft a fossil awareness programme for the construction team induction, as well as train the ECO in the identification of fossils that may occur within the region.</u> » <u>Before the commencement of the proposed development, the Developer must appointed a suitably qualified palaeontologist with the required expertise to compile a Fossil Awareness Programme, an</u> 					
7	Contractors are expected to give preference to unskilled and skilled labourers residing in the communities of Kriel and Thubelihle for the duration of the construction phase.	Creation of employment opportunities	Ensuring that at least 15% unskilled labour is from the nearby communities.	<ul style="list-style-type: none"> » A local's first approach should be adopted for the procurement of sub-contractors and employees on the construction site. » Priority should be given to unskilled members of the local community. » Existing local community structures should be used as a communication or liaison tool between the applicant and members of the local community. 	<ul style="list-style-type: none"> » Project Manager » Site Manager 	<ul style="list-style-type: none"> » Duration of the Construction phase (18 months) 	<ul style="list-style-type: none"> » At least 20 employment opportunities be generated during the construction phase. » At least 50 attendees of any skills and development programmes implemented during the construction phase. 	<ul style="list-style-type: none"> » Project Manager will source and appoint accredited training service provider for the skills development programme. » Project Manager will liaise with local municipal and tribal authorities regarding the number of low-semi-skilled employees from each community surrounding the proposed development area (i.e. Kriel, Thubelihle and Ogies). » Project Manager should ensure through that at least 20 workers employed by the Contractor are from the surrounding communities (as mentioned above). 	<ul style="list-style-type: none"> » Bi-annual skills audit of workers on-site to be conducted by Site Manager and reported to Project Manager.
8	The construction of the clarifiers and associated infrastructure and supply chain opportunities will be created that could benefit local SMEs.	Purchase of materials from local SMEs	Ensuring that at least 2 local businesses are supplier to the project (i.e. Catering and Waste Collection).	Liaison should be made with local businesses to register on a vending list to manage expectations.	<ul style="list-style-type: none"> » Project Manager 	<ul style="list-style-type: none"> » Duration of the Construction phase (18 months) 	<ul style="list-style-type: none"> » At least 3 local business should be listed and appointed as suppliers of services and components required for the construction of the clarifiers and pipelines for the proposed upgrades. 	<ul style="list-style-type: none"> » Project Manager should ensure during the tender bidding process that at least three (3) of the selected suppliers are residents of the greater Nkangala District Municipality. 	<ul style="list-style-type: none"> » Audit appointed suppliers bi-annually, if unacceptable non-conformances are raised, Project Manager should give preference to other suppliers within the municipal area.

9	Noise generation due to civil works, and movement of heavy machinery.	Noise Impacts	Reduction of noise-related impacts on employees and surrounding landowners.	<ul style="list-style-type: none"> » Any drilling activity should take place during the approved working hours, these are to be known and agreed upon with all contractors. » Machinery and equipment are to be switched off when not used. » All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). » Noise protection ((i.e. earplugs/ear muffs) should be used by all construction workers where excessive noise is to be generated. 	<ul style="list-style-type: none"> » Site Manager » SHE Rep 	<ul style="list-style-type: none"> » Duration of the Construction phase (18 months) 	<ul style="list-style-type: none"> » Zero complains from construction workers and employees of Eskom on the station regarding increased levels of noise due to the development. 	<ul style="list-style-type: none"> » Site Manager should ensure procure and supply workers with noise abatement devices (i.e. ear plugs or ear muffs). » SHE Representative in conjunction with supervisors/foremen should ensure that should ensure all workers have noise abatement devices and should report the lack thereof to the Site Manager. 	<ul style="list-style-type: none"> » Weekly Inspections by the SHE Representative. » Mass Meetings with the Site Manager.
10	Loss of materials	Impacts on security	Ensure there is no theft of any material at the station.	<ul style="list-style-type: none"> » All personnel and staff should be searched when entering the station's premises and when exiting. » Vehicles should be searched when entering the premises and exiting the premises » The movement of contractors on-site should be closely managed and monitored by the Contractor. 	<ul style="list-style-type: none"> » Project Manager » Engineering Representative » Site Manager 	<ul style="list-style-type: none"> » Duration of the Construction phase (18 months) 	<ul style="list-style-type: none"> » Zero incidents of theft or any other crime related incidents at the Kriel Power Station. 	<ul style="list-style-type: none"> » Project Manager in liaison with the Head of Security at the station should ensure the existing 'search' policy is implemented. » Site Manager is responsible for reporting theft-related incidents amongst his workers to the Project Manager or KPS Head of Security. 	<ul style="list-style-type: none"> » Workers like with Kriel Power Station will be searched when entering and exiting the station's premises daily. » In addition, workers should be supplied with identity cards which they should present at the entrance gate upon entering the facility. » Vehicles entering the facility should be registered on the existing access control register available at the gate.
11	Increase in vehicular movement on the station.	Impacts on traffic	Minimise the impact of traffic associated with the expansion of the Lime Treatment plants at the station.	<ul style="list-style-type: none"> » Contractors should adhere to speed limits and roads signs on and off site at all times. » All construction vehicles must be road worthy and all designated drivers must be in possession of a valid South African drivers licence. » If any abnormal loads will be transported to site during the construction phase, all the prescribed permits and clearances should be obtained from the relevant authorities. Above all, abnormal load transportation should be limited to during peak hours. » Transportation of material and waste should comply with the necessary road regulations at all times. 	<ul style="list-style-type: none"> » Project Manager » Engineering Representative » Site Manager 	<ul style="list-style-type: none"> » Duration of the Construction phase (18 months) 	<ul style="list-style-type: none"> » Zero traffic-related incidents involving project personnel, workers, visitors or any other stakeholder associated with Eskom. » Zero complaints from Eskom staff and stakeholders regarding traffic congestion and delays experienced in and out of the station. 	<ul style="list-style-type: none"> » Project Manager, Engineering Representative and Site Manager should ensure all traffic-related signage is made available at the station. 	<ul style="list-style-type: none"> » Daily visual monitoring of traffic control measures to ensure they are effective by the Site Manager.

5.3 Detailing Method Statements

The environmental specifications need to be underpinned by a series of Method Statements, in which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

- » Details of the responsible person/s;
- » Construction procedures;
- » Materials and equipment to be used;
- » Getting the equipment to and from site;
- » How the equipment/material will be moved while on-site;
- » How and where material will be stored;
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- » Timing and location of activities;
- » Compliance/non-compliance with the Specifications; and
- » Any other information deemed necessary by the Site Manager.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed through method statements (pre, during and post construction) may include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities to be established etc., including a site camp plan indicating all of these).
- » Excavations and backfilling procedure.
- » Stormwater management method statement.
- » Ablution facilities (placement, maintenance, management and servicing).
- » Solid Waste Management:
 - * Description of the waste storage facilities (on site and accumulative).
 - * Placement of waste stored (on site and accumulative).
 - * Management and collection of waste process.
 - * Recycle, re-use and removal process and procedure.
- » Dust and noise pollution:
 - * Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
 - * Procedure to control dust at all times on the site.

- » Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, and any other harmful and hazardous substances and materials (South African National Standards apply).
 - * Lists of all potentially hazardous substances to be used.
 - * Appropriate handling, storage and disposal procedures.
 - * Prevention protocol of accidental contamination of soil at storage and handling areas.
 - * All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
- » Incident and accident reporting protocol.
- » Designate access road and the protocol on roads in use.

The Contractor may not commence the activity covered by the Method Statement until it has been reviewed by the Site Manager and ECO, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a required method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

5.4 Awareness and Competence: Construction Phase of the Lime Treatment Plant upgrades

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- » All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- » The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant Method Statements and be aware of the content thereof.
- » Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff is aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the Water Treatment Plant.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
 - * Records must be kept of those that have completed the relevant training.
 - * Training should be done either in a written or verbal format but must be appropriate for the receiving audience.

- * Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- » All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr.

5.5 Monitoring Programme: Construction Phase of the Lime Treatment Plant upgrades

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation. Where this is not clearly dictated, Eskom Holdings SOC Limited will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The PM and EM will jointly ensure that monitoring is conducted and reported on. The intention of the monitoring and auditing process is to routinely monitor the implementation of the specified environmental specifications, in order to:

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

5.2.1 Environmental Awareness Training

Environmental Awareness Training must be undertaken by the Contractor and must take the form of an on-site talk and demonstration by the SHE Officer and/or ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the SHE Officer on site.

5.2.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site, be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's SHE Officer and should include discussing the developer's environmental policy and values, the function of the EMP and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight the overall "do's" and "don'ts" on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the SHE Officer on site.

5.2.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of the reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

5.2.4 Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided with the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

5.2.5 Incident Reports

According to Section 30 of National Environmental Management Act (NEMA), an "Incident" is defined as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

- a) the nature of the incident;
- b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and date needed to assess these effects;
- c) initial measures taken to minimise impacts;
- d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
- e) measures taken in order to avoid a recurrence of such incident.

5.2.6 **Chance and Fossil Finds Procedure**

- » If a chance find is made the person responsible for the find must immediately **stop working** and all work must cease in the immediate vicinity of the find.
- » The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ECO or site manager. The ECO must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- » A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- » Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report the Heritage Agency will inform the ECO (site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- » The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advice on the most suitable method of protection of the find.
- » In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ECO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- » Once Heritage Agency have issued written authorization, the developer may continue with the development.

5.2.7 **Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to the Director: Compliance Monitoring at DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The Contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DEA regarding waste related activities.

5.2.8 **Audit Report**

The Developer must ensure that project compliance with the conditions of the Environmental Authorisation is audited by an independent auditor, and that the audit reports are submitted to the Director: Compliance Monitoring at the DEA. Such audits must be undertaken during both the construction and operation phases of the Lime Treatment Plant. The effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, noise, dust emissions, traffic and transportation should be audited. The results form part of the project monitoring and audit reports.

5.2.9 Final Audit Report

A final environmental audit report must be compiled by an independent external auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities). This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

CHAPTER 6: MANAGEMENT PROGRAMME: OPERATION

Overall Goal: To ensure that the operation of the Lime Treatment Plant does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the Lime Treatment Plant in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts

An Environmental Manager must ensure the implementation of the operational EMPr. Therefore, formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Engineering Representative, and Environmental Manager for the operation phase of this project are detailed below. It should be noted that as the Lime Treatment Plant is planned to be located within the boundaries of the Kriel Power Station, and will form part of the station's infrastructure, that the roles described below would be fulfilled by the Kriel Power Station personnel.

The **Engineering Representative** will:

- » Ensure that adequate resources are made available and appropriately managed for the successful implementation of the operational EMPr.
- » Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
- » Take appropriate action as a result of findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.

The **Environmental Manager** will:

- » Develop and Implement an Environmental Management System (EMS) for the Lime Treatment Plant.
- » Manage and report on the plant's environmental performance.
- » Maintain a register of all known environmental impacts and manage the monitoring thereof.
- » Conduct internal environmental audits and co-ordinate external environmental audits.
- » Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA and MDEDET) on environmental performance and other issues.
- » Conduct environmental training and awareness for the employees who operate and maintain the Lime Treatment Plant.
- » Compile environmental policies and procedures.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

The Environmental Manager must provide fourteen (14) days written notification to the DEA that the activity operation phase will commence.

6.1 Operation Phase Impacts

OPERATION PHASE										
Project Component/s		Lime Treatment Plant infrastructure								
No	Aspect	Potential Impact	Outcome	Mitigation measures/ management actions	Responsible Persons	Time period for implementation	Implementation indicator (KPI)	Monitoring Mechanism & staff responsible	Monitoring Method & Frequency	
1	Domestic Waste is anticipated to be generated during the 20-year operational lifespan of the plant	Generation of Solid Waste	To minimise the production general waste.	General waste: <ul style="list-style-type: none"> » Where possible, waste should be recycled. » General waste should be disposed of an approved waste disposal facility. » No dumping of waste material must be permitted in the surrounding open areas. » Records of all waste being taken off site must be recorded and kept as evidence. » All solid waste should be handled and disposed of in accordance with KPS's Waste Management Procedure (RER0221). » Records of all waste being taken off site must be recorded and kept as evidence. 	<ul style="list-style-type: none"> » EM » ECO 	Operation Phase	<ul style="list-style-type: none"> » Zero complaints received regarding waste on site or indiscriminate dumping 	<ul style="list-style-type: none"> » Internal audits by the EO and EM. » Bi-weekly inspections by the EO. » Monthly audits of the station's area by an independent ECO. 	<ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout operation phase through daily inspections and monthly audits. » Waste collection to be monitored on a weekly basis by the EO. » An incident reporting system will be used to record non-conformances to the EMPr as and when an incident occurs. This to be implemented by the EO and EM. 	
2	During the operational phase, hazardous waste is expected to be generated from the Lime Plants and disposed of in the ash water dams on the station.	Hazardous Waste Generation	To minimise the production of hazardous waste	Hazardous waste: <ul style="list-style-type: none"> » Any spillages during the operational phase should be cleaned up using absorbent material. » Absorbent materials used to clean up spillages should be disposed of in a separate and labelled hazardous waste bin. » The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated. » All hazardous waste should be handled and disposed of in accordance with KPS's Waste Management Procedure (RER0221). » All hazardous waste must be disposed at an appropriately registered hazardous waste disposal facility or at the ash water dams. » Records of all waste being taken off site must be recorded and kept as evidence. 	<ul style="list-style-type: none"> » EM » ECO 	Operation Phase	<ul style="list-style-type: none"> » Zero complains received regarding amount of waste on site or indiscriminate dumping. 	<ul style="list-style-type: none"> » EO and EM to undertake internal audits. » Bi-weekly visual inspections by the EO. » Monthly inspections by the independent ECO. 	<ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout operation phase through daily inspections and monthly audits. » Waste collection to be monitored on a weekly basis by the EO. » An incident reporting system will be used to record non-conformances to the EMPr as and when an incident occurs. This to be implemented by the EO and EM. 	

3	Impacts on the health and safety of the staff is anticipated during the operation phase.	Health and Safety Impacts	To minimise health and safety risks and incidents on-site.	<ul style="list-style-type: none"> » All Health and Safety regulatory frameworks must be complied with. » Areas near generators and fuel storage tanks must be clearly demarcated as no-smoking areas. » SHEQ Department should implement and co-ordinate regular fire drills in conjunction of those at the station. » The plant operators should conduct and complete a job-specific risk assessment before commencing with any task on the plants. » An existing Emergency Plan for the Lime Plants must be used or updated following the addition of new infrastructure. » Fire extinguishers must be placed (and serviced regularly) at conspicuous locations so they can be easily accessible. » All staff must be provided with adequate PPE gear. 	<ul style="list-style-type: none"> » Safety Officer » Plant Safety Rep. 	Operation Phase	<ul style="list-style-type: none"> » Zero incidents or fatalities at the Lime Treatment Plants. 	<ul style="list-style-type: none"> » Internal health and safety audits by Kriel Power Station Safety Department. 	<ul style="list-style-type: none"> » Annual health and safety audits to be undertaken by the KPS SHE Department. » Bi-weekly or daily (where possible) site inspections by SHE Representatives.
4	Eskom is expected to give preference to skilled plant operators residing in the communities of Kriel and Thubelihle for the duration of the operational phase.	Employment creation	Ensure that at least a percentage of the plant operators are residents of the municipal area	<ul style="list-style-type: none"> » Priority should be given to skilled plant operators located within the surrounding communities. » Existing local community structures should be used as a communication or liaison tool between the applicant and members of the local community. 	<ul style="list-style-type: none"> » PM 	Operation Phase	<ul style="list-style-type: none"> » At least three (2) of the staff appointed on the plant, or as ancillary staff following the upgrades must be from the surrounding communities or the municipal area. 	<ul style="list-style-type: none"> » Eskom in accordance with its policies shall conduct a skills audit as and when required. 	<ul style="list-style-type: none"> » Skills audit must be undertaken in accordance with existing Eskom Human Resource Management policies.
5	The proposed expansion on the lime plants will reduce the station running costs during the operational phase.	Economic Benefits to Kriel Power Station	Reduction of operational costs of the station.	<ul style="list-style-type: none"> » Latest technology and equipment should be procured and utilised on the plants to enhance its treatment capacity and durability. 	<ul style="list-style-type: none"> » PM » ER 	Operation Phase	<ul style="list-style-type: none"> » Amount of capital saved by the station in terms of operational costs following the installation of the upgrades on the plants. 	<ul style="list-style-type: none"> » Engineering Representative should ensure plants run optimally and are scheduled for maintenance at pre-determined periods without compromising the utility's mandate, power generation. » Project Manager and Engineering Representative should liaise with technicians and ensure maintenance is carried out timeously. 	<ul style="list-style-type: none"> » Daily inspections per shift by operators and supervisors on optimality of plants. » Annual inspection for maintenance by Engineering Representative and Technicians to ensure plants continue to function optimally and at no additional cost to the station.
6	Delivery of Lime	Traffic Impact		<ul style="list-style-type: none"> » Contractors tasked with the delivery of lime powder to the KPS should adhere to speed limits and 	<ul style="list-style-type: none"> » ER » EO » Lime Powder Supplier 	Operation Phase	<ul style="list-style-type: none"> » Zero traffic incidents reported or complains regarding traffic at the station. 	<ul style="list-style-type: none"> » Engineering Representative should ensure Lime Powder supplier adheres to the 	<ul style="list-style-type: none"> » Daily visual monitoring of traffic control measures to ensure they are effective by security. » Internal audits by the EO.

				<p>roads signs on and off station at all times.</p> <ul style="list-style-type: none"> » Should there be more than one heavy load vehicle making a delivery, alternative parking (preferably outside the station) should be used. » All heavy load vehicles delivering lime powder to the station must be road worthy and all designated drivers must be in possession of a valid South African drivers licence. 	<ul style="list-style-type: none"> » Security Personnel 		<ul style="list-style-type: none"> » No traffic incidents involving project personnel or appointed contractors. » Appropriate signage in place. » No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the Lime Treatment Plant upgrades. 	<p>station's policies in terms of traffic management.</p> <ul style="list-style-type: none"> » Supplier should ensure designated drivers have the necessary documents required of them. » Security Personnel should undertake searches on Lime delivery vehicle when entering and exiting the station daily. They must ensure the drivers are in possession of a valid South African drivers licence. 	
7	Storm water impacts during periods of rainfall	Storm Water Impacts	Minimal soil erosion occurrence on the station	<ul style="list-style-type: none"> » Ensure bare areas around the plants are paved. » Monitor and control hydrocarbon leakages from operations equipment and machinery (i.e. placement of drip trays underneath plant components during mechanical breakdowns). » Ensure ongoing and sufficient maintenance of the stormwater drains of the lime treatment plant facility to ensure effective stormwater control on site. 	<ul style="list-style-type: none"> » ER » EM » EO 	Operation Phase	<ul style="list-style-type: none"> » No reported incidents on the station for the erosion of soil caused by surface water run-off. 	<ul style="list-style-type: none"> » EO should conduct inspections monthly and report any erosion incidents to the ER. » ER should implement feasible, environmentally friendly measures to prevent erosion. 	<ul style="list-style-type: none"> » Monthly internal audits by the EO or EM.

CHAPTER 7: MANAGEMENT PROGRAMME: DECOMMISSIONING

Overall Goal: To ensure that the decommissioning of the Lime Treatment Plant and associated infrastructure does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action is taken at all costs.

The Lime Treatment Plant infrastructure which will be utilised for the treatment of cooling water at the Kriel Power Station is expected to have a lifespan of 20 years (with maintenance). Equipment associated with the plants would be only decommissioned once both the plant and the station have reached the end of their economic life. It is most likely that decommissioning activities of the infrastructure of the lime plants would involve the disassembly and replacement of the clarifiers, silos, pipeline with more appropriate technology available at the that time. It must be noted that decommissioning activities need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMP to be revisited and amended.

» **Site Preparation**

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment, preparation of the site (e.g. laydown areas, construction platform) and the mobilisation of construction equipment.

» **Removal of Infrastructure**

All infrastructure must be dismantled and removed. Inert material must be removed from site and disposed of at a registered landfill site. In addition, all foundations must be removed to a depth of 1m. Hard surfaces must be ripped to a depth of 1m and be vegetated. Furthermore, the removed infrastructure will be re-used, recycled, or disposed of in accordance with regulatory requirements of the National Environmental Management Act of 1998 and the National Environmental Management Waste Act of 2008.

» **Soil Amelioration**

The steps that should be undertaken during the amelioration of soils are as follows:

- * The deposited soils must be ripped to ensure reduced compaction;
- * An acceptable seed bed should be produced by surface tillage;
- * Restore soil fertility;
- * Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- * Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

» **Establishment of Vegetation**

The objective is to restore the project site to a self-sustaining cycle, i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

7.1 Decommissioning Phase Impacts

DECOMMISSIONING PHASE									
Project Component/s	Lime Treatment Plant infrastructure								
No	Aspect	Potential Impact	Outcome	Mitigation measures/management actions	Responsible Persons	Time period for implementation	Implementation indicator (KPI)	Monitoring Mechanism & staff responsible	Monitoring Method & Frequency
1	Removal of foundations will create soil erosion and compaction impacts	Soil Compaction and Erosion	Minimise the likelihood of soil erosion or compaction during the decommissioning phase	<ul style="list-style-type: none"> » Removal of any foundations should be kept within the development footprint. » Clearance of any areas with cultivated lawn grass must be kept to a minimum. » Existing service roads within the station must be used. » Bare areas should be suppressed for dust (using a water tank/bowser) in accordance with the EMPr. Therefore, this will reduce the likelihood of wind being an effective erosion agent for the duration of the 18-month construction phase. » Removed soil should be used as infill material for any voids created during the decommissioning phase. » Drivers and operators of any equipment being used should adhere to the prescribed speed limits within the station. 	<ul style="list-style-type: none"> » EM » EO » ER » Site Manager 	Decommissioning phase	<ul style="list-style-type: none"> » Zero incidents of soil erosion reported on site. 	<ul style="list-style-type: none"> » Monthly internal audits by the EM and EO. » Site Manager should ensure all disturbed areas are rehabilitated » ER should ensure the Site Manager attends to areas of soil erosion. 	<ul style="list-style-type: none"> » Monthly audits by the EO and EM. » Regular visual inspections by the EO, EM and ER. » Site Manager should undertake visual inspections of work completed by workers to ensure this impact is avoided or mitigated.
2	Presence of solid waste such as construction rubble	Waste Generation	To minimise the generation of hazardous and domestic waste	<p>General waste:</p> <ul style="list-style-type: none"> » Where possible, waste should be recycled. » Absorbent materials used to clean up spillages should be disposed of in a separate and labelled hazardous waste bin. » The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated. » All hazardous waste must be disposed at an appropriately registered 	<ul style="list-style-type: none"> » EM » EO » Site Manager 	Decommissioning phase	<ul style="list-style-type: none"> » No complaints received regarding waste on site or indiscriminate dumping » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately » Provision of all appropriate waste manifests for all waste streams. 	<ul style="list-style-type: none"> » Monthly internal audits by the EM and EO. » Site Manager should ensure waste products are disposed of at a registered landfill site. 	<ul style="list-style-type: none"> » Monthly internal audits by the EO and EM. » Regular visual inspections by the EO and EM. » Waste collection to be monitored on a weekly basis by the Site Manager.

				hazardous waste disposal facility. » Records of all waste being taken off site must be recorded and kept as evidence.					
3	Generation of Dust	Air Quality Impact	To minimise the generation of dust during this phase	Regular suppression of bare areas on the station with a water tank or bowser » EM » EO » Site Manager	Decommissioning phase	» Zero complaints from workers, KPS staff and surrounding landowners.	» EM » EO » Site Manager	» Monthly analysis of data collected from existing dust buckets system by the EO. » Daily visual inspections to ensure bare areas on site are suppressed by a water bowser.	
4	Health and Safety impacts on the workers during the decommissioning of the plants	Health and Safety Impacts	» Minimise and control risks	» All Health and Safety regulatory frameworks must be complied with. » Areas near generators and fuel storage tanks must be clearly demarcated as no-smoking areas. » Workers should conduct and complete a job-specific risk assessment before commencing with any task. » The Contractor should implement the Emergency Preparedness Plan (RIR0113) available at the station. » Fire extinguishers must be placed (and serviced regularly) at conspicuous locations so they can be easily accessible. » All staff must be provided with adequate PPE gear	» Site Manager » SHE Representative	Decommissioning phase	» Zero incidents or fatalities reported during this phase.	» Site Manager should procure and supply workers with PPE. » Internal audits by the SHE Representative.	» Weekly toolbox talks » Daily visual inspections by the SHE Representative » Monthly internal H&S audits by the SHE Representative
5	Increase in human traffic at the station.	Security impact	» Control and minimise any incidents of crime-related activities	» Contractors tasked with the decommissioning of the lime plants should adhere to the speed limit and road signs on and off the station at all times. » Alternative parking areas should be utilised for heavy load vehicles taking material from the lime plants to designated waste disposal sites for decommissioning purposes. » All heavy load vehicles that will collect various components of the lime plants from the station for	» PM » Security	Decommissioning phase	» Zero reported incidents of theft at the station.	» PM will ensure the Site Manager and workers adhere to the station's security procedures (i.e. daily searches). » Security will undertake daily searches on all workers entering the perimeter of the station.	» Daily searches by security at the entrance gate. » A quarterly inventory audit by the Site Manager of the various components available on site.

				decommissioning, their drivers must all be in possession of a valid South African drivers licence.					
6	Increase in vehicular movement at the station	Traffic Impact	» Control traffic at the station	<ul style="list-style-type: none"> » Contractors tasked with the decommissioning of the lime plants should adhere to the speed limit and road signs on and off the station at all times. » Alternative parking areas should be utilised for heavy load vehicles taking material from the lime plants to designated waste disposal sites for decommissioning purposes. » All heavy load vehicles that will collect various components of the lime plants from the station for decommissioning, their drivers must all be in possession of a valid South African drivers licence. 	<ul style="list-style-type: none"> » PM » Site Manager » Security 	Decommissioning phase	» Zero traffic-related incidents reported at the station.	<ul style="list-style-type: none"> » PM should ensure the appointed Contractor (represented by the Site Manager) adheres to all KPS's traffic management procedures. » Site Manager should ensure drivers adhere to the prescribed speed limit within the station. » Site Manager should ensure all drivers on the station are in possession of valid South African Drivers Licences. 	» Daily visual monitoring of traffic control measures to ensure they are effective by the Site Manager

APPENDIX A:

PROJECT TEAM CURRICULA VITAE

APPENDIX B:

SPECIALIST TEAM CURRICULA VITAE

APPENDIX C:
GRIEVANCE MECHANISM

APPENDIX D:

A3 LAYOUT AND SENSITIVITY MAPS