ESKOM HOLDINGS LIMITED

CONSTRUCTION AND OPERATION OF ASH DAM EXTENSION 3 & THE DEVIATION OF TRANSMISSION AND DISTRIBUTION LINES AT KOMATI POWER STATION, MPUMALANGA

FINAL ENVIRONMENTAL IMPACT REPORT

Volume 1

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DEAT Reference Number: 12/12/20/1007

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ESKOM HOLDINGS LIMITED

Construction and Operation of Ash Dam Extension 3 And the Deviation of Transmission and Distribution Lines at Komati Power Station, Mpumalanga Province

FINAL ENVIRONMENTAL IMPACT REPORT

Executive Summary

Introduction

Eskom Holdings Limited is re-commissioning the Komati Power Station, located between Middelburg and Bethal in Mpumalanga Province. The first unit at Komati Power Station is expected to be re-commissioned in 2008, with the last unit being re-commissioned in 2010. It is anticipated that the Komati Power Station will have an operational life of 20 years from re-commissioning. The combustion of coal at a power station produces ash that is disposed of in engineered ash disposal facilities. At Komati Power Station a wet-ashing system is used and the ash is deposited in ash dams. The existing ash dams at Komati do not have sufficient capacity for the planned life of the station and it is therefore necessary to develop an additional ash dam.

While the return to service of Komati Power Station has been granted environmental authorisation (Ref: 17/2/1 NK 40) by the Mpumalanga Department of Agriculture and Land Administration, the authorisation did not permit any capacity increases. Thus an environmental authorisation is required for the new ash dam, namely ash dam extension 3. It is proposed that ash dam extension 3 be developed adjacent to the existing ash dam complex within the Komati Power Station Property. To facilitate the development of ash dam extension 3 it will be necessary to deviate two powerlines, a 275 kV transmission and an 88 kV distribution line from the site.

In terms of the National Environmental Management Act (No. 107 of 1998) and the environmental impact assessment (EIA) Regulations, a scoping and an EIA are required for the development. Synergistics Environmental Services (Pty) Ltd was appointed as independent environmental consultants responsible for the EIA. An application for authorisation was submitted to the Department of Environmental Affairs and Tourism (Ref: 12/12/20/1007). This EIA report presents the assessment of the environmental impacts associated with the development of ash dam extension 3 and the deviation of the two powerlines.

Project Description

Site alternatives for a new ash dam at Komati Power Station were considered during a screening process. Site 7, adjacent to the existing ash dams, was selected as the preferred site based on environmental and technical criteria. Ash dam extension 3 will cover an area of approximately 42 ha and rise to a maximum height of 47 m above natural ground level. The dam will be constructed using the daywall method whereby an outer wall is constructed of ash on the perimeter of the site. The outer daywall will form the walls of the dam into which further ash is deposited. Ash will be delivered from the power station as slurry via a series of pumps and pipelines. The existing ash delivery pipes will be extended. The dam will be under-drained with a herring-bone system and a cut-off trench will be installed to collect run-off and seepage water. All water drained off the ash dam will be collected in the dirty water dam and recycled to the power station. Trenches to divert clean storm water will be extended to include ash dam extension 3.

In order to utilise the preferred ash dam site, two Eskom powerlines, a 275 kV transmission and an 88 kV distribution line, running on Komati Power Station property will have to be deviated. Engineering investigations have identified a preferred route for the deviation that runs parallel to the R35 provincial road from the existing lines and enters Komati Power Station from the east. The new route covers a distance of approximately 2.3 km and will require an 87 m wide servitude. The 88 kV line deviation will require 12 new towers while the 275 kV line will require 9 towers.

Public Issues and Concerns

Landowners and the general public were consulted during the scoping assessment by means of press advertisements, posters, background information documents, a public meeting and telephonic consultation. Public participation elicited minimal response and the only concern raised by IAPs during the scoping assessment was the potential risk to residents of Komati Village should the ash dam fail.

The scoping report was made available to IAPs for public review, but no comments were received. No further issues have been raised by IAPs. As no interest or response has been received from IAPs regarding the project, no public feedback meeting was scheduled. The EIA and EMP was available for public review from 1 April until 2 May 2008. No comments were received from the public or provincial authorities during the review period.

Baseline Environmental Conditions

The proposed site for ash dam extension 3 site lies within Eskom property at the Komati Power Station's ash dam complex. The site is immediately south of Komati Power Station and east of Komati Village and is adjacent to the existing ash dams. Receptors in the area include the villages of Komati, Koornfontein and Blinkpan, local farmers and farm labourers. The region comprises agricultural lands, coal mining and electrical generation activities. Surface topography is fairly even and the ground slopes gently to the north-west.

The climate of the area is typical of the Highveld with moderate, wet summers and cold, dry winters. Average rainfall is 735 mm per annum and average daily temperatures range from less than 15℃ in winter to the mid 20℃ range in summer . Prevailing winds are from the north-east and north.

The ash dam site lies within the B11B quaternary *catchment which drains via the Koringspruit River to the Olifants River. An unnamed tributary of the Koringspruit passes immediately to the north of the power station while a small drainage line runs through the centre of the ash dam complex, draining via the Gras Dam on route to the Koringspruit River.*

The regional geology consists of various groups of the Karoo Supergroup with numerous dolerite intrusions. Shale and sandstone elements of the Vryheid formation dominate locally. No coal resources, dykes or sills are known from the ash dam site and undermining has not occurred. Soils of the area are fine to medium sand and are reasonably deep. Land in the region is generally classed as arable and dryland agriculture is extensively practiced. Land use in the ash dam complex is restricted to power station activities. Approximately half of the powerline deviation is under maize, with the remainder being natural or secondary grasslands used for stock grazing.

Two distinct aquifers occur in the Karoo rocks namely a shallow, weathered aquifer and a deeper fractured aquifer. In the Komati area the weathered aquifer extends to approximately 15 m below surface. There is a strong relationship between surface topography and groundwater levels and the predominant groundwater flow is in a northerly direction. Borehole yields in this aquifer are generally low. The deeper fractured aquifer seldom constitutes an economic aquifer as a result of the low porosity of the Ecca group rocks. Water in the fractured aquifer is generally of a poorer quality as a result of the concentration of salts and the slow recharge rate. It is likely that the two aquifers are interconnected and that groundwater flows between the two.

Sampling from the monitoring boreholes at Komati Power Station indicates that the local aquifers are affected by contaminant sources at Komati Power Station. Elevated sulphate, iron, chloride, magnesium, manganese and calcium levels have been recorded in the majority of the monitoring

boreholes. Possible contaminant sources include the coal stockyard, return water dam and the ash dams. Remedial measures are being implemented at Komati Power Station and the Ash Dam Complex as part of a groundwater management system. There are no known groundwater users in the area surrounding the proposed ash dam site.

Komati Power Station falls within the Eastern Highveld Grassland vegetation type. The vegetation is dominated by grass species typical of the Highveld grasslands. The vegetation unit is poorly conserved and transformation has been extensive (~44%) as a result of cultivation, plantations, mining and urbanisation. The proposed site has been altered by extensive disturbances. Roads and tracks; old buildings; seepage; sedimentation of ash; and various in-stream and off-stream impoundments have changed the nature of the site. Soils across the site are damp as a result of seepage from the ash dams. The site is vegetated with a mixture of natural, disturbed and invasive species. The majority of the area is dominated indigenous grasses, but many of the species are typical of disturbed areas. In some places the grass sward has been extensively invaded by Kikuyu and stands of exotic trees occur across the site. The drainage areas and dams on site have extensive reed (Arundo spp) and bulrush stands. In the areas with damp soils there are numerous sedge species and hydrophilic grasses.

The powerline route consists largely of agricultural lands including maize fields and areas that have been ploughed. The disturbed lands are interspersed with small patches of remnant or secondary grassland, these occur largely at the northern end of the route. More than half of the tower footprints will be located within maize fields.

Mammal and birds of the area are limited by the disturbed nature of the area, both as a result of agriculture and power generation activities. A number of common grassland bird species were observed in the natural and secondary grasslands, however sensitive and specialist grassland species are not expected to occur. Various water and wetland bird species were observed on the dam and wetland areas at the ash dam site, but these species are widespread and highly adaptable in their use of disturbed habitats. No mammal species were observed during the site visit, but signs of regionally common species were observed. It is likely that other common mammal species frequent the area, either permanently or on a transient basis. However as a result of the long history of disturbance at both the ash dam site and powerline route, no bird or mammal species of conservation significance are expected to persist.

Air pollution concentrations in the Mpumalanga Highveld are elevated and sulphur dioxide and nitrogen oxides have been identified as criteria pollutants. Pollutant sources in the region include Eskom power stations, industrial emissions, blasting operations at mines, the spontaneous combustion of discard at coal mines, veld burning, vehicle exhaust emissions and household fuel burning. Elevated, suspended fine particulate concentrations also occur in the region. Local sources include wind erosion from exposed areas, fugitive dust from agricultural and mining operations, particulate releases from industrial operations, vehicle entrainment from roads and veld burning. Background maximum daily PM10concentrations in the region were estimated to be between 25 µg/m³ and 75µg/m³.

Air quality impacts of the existing ash dam operations were estimated using air dispersion modeling. The main source of fugitive dust emissions during operation of the ash dams is wind erosion from exposed surfaces. Predicted highest daily average ground level PM10 concentrations for baseline operations were less than 5 µg/m³ beyond the site boundary, while maximum daily dust deposition rates for the baseline operations were 120 mg/m²/day.

Noise in the Komati Power Station area emanates from the re-commissioning operations at the power station. Noise sources include the operation of heavy machinery and the handling of materials at the power station and ash dam sites. Additional noise sources in the area include vehicles on the provincial road, the mining operations and agricultural activities.

No sites or artefacts of heritage value were discovered on the ash dam site or powerline route during the heritage assessment, although burial sites are associated with many of the farm homesteads.

The Komati Power Station, local coal mines (Koornfontein and Goedehoop) and associated infrastructure dominate the visual environment in this otherwise rural area. The mines and power station are large scale installations that dwarf other visual attributes in the area. The existing ash dams are large structures with a regular profile, but are vegetated and therefore less visually obtrusive than much of the other power station infrastructure. Numerous powerlines depart from the power station and have a strong impact on the character of the area.

Komati Power Station lies within the Steve Tshwete Local Municipality. The municipality has a growing economy dominated by agriculture, mining, electricity generation and industry. Unemployment is approximately 30%. Approximately 398 persons, including Eskom personnel and contractors are currently employed at Komati Power Station during the re-commissioning phase. It is expected that there will be a permanent force of 217 employees at the power station during operation. 8 people will be involved in the management and maintenance of the ash dam facilities. There are approximately 440 residential stands in Komati Village which has been revitalised by the re-commissioning of the power station and significant economic stimulation and development is underway. Service provision in Komati Village is of a high standard and all houses having water, electricity and sewerage facilities.

Environmental Impact Assessment

Key environmental issues (biophysical and socio-economic) associated with the development of ash dam extension 3 and powerline deviation have been identified and assessed during the EIA. Specialist studies were completed for air quality, groundwater and heritage impacts to ascertain the current baseline conditions and to provide detailed assessments of the significance of potential impacts. The significance of the impacts was determined both without and with the implementation of mitigation measures. Each impact was considered in terms of the direct impact of the project as well as the cumulative effect of the project when considered in terms of current environmental conditions.

Although no environmental fatal flaws were identified during the EIA of the ash dam extension and powerline deviation a number of impacts of high and medium significance were identified. Following mitigation, no impacts were rated higher than medium significance. Draft environmental management plans have been prepared to detail the mitigation measures necessary to manage impacts associated with ash dam extension 3 and the powerline deviation. The most significant impacts and the mitigation proposed to reduce their significance are outlined in the tables below.

Table: Summary of Key Environmental Impacts from Ash Dam Extension 3

ENVIRONMENTAL IMPACT	Impact Significance		Environmental Management
	Without Mitigation	With Mitigation	
Loss of available topsoil	*Medium*	*Very Low*	*Strip available topsoil from ash dam footprint area and stockpile.* *Protect stockpiles from erosion*
Loss of land capability	*Medium*	*Medium*	*No mitigation will be effective*

ENVIRONMENTAL IMPACT	Impact Significance		Environmental Management
	Without Mitigation	With Mitigation	
Contamination of groundwater	*High*	*Medium*	*Construct herring bone drainage system under ash dam to collect seepage.* *Seepage cut-off drains to be put in place.* *Groundwater monitoring program to monitor effectiveness of mitigation measures.*
Contamination of surface water	*High*	*Low*	*Clean and dirty water drain system, sub-soil cut-off drains and retention of polluted water on site.* *Surface water monitoring to monitor effectiveness of mitigation measures.*
Loss of runoff to the catchment	*Medium*	*Medium*	*Ensure that clean water is released to the catchment.* *Rehabilitated areas to be returned to clean water.*
Loss of biodiversity	*Medium*	*Low*	*Alien plant control.*
Loss of habitats	*Medium*	*Medium*	*Ensure minimal disturbance to areas beyond the ash dam site.*
Disruption of natural views	*Medium*	*Low*	*Construct dam to height of existing dams.* *Vegetate slopes as soon as possible.*
Economic benefits through employment	*+Medium*	*-*	*Preference to employment of local persons.*
Continued operation of Komati Power Station	*+Medium*	*-*	*Ensure continued, optimal electrical generation.*

Table: Summary of Key Environmental Impacts from the Powerline Deviations

ENVIRONMENTAL IMPACT	Impact Significance		Environmental Management
	Without Mitigation	With Mitigation	
Loss of land capability	*Medium*	*Low*	*Agreement with land user on land uses.*
Change of land use	*Medium*	*Low*	*Negotiate use agreements between Eskom and land user. Ensure that the establishment of the servitude has minimal interference with agricultural practice on the land.*

ENVIRONMENTAL IMPACT	Impact Significance		Environmental Management
	Without Mitigation	With Mitigation	
Disruption of habitats	*Medium*	*Low*	*Management of the servitude should consider the current state of the environment and ensure no further degradation.* *Control of alien plant species.*
Disruption of natural views	*Medium*	*Medium*	*No mitigation will be effective.*

Conclusions

The EIA concluded that development of ash dam extension 3 on the preferred site is not subject to any fatal flaws. The majority of impacts that may affect the site or local receptors are of medium to low significance and no impacts of high significance that cannot be mitigated will result. The use of a brownfields site for ash dam extension 3, in preference to a greenfields site, is important as the site and adjacent areas have been altered by power station and ash dam activities and are currently degraded, thus impacts of the ash dam extension will be of lower significance than for a greenfields site.

Key negative impacts associated with ash dam extension 3 include the change in site topography, the loss of land capability, contamination of groundwater, the loss of habitat and the disruption of local views. The majority of the identified impacts will be localised to the ash dam site and are not expected to worsen the current situation in a significant manner. These impacts, following mitigation, were all rated of medium significance.

Contamination of groundwater was identified as the most important issue relating to the development of ash dam extension 3. Groundwater contamination from existing sources at Komati Power Station is currently an impact of concern. Groundwater modelling for ash dam extension 3 predicted a marginal, westerly increase in the extent of the groundwater contamination plume when compared to the current plume. However, with the inclusion of the remedial measures currently being implemented at the power station and the improved seepage controls in ash dam extension 3, the magnitude and rate of spread of the contamination plume from the ash dam complex is expected to reduce.

While the direct impact of groundwater contamination from ash dam extension 3 is of medium significance, the development of ash extension 3 does not contribute substantially to the existing groundwater contamination risk. Thus the development of ash dam extension 3 is not expected to worsen the current or future levels of groundwater pollution resulting from Komati Power Station. The development of ash dam extension 3 is crucial to the continued operation of Komati Power Station.

The EIA of the powerline deviation did not identify any fatal flaws that should prevent the deviation being implemented along the proposed route. Impacts such as the loss of land capability, the change of land use, loss of habitat and the disruption of views were rated of medium significance. Mitigation can be implemented to reduce the significance these, and all other impacts to acceptable levels.

As the proposed developments will not ultimately worsen the current situation or contribute significantly to current levels of degradation associated with Komati Power Station and the ash dams, it is recommended that ash dam extension 3 and the powerline deviation be granted environmental authorisation by the competent authority in terms of the National Environmental Management Act. The recommendations set out in the draft EMP should be included as a condition of project implementation.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES – see Volume 2: Appendices

TERMS AND ABBREVIATIONS

DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EMP	Environmental Management Programme
EP	Environmental Practitioner – as employed by Eskom
ER	Environmental Representative – as appointed by Eskom
Eskom	Eskom Holdings Limited
GN	Government Notice, as published in the Government Gazette
ha	hectare
IAP	Interested and Affected Party
ISEP	Integrated Strategic Electricity Planning
m	metre
m^2	square metre
m^3	cubic metre
masl	metres above sea level
MDALA	Mpumalanga Department of Agriculture and Land Affairs
Mm^3	Million cubic metres
Mt	Million tonnes
NEMA	National Environmental Management Act No. 107 of 1998
NERSA	Energy National Energy Regulator of South Africa
PM_{10}	Particulate matter with a diameter smaller than 10 micro metres
RTS	Return to Service
Synergistics	Synergistics Environmental Services (Pty)
TSP	Total suspended particulate matter (dust)
WULA	Water Use License Application
y	year

ESKOM HOLDINGS LIMITED

Construction and Operation of an Ash Dam Facility And the Deviation of Transmission and Distribution Lines at Komati Power Station, Mpumalanga Province

FINAL ENVIRONMENTAL IMPACT REPORT

1. INTRODUCTION

Eskom Holdings Limited is in the process of re-commissioning the Komati Power Station, located between Middelburg and Bethal in Mpumalanga Province (Figure 1). Komati Power Station is equipped with a wet ashing system and the ash is disposed of in engineered ash dams. The existing ash dam facilities at Komati Power Station do not have sufficient deposition capacity for the remainder of the power station's life and it is therefore necessary to develop a new ash dam. The proposed development will involve the construction and operation of an ash dam at Komati Power Station as well as the deviation of two powerlines which currently cross the preferred ash dam site.

A number of site alternatives for the new ash dam were considered during a site screening process. A preferred site, located within the Komati Power Station property and adjacent to the existing ash dams, has been selected for the development of the new ash dam (Figure 1). The preferred ash dam site is traversed by two Eskom powerlines which will have to be removed in order for the ash dam to be constructed. The powerlines, a 275 kV transmission line and an 88 kV distribution line are essential lines and will have to be deviated to a new route. Engineering investigations have identified a preferred route for the deviation of the powerlines (Figure 1).

The preferred ash dam site and powerline route were assessed through detailed investigations during the Environmental Impact Assessment (EIA) process. The project and the results of the EIA are documented in this EIA Report.

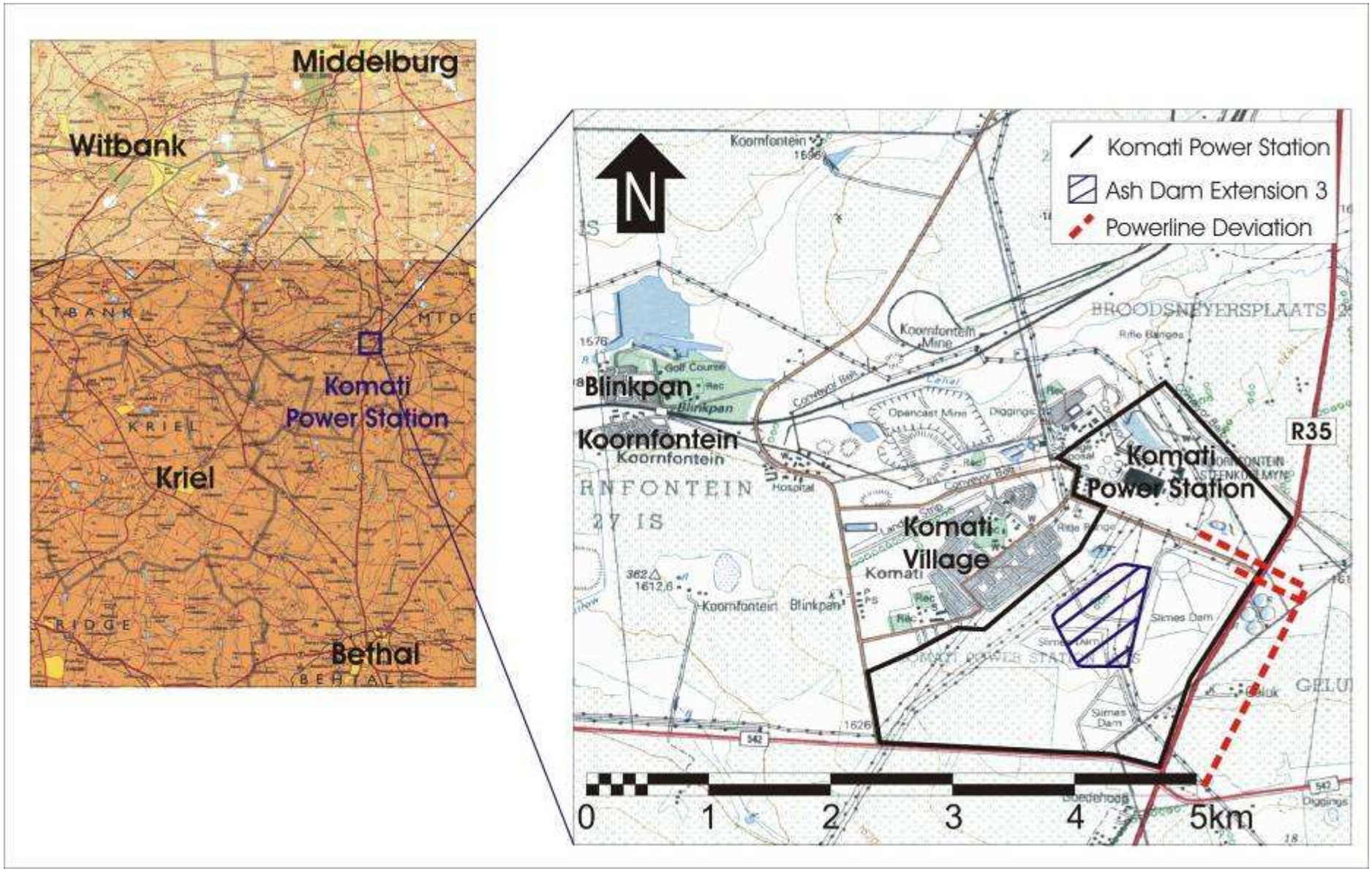

Figure 1: Location of Komati Power Station, showing Ash Dam Extension 3 and the Powerline Deviation

1.1 Project Motivation

Eskom Holdings Limited has commenced with the Return-To-Service (RTS) project in which existing, mothballed power stations, are re-commissioned in order to increase electricity generation capacity in South Africa. The RTS project includes the Camden, Grootvlei and Komati Power Stations which are scheduled for re-commissioning between 2006 and 2009 and will provide an additional 2 964 MW of generating capacity between the three RTS power stations. The decision to re-commission these power stations was informed through the strategic energy planning that takes place in the South African electricity industry (see Section 1.2).

The operation of a coal fired power station, such as Komati, produces ash as a by-product of the power generation process that is disposed of in specially designed ashing facilities. Komati Power Station is fitted with wet-ashing equipment and the ash is deposited as slurry in engineered ash dams. The existing ash dams at Komati, which are being re-commissioned, only have an estimated capacity for a further 18 months of ash deposition. It is therefore necessary to develop a new ash dam to provide capacity for future ash deposition at Komati Power Station. The preferred ash dam site is traversed by two active powerlines which will have to be deviated along a new route.

1.2 Strategic Energy Planning

Eskom's core business is the generation, transmission and distribution of electricity and Eskom currently generate approximately 95% of the electricity used in South Africa. Electricity, by its nature, cannot be stored in large quantities and must be used as it is generated. Therefore electricity is generated in accordance with supply-demand requirements, and must be efficiently transmitted from the point of generation to the end-users. The reliable provision of electricity by Eskom is critical for industrial development and employment creation in the region and Eskom's performance is therefore a contributing factor to the overall challenge of poverty alleviation and sustainable development in South Africa. Eskom's capacity generation expansion supports government's drive to boost economic growth by 6% per annum (as per Government's Accelerated and Shared Growth Initiative) by 2010. It is estimated that this will translate to an average growth in electricity demand of 4% per year.

If Eskom is to meet its mandate and commitment to supply the ever-increasing needs of end-users in South Africa, it has to continually expand its infrastructure of generation capacity and transmission powerlines. Current energy and electricity demands within the country are projected to continue increasing. The decision to expand Eskom's electricity generation capacity is based on national policy and informed by on-going strategic planning. The planning process is briefly described below.

Energy planning, including electricity demand and supply, in South Eskom is done by the Department of Minerals and Energy (DME), the National Energy Regulator of South Africa (NERSA) and Eskom. The DME and NERSA produce the national integrated energy plan and the national integrated resource plan, respectively. These plans give a long term view of electricity demand and provide the framework for investigations into electricity supply and demand options. Eskom applies an Integrated Strategic Electricity Planning (ISEP) process to provide strategic projections of supply-side and demand-side options to be implemented to meet long-term load forecasts. ISEP provides the framework for Eskom to investigate a wide range of new supply-side and demand-side technologies with a view to optimising investments and returns.

South Africa's economy, and hence the demand for electricity, has been increasing and this is placing growing pressure on South Africa's existing power generation capacity. The ISEP has identified that South Africa was expected to require additional base load capacity by 2010. NERSA has determined that although various alternative and renewable energy generation options should be investigated, coal will continue to provide the main fuel source in South Africa for the next 20 years. Eskom have considered and are considering numerous options and technologies to employ for power generation.

1.3 Background to the Project

Komati Power Station was originally commissioned in 1961 and operated until 1990 when it was mothballed. Eskom has decided to re-commission the power station in order to meet the growing demand for base-load electricity generation capacity. Upgrading and refurbishment of the power station is currently in progress. It is expected that the first unit will be re-commissioned in August 2008 and that additional units will be re-commissioned every few months with the final unit expected to come into operation in March 2010. It is anticipated that the operational life of the Komati Power Station will be 20 years from re-commissioning.

As part of RTS operations the existing ash dams are being upgraded and re-commissioned. This activity is allowed in terms of the Record of Decision that was issued in December 2005. The consulting engineers have recommended that the ash dams be restructured. Ash Dam 1 will operate as a compartment and its Extensions, 1 and 2, will operate as a second compartment. The northern compartment of Extension 2 will be converted to an ash water return dam. Ash Dams 2 and 3 will be closed as it is not financially viable to re-commission them (Jones & Wagener, 2007a). Ash dam 1 and its extensions only have approximately 18 months of ash deposition capacity and a new ash dam facility must be identified, designed and constructed prior to July 2009.

This EIA report is the final report of the EIA investigations, which has aimed to inform an environmental authorisation for the new ash dam facility and the deviation of the powerlines.

1.4 Project Overview

The project requires the construction of a new ash dam facility for ash deposition at Komati Power Station. Following a screening process (see Appendix 10) a preferred site, located within the Komati Power Station property was selected for the development of the new ash dam. The preferred site is crossed by two Eskom powerlines which will have to be removed in order for the ash dam to be constructed. The powerlines, a 275 kV transmission line and an 88 kV distribution line are in use and will have to be deviated along a new route. Engineering investigations have identified a preferred route for the powerline deviation.

It is proposed that the new ash dam, named Extension 3, will cover an area of 42 ha and rise to a maximum height of 47 m above natural ground level at full utilisation. The dam will be constructed using the daywall method whereby an outer wall is constructed of ash on the perimeter of the site. The outer daywall will form the dam walls into which further ash is deposited. The outer walls are constructed during the day, hence the term 'daywall', while the dam is filled with ash at night. The ash dam will be operated in the same manner as the existing dams whereby ash is delivered from the power station as slurry via a series of pumps and pipelines. Ash delivery pipes used for the existing dams will be extended to allow for ash deposition on Extension 3. The dam will be under drained with a herring-bone system and sub-soil drains will be installed to collect seepage water. All water drained off the ash dam will be collected in ash water return dams and recycled to the power station. Trenches to divert clean storm water will be upgraded or constructed to include Extension 3.

The proposed new routes for the 275 kV transmission line and the 88 kV distribution line will run parallel to and on the east side of the R35 provincial road. Both lines will be deviated from their existing routes prior to crossing the R35 and will extend northwards along the R35 before crossing the road and entering the power station from the east. The servitudes for the two powerlines will run adjacent to each other and will be approximately 83 m wide (Trans-Africa Projects, 2007).

1.5 Requirement for an Environmental Impact Assessment

The Komati Power Station RTS project was granted environmental authorisation (Ref: 17/2/1 NK 40) in 2005 by the Mpumalanga Department of Agriculture and Land Administration in terms of Section 22 of the Environment Conservation Act (No. 73 of 1989). The authorisation included the return to service of the Komati Power Station and the refurbishment of the existing plant without

any capacity increase. A condition of the decision was that separate applications for authorisation must be lodged for any other development or activity at or near Komati Power Station.

Since the original authorisation was granted in 2005, new EIA regulations (Government Notice R 385, 386 and 387, April 2006) have been made in terms of Chapter 5 of the National Environmental Management Act (No. 107 of 1998) (NEMA). The NEMA EIA Regulations have replaced the Environment Conservation Act regulations regarding the EIA process and thus further applications for environmental authorisation at Komati Power Station must be made in terms of the NEMA EIA regulations.

NEMA makes provision for the authorisation of certain controlled activities by a competent authority. In terms of Section 24 (1) of NEMA the potential environmental impact associated with these controlled (or 'listed activities') must be considered, investigated, assessed and reported on to the competent authority for the granting of a relevant environmental authorisation.

The need to comply with the requirements of the EIA Regulations ensures that decision makers are provided with the opportunity to consider the potential environmental impacts of the project early in the project development and design phase. An assessment can then be made whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. For an informed decision regarding the project to be taken, comprehensive, independent environmental investigations must be completed in accordance with the EIA Regulations and this information provided to the competent authority.

In terms of Section 24 and 24D of NEMA, as read with the EIA Regulations (Government Notices R385 – 387, Regulations 27- 36) The following activities (Table 1), listed in terms of GN R386 and R387 (GG 28753 of 21 April 2006), are applicable to the ash dam development and the re-alignment of the two powerlines:

Table 1: Listed Activities Applicable to the Project.

Number and date of the notice:	Activity No (s) :	Describe each listed activity:
No. R387, 21 April 2006	**1a**	**'The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(a) the generation of electricity where -** **(i) the electricity output is 20 megawatts or more; or** **(ii) the elements of the facility cover a combined area in excess of 1 hectare;'**
No. R387, 21 April 2006	**1f**	**'The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(f) the recycling, re-use, handling, temporary storage or treatment of general waste with a throughput capacity of 50 tons or more daily measured average over a period of 30 days;'**
No. R387, 21 April 2006	**1l**	**The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(l) the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more;**

No. R387, 21 April 2006	**2**	**'Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.'**
No. R386, 21 April 2006	**1l**	**The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(l) the transmission and distribution of above ground electricity with a capacity of more than 33 kilovolts and less than 120 kilovolts;**

Thus a scoping and EIA are required to be undertaken for the proposed development of the ash dam facility and its associated infrastructure at Komati Power Station. The construction of the 88 kV distribution line requires a basic assessment, while a scoping and EIA are required for the 275 kV transmission line. As the two powerlines will be constructed in adjacent servitudes, along the same route, a scoping and EIA will be completed for both lines. The decision was taken to combine the ash dam and powerline re-alignment projects into a single application as the projects are linked and their development cannot proceed independently.

As Eskom is a statutory body, the competent authority for this project is the National Department of Environmental Affairs and Tourism (DEAT), and an application for authorisation has been submitted (Ref: 12/12/20/1007) to DEAT.

DEAT acceptance of the scoping report and plan of study for EIA was received on 22 February 2008. The acceptance (see Appendix 9) indicated that the EIA for the development of the ash dam extension and the deviation of powerlines may proceed in accordance with regulation 31(1) (a) of GN R 385.

1.6 Exemption from Alternatives

In addition to the application for environmental authorisation, an application for exemption in terms of Regulation 51(2) was submitted to the DEAT for the ash dam extension project at Komati Power Station. The application was for exemption from the consideration of ash dam alternatives during the EIA phase as required by Regulation 32 (2)(h). Motivation for the exemption application was based on the site screening process that had been completed for the selection of a preferred site for the new ash dam facility (see Appendix 10).

Subsequent to the submission of the exemption application Synergistics completed a Scoping Report, in terms of Sub-regulation 29 of the EIA Regulations (GN R 385). The Scoping Report included, as Chapter 3, the ash dam site screening report and clearly indicated that further ash dam alternatives would not be considered during the EIA phase of the study. The draft scoping report was made available to the public for review and the final report was submitted to the DEAT on 10 December 2007. DEAT accepted the Scoping Report and Plan of Study for EIA on 22 February 2008 and advised that the EIA may proceed accordingly.

Following enquiries, by Eskom and Synergistics, as to the status of the exemption application an email response was received from the DEAT case officer indicating that Eskom should withdraw the exemption application. The communication, included as Appendix 10, detailed the following reasons why Eskom should withdraw the exemption application:

- Scoping had considered all seven site alternatives;
- The site screening process was made available for public scrutiny; and
- The Scoping Report had been accepted by DEAT as meeting the requirements of Regulation 29(1) of GN R 385.

DEAT were therefore satisfied that the EIA regulation's requirement for the consideration of alternatives had been met in the Scoping Report and further consideration of alternatives during the EIA phase is not required. The application for exemption from the consideration of ash dam alternatives was thus withdrawn (Appendix 10).

1.7 Terms of Reference

Synergistics Environmental Services (Pty) Ltd has been appointed as independent environmental consultant to undertake the necessary work to meet the requirements of informing an environmental authorisation for the proposed new ash dam facility and powerline re-alignment at Komati Power Station. Synergistics has facilitated the EIA process, including public participation and the development of the draft environmental management plan (EMP) for the project.

In order to adequately identify and asses the environmental impacts of the proposed project a number of specialist investigations were completed. Synergistics appointed Rison Groundwater Consulting to assess groundwater impacts (Appendix 11), Airshed Planning Professionals to asses air quality impacts (Appendix 12), and Dr van Schalkwyk to asses heritage impacts (Appendix 13).

Synergistics will also be responsible for the water use licence application that will be made for the new ash dam facility. The water use licence application will be submitted to the Department of Water Affairs and Forestry for approval.

2. LEGAL REQUIREMENTS

2.1 Legislation and Guidelines Considered

The proposed new ash dam facility and powerline route has been assessed in terms of the applicable South African legislation. Environmental legislative requirements for the project were identified during the scoping and actions have been taken to ensure that the required approvals are obtained. The following acts and guidelines have been considered.

2.1.1 National Environmental Management Act, No. 107 of 1998

The National Environmental Management Act (NEMA) makes provision for the authorisation of certain controlled activities by a competent authority. These controlled activities are listed in GN R 386 and 387. In terms of Section 24 (1) of NEMA the potential environmental impact associated with these controlled (or 'listed activities') must be considered, investigated, assessed and reported on to the competent authority for the granting of a relevant environmental authorisation.

EIA Regulations were promulgated in terms of Section 24(5) of NEMA on 21 April 2006 in Government Notice R 385. The regulations define the requirements in terms of Chapter 5 of NEMA for the submission, processing, consideration and decision of applications for environmental authorisation of listed activities. Two lists, defining activities that require either basic assessment or scoping in terms of Sections 24 and 24D of NEMA were published in Government Notice R 386 and R 387 respectively. Any activity that is captured under either of these lists requires environmental authorisation from the competent authority

The need to comply with the requirements of the EIA Regulations ensures that decision makers are provided with the opportunity to consider the potential environmental impacts of the project early in the project development and design phase. An assessment can then be made whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. For an informed decision regarding the project to be taken, comprehensive, independent environmental investigations must be completed in accordance with the EIA Regulations and this information provided to the competent authority.

2.1.1.1 Ash Dam

The proposed ash dam extension is captured under a number of the listed activities in the Schedule of activities requiring scoping and EIA (GN R 387). Listed activities that may be triggered by ash dam extension 3 are shown in Table 1.

2.1.1.2 Powerlines

The proposed deviation of the two powerlines is captured under activities listed in both the Schedule of activities requiring basic assessment (GN R 386) and those requiring scoping and EIA (GN R 387), these activities are shown in Table 1

In order to obtain environmental approval the 275 kV transmission line requires a scoping and EIA assessment while the 88 kV distribution line requires only a basic assessment. As the two re-aligned powerlines will follow the same route in adjacent servitudes, the decision was taken to assess the combined footprint of both powerlines through the more comprehensive scoping and EIA assessment. A revised application for environmental authorisation that included the powerline deviation and ash dam development was submitted to the DEAT in December 2007.

2.1.2 EIA Guidelines

The EIA Regulations provide clear instructions on the required content of an EIA report and this report has been prepared in accordance with these regulations. In addition a number of guidelines to NEMA and the EIA Regulations have been published to assist in the Scoping and EIA process. Guidelines that have been considered include:

- Guideline 3: General Guideline to the Environmental Impact Assessment Regulations (DEAT, 2006);
- Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations (DEAT, 2006);
- Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations (DEAT, 2006); and
- Guideline 6: Environmental Management Frameworks in support of the Environmental Impact Assessment Regulations (DEAT 2006).

2.1.3 National Water Act (No 36 of 1998)

An Integrated Water Use Licence Application (IWULA) for water uses listed in Section 21 of the National Water Act (No 36 of 1998) was compiled in 2007 for Komati Power Station and submitted to the Department of Water Affairs and Forestry (DWAF) for approval, but does not include the proposed ash dam extension 3. The IWULA is currently under review by the DWAF and additional information has been requested from Eskom. The proposed ash dam facility was not included in the original application and water uses associated with the new ash dam will be identified and licensed separately. It is anticipated that the following water uses may be required for the proposed ash dam extension 3:

- Section 21 g: disposing of waste in a manner that may detrimentally impact on a water resource (ash disposal on the ash dam);
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.

Discussions with DWAF as to the WULA requirements for ash dam extension 3 will commence in April 2008.

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

The National Heritage Resources Act provides for the protection of all archaeological and palaeontological sites and meteorites. Section 38 of the Act defines the categories of development for which the responsible heritage resources authority must be notified. In terms of Section 38 (a) 'the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length' and Section 38 (c) 'any development or other activity which will change the character of a site-'(i) exceeding 5000m^2' the responsible heritage authority must be informed of the proposed ash dam extension and powerline deviation. It was assumed that the responsible authority would require a phase 1 heritage impact assessment for the ash dam extension and powerline deviation. A heritage assessment was completed during the EIA phase and the report was submitted to SAHRA for comment.

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

The Act provides for the Minister or MEC to list species and ecosystems which are threatened and in need of protection as well as to identify threatening processes within these ecosystems. No ecosystems or processes have as yet been listed. A list of threatened and protected species and regulations pertaining thereto has been published (GN R 150, 151 & 152, February 2007). Should any of these protected species be identified on site then the appropriate mitigation or permits must be implemented.

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

The National Environmental Management Air Quality Act has been promulgated with the intent to reform the law regulating air quality in order to protect the environment. The new Act has shifted the approach of air quality management from source-based control only to the control of the receiving environment. The main objective of the act is to ensure the protection of the environment and human health through reasonable measures of air pollution control within the sustainable (economic, social and ecological) development framework. The Act makes provision for the establishment of a National Management Framework to set standards with regards to ambient air quality standards and emission limits. More stringent ambient standards may be implemented by provincial and metropolitan authorities.

The Highveld Airshed was declared the second priority area by the minister in November 2007, requiring that an Air Quality Management Plan be developed for the area. The plan will include the establishment of an emissions reduction strategies and intervention programmes based on the findings of a baseline characterisation of the area. The implication of this is that all contributing sources in the area will be assessed to determine the emission reduction targets to be achieved over the following few years. Komati Power Station falls within the Highveld priority area. Emission reduction strategies will be included for all significant sources of pollution in the area with specific targets associated with it.

Listed activities will be identified by the Minister and will include all activities regarded to have a significant detrimental effect on the environment, including health. Emission limits will be established on National level for each of these activities and an atmospheric emission licence will be required in order to operate. An initial list of activities forms part of the National Framework and it is likely that the final lists and limits will be published by mid 2008. The initial list of activities, as published in the National Framework for Air Quality Management (2007), includes Combustion Installations as proposed Category 1 listed activities. This implies that minimum emission limits will be stipulated for all sources associated with Combustion Installations and an Atmospheric Emissions License will be a legal requirement. It is likely, that for fugitive dust sources, dust fallout monitoring and mitigation measures will be a requirement at a combustion installation such as Komati Power Station.

2.1.7 Conservation of Agricultural Resources Act (No 43 of 1983)

Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) defines a list of registered weeds and invader plants, categorises them into different classes and introduces restrictions where these plants may occur. The act prohibits the spread of weeds and requires that listed weeds be controlled. An alien and invasive plant control programme in terms of the Act will have to be implemented for the ash dam facility and powerline servitude.

2.1.8 Mpumalanga Nature Conservation Act (No. 10 of 1998)

The Act provides schedules of provincially protected fauna and flora for which permits will be required should the construction of the ash dam facility or powerline deviation require their relocation or destruction. No provincially protected species have been identified on either the ash dam site or powerline route.

3. STUDY APPROACH AND METHODOLOGY

3.1 Study Objectives

The objectives of the EIA study were to:

- Develop a detailed baseline description of the environment to be affected, against which the impacts of the project can be assessed:
- Identify potential impacts of the project on the biophysical, cultural, social and economic environment;
- Identify mitigation measures to enhance positive impacts and reduce negative impacts identified during the EIA;
- Develop actions that can be implemented to address impacts for inclusion in the EMP;
- Provide feedback to stakeholders; interested and affected parties as to how their concerns have been addressed; and
- Provide sufficient information to the environmental authorities in order that they can make an informed decision regarding the future of the project.

3.2 Authority Consultation

Authority consultation for the Komati Power Station Ash Dam Extension Project commenced in June 2007. Regulatory authorities, including the Mpumalanga Department of Agriculture and Land Affairs and DWAF were consulted on the status quo at the power station and on the proposed way forward. A meeting was held with DEAT, the lead regulatory authority, on 8 August 2007. The purpose of the meeting was to inform the DEAT authorities of the proposed project and establish the enviro-legal and administrative requirements. The minutes of this meeting are included in Appendix 1.

An application for environmental authorisation of the ash dam extension at Komati Power Station was submitted to the DEAT on 8 August 2007 (Appendix 2). The application was registered under the DEAT reference number 12/12/20/1007. Subsequent to the submission of the initial application, a motivation for exemption from the consideration of alternatives during the EIA phase was submitted. The exemption application pertained to the assessment of alternatives for the ash dam site. The exemption application was submitted to the DEAT on 23 August 2007. DEAT advised that Eskom withdraw the exemption application as the Scoping Report had considered alternatives for the ash dam and therefore met the EIA Regulation requirements (Appendix 10).

Following the selection of the preferred ash dam site it became necessary to deviate the two powerlines. An amended application for environmental authorisation was submitted to the DEAT to include the deviation of the two powerlines with the ash dam development. The two projects have been included under a single application as the powerline re-alignment is required as a result of the ash dam project. The revised application was submitted to DEAT on 3 December 2007 with the scoping report. Approval of the scoping and plan of study for EIA was obtained from DEAT on 22 February 2008 (Appendix 9).

3.2.1 Provincial Authority Review

The Draft EIA and EMP report was made available to the relevant provincial authorities for review from 1 April 2008 until 2 May 2008. A copy of the report was couriered to each of the following departments (See Appendix 17):

- Department of Water Affairs and Forestry;
- Mpumalanga Department of Agriculture and Land Administration;
- Mpumalanga Parks Board;
- Steve Tshwete Local Municipality.

It was requested that comments be forwarded directly to DEAT and to the environmental consultant. The comment period has closed and no comments were received by the environmental consultants during the review period. DEAT was consulted on 7 May 2008 and no comments had been received.

3.3 Consultation with landowners, lawful occupiers and any other affected parties

The public participation process has been conducted in terms of the EIA Regulations 56 – 59 and Guideline 4: Public Participation in support of the Environmental Impact Regulations (DEAT, 2006) published in terms of the EIA Regulations.

3.3.1.1 Advertisements and Posters

Press advertisements, informing the public of the project and requesting participation, were placed on 17 August 2007 in the following regional and local newspapers:

- Die Beeld (in Afrikaans); and
- The Middelburg Observer (in English).

Copies of these advertisements are provided in Appendix 3.

Following the addition of the powerline deviation to the project, additional press adverts, providing notification of the altered project scope, were published in both the Middelburg Observer and the Beeld on 19 October 2007 (See Appendix 3)

"A3-sized" posters, providing notification of the ash dam project, requesting public participation and informing the public about a public meeting were placed on site at the main entrance to the Komati Ash Dam complex and on the boundary fence along the R542 provincial road on 23 August 2007. Additional A2 posters were placed in Komati Village at the Igwababa Shop, the Igwababa Recreation Club, the Municipal Offices and at the general dealer shop in Blinkpan. A copy of the poster is included in Appendix 4.

3.3.2 Identification of Stakeholders

As per the requirements of the EIA Regulations number 56 (2)(b), Synergistics has undertaken to notify and consult with land owners and affected parties. Eskom is the owner of the being used for the ash dam extension. The route deviation of the powerlines will cross the farms Geluk 26 IS and Komati Power Station. Portions of the farm Geluk 26 IS, which will be affected, are owned by Mr M Dippenaar, who has been consulted. Proof of consultation is included in Appendix 5. Servitude negotiations are on-going between Eskom and Mr Dippenaar

The names and contact details of potentially interested and affected parties (IAPs) were obtained from the interested and affected party register compiled for the public participation process of the Komati RTS Project. Additional measures to contact IAPs included the placement of posters, newspaper advertisements and telephonic communications.

3.3.3 Background Information Document

A background information document (BID) was compiled in English and Afrikaans for circulation to all interested and affected parties. The document included a response sheet, which provided persons with the opportunity to register as IAPs, list additional persons that would be interested in and/or affected by the project, provide comment and raise issues and concerns. The BID gave notice of the public meeting to be held for the project and requested written response from IAPs on or before 21 September 2007. The BID is attached as Appendix 6.

The BID was delivered to 150 of the residences in Komati Village closest to the Komati Power Station Ash Dam complex. In addition, a further 80 potential IAPs, who live in Komati or on neighbouring farms, were selected from the Public Participation Register from the Komati RTS Project and sent the BID (see Appendix 5). The BID was also posted to the relevant municipal officials at the Steve Tshwete Local Municipality. The BID was further circulated to any additional persons who registered as an IAP or made enquiries with the public participation office.

3.3.4 Registration of IAPs

Persons who have returned the response form, contacted the public participation office or attended the public meeting have been registered as IAPs and will receive further information regarding the project. The database of registered IAPs is included in Appendix 7.

3.4 Stakeholder Meeting

A public scoping meeting was arranged for on 13 September 2007 at the Igwababa Hall to inform interested and affected parties of the proposed new ash dam facility for Komati Power Station. The meeting was advertised in the press adverts, posters and BIDs. The purpose of the meeting was to introduce the project, provide an overview of potential ecological sensitivities and to receive questions and comments from the interested and affected parties.

Apart from the Eskom project team members, no interested or affected parties or public members attended the meeting. The attendance register and presentations prepared for the meeting are included in Appendix 8.

3.5 Public Review of Documents

3.5.1 Scoping

The scoping report was made available for public review at the municipal office in Komati Village as well as at the Komati Power Station and on the internet at www.synergistics.co.za from 17 October to 16 November 2007. All registered IAPs were informed of the review period and the reports availability by email, fax or telephone. No comments were received from IAPs on the scoping report following the review period.

3.5.2 EIA and EMP

The Draft EIA and EMP report was made available for public review from 1 April 2008 until 2 May 2008. Registered IAPs were informed of the reports availability by email, fax or telephone. The EIA report was made available for public review at the municipal office in Komati Village, at the Komati Power Station and on the internet at www.synergistics.co.za. No comments were received during the review period.

3.6 Collation of Baseline Data

Environmental baseline information for the ash dam area was collated from a number of reports, national and regional databases, literature and a site visit to the Komati Power Station ash dam complex. This information was updated using relevant information obtained from the specialist studies that were completed for the EIA. Information from these reports has been summarised in the various sub-sections of Section 6. The full reports from each of the specialists are included in the Appendices 11 - 14.

3.6.1 Existing Information Review

Several studies, both technical and environmental, have been undertaken in the past at the Komati Power Station to investigate potential sites for ash deposition. As part of the baseline assessment, environmental considerations in these existing reports were reviewed. Reference has been made to the following studies:

- Komati Power Station, Ash Disposal System, Feasibility Study for the Future Operating Philosophy and Site Selection of a Surface Ash Disposal Facility, Report K120, June 1990.
- Jones & Wagener, Komati Power Station, Re-commissioning of Ash Dams, Feasibility Study, Report JW44/06/A542, January 2007.
- Jones & Wagener, Komati Power Station, Re-commissioning of Ash Dams, Report JW49/07/A784 – Rev A, April 2007.
- Komati Ash Dam Deviation: Final Design Document. Trans-Africa Projects, October 2007.

3.7 Specialist Studies

In order to adequately assess the existing environmental impacts as well as the incremental and cumulative impacts of the proposed ash dam extension and powerline deviation at Komati Power Station a number of specialist studies were completed. The scope of these specialist environmental studies was identified through consultation with the authorities and the responses received from interested and affected parties. The information contained in these studies was used to fully describe the environmental baseline, to assess the significance of all impacts and to propose mitigation and management measures for the project. The studies, which were completed between October 2007 and January 2008 include:

- Heritage Impact Assessment, completed by Dr J van Schalkwyk;
- Groundwater Impact Assessment, by Rison Consulting;
- Air Quality Impact Assessment, conducted by Airshed Planning Professionals; and
- Ecological Impact Assessment, completed by Synergistics.

3.7.1 Groundwater Impact Assessment

A comprehensive groundwater investigation was carried out by Rison Groundwater Consulting (Rison) for the purposes of assessing the impacts of ash dam extension 3 on groundwater resources (see Appendix 12). Baseline investigations included the measurements of static water levels and groundwater quality, as well as basic aquifer parameter testing. Samples were taken at six (6) monitoring boreholes at Komati Power Station and information from various historical monitoring sources was also utilised. Aquifer testing was carried out on three (3) of the monitoring boreholes and included constant rate pump tests and recovery times.

Rison developed a numerical groundwater flow model and a contaminant transport model to provide an understanding of groundwater conditions at Komati Power Station. A conceptual model was developed for the study area, based on the geological setting, the hydrogeological parameters and groundwater flow patterns. The model included both the weathered and fractured aquifers. The model was constructed in MODFLOW Pro and was simulated with a series of defined assumptions. The model boundaries were set at the water divide south of the ash dams and the Koringspruit tributary north of the power station. The eastern and western boundaries were set at >1000 m from the ash dam area. The model was calibrated in both the steady state and transient state to quantify aquifer parameters.

The numerical model was used to understand the current baseline conditions and predict the likely impacts of the ash dam extension 3 on groundwater quality. Two simulations were run over a 100 year time period. These included the current baseline situation (status quo) and the future situation with ash dam extension 3. The effectiveness of remedial measures being implemented at the site was also examined during the second simulation.

3.7.2 Air Quality Impact Assessment

In order to better understand the emissions from and air quality impacts of the proposed ash dam extension on the surrounding environment and human health an air quality impact study was undertaken by Airshed Planning Professionals (see Appendix 13). The assessment comprised two components viz. a baseline characterisation and compliance assessment.

The baseline characterisation included the review of the site-specific atmospheric dispersion potential, relevant air quality limits and existing ambient air quality in the region. Use was made of site specific meteorological data and air quality data recorded for the region in the characterisation of the baseline conditions.

The air quality impact assessment comprised the identification and quantification of all sources of atmospheric emissions associated with the ash dam extension project. An emissions inventory was compiled, atmospheric dispersion simulations undertaken and the predicted concentrations evaluated. This included the simulation of ground level inhalable particulates (PM10) concentrations and dust fallout (TSP) that may arise from the ash dam.

The dispersion modeling results were analyzed to determine zones of maximum incremental ground level impacts (concentrations and dust fallout from each source) and the zones of maximum predicted cumulative ground level impacts (concentrations and dust fallout from all sources). The potential for human health and environmental impacts was evaluated in terms of pertinent local ambient air quality limits viz. the Department of Environmental Affairs and Tourism (DEAT) standards, recently included in the National Environmental Management: Air Quality Act and limits published by the South African Bureau of Standards (SABS). A series of mitigation measures were recommended in a Dust Management Plan (DMP) for the Power Station dust sources.

Air Quality Guidelines and Standards

In order to assess the impacts of TSP and PM10 emissions and ensure effective management of air quality, emissions need to be compared to standards and guidelines. Ambient, air quality guideline values indicate safe daily exposure levels for the majority of the population, including

the very young and the elderly, throughout an individual's lifetime. Air quality guidelines and standards are given for specific averaging periods (the time-span over which the air concentration of a pollutant was monitored at a location). Generally the 24-hour average and annual average are considered as reference conditions. In South Africa, ambient air quality guidelines were published in terms of the National Environmental Management –Air Quality Act in 2004. However, updated ambient air quality limits (SANS 1929: 2006) have been published for public comment and it is likely that these limits will become applicable shortly. The application of these standards has not been defined, but it is likely that a certain number of exceedances of each of the standards will be allowed per year, and that offenders will be given a time period within which to improve emissions to the standards. The proposed SANS 1929 limits were used as reference points during the air quality impact assessment (Table 2).

Table 2: SANS Ambient Air Quality Limits (proposed)

	PM10		TSP	
Standards	**Maximum 24 hr concentrations µg/m²/day**	**Annual average Concentrations µg/m²/day**	**Maximum Monthly dust deposition mg/m²/day**	**Annual average dust deposition mg/m²/day**
SANS 1929 (proposed limits)	75	40	600 (residential)	300

3.7.3 Heritage Impact Assessment

A phase 1 heritage impact assessment of the area proposed for the ash dam extension and powerline deviation was carried out by Dr J van Schalkwyk (see Appendix 14). The aim of the survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the area proposed for the development of the ash dam and powerlines. The assessment involved a desktop review of available records for the area, as well as field survey of the proposed project area.

3.7.4 Ecological Impact Assessment

Synergistics completed an ecological assessment of the preferred ash dam site and powerline route. As both the ash dam site and powerline route have experienced significant historical disturbance, the investigation only comprised a site walk-over with the aim of identifying potentially sensitive sites that might require additional management. No natural, undisturbed habitats or sites of significance were located and thus no field sampling of fauna or flora was completed. Photos of the ash dam site and powerline route are included in Appendix 15.

3.8 Environmental Impact Assessment Method

3.8.1 Impact Ranking Criteria

The criteria used for assessing the significance of the impacts are given in Table 3 to Table 5. The impact assessment method takes into account the current environment, the details of the proposed project and the findings of the specialist studies. Cognisance has been given to both positive and negative impacts that may result from the development. The significance of the impact is calculated as follows:

impact significance = consequence (intensity + frequency + extent + duration)* x *probability

Although the criteria used for the assessment of impacts attempts to quantify the significance, it is important to note that the assessment is generally a qualitative process and therefore the application of these criteria is open to interpretation. The process adopted has involved the application of scientific measurements and professional judgment to determine the significance of environmental impacts associated with the project. The assessment thus largely relies on experience of the environmental assessment practitioner (EAP) and the information provided by the specialists appointed to undertake studies for the EIA.

Where the consequence of an event was not known or cannot be determined, the "precautionary principle" was adhered to and the worst-case scenario assumed. Where possible, mitigation measures to reduce the significance of negative impacts and enhance positive impacts were recommended. The detailed actions, which are required to ensure that mitigation is successful, are given in the draft EMP (see Section 9).

Consideration was given to the phase of the project during which the impact occurs. The identification of the project phase is provided to assist with the schedule for the implementation of the management measures.

Table 3: Criteria for Assessing the Significance of Impacts

INTENSITY = MAGNITUDE OF IMPACT	RATING
Insignificant: impact is of a very low magnitude	1
Low: impact is of low magnitude	2
Medium: impact is of medium magnitude	3
High: impact is of high magnitude	4
Very high: impact is of highest order possible	5

FREQUENCY = HOW OFTEN THE IMPACT CAUSE OCCURS	RATING
Seldom: impact cause occurs once or twice	1
Occasional: impact cause occurs every now and then	2
Regular: impact cause is intermittent but does not occur often	3

Often: impact cause is intermittent but occurs often	4
Continuous: the cause of the impact occurs all the time	5

EXTENT = SPATIAL SCOPE OF IMPACT	RATING
Site: limited to the impact site	1
Local area: impact affects immediate neighbours with 300m	2
General area: impact affects the community within 5km	3
Regional: impact extends beyond the neighbouring properties	4
Provincial: impact affects the Mpumalanga Province	5

DURATION = HOW LONG THE IMPACT LASTS	RATING
Very short-term: impact lasts for a very short time (days or less)	1
Short-term: impact lasts for a short time (weeks or months)	2
Medium-term: impact lasts for the first few years of as dam operation	3
Long-term: impact occurs over the operational life of the ash dam	4
Residual: impact is permanent (remains after closure of ash dam)	5

PROBABILITY = LIKELIHOOD THAT THE IMPACT WILL OCCUR	RATING
Highly unlikely: the impact is highly unlikely to occur	1
Unlikely: the impact is unlikely to occur	2
Possible: the impact could possibly occur	3
Probable: the impact will probably occur	4
Definite: the impact will occur	5

Table 4: Significance Rating Matrix

	Consequence (intensity+ frequency + extent + duration)																			
Probability	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Table 5: Positive and Negative Impact Significance Ratings

	Very high	81-100	impact is of the highest order possible /potential fatal flaw
	High	61-80	impact is substantial
	Medium	41-60	impact is real but not substantial in relation to other impacts
	Low	21-40	Impact is of a low order
	Very low	1-20	Impact is negligible

3.8.2 Project Phases

Impacts during the planning, construction, operation and decommissioning phases of the project have been assessed. There will however be a limitation in considering impacts of decommissioning as it is estimated that the facility will be in operation for at least 20 years. The status of the environment may have changed significantly at that stage. The aim of the assessment was thus be to provide an initial input into the project in terms of measures that could be implemented during the initial phases to facilitate rehabilitation in the future.

3.8.3 Current Level of Degradation

A general assessment of the current condition of the baseline environment is provided in order to explain the environmental context of the project. Existing infrastructure and activities have, in many cases, altered the baseline environment to a less than natural state. In assessing the baseline environmental conditions, cognisance was given to two main impact sources; those resulting from the Komati Power Station and ash and those resulting from more distant or regional infrastructure and activities.

3.8.4 Cumulative Impacts

As Komati Power Station is an existing facility with operational ash dams and powerlines, the extension of the ash dam and deviation of the powerline, is unlikely to result in new impacts on the environment. The proposed ash dam extension and powerline deviation may however alter the extent or magnitude of an existing impact and thereby alter the impacts significance. To determine the significance of the resultant change in impact status the cumulative impact of each of the project aspects was considered. It is possible that an aspect of the project has a direct impact of low significance, while the overall impact of the project combined with the existing impacts has a cumulative impact of high significance, or vice versa.

3.8.5 Mitigation Confidence

Mitigation measures have been identified for significant impacts identified. The impacts were ranked before and after the implementation of the mitigation measures. Consideration will be given to the confidence level that can be placed on the successful implementation of the mitigation level as follows:

- **High Confidence:** mitigation measure easy and inexpensive to implement.
- **Medium Confidence:** mitigation measure expensive or difficult to implement.
- **Low Confidence:** mitigation measure expensive and difficult to implement.

4. PROJECT DESCRIPTION

4.1 Ash Dam

4.1.1 Project Scope

The proposed ash dam will be a brownfields expansion project located within the Komati Power Station property, on a portion of the farm Komati Power Station 56 IS (Figure 2). The proposed ash dam, named extension 3, is an extension to the existing ash dams and will increase the ash deposition capacity at Komati Power Station with an additional 13.5 Mm^3. It is proposed that the new ash dam will cover an area of 42 ha and rise to a maximum height of 47 m above natural ground level at full utilisation. A description of the ash dam is provided below.

4.1.2 Project Motivation

Eskom is re-commissioning Komati Power Station to increase the base-load electricity generation capacity to meet the growing demand in South Africa. Their decision was informed through various strategic energy planning processes carried out by the DME, NERSA and Eskom (see Section 1.2). The operation of a coal-fired power station, such as Komati, generates large quantities of ash as a by-product and this ash is deposited at an ashing facility (Figure 8). The existing ash dams at Komati Power Station are being re-commissioned and upgraded however, based on the proposed deposition rates their capacity will only sustain deposition for 18 months As a result a new ash dam site must be identified, engineered and developed to enable electricity generation at Komati Power Station to continue beyond the initial 18 month period.

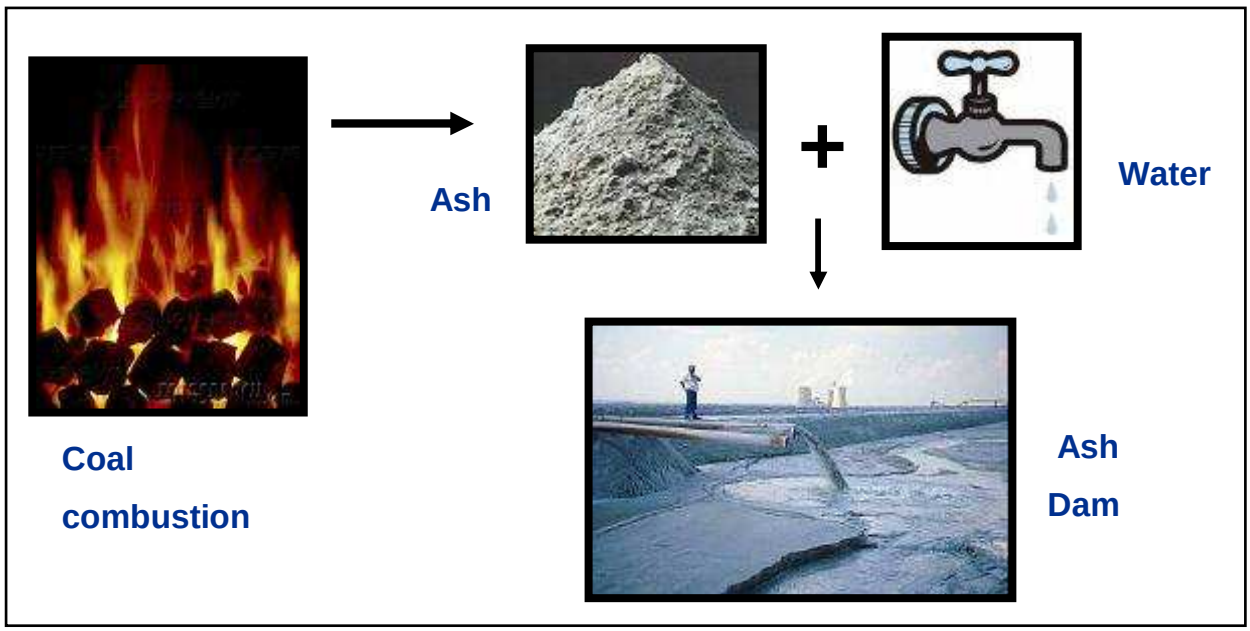

Figure 2: A Simplified Depiction of the Ash Creation and Deposition Process

4.1.3 Construction Process

Preparation of the ash dam site and initial construction work will take approximately 6 months. All infrastructure and vegetation will be cleared from the site and the topsoil will be stripped and stockpiled. An under-drain system, in a herring-bone configuration, will be excavated within the ash dam footprint (Figure 9). These drains will intercept and drain vertical seepage through the ash dam to a sump. Toe and blanket drains will be provided on the perimeter of the dam to improve stability. The subsoil drains on the downstream flanks of the existing dams will be extended to include Extension 3. This natural filter drain intercepts groundwater seepage from the basin of the ash dams. Water collected in these drains will be pumped to the ash water return dam. The clean storm water cut-off trenches up-stream of the existing ash dams will be extended to include the Extension 3 area.

A starter wall will be constructed of available in situ soil on the outer perimeter of the ash dam footprint. The ash dam will be constructed using the daywall method whereby an outer wall is constructed of ash on the perimeter of the site, but inside the starter wall. The outer daywall will form the dam walls into which further ash is deposited. The outer walls are constructed during the day, hence the term ‘daywall’, while the dam is filled with ash at night. A 20 m wide daywall is to be constructed inside of the starter wall and will enclose the entire ash dam footprint. The daywall will be formed by constructing 1m high compacted bund walls on either edge of the daywall and filling the centre with the initial ash slurry. Only fine ash is to be used in the daywalls.

The ash dam will be operated in the same manner as the existing dams whereby ash is delivered from the power station as slurry via a series of pumps and pipelines. Ash delivery pipes will be installed in a ring feed around the ash dam footprint. The ash delivery pipes will connect to the existing ash delivery infrastructure at the north western corner of ash dam Extension 1. Two new pairs of 250 mm steel pipelines will be installed in a ring around the ash dam, the first will be the fine ash pipeline and the second the coarse ash pipeline. One pipe from each pair will be an operational line and the other a standby line.

The ash dam will be under-drained with a herring-bone drain system and sub-soil drains will be installed downstream of the dam to collect seepage water. All water drained off the ash dam will be stored in ash water return dams and recycled to the power station.

4.1.4 Operations and Life of Facility

Ash dam Extension 3 is designed with a footprint of 42 ha, a maximum rise of 47 m from the natural topographical low and an ash deposition capacity of 13.5 Mm^3 (Figure 9). The design has maximised the capacity and hence operational life of the ash dam facility within the available space (J&W, 2007b).

The dam will be operated as a traditional ring dyke using the daywall method. Daywalls will be constructed on the dam perimeter using fine ash, with deposition taking place during the day. The daywall forms the outer wall of the ash dam. The centre of the dam, created by the daywalls, will be filled with both coarse and fine ash slurry, with deposition taking place largely at night. The ash slurry is disposed of in the dam where the ash settles and the water is recovered. As a portion of the dam gets filled from disposing of the ash for a specific period at one location the disposal point is shifted to a new location. Once the initial dam is filled to the appropriate level then a new daywall, covering a slightly smaller footprint will be constructed on the filled dam and the process repeated. The width of the daywall will be adjusted by the operator as necessitated by the gradual increase in deposition rate over time. The completed outer walls of the ash dam will be rehabilitated by covering them with a layer of topsoil and vegetating them.

Seepage water from ash dam Extension 3 that is intercepted by the sub-soil drain and under-drains will be collected in a sump and pumped to the ash water return dam. This water is then recycled to the power station for reuse.

4.1.5 Stormwater and Seepage water Management

Provisions are in place for stormwater diversion around the existing ash dam area. Clean storm water is diverted around the ash dam complex to the Gras Dam. The up-stream cut off drains will be extended to include the area upstream of ash dam extension 3. Gras Dam has been receiving both clean and dirty storm water but the current remedial measures will restore Gras Dam to a clean water dam. The dirty water system at the ash dam complex is being upgraded as part of the current remedial measures. This includes the construction of a new, larger capacity, dirty water dam and the development of sub-soil seepage trenches, a sump and a pump system. The new dirty water dam will have a capacity of 120 000 m^3 (whilst allowing for a dry free board of 800 mm). Dirty stormwater running off ash dams and ash dam slopes will be collected in cut-off trenches at the base of each dam and drained to the sump from where it is pumped to the dirty water dam. This water then decants to the power station for re-use.

4.1.6 Employment

No changes in the on-site construction or operational workforce are anticipated for the ash dam extension. The same construction personnel as utilised for the remedial measures being implemented at the existing ash dams will be employed to construct the new ash dams. Operations personnel will be drawn from the personnel operating the existing ash dams.

4.1.7 Infrastructure and Services

The ash dam will be accessed via a road around the perimeter of the ash dam footprint. Two pairs of 250 mm steel pipelines will be installed around Extension 3 as operational and standby ash delivery pipes. These pipes will connect to the existing ash delivery pipe and pump systems used for ash dam 1 and its extensions.

See Separate Electronic Figure

Figure 3: Conceptual Layout of the Ash Dam Extension at Komati Power Station

4.1.8 Consideration of Ash Dam Alternatives

4.1.8.1 Site Alternatives

Seven alternative sites were considered for the location of a new ash dam for Komati Power Station. A site screening process was completed in which all sites were assessed in terms of their suitability for an ash disposal site. The assessment of site alternatives is described in the Site Selection Report (see Appendix 10). Following the site screening process an exemption from the assessment of alternatives was submitted to DEAT. Only the preferred site, located adjacent to the existing ash dams within the power station property, was considered in the EIA process.

4.1.8.2 Deposition Method

Ash is an inherent constituent of coal and when the coal is burnt in the furnaces of a power station the residue that remains behind is called ash. The ash needs to be removed from the furnace chambers to maintain the efficiency of the combustion process. Komati Power Station uses a wet ashing system as opposed to a dry ashing process to remove the ash.

There are two ash collection points in the ash removal plant at Komati Power Station:
1. Course ash falls out of the draught to the bottom of the combustion chamber and into the ash hoppers.
2. The lighter fly ash is extracted from the boiler from the top and then falls into the precipitator ash hoppers.

The ash handling plant collects all this ash and it is then transported to the ash sumps, using water, where it is crushed. The ash is then pumped in a series of pipelines to the ash dams in the form of slurry (Figure 8).

Wet ashing produces less dust but uses more water than dry ashing. However a large proportion of this water is recovered and recycled to the power station. Wet ashing is currently employed at Komati Power Station. The costs to retrofit a dry ashing plant at Komati Power Station would be three times that of the wet ashing process and it is thus economical for Komati to continue with a wet ashing system.

4.1.8.3 No-Go Alternative

Without a new ash dam Komati Power Station will not be able to operate beyond the remaining life of the existing ash dams. The life of the existing ash deposition facility is estimated at approximately 18 months following start up of the first unit at Komati Power Station. The subsequent shut down of Komati Power Station would result in the loss of approximately 1000 MW of base-load electricity generation capacity, thus Eskom would not be able to meet the continuously increasing electricity demand. Shutdown would also result in the loss of 217 jobs at Komati Power Station.

4.2 Powerlines

4.2.1 Project Scope

The two powerlines affected by the proposed ash dam will be deviated from their current location to an alternative route that follows the R35 provincial road and enters Komati Power Station from the east (see Figure 4). The two powerlines will be constructed in adjacent servitudes that deviate from the existing route at the towers immediately prior to the point where the lines cross the R35 road. The new lines will run on the eastern side of the R35 road, on the opposite side of the road from the existing ash dam facility, pass beyond the Komati water reservoirs, turn 90 degrees, cross the R35 road and enter the Komati Power Station from the east.

The 275 kV Camden Komati line deviation will be constructed with 9 new towers over a distance of approximately 2400 m. The 434 series of self-supporting towers, which are approximately 24 m high and 16 m wide at the apex, will be used in order to maintain similar criteria as the existing line. The base of the tower is approximately 8 m wide and the tower is supported on four feet (see Figure 5).The deviation will commence from tower number 250 of the existing line and enter the power station through an alteration to the Arnot Kruispunt line which is currently inactive. The 275 kV line will require a servitude of 47 m wide (TAP, 2007).

The 88 kV Halfgewonnen North-Kudu Traction line deviation will be constructed with 12 towers of the 131 series of self-supporting towers over a distance of approximately 2700 m. The base of the tower is approximately 5 m wide and the tower is supported on four feet. The deviation will connect to the existing line at tower nearest to the adjacent 275kV line deviation tower and enter the power station via the existing towers. The 88kV line will require a servitude of 36 m wide (TAP, 2007). The two powerlines will be routed in adjacent servitudes with a combined width of 87 m.

4.2.2 Project Motivation

In order to prepare the preferred ash dam site for development, a 275 kV transmission and an 88 kV distribution line that cross the site, will have to be re-routed. The powerlines are both required for the transmission and distribution of electricity to and from Komati Power Station and thus cannot be taken down without alternative lines being constructed. A new route for the two powerlines has been identified and runs parallel to the R35 provincial road. The powerlines will enter Komati Power Station from the east. Environmental authorisation, in terms of the EIA regulations, will be sought from DEAT for the construction of the replacement powerlines.

4.2.3 Construction Process

The servitude rights for the preferred route will be acquired by Eskom and certain constraints would be imposed on the types of activities that could be permitted within the servitude. The towers required for each of the two deviations, as identified by the design engineers, will be erected along the routes at the appropriate spacing. The 275 Kv deviation will b constructed using 434 series towers and the 88 Kv deviation will be built with smaller 131 series towers. Each of the towers will be built using standard materials according to the SANS 10280:2001 standards. The towers and conductors will be configured to ensure suitable wind spans, weight spans, ground clearances and earthing. Each tower will be mounted on four foundation blocks. The foundation system for each tower will be determined following geotechnical investigations of the servitude route. Both powerlines have been engineered to ensure that the required phase to ground and phase to phase clearances are maintained.

4.2.4 Operations

The two powerlines will be operated and maintained in terms of standard Eskom protocols. Vegetation maintenance in the powerline servitude will be done in accordance with Eskom's Environmental Procedure 32-247. Vegetation within the servitude will be maintained to enable service access, reduce fire loads and ensure the required conductor clearances.

4.2.5 Infrastructure and Services

The powerlines will be developed within a new servitude, approximately 87 m wide, which will include an access track. Gates will be installed in existing fences to enable access for maintenance crews.

See Separate Electronic Figure

Figure 4: Preferred Route for the Deviation of the 275 kV and 88kV Powerlines at Komati Power Station (TAP, 2007).

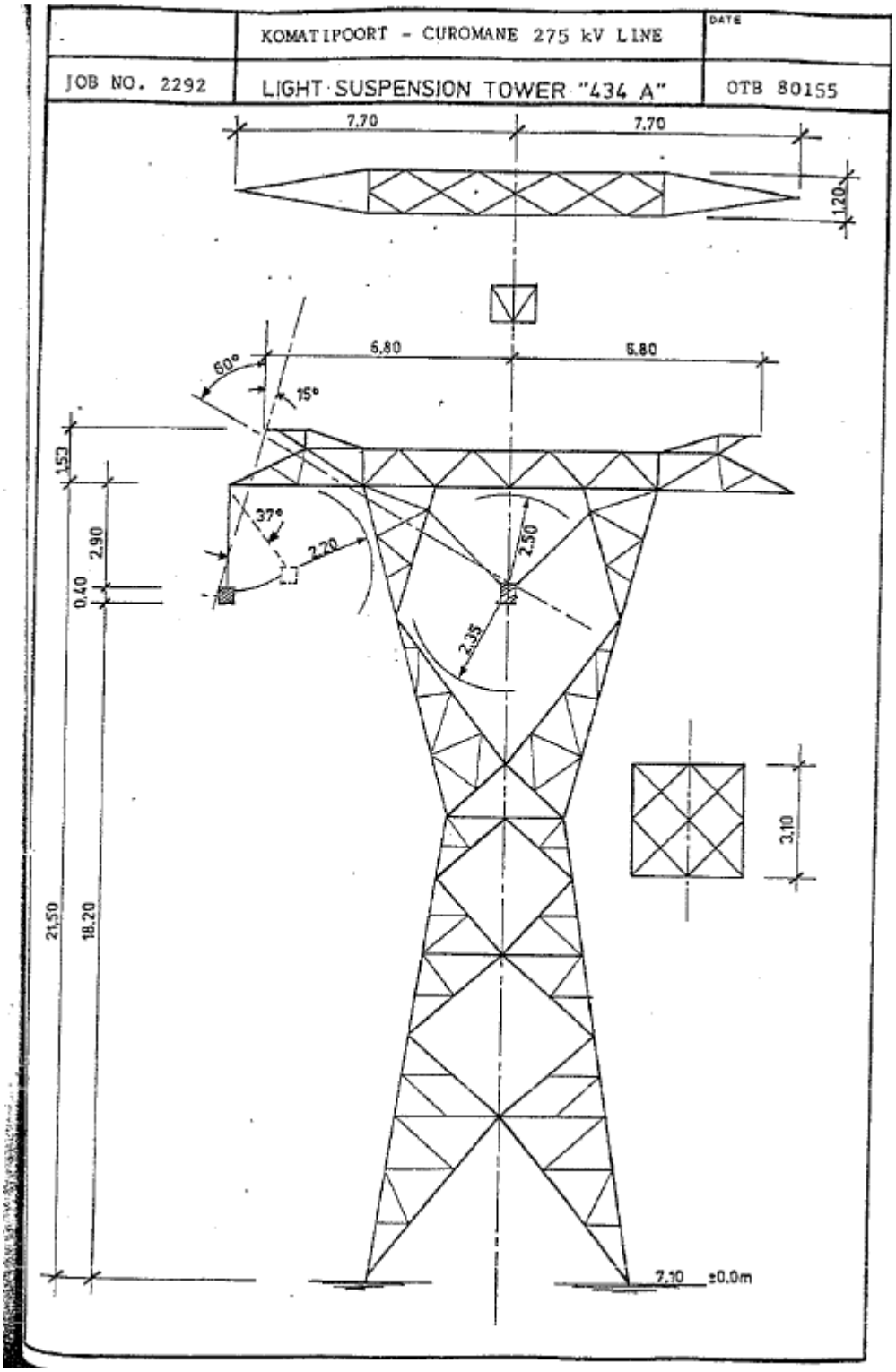

Figure 5: **Diagrammatic Representation of the Self-Supporting Strain Configuration Tower - 434 Series.**

4.2.6 Consideration of Route Alternatives

Route investigations for the deviation of the powerline were undertaken by the consulting engineers. Eskom's preferred option was to deviate the powerlines within the Komati Power Station property, but this was not possible as there was insufficient space for the required servitudes within the Komati Power Station property. The engineers thus plotted the shortest available route, taking into consideration the presence of roads, buildings and existing servitudes. The route was ground-truthed by the engineers and an ecological walk-over conducted to identify sensitive habitats.

Additional routes were not considered as any alternative would have been longer than the preferred route, thereby covering a greater area of land and resulting in impacts of greater magnitude.

5. BRIEF DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Regional Setting

Komati Power Station is located midway between Middelburg and Bethal in Mpumalanga (Figure 1) on the farm Komati Power Station 56 IS. The power station lies west of the R 35 provincial road north east of Komati Village. The existing ash dam complex is adjacent to the Komati Village and is located south of the power station, north of the R542 provincial road and between the R35 and Komati Village.

The Koornfontein Coal Mine is located west of the power station while the adjacent surrounds are comprised of agricultural farms. Additional residential areas, Blinkpan/Koornfontein, are located to the west of the power station, adjacent to the coal mine.

The proposed powerline route will run to the east of the R35 provincial road on land that is currently used for agriculture, largely dryland cropping.

5.2 Climate

Komati Power Station occurs in an area with typical Highveld conditions. The summers are moderate and wet while the winters are harsh, cold and dry. Minimum long term temperatures have been recorded from -1.8℃ to 13.7℃ with maximum temperatures ranging between 18.4℃ and 27.1℃, Average daily temperatures are in the middle 20℃ range in summer (October to March) and are lower than 15℃ in winter (April to September). Winter minima fall below 0℃ in June, July and August.

The average total annual rainfall is ~735 mm with the rain falling mostly in the summer months (October to April). Peak rainfall occurs in January.

The prevailing wind directions are from the north-east and north, with frequencies of up to 10% and strong wind speeds of up to 15 m/s. During the day-time the predominant winds are from the north-westerly, northerly and easterly sectors, with an increase in frequency of winds from the north-westerly sector. Night-time conditions are characterised by winds from the north-easterly and south–easterly sectors. The seasonal variability in the wind field for the Komati Power Station site for 2006 is shown in Figure 6. In the summer months, winds from the easterly, south easterly and northerly sectors dominate, and stronger winds of up to 15 m/s occur from these directions. The winter months reflect winds from the northerly, south-easterly and westerly sectors, with a decrease in the frequency of winds from the northerly sector.

5.3 Topography

Surface topography of the ash dam area is gently undulating to flat with the majority of the area sloping toward the north-west. The topographical high of the ash dam area lies near the junction of the R35 and R542 provincial roads at approximately 1655 masl. The site slopes gently and consistently down to a natural topographical low near the Gras Dam (1610 masl). A small drainage line runs through the centre of the ash dam complex.

The topography of the powerline route is gently undulating with no distinct topographical features. The deviation commences near to the crest of the slope and enters the power station prior to the valley bottom.

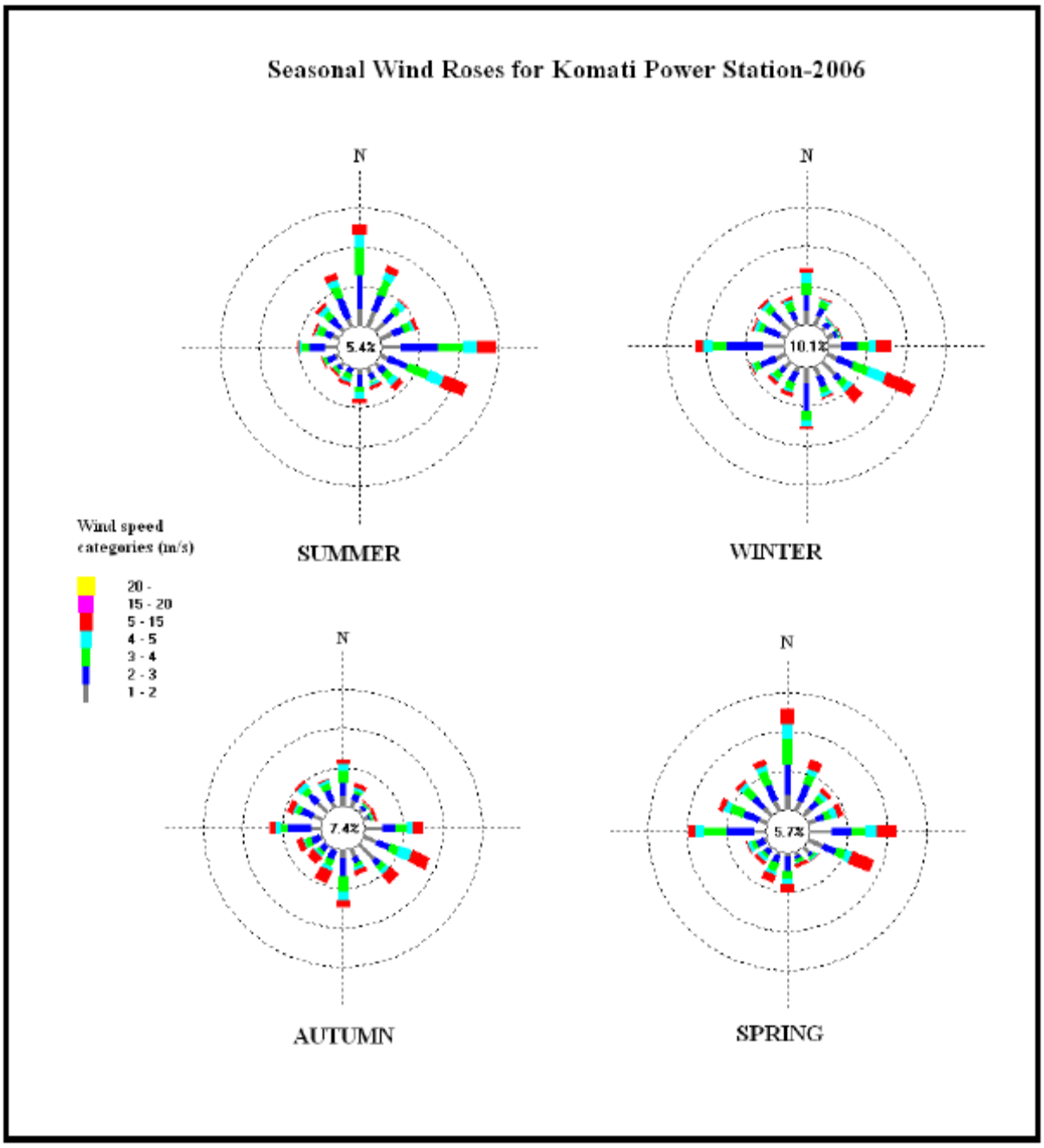

Figure 6: Seasonal Wind Roses for Komati Power Station (2006)

5.4 Geology

The regional geology consists of various groups within the Karoo Supergroup as well as numerous dolerite intrusions. Dolerite dyke and sill intrusions are ubiquitous throughout the area although no formations are known to occur on the ash dam site. The Ecca group occurs extensively with the region and of the 16 formations, one, the Vryheid formation, dominates the immediate study area. The Vryheid formation comprises shale and sandstone elements interspersed with coal beds. These were laid down in a number of different cycles of deltaic and

fluvial processes. Locally, siltstones and sandstones of the Vryheid Formation are encountered. These rock types weather to fine grained sands, silts and clays. In the lower terrain units a transported wet, clayey sand with occasional gravels overlies the residual profile.

Komati Power Station is situated within the Springs-Witbank Coalfield. The sediments of the coalfield were deposited on an undulating pre-Karoo floor and consequently the distribution and thickness of the Karoo Sequence sediments vary significantly. The sediments of the Karoo basin were deposited in fluvial floodplains and shallow shelves over a period of more than one hundred million years extending from the late Carboniferous (290million years ago) to the early Jurassic (190million years ago).

5.5 Soils and Land Capability

During geotechnical investigations of the ash dam site a number of test pits were excavated and the soil profiles recorded. The typical profile comprised:

0 – 1 m	Hillwash: moist, brown, loose, slightly clayey silty, fine and medium sand.
1- 1.7 m	Ferruginised Hillwash: moist, red brown mottled orange brown and grey, dense to very dense, moderately ferrunginised, slightly clayey silty fine sand with ferricrete nodules and concretions.
1.7 – 4.1 m	Ferruginised Transition: Moist, mottled orange brown red brown and grey, dense, moderately cemented and ferrunginised, clayey fine and medium sand with ferricrete nodules and concretions
4.1 – 4.9 m	Reworked Residual Siltstone/Sandstone: Moist, yellow brown mottled grey, firm to stiff, poorly ferrunginised, slightly micaceous, clayey fine and medium sand to sandy clay.

The reworked horizon grades into a residual siltstone of very stiff, sandy silt that extends to depths of 10 m. In the southern areas of the site very dense residual sandstone is encountered from depths of 2.5 m.

Land capability of the majority of the local region is classed as arable and agriculture is extensively practiced. Approximately half of the proposed powerline route is currently planted to a maize crop, while the remainder is natural or secondary grasslands, used largely for grazing of large stock.

5.6 Groundwater

The following section has been summarized from information in the groundwater impact assessment report (see Appendix 12):

Rocks of the Karoo Supergroup are not known for the development of economic aquifers, although occasional, high-yielding boreholes may be encountered. Generally, two distinct aquifers occur, namely a shallow, weathered aquifer and a deeper fractured aquifer. In the Komati area the general weathered aquifer extends to approximately 15 m below surface and there is a strong relationship between surface topography and groundwater level (99.96% correlation). The predominant groundwater flow in the study area is in a northerly direction toward the unnamed Koornfontein tributary, along a topographical gradient of approximately 1:70. Based on the geological borehole logs the depth of weathering in the weathered aquifer is relatively deep in places, reaching depths in excess of 66m in valleys and in swamp areas. Recharge to the aquifer is estimated to be in the order of 3% of the annual rainfall. The aquifer is often perched and due to the impermeable shale horizons, which restrict the downward filtration of rainwater into the aquifer, may even be artesian in places. The largest accumulation of water is normally confined to the contact between the weathered and “fresh” bedrock. Borehole yields in this aquifer are generally low due to the low transmissivity parameters of the aquifer material.

The deeper fractured aquifer, formed by bedding planes, fractures and faults is developed from approximately 10m. This aquifer seldom constitutes an economic aquifer as there is seldom significant groundwater flow as a result of the low porosity of the Ecca group rocks. Aquifer flows may be increased where secondary structures, such as dykes, have increased porosity and water bearing conduits. Water quality in the fractured aquifer is generally of a poorer quality as a result of the concentration of salts and the slow recharge rate. No dykes or sills are known from the site and results from the aquifer testing suggest that the aquifer is heterogeneous and not well developed in the study area. It is likely that the two aquifers are interconnected and that groundwater flows between the two.

The regional groundwater quality from the weathered aquifer in undisturbed areas is good due to the dynamic recharge from rainfall. A total of nine monitoring boreholes have been drilled at Komati Power Station and monitoring has been undertaken at various stages by different consulting firms. The most recent sampling results indicate that the local aquifer is affected by contaminant sources situated on surface. Elevated sulphate, iron, chloride, magnesium, manganese and calcium levels were recorded in the majority of the monitoring boreholes at Komati Power Station (Appendix 12). There are no known groundwater users on the ash dam site or between the ash dam and the mined out areas of the Koornfontein mine.

It is expected that a groundwater mound occurs around the ash dams as a result of seepage from the ash slurry into the underlying soil. Shallow groundwater seepage intercepted in test pits dug around the ash dam suggests this.

The numerical groundwater model was used to understand the current baseline conditions and to predict the likely impacts of the existing ash dams on groundwater quality. The groundwater model was run over a 100 year time period. Contamination, resulting from the current ash dams, is expected to move in a northerly direction towards the unnamed Koringspruit tributary north of the power station. Although the contaminant plume is expected to move relatively slowly through the aquifers, the model predicted that contamination from the ash dams will probably reach the unnamed tributary within 50 years. It is anticipated that sulphate concentrations (Figure 9), in groundwater contributing to stream baseflow could exceed 200 mg/l while the sodium concentrations (Figure 11) could exceed 50 mg/l and electrical conductivity (Figure 13) could increase to more than 100 mS/m. The result is that the baseflow water quality would not conform to SABS drinking water standards (Class 0) after this time period. The impacts of the pollution plume on water quality will vary with high and low stream flows.

5.7 Surface Water

The Komati Power Station falls within the B11B quaternary catchment that has a surface area of approximately 482 km^2. The Koornfontein River runs to the north west of the Komati Power Station, and is joined by an unnamed tributary that flows from east to west past the power station. The Koornfontein River also passes the Koornfontein and Goedehoop Coal mines and drains to the Olifants River catchment. The ash dam area drains in a north westerly direction to Gras Dam and via a small drainage line to the Koornfontein River. The ash dams lie close to the head of this small catchment area, the majority of which is occupied by the dirty water area of existing ash dams. Currently there is a seepage area/drainage line within the dirty water area of the existing ash dams that holds water. It is expected that this water results largely from seepage off the ash dams, which have been used as water storage facilities during Komati Power Station's inactivity. Water from this drainage line collects in the Gras Dam.

The area of the powerline route drains north toward the unnamed tributary of the Koornfontein River. The 88 kV servitude is closest to the tributary, at a distance of approximately 200m.

5.8 Land Use

The predominant land uses in the area are electricity generation and transmission facilities, coal mining operations, and agricultural activities with pockets of residential areas supporting these activities. The area proposed for the new ash dam is between the existing ash dams, the power station and Komati Village. The proposed site is currently unutilised except for two powerlines, a 275kV and an 88kV, that cross the area.

The area of the powerline route is largely agricultural land, currently used for dryland agriculture and grazing.

5.9 Ecology

The Komati Power Station falls within the Highveld Grasslands region and in the Eastern Highveld Grassland vegetation type (Mucina & Rutherford, 2006). These short, dense grasslands are found on the gently undulating plains of the Highveld and include some low hills and pan depressions. The vegetation is dominated by the usual Highveld grass composition including *Aristida, Digitaria, Eragrostis, Themeda* and *Tristachya* spp. Occasional rocky outcrops occur with wiry, sour grasses and some woody species. The sward often has an extensive herb component. In general the vegetation unit is poorly conserved and transformation has been extensive (~44%) as a result of cultivation, plantations, mining and urbanisation. Erosion is not typically a concern within this vegetation unit.

The proposed site for ash dam extension 3 is located within the Komati Power Station Property, adjacent to the ash dam complex. The area slopes gently to the north and is bisected by a small drainage line that drains to the Gras Dam. Extensive historical and more recent operational disturbances have altered areas across the site. The disturbances include; roads and tracks; old buildings; seepage; sedimentation of ash; and various in-stream and off-stream impoundments. Soils in the drainage line and large portions of the lower lying areas are damp to completely inundated, mostly from the seepage that comes from the ash dams.

The site is vegetated with a mixture of natural, disturbed and invasive species. The majority of the area is dominated by a grass sward of indigenous grasses, but many of the species on the site are typical of disturbed areas. Common species include *Hyparrhenia hirta*, *Cymbopogon validus*, *Sporobolus* spp and *Melenis repens*. In some places the grass sward has been extensively invaded by Kikuyu. There are a number of stands of exotic trees across the site; these include species such as the Black Wattle, Poplar, Willow and Bluegum. In addition there are numerous weed species occurring on the site including: the Spear Thistle (*Cirsium vulgare*), Cosmos (*Cosmos bipinnatus*), Tall Khakiweed (*Tagetes minuta*), and Large Thorn-apple (*Datura ferox*).

The central drainage line, adjacent wet areas and dams have extensive reed (*Arund*o spp) and bulrush stands. In the areas with damp soils there are numerous sedge species and hydrophilic grasses as well as extensive stands of *Imperata cylindrical*, which was used to vegetate the ash dam walls.

The powerline route consists largely of agricultural lands including maize fields and areas that have been ploughed, interspersed with small patches of remnant or secondary grassland. A walk-over along the proposed powerline route was conducted to assess the condition of the habitat at each of the proposed tower footprints. Descriptions of the vegetation condition at each of the tower footprints are included in Table 6 below.

Table 6: Site and Vegetation Description from each of the Proposed Powerline Tower Footprints

Tower No.	X	Y	Site Description and Vegetation
275 – 1	-47696.4	2889507.4	Adjacent to existing tower on hill crest. Rural farm workers houses nearby. Short indigenous grassland, heavily grazed. *Sporobolus* and *Aristida* spp
275 – 2	-47832.8	2889221.2	Flat area within maize field.
275 – 3	-47987.6	2888896.2	Flat area within maize field.
275 – 4	-48140.7	2888574.8	Flat area within maize field.
275 – 5	-48267.9	2888307.8	Flat area within maize field.
275 – 6	-48434.5	2887957.9	Flat area within secondary grassland on old ploughed lands. *Hyparrhenia* spp, *Sporobolus* spp, *Setaria* spp, Sedge spp. Significant invasion by *Sesbania* spp.
275 – 7	-48417.3	2887889.3	Flat area within secondary grassland on old ploughed lands. *Imperata cylindrica*, *Sporobolus* spp, *Setaria* spp and Sedge spp. Significant invasion by *Sesbania* spp.
275 – 8	-48184.9	2887786.4	Flat area within natural grassland. Short, dense sward interspersed with tall grass clumps and various herb spp.
275 – 9	-47874.5	2887649.	Adjacent to existing tower within ash dam property. Heavily disturbed, significant seepage from ash dam. Bulrushes and weedy species such as Thistle and Thorn Apple
88 – 1	-47735.5	2889503	Adjacent to existing tower on hill crest. Rural farm workers houses nearby. Short indigenous grassland, heavily grazed. *Sporobolus* and *Aristida* spp

88 – 2	-47852.6	2889257	Flat area within maize field.
88 – 3	-47955.5	2889040	Flat area within maize field.
88 – 4	-48067.8	2888803	Flat area within maize field.
88 – 5	-48169.1	2888590	Flat area within maize field.
88 – 6	-48272.1	2888373	Flat area within maize field.
88 – 7	-48378.9	2888148	Flat area within secondary grassland on old ploughed lands. *Imperata cylindrica*, *Sporobolus* spp, *Setaria* spp, Sedge spp. Significant invasion by *Sesbania* spp as well as creeper.
88 – 9	-48491.4	2887911	Flat area within natural grassland. Short, dense sward interspersed with tall grass clumps and various herb spp.
88 – 10	-48302.5	2887784	Flat area adjacent to road and house complex. Significant surface disturbance and rubble.
88 – 11	-48096.5	2887646	Between power station access road and pipeline. Heavily grazed by community stock. *Sporobolus* spp, *Themeda triandra*, *Setaria* spp, *Heteropogon* spp
88 – 12	-47953.5	2887550	Adjacent to exiting tower within power station property. Within a graded, laydown area being used for construction, no vegetation.

Fauna on the ash dam site and powerline route is limited by the disturbed nature of the area, both as a result of agriculture and power generation activities. A number of common grassland bird species were observed in the natural and secondary grasslands, however sensitive grassland specialist such as lark, pipit, korhaan and cisticola spp are not expected to occur. Various water and wetland bird species were observed on the dam and wetland areas at the ash dam site. These included species such as White-faced Whistling Duck, Egyptian Goose, Yellow-billed Duck, Reed Cormorant, Sacred Ibis, Cattle Egret, Hadeda Ibis, Cape Weaver, Twany-flanked Prinia and Nedicky. All of these species are widespread and highly adaptable in their use of disturbed habitats.

No mammal species were observed during the site visit, but signs of Common Reedbuck, Grey Duiker and Porcupine were observed. It is likely that other common mammal species frequent the area, either permanently or on a transient basis however, as a result of the long history of disturbance of both the ash dam site and powerline route, no sensitive mammal species are expected to persist.

5.10 Air Quality

The following section has been summarized from information in the air quality impact assessment report (see Appendix 13).

The Mpumalanga Highveld region has long been noted to have elevated air pollution concentrations and a number of sources of elevated emissions are located in the region. These sources have been associated with the long-range transportation of pollutants and have the potential for impacting on the air quality of the adjacent and more distant regions Criteria pollutants identified as of major concern in the region include particulates, sulphur dioxide and nitrogen oxides.

Sources of SO_2 and NO_x that occur in the region include Eskom power stations, industrial emissions, blasting operations at mines and spontaneous combustion of discard at coal mines, veld burning, vehicle exhaust emissions and household fuel burning. The highest ground level concentrations due to the Eskom Power Station stack emissions are expected to occur during unstable conditions when the plume is forced to ground in relatively close proximity to the power station.

Various local and far-a-field sources are expected to contribute to the suspended fine particulate concentrations in the region with the Eskom Power Stations predicted to contribute only marginally to such concentrations. Local sources include wind erosion from exposed areas, fugitive dust from agricultural and mining operations, particulate releases from industrial operations, vehicle entrainment from roadways and veld burning. Household fuel burning also constitutes a significant local source of low-level emissions. Long-range transport of particulates, emitted from remote tall stacks and from large-scale biomass burning in countries to the north of South Africa, has been found to contribute significantly to background fine particulate concentrations over the interior.

A cumulative study was conducted for Eskom in 2006 which predicted the highest and annual average concentrations of particulates in the study region for all the sources (Figures 7 and 8). The study led to the conclusion that elevated PM10 concentrations were predicted to occur in the study region as a result of regional emission sources and those of local operations. Background maximum daily concentrations were estimated to be between 25 µg/m³ and 75µg/m³ in the region. Annual average concentrations are estimated to be about 10 µg/m³.

The air quality impacts of the existing ash dam operations were considered using air dispersion modeling. The main source of fugitive dust emissions during operation of the ash dams is wind erosion from exposed surfaces. The predicted highest daily average ground PM10 level concentrations for baseline operations were less than 5 µg/m³, beyond the site boundary (Figure 12 and Table 9). These concentrations are well below the daily SA standard of 180 µg/m³ and the proposed SA standard of 75 µg/m³. The predicted maximum daily dust deposition rates for the baseline operations were 120 mg/m²/day and do not exceed the SANS residential dust fallout limit of 600 mg/m²/day beyond the site boundary or at any of the sensitive receptor sites (Figure 14 and Table 8).

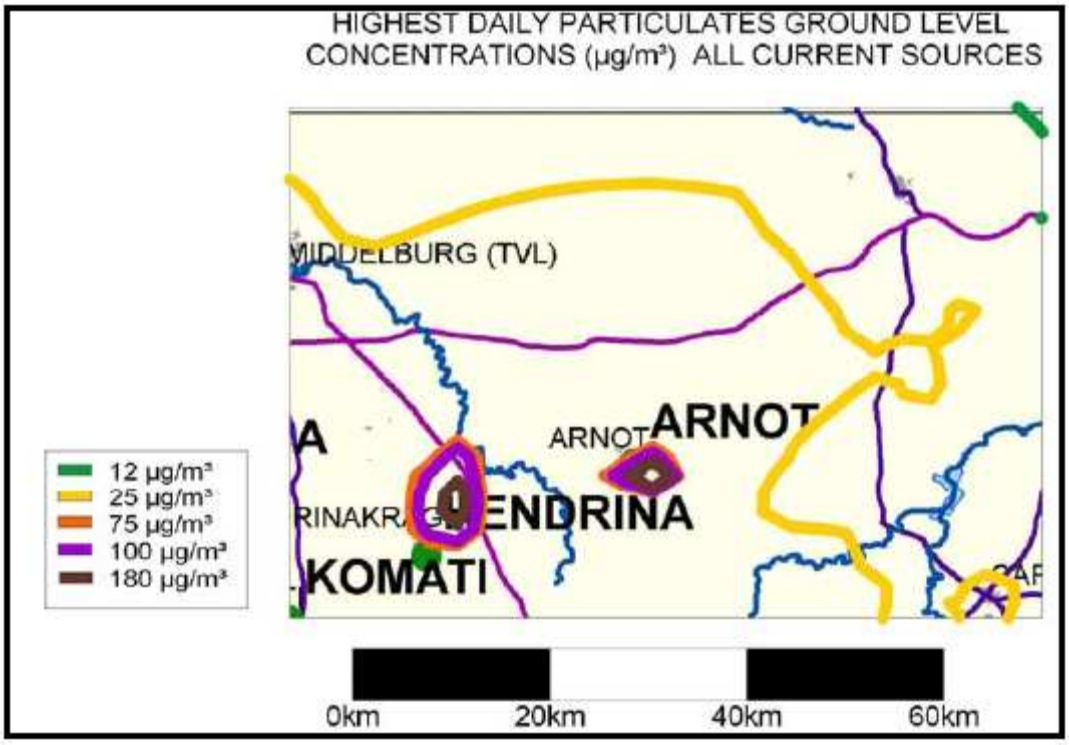

Figure 7: Predicted Highest Daily PM10 Concentrations in the Study Area

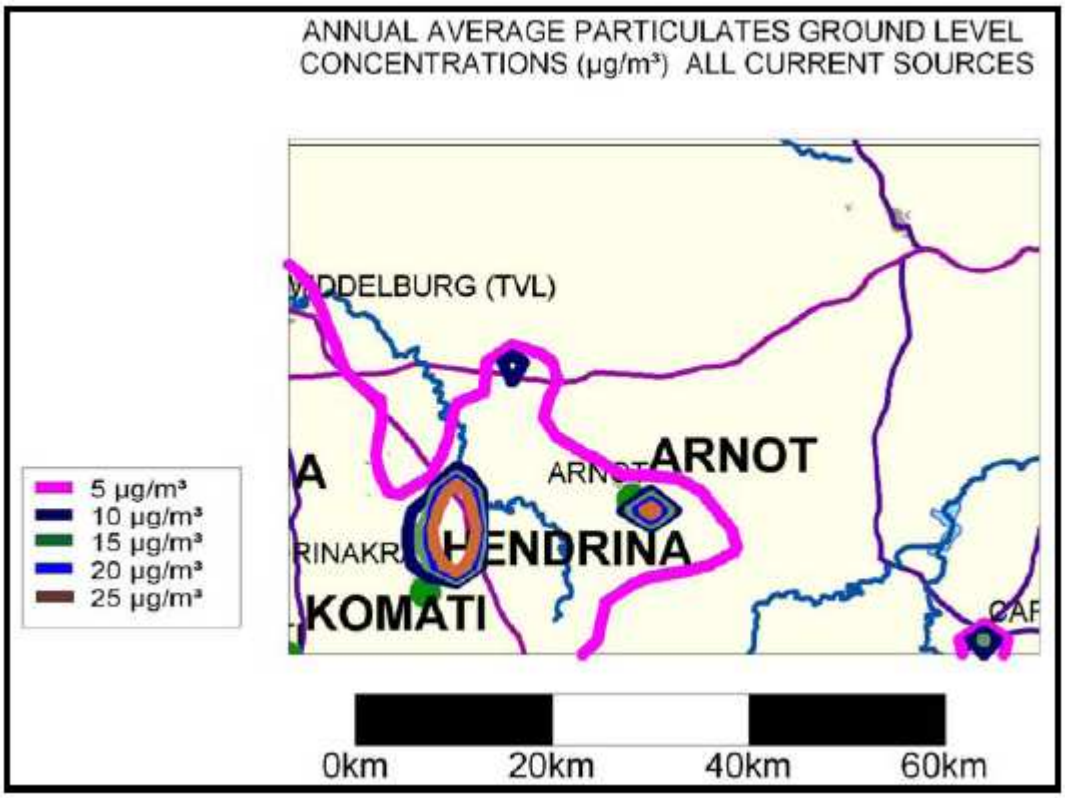

Figure 8: Predicted Annual Average PM10 Concentrations in the Study Area

5.11 Noise

Currently, the main source of noise in the area emanates from Komati Power Station and re-commissioning operations there. Noise sources include the operation of heavy machinery and the handling of materials at the power station and ash dam sites. Additional noise sources in the area include vehicles on the nearby provincial road, the mining operations and agricultural activities.

5.12 Cultural Heritage

The area is a farming district and there are known burial sites associated with many of the homesteads. No sites or artefacts of heritage value were discovered on the ash dam site or powerline route during the heritage assessment (Appendix 14).

5.13 Visual Environment

The Komati Power Station, local coal mines (Koornfontein and Goedehoop) and associated infrastructure dominate the visual environment in this otherwise rural area. The mines and power station are large scale installations that dwarf other visual attributes in the area. The existing ash dams are large structures with a regular profile, but are vegetated and therefore less visually obtrusive than much of the other power station infrastructure. Numerous powerlines depart from the power station and have a strong impact on the character of the area.

5.14 Social and Economic Environment

Komati Power Station lies within the Steve Tshwete Local Municipality and adjacent to the Komati and Blinkpan Villages. Municipal administration takes place in Middelburg, about 40 km to the north. Middelburg is a large, growing town and is an important agricultural and industrial centre in the region. Middelburg is the seat of local government and hosts a number of industries including stainless steel, coal mining, agriculture and electricity generation. The economic situation in the municipality is generally good with a number of large industries providing significant employment. Unemployment is around 30%.

The Steve Tshwete municipal area has a population of approximately 145 000 people. Water provision and sanitation services in the urban areas is generally very good with all residents having access to IDP standard water and sanitation, however in the rural areas the situation is poor. Rural households, including most of the informal settlements have access to electricity, but only 27% of rural households have access to electricity. Coal, paraffin and candles are thus still extensively used in the rural and informal settlements as sources of energy.

Approximately 398 persons, including Eskom personnel and contractors are currently employed at Komati Power Station during the re-commissioning phase. It is expected that there will be a permanent force of 217 employees at the power station during operation. 8 people will be involved in the management and maintenance of the ash dam facilities.

Komati Village was owned by Eskom prior to the mothballing of Komati Power Station, but nearly all of the houses are now privately owned. There are approximately 440 residential stands in Komati Village and a large proportion of the employed people work at the power station or associated services. A large number of people working at the power station live and commute from Middelburg, Witbank or Bethal. Service provision in Komati Village is of a high standard with all houses having water, electricity and sewerage facilities.

6. RESULTS OF CONSULTATION WITH AFFECTED PARTIES

6.1 Collation of Issues and Concerns

It was proposed to capture issues and concerns relating to the proposed new ash dam at Komati Power Station by means of:

- response sheets, circulated within the background information document (BIDs);
- meeting minutes;
- letters;
- e-mail correspondence; and
- telephonic conversations.

A total of 240 BIDs were hand delivered or mailed to potential IAPs between 20 and 31 August 2007. No interested or affected parties attended the public meeting and to date only 2 formal responses have been received.

Registered IAPs were informed of the availability of the draft scoping report and the draft Environmental Impact Report, but no comments were received.

6.2 Synthesis of Issues Raised

The issues, concerns and questions raised by the IAP are documented in Table 7 below. The responses are included in Appendix 7.

Table 7: Summary of Public Issues and Concerns

COMMENT / ISSUE RAISED	NUMBER OF RESPONSES	PROJECT RESPONSE
Can it be guaranteed that the ash dam will never break its wall under heavy rain conditions and kill half of the residents Komati Village?	2	The ash dam is to be constructed, operated and monitored in accordance with the legal requirements and industry standards. A risk assessment will be completed for the dam to determine the zone of influence and safety classification in terms of SANS 10286. Water levels on the dam will be managed to ensure that the dam cannot overtop during extreme rainfall. In addition, the dam infrastructure, including the gravity decant penstock, sump, pumps and return water dam have been designed such that neither storm nor ash water will be stored on the dam at any time. This will prevent the phreatic level (water table) within the outer wall from rising thereby ensuring the stability of the outer wall
Why is the ash not disposed of into the closed mine workings?	1	In the past ash was disposed of in the underground workings but this practice was discontinued. The underground disposal of ash from Komati Power Station has not been considered because there is the potential that the underground disposal of ash may result in impacts on groundwater resources that would be difficult to manage. On surface ash disposal results in a facility that is more easily managed. Impacts are likely to be easier to detect and mitigate.

7. ASSESSMENT OF ENVIRONMENTAL, SOCIAL AND CULTURAL IMPACTS

Potential environmental (biophysical and socio-economic) impacts associated with the construction and operation of the ash dam (Tables 10) and the transmission lines at Komati Power Station are evaluated below (Table 11). The significance of environmental impacts associated with the development of the ash dam and powerline at Komati Power Station have been assessed using the methodology described in Section 3.8. The significance of the impacts has been determined both without and with the implementation of mitigation measures. A summary of all impacts identified for ash dam extension 3, with the scoring of each criteria, the overall significance and suggested mitigation measures is presented in Table 10. Information on the current level of degradation at the ash dam site and the expected cumulative impact of the ash dam extension combined with the current impacts is presented in Table 11. Similar information for the powerline deviations is provided in Tables 12 and 13.

7.1 Discussion of Significant Impacts from Ash Dam Extension 3

7.1.1 Topography

The construction and operation of ash dam extension 3 will result in a change to the natural topography of the site. The footprint of the proposed dam is currently gently sloped and will be changed to a steep-sided, flat-topped mound, nearly 50 m higher than the current ground level. The proposed ash dam is however adjacent to a series of existing ash dams and will be developed to the same height. Thus ash dam extension 3 will not result in a topography that is significantly altered from overall current topography and the cumulative change in the topography is thus considered to be of low significance.

7.1.2 Soils and Land Capability

The development of ash dam extension 3 over a footprint area of approximately 42 ha would result in the burying of the topsoil and therefore its permanent loss. As topsoil is a valuable resource, particularly for facilitating rehabilitation, the loss of topsoil will result in an impact of moderate significance. Stripping and stockpiling of the topsoil from the footprint area of ash dam extension 3 will effectively mitigate any potential losses of topsoil. In addition, it will be important to prevent the erosion of topsoil while it is stockpiled. With mitigation in place the impact of topsoil loss is expected to be of very low significance.

Development of the ash dam will alter the capability of approximately 42 ha of land. Normal land capability for land in the Komati area is considered to be between arable and grazing while ash dam surfaces no land capability as the use thereof will be restricted following closure of the ashing operation. Although the ash dam site currently has a normal land capability the land is not available as agricultural land as it is within the Komati Power Station property, which is a restricted area. Thus, although the capability of the land as an ash dam will permanently reduce, the restricted status of the land will remain unchanged and the impacts will be of moderate significance.

7.1.3 Groundwater

The objective of the numerical groundwater flow model was to predict the cumulative impact of the ash dam extension 3 on groundwater quality. Two situations were modeled, including the current, baseline situation (status quo) and the future situation with the development of ash dam extension 3 (including remedial measures at the existing dams).

Details on the groundwater conditions that would result at Komati if the current situation persisted have been discussed under the baseline chapter (Section 5.6). Modeling predicted that if the current situation persisted then the groundwater conditions near the unnamed tributary of the Koringspruit River are likely to deteriorate within 50 years. Impacts of high significance on groundwater are expected as a result of the seepage of contaminants into the groundwater resource from both the coal stockpiles and the existing ash dams. Remedial measures, aimed at improving the management of seepage and groundwater at Komati Power Station, are currently being implemented to rectify the groundwater issues that have developed while the power station has been mothballed (J&W 2007a).

Groundwater conditions at Komati Power Station, with the addition of ash dam extension 3 to the current situation, were simulated with the groundwater flow model. It was assumed that by the time ash dam extension 3 is constructed the remedial measures at the ash dam complex will be in place and these were included in the model. Contamination of the groundwater is predicted to continue to occur from the ash dam complex. The plume is predicted to move in a northerly direction towards the unnamed Koringspruit tributary will extend marginally further west than during the current situation model. Elevated sulphate (Figure 10), sodium (Figure 12) and electrical conductivity (Figure 14) levels within the vicinity of the tributary are predicted to become noticeable within 50 to 80 years.

Although the addition of ash dam extension 3 may marginally increase seepage and the production of contaminants, the design measures and the seepage cut-off drain which is being implemented are predicted to significantly reduce contamination of the groundwater. While the extent of the contamination plume is predicted to extend further west than without ash dam extension 3, the rate of spread is predicted to be reuced. The effect of the cut-off drain will be to slow the spread of contamination and reduce the downstream concentration of pollutants by capturing seepage water and directing it to the dirty water dam. The herring-bone drain that will capture water from under ash dam extension 3 will also reduce the seepage to groundwater.

Although some contamination will escape underneath the cut-off drain and continue to pollute the groundwater, there will be a reduction in groundwater pollution levels when compared with predictions for the current situation. The improvement over the predictions for the current situation is despite the addition of ash dam extension 3 to the ash dam complex. Therefore, as long as the planned remedial measures are implemented, the addition of ash dam extension 3 will not substantially change the contamination of groundwater over the current situation.

The unmitigated impacts of ash dam extension 3 on groundwater are expected to be of high significance as water quality will be adversely affected. However, with the planned mitigatory designs and the implementation of remedial measures the impacts of ash dam extension 3 on groundwater are expected to reduce to medium significance as contaminants are contained. The current level of degradation is also expected to stabilize or improve as remedial measures are implemented and seepage to groundwater from the ash dam complex is reduced. The development of ash dam extension 3 will therefore not substantially change cumulative impact of the Komati Power Station and ash dams on groundwater.

The design of ash dam extension 3 to higher standards, on-going rehabilitation of sections of the existing ash dams, the removal of water from many areas of the ash dams and other remedial measures such as cut-off seepage drains will be critical to reduce the seepage to the underlying aquifers thereby preventing or slowing the spread of contamination. Groundwater monitoring will be essential to assess the spread of a pollution plume and determine the effectiveness of the mitigation measures. Groundwater monitoring must be conducted at the existing monitoring network and it is further recommended that additional monitoring boreholes be drilled to the west of ash dam extension 3.

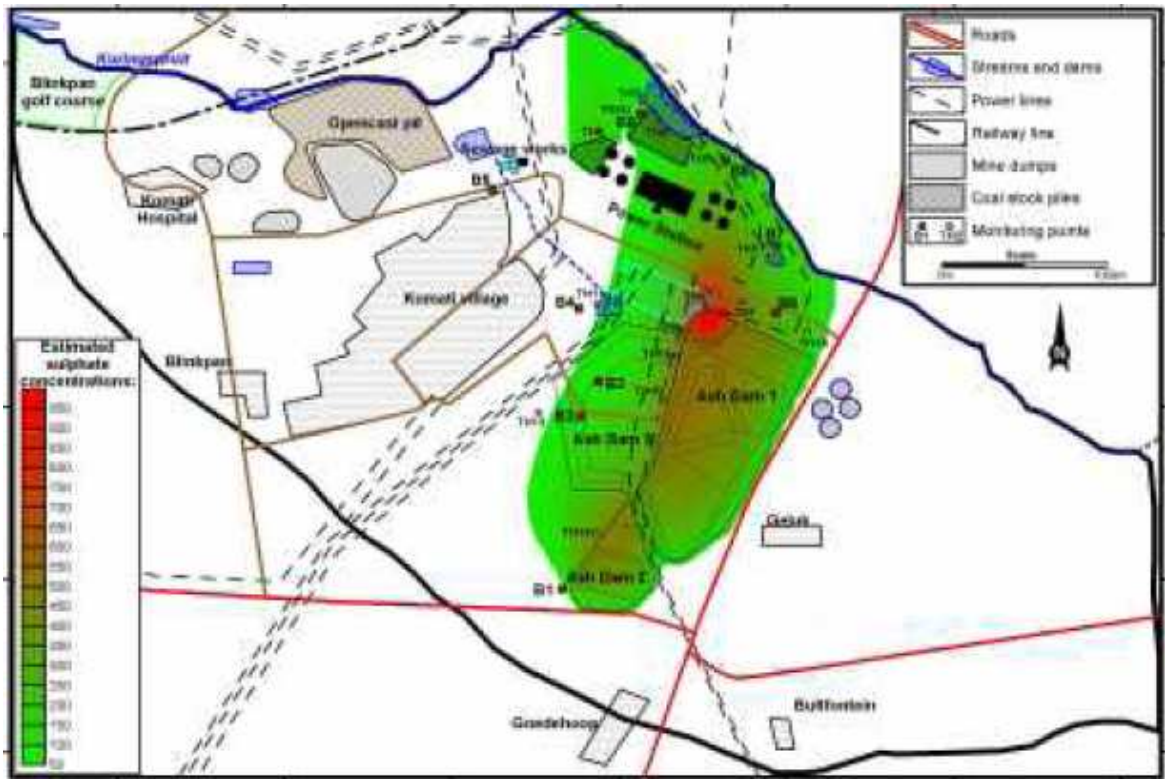

Figure 9: Predicted Sulphate Contaminant Plume at Komati Ash Dam (Status quo)

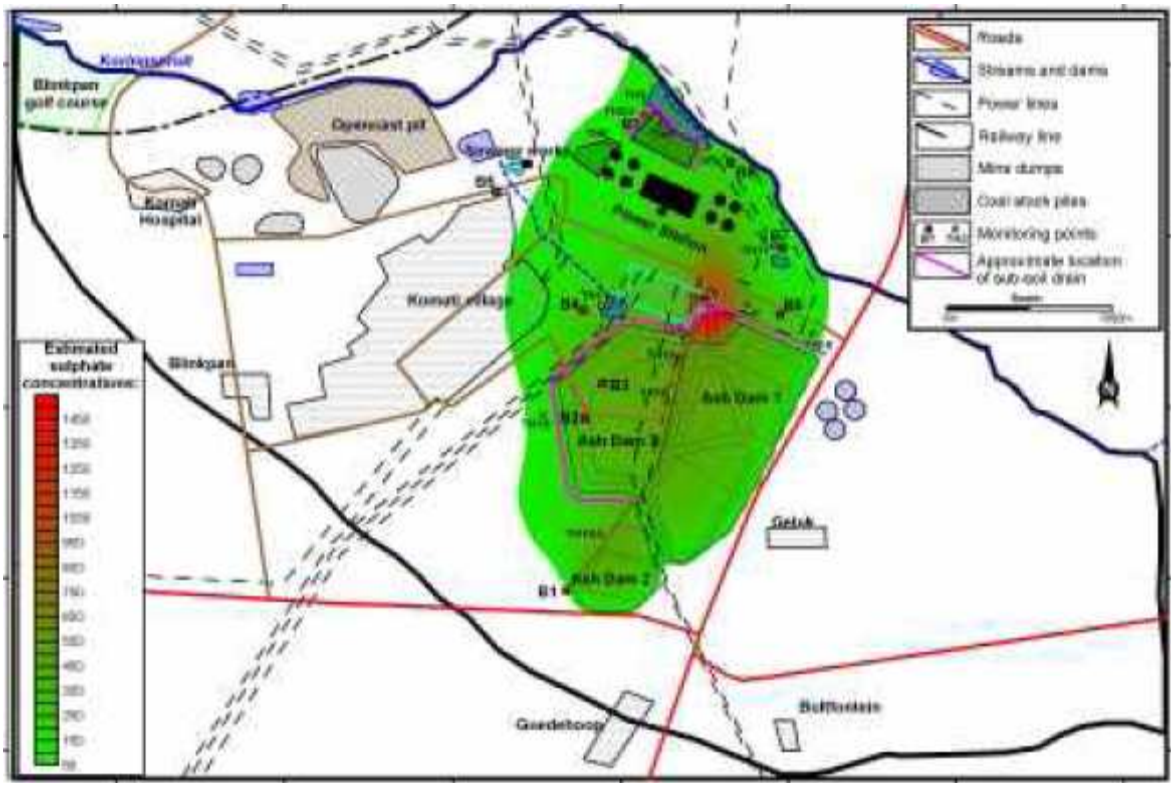

Figure 10: Predicted Sulphate Contaminant Plume at Komati Ash Dam (Future)

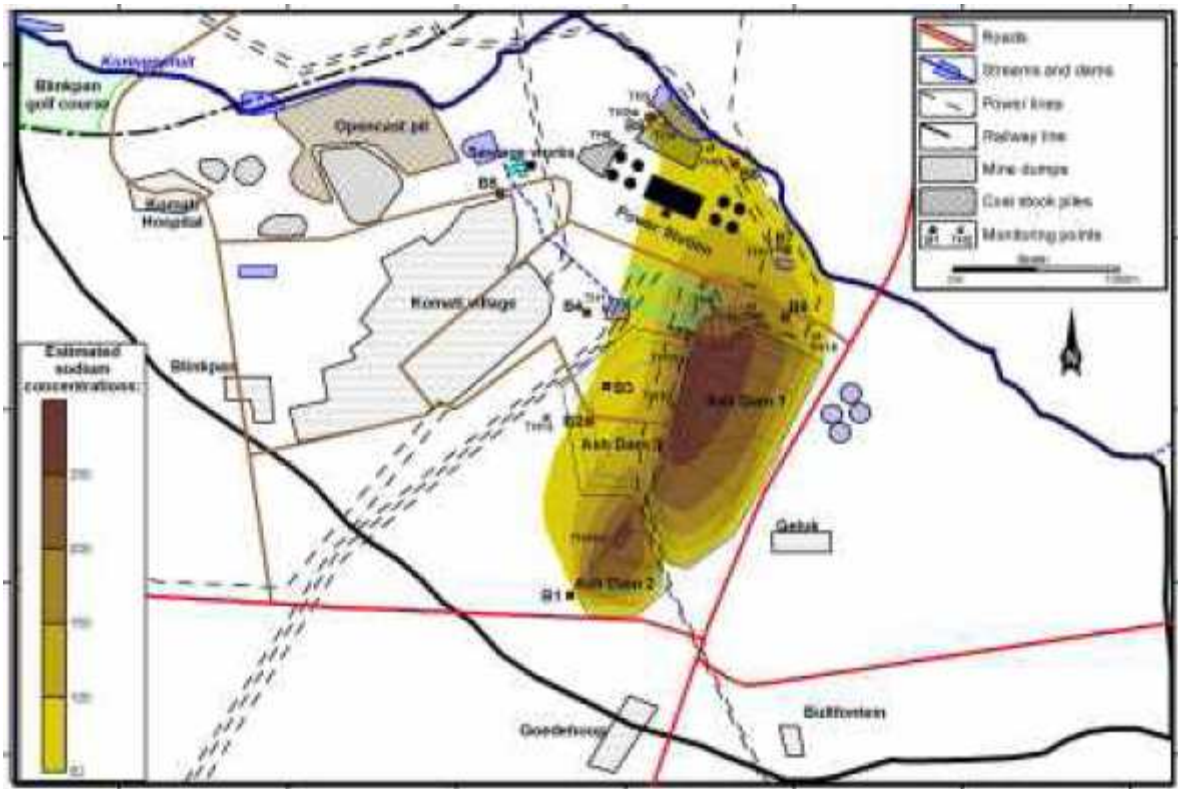

Figure 11: Predicted Sodium Contaminant Plume at Komati Ash Dam (Status quo)

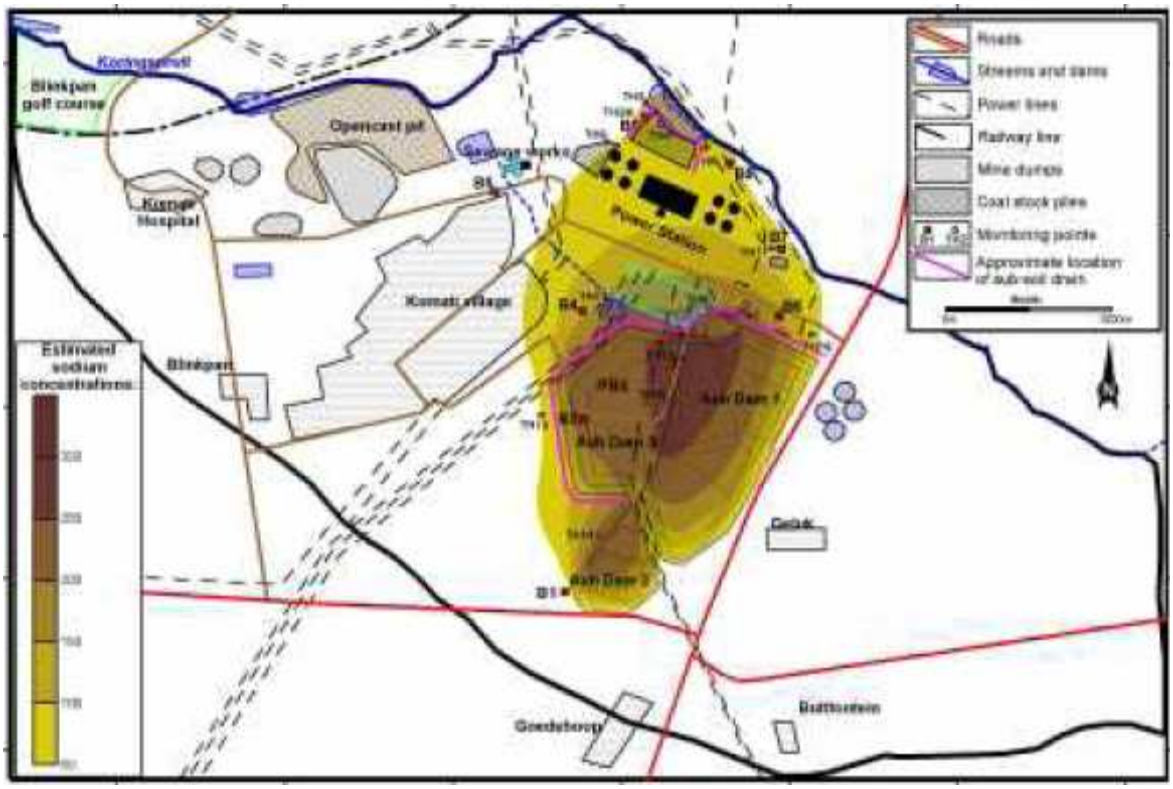

Figure 12: Predicted Sodium Contaminant Plume at Komati Ash Dam (Future)

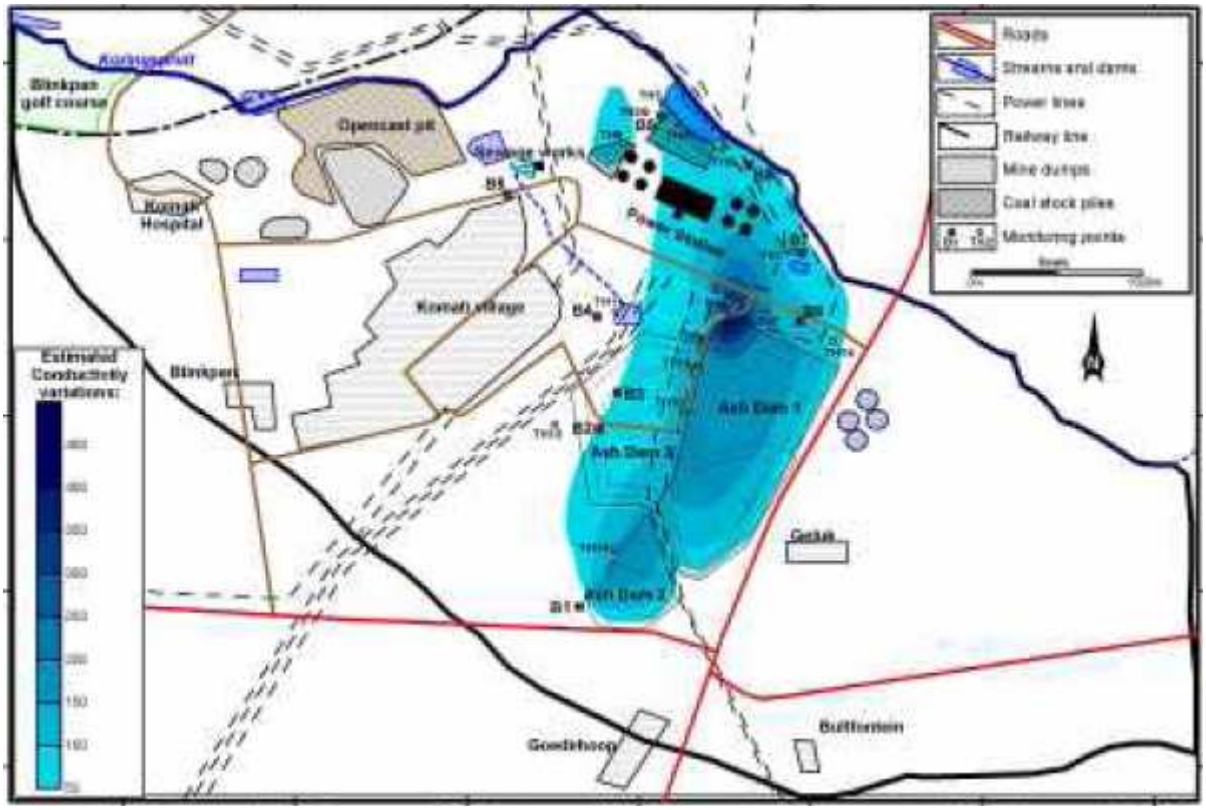

Figure 13: Predicted Electrical Conductivity Increase at Komati Ash Dam (Status quo)

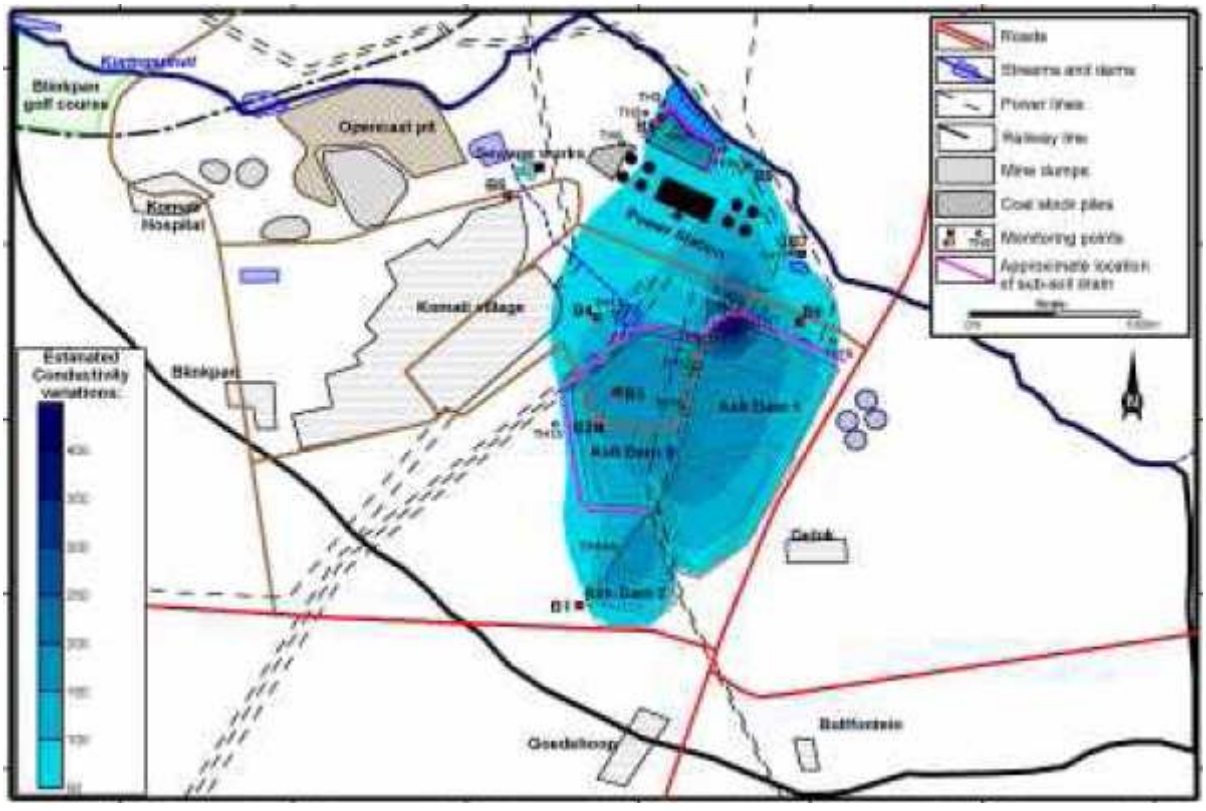

Figure 14: Predicted Electrical Conductivity Increase at Komati Ash Dam (Future)

7.1.4 Surface Water

Storm water that comes into contact with ash has the potential to become polluted and transport contaminants to the local water resources. Pollutants, including dissolved salts and sediments may be dispersed in the contaminated run-off water. The drainage line flowing through the ash dam site, and the unnamed tributary to the north of the power station, both drain to the Koringspruit River and could transport pollutants from the ash dam site. Ash dam extension 3 will increase the surface area of the ash dam complex and result in a greater cumulative risk for surface water pollution. Pollution can reduce the quality of the water and alter the biota occurring in the stream. Pollutants will also be transported downstream and add to the contaminant load in the Olifants River. The unmitigated impacts of surface water pollution are likely to be of medium significance.

Currently dirty run-off water and seepage water from the existing ash dams escapes the dirty water system and drains to the Gras Dam. The dam is not therefore a clean water dam. However these systems are currently being upgraded as part of the remedial measures and Gras Dam will be restored to a clean water dam. Cut-off drains and a sub-soil seepage trench are expected to be effective in collecting dirty water from the ash dams and draining it to the dirty water dam. Containment of all the dirty water will be essential to protect surface water resources and reduce the significance of impacts. The cumulative impact of all the ash dams on surface water is expected to be of low significance, which is an improvement over the current situation without the remedial measures.

Stormwater controls to divert clean storm water around the ash dam complex are largely in place for the existing dams and will be effective for ash dam extension 3. Clean storm water is diverted around the site or collects in the Gras Dam. Precipitation falling onto the ash dams is largely contained within each ash dam, while run-off from the ash dam slopes is contained by cut-off trenches and drained to the dirty water dam. Ash dam extension 3 will be built within the existing drainage systems and dirty run-off will be effectively contained and clean water effectively diverted. These mitigation measures are expected to be successful in minimizing the flow of dirty run-off to the catchment. Thus impacts, with mitigation, are expected to be of low significance.

It is recommended that surface water monitoring be implemented to assess the success of polluted run-off control measures. Monitoring should take place at a point below the Gras Dam and within the unnamed tributary of the Koringspruit River, downstream of the power station.

Construction of ash dam extension 3 will result in the loss of that surface area from the local catchment. Water from the ash dam surface will be considered contaminated and be contained within the dirty water system, thereby removing that runoff from the catchment. However, less than 1 % of the quaternary catchment surface area will be lost. As ash dam extension 3 is located downstream of the existing ash dam complex, within the current dirty water area, there is no additional loss of water from the catchment. There is thus no impact or change in the cumulative impact on the loss of runoff from the catchment. The impact will be reversed once the dam is completely rehabilitated and returned to the clean water system.

7.1.5 Land Use

Development of ash dam extension 3 will affect the use of approximately 42 ha of land. The land currently forms part of the Komati Power Station and although unused, is designated as part of the ash dam complex. Once developed as an ash dam the land will not be available for alternate uses either in the medium or the long-term. Although, the rehabilitation of the dam will probably result in the successful establishment of vegetation it is unlikely that the land will be able to be utilized for any other purpose. However, given that the land is currently used as support services for the Komati Power Station and will continue to be used for the same purpose, the impact is considered to be of low significance. There is no change to the cumulative impact.

7.1.6 Ecology and Biodiversity

Ash dam extension 3 will be built on an already disturbed site. Disruptions to the natural habitat and the subsequent loss of biodiversity from the site have occurred to a large extent. No range-restricted or red data species have been recorded and while the site is still well represented by indigenous fauna and flora, these are largely comprised of generalist species that adapt to, or thrive in disturbed situations. In addition there are numerous alien, invasive plant species across the site.

The complete destruction of the 42 ha site will result in the loss of all of the non-mobile fauna and flora from the site. The loss is not considered significant as these species are well represented elsewhere in the area. The drainage line and some of the wetland areas at the site will also be lost under ash dam extension 3. These wetland habitats are artificially supported by seepage emanating from the ash dams and support numerous alien invasive and disturbance tolerant species. The wetland area is not naturally supported and in addition the majority of the drainage line and wetland forms part of the dirty water area for the ash dam complex. Thus, although the development of the ash dam will result in the complete destruction of the site, the loss of the habitat and biodiversity is not considered significant and there is no change to the cumulative impact.

7.1.7 Air Quality

The air quality impacts have been assessed for the various project phases. The results from the air dispersion modeling are discussed below.

7.1.7.1 Construction

Construction activities such as land clearing, topsoil removal, material loading and hauling, stockpiling, grading, bulldozing and compaction were identified as having the potential for the generation of fugitive emissions. Dispersion simulation determined the inhalable particulate (PM10) concentrations and dustfall rates under both unmitigated and mitigated scenarios.

During unmitigated construction the predicted highest daily average ground level PM10 concentrations exceeded the current daily SA standard of 180 µg/m^3 and the proposed SANS standard of 75 µg/m^3 at the site boundary and at Komati Village, but not at the other sensitive receptor sites at Blinkpan or Koornfontein (Table 8). The maximum daily dustfall did not exceed SANS residential dust fallout limit of 600 mg/m²/day beyond the site boundary.

With the implementation of mitigation measures, to a control efficiency of 50%, the highest daily average ground level PM10 concentrations did not exceed the daily SA standard, but remained above the proposed SANS standard of 75 µg/m^3 at the site boundary and at Komati Village (Table 8). The maximum daily dustfall during construction did not exceed SANS standards beyond the site boundary.

It is predicted that elevated PM10 concentrations are likely to be experienced by receptors in Komati Village during construction of the ash dam. While mitigation will be effective in reducing PM10 concentrations to below the current SA standards, it is expected that emissions will remain above the more stringent, proposed SANS standards. The isopleths plots of highest daily PM10 concentrations contain only the highest predicted concentration over the averaging period for a location. Therefore the predicted concentration may actually only occur on one day during the entire operation. It is likely that a number of such exceedances will be permissible per year when the SANS air quality guidelines are finalised. The impact of exceedance of the proposed SANS PM10 air quality standards during construction is of low significance.

However the predicted PM10 concentrations from construction operations must be considered with the current background concentrations for the region, which are between 25 and 75 µg/m^3. Overall emissions are therefore expected to exceed the proposed SANS standards at the sensitive receptors and result in cumulative air quality impacts of moderate significance. As construction of ash dam extension 3 will only occur for a short duration, and result in infrequent elevated PM10 levels the significance of the cumulative impact will remain unchanged. Effective dust control measures, in line with good practice, must be implemented during the construction phase with at least 50 % emission control efficiency to ensure that PM 10 and dust impacts are of low significance. Practices such as the wet suppression on road surfaces and disturbed areas can prove effective.

Table 8: Predicted Highest Daily Average PM10 Concentrations and Dustfall Rates during Construction

Scenario	Highest Daily Average PM10 Concentrations(µg/m_3)				Maximum Total Daily Dustfall (mg/m_2/day)			
	At Site Boundary	Komati	Koornfontein	Blinkpan	At Site Boundary	Komati	Koornfontein	Blinkpan
Unmitigated	320	287	64.8	41.2	250	105	12.5	11
Mitigated	150	143	32.6	19	122	52.6	6	5

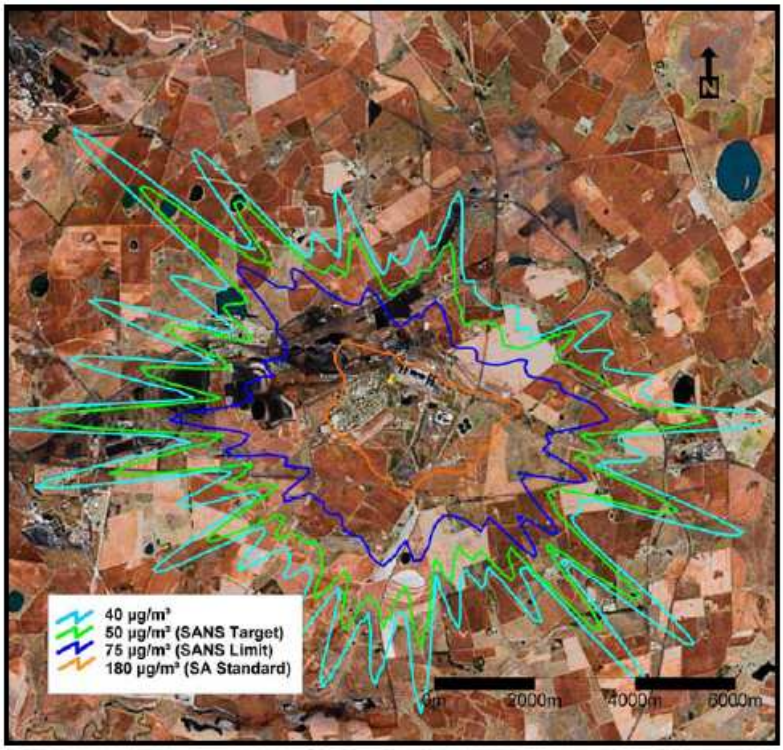

Figure 15: Highest Daily Average PM10 concentrations for Unmitigated Construction

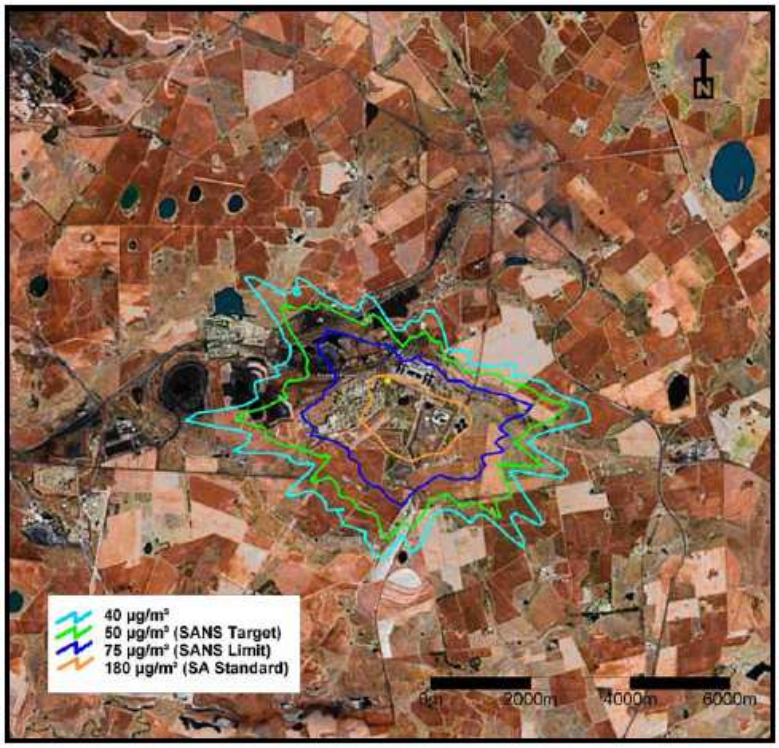

Figure 16: Highest Daily Average PM10 concentrations for Mitigated Construction

7.1.7.2 Operations

The main source of fugitive dust emissions during operation of the ash dam is wind erosion from exposed surfaces. Dispersion simulations determined the inhalable particulate (PM10) concentrations and dustfall rates for the current baseline scenario (existing ash dam operations) (Figure 12 and Table 9) and for the operational phase of ash dam extension 3 (existing ash dam operations with extension 3 operations).

Operations of the current ash dams are predicted to result in very low PM10 concentrations and intermediate dustfall rates. The addition of ash dam extension 3 to the baseline operations resulted in a negligable increase in the predicted highest daily average ground PM10 level concentrations. Concentrations remained well below the daily SA standard of 180 µg/m³ and the proposed SA standard of 75 µg/m³ at the site boundary (Figure 13 and Table 9). While the predicted highest daily PM10 concentrations from the ash dam operation do not exceed the SANS standards, the combination of ash dam emissions with the elevated background concentrations (between 25-75 µg/m³) could exceed the SANS standard beyond the site boundary or at some of the sensitive receptor sites. Similarly, the annual values are expected to be higher than predicted due to the current background PM10 levels (of ~10 µg/m³). The direct impacts, as a result of the exceedance of air quality standards, will be of very low significance, but the cumulative impacts will be of medium significance.

The predicted maximum daily dust deposition rate for the operation of ash dam extension 3 increased, but still did not exceed the SANS residential dust fallout limit of 600 mg/m²/day beyond the site boundary or at any of the sensitive receptor sites (Figure 15 and Table 9). Dustfall rates may also be higher than predicted by the model when local background levels are taken into consideration. No direct impacts are expected to result and cumulative impacts are expected to remain unchanged. Effective dust control measures, in line with good practice, should be implemented at the ash dam complex. Measures to be considered include the vegetation of daywalls and completed surfaces and the development of screens and berms to reduce wind speeds across exposed areas.

Table 9: Predicted Highest Daily Average PM10 Concentrations and Dustfall Rates during Baseline Operations and with Ash Dam Extension 3

Scenario	Highest Daily Average PM10 Concentrations(µg/m₃)				Maximum Total Daily Dustfall (mg/m₂/day)			
	At Site Boundary	Komati	Koornfontein	Blinkpan	At Site Boundary	Komati	Koornfontein	Blinkpan
Current Baseline	5	2	0.5	0.5	120	111	23	22
Existing + Ash Dam Extension 3	6	4.2	0.77	0.8	260	229	32	35

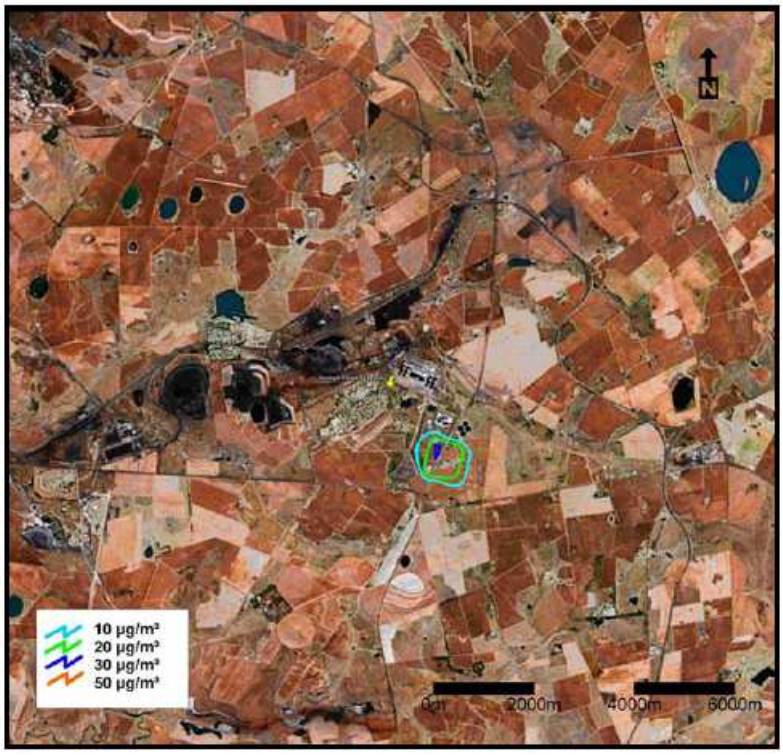

Figure 17: Highest Daily PM10 Concentrations during Baseline Operations

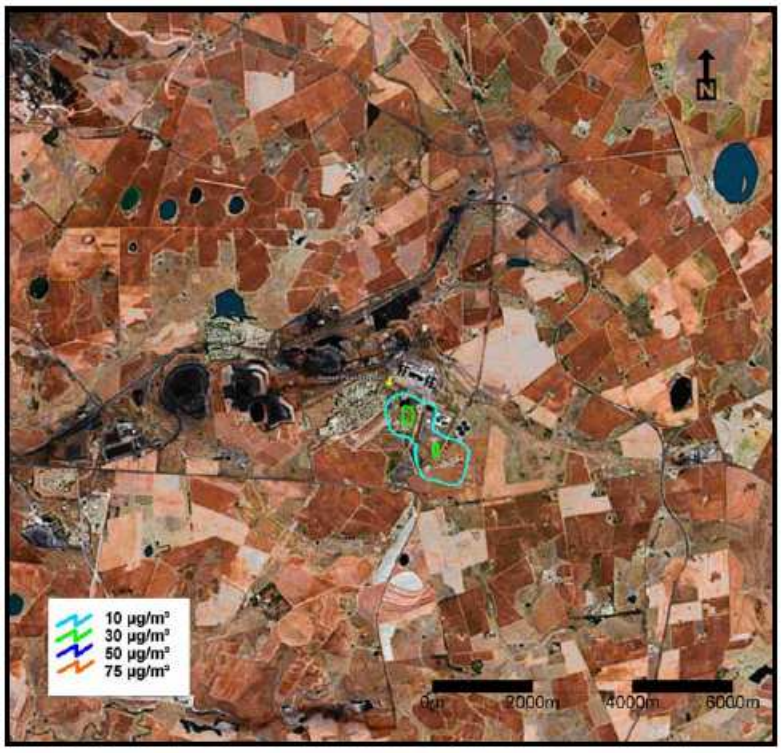

Figure 18: Highest Daily PM10 Concentrations during Extension 3 Operations

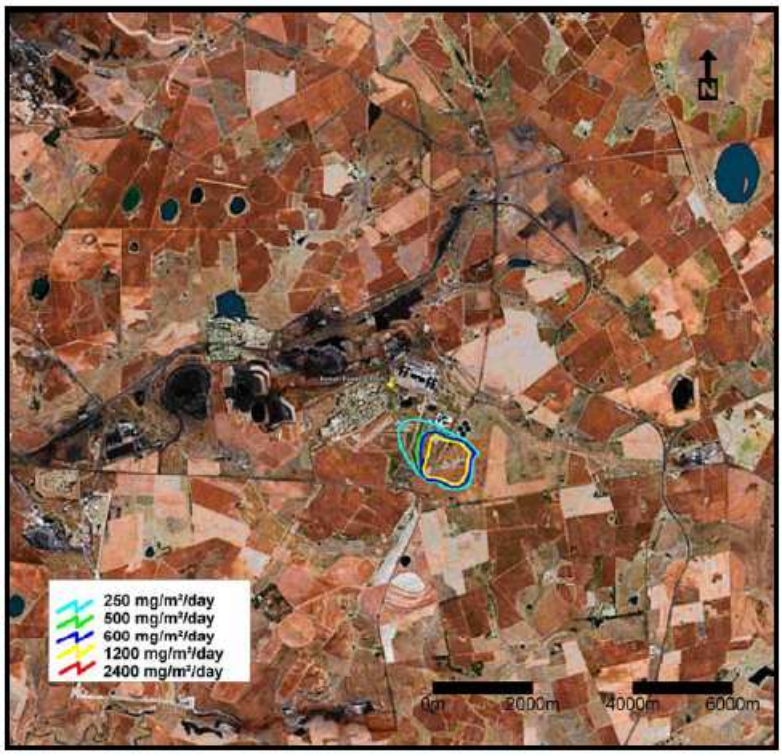

Figure 19: Maximum Daily Dust Deposition Rates during Baseline Operations

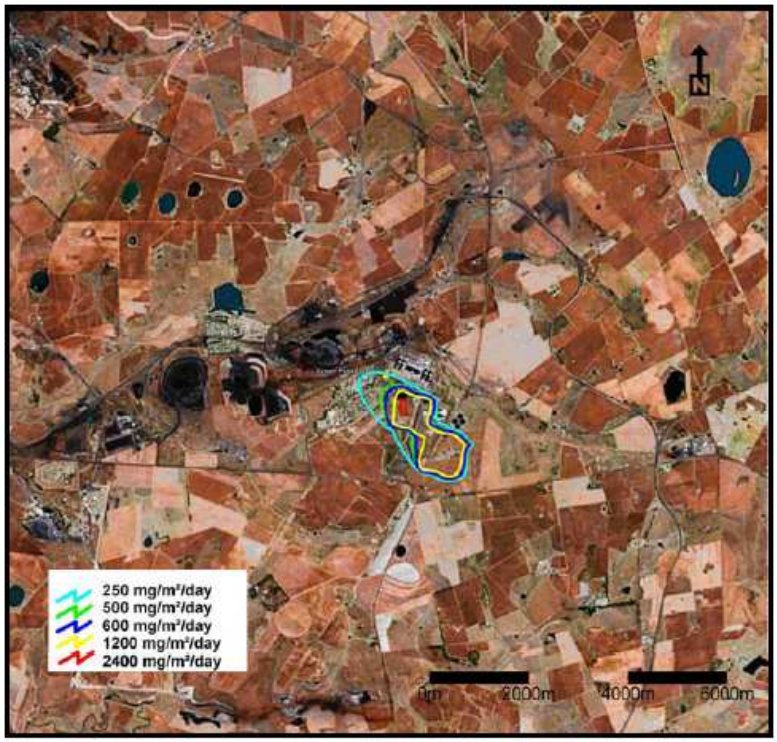

Figure 20: Maximum Daily Dust Deposition Rates during Extension 3 Operations

7.1.8 Noise

Construction of ash dam extension 3 will involve the use of heavy earth-moving machinery and transport vehicles that will generate noise. Re-commissioning of the Komati Power Station and ash dam complex generates noise of a similar nature. Thus construction of ash dam extension 3 is not expected to increase noise levels or introduce additional noises, but will extend the duration of the noise generating period. The impacts are expected to be of low significance and the cumulative impact will not change.

Operation of ash dam extension 3 will involve the same operating procedures as for the current ash dam complex. Noise generation from operations of the ash dams is generally minimal and thus no additional noise impacts are expected.

7.1.9 Cultural Heritage

No heritage sites or artefacts were discovered on site (Appendix 14). No impact is expected.

Should any archaeological sites be exposed during construction or operation it must immediately be reported to the South African Heritage Resources Agency (SAHRA) so that an investigation and evaluation of the finds can be completed.

7.1.10 Visual

The construction and operation of ash dam extension 3 will result in a change to the topography and the removal of the natural vegetation from the site. The proposed dam site is currently gently sloped and vegetated with natural grassland interspersed with exotic trees. The views of the site will be changed to a steep-sided mound, of pale ash, with pipelines and roads. The proposed ash dam is however adjacent to a series of existing ash dams and will be developed in a similar manner, to the same height. Ash dam extension 3 will form a very small part of the views from the provincial roads and the entrance to Komati Power Station as it is largely screened by the existing ash dams. The views from the residential areas will change as ash dam extension 3 will occupy more of the foreground, however the background and skyline will not change. Thus ash dam extension 3 will result in an impact of medium significance, but will not change the current views and the cumulative impact is unchanged.

7.1.11 Social and Economic

The proposed re-commissioning of Komati Power Station has revitalised the economy of Komati Village, providing employment and economic input into the area during the construction period. The development of ash dam extension 3 and deviation of the powerline forms an integral part of the re-commissioning process and will enable Komati Power Station to operate for a further 20 years or more thereby ensuring continued employment for at least 217 people. Approximately 20 persons will be employed on the construction and 8 persons for the operation of the ash dams. These personnel are currently working at the ash dam complex and the development of extension 3 will ensure there continued employment. This is a positive impact of moderate significance.

Komati Power Station is being re-commissioned to provide additional electrical generation capacity in order to alleviate the current energy short-fall in South Africa. Once operating at full capacity Komati will produce approximately 1000 MW for the distribution in the national grid. The existing ash dams only have sufficient capacity for 18 months of ash deposition. Therefore without ash dam extension 3, operations and electricity generation at Komati Power Station will cease. Ash dam extension 3 will facilitate the operation of Komati Power Station for most or perhaps all of the station's planned life. This is a positive impact of moderate significance.

Construction activities for ash dam extension 3 are predicted to result in elevated highest daily PM10 concentrations that may be above recommended standards at a point in time during the construction period. Mitigation, with a control efficiency of 50%, should be implemented during construction and is expected to lower PM10 concentrations considerably. However exceedances of the highest daily standard may still be experienced close to the site. The fine PM10 particles are inhalable and are damaging to the lower airways and gas exchanging portions of the human lung. Elevated PM10 levels are likely to result in human health impacts that include reductions in peak respiratory flow, bronchodilator use and increased symptoms in asthmatics, increased coughing and hospitalization as well as increased daily mortality. There is a linear increase in the incidence of many of these conditions with increasing PM10 concentration. The SANS standards consider human health impacts and PM10 concentrations in local communities higher than the standards can result in human health impacts. The isopleths plots of highest daily PM10 concentrations contain only the highest predicted concentration over the averaging period. Therefore the predicted concentration may actually only occur on one day during the entire operation. It is likely that a number of such exceedances will be permissible per year when the SANS air quality guidelines are finalised. As a result of the short duration of construction activities at Komati no significant impacts on human health are expected and the impact is of low significance.

It is predicted that elevated dustfall rates may occur during operation of ash dam extension 3 as a result of wind erosion from exposed surfaces. Dustfall can result in nuisance impacts in residential areas. Predicted dustfall in the nearby sensitive receptors will be well below the recommended standards for residential areas and thus impacts of low significance are expected. Mitigation, in line with good practice, should be implemented to prevent dustfall from becoming an issue in Komati Village.

The infiltration of contaminants from the ash dam has been predicted to result in some pollution of local groundwater, and it is further expected that this contaminant plume will disperse northwards over the course of the next 100 years. Modelling of the contaminant levels and plume dispersal associated with ash dam extension 3 have indicated that the elevated sulphate, sodium and electrical conductivity are expected to occur as far as the tributary to the Koornfontein River. Dispersion of the plume to this point will not result in exceedances of the SABS drinking water standards for at eat 50 years and as there are no known groundwater users within this area no significant impacts are expected.

Development of ash dam extension 3 will result in a larger ash dam facility that is closer to the adjacent areas of Komati Village than the current situation. This could present a greater safety risk to residents should the dam fail. A risk assessment on the zone of influence and a safety classification in terms of SANS10286 will be completed for ash dam extension 3. It is likely that the dam will classify as a high hazard dam due to the locality of Komati Village. Ash dam extension 3 has been designed, and will be constructed and operated under supervision, by professional engineers to the required standards.

Table 10: Environmental Impacts associated with the Komati Ash Dam Extension 3

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Topography											
Change in the natural topography	L	2	1	2	5	5	40	40	L	No mitigation possible.	-
Soils and Land Capability											
Loss of available topsoil	-	4	1	1	5	5	55	20	-	Strip available topsoil from ash dam footprint area and stockpile. Protect stockpiles from erosion	H
Loss of land capability	L	3	1	1	5	5	50	50	L	No mitigation will be effective	-
Groundwater											
Contamination of groundwater	M	4	5	3	5	4	68	42	M	Construct herring bone drainage system under ash dam to collect seepage. Seepage cut-off drains to be put in place. Groundwater monitoring program to monitor effectiveness of mitigation measures.	L
Surface Water											

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Contamination of surface water	M	3	4	4	5	4	64	24	L	Clean and dirty water drain system, sub-soil cut-off drains and retention of polluted water on site. Surface water monitoring to monitor effectiveness of mitigation measures.	M
Loss of runoff to the catchment	L	1	1	4	4	1	7	0	L	Ensure that clean water is released to the catchment. Rehabilitated areas to be returned to clean water.	M
Land Use											
Change of land use	L	1	1	1	5	5	40	40	L	No mitigation required as and use remains for power station activities.	-
Ecology											
Loss of biodiversity	M	1	1	2	5	5	45	40	M	Alien plant control.	H
Loss of habitats	M	2	1	1	5	5	45	45	M	Ensure minimal disturbance to areas beyond the ash dam site.	M
Air Quality											
Exceedance of standards for PM10 concentrations during construction	M	4	2	3	2	3	33	18	M	Implement emissions control on roads and disturbed areas. Use chemical and wet suppression during construction operations to 50% efficiency.	H

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Exceedance of standards for PM10 concentrations during operation	M	4	1	1	4	2	20	10	M	Vegetate ash dam walls and completed areas as soon as possible. Minimise the size of exposed surfaces.	H
Exceedance of standards for dustfall rates during construction	L	2	1	3	2	2	16	7	L	Implement emissions control on roads and disturbed areas. Use chemical and wet suppression during construction operations to 50% efficiency.	H
Exceedance of standards for dustfall rates during operation	L	2	2	3	4	3	33	18	L	Vegetate ash dam walls and completed areas as soon as possible. Minimise the size of exposed surfaces.	H
Noise											
Change in ambient noise levels during construction	L	3	2	2	2	3	27	21	L	Ensure that all machinery working on site is properly maintained and fitted with appropriate silencers.	H
Change in ambient noise levels during operation	L	1	2	2	4	2	18	16	L	Ensure that all machinery working on site is properly maintained and fitted with appropriate silencers.	H
Cultural Heritage											

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Disturbance of cultural or historical sites	-	4	1	1	5	2	22	11	-	Cease construction activity and report any archaeological finding to SAHRA. Provide opportunity for the necessary investigations.	H
Visual Environment											
Disruption of natural views	H	2	1	2	5	5	50	36	H	Construct dam to height of existing dams. Vegetate slopes as soon as possible.	H
Social & Economic Environment											
Economic benefits through employment	+M	4	1	3	4	5	+60	-	+M	Preference to employment of local persons.	H
Continued generation of electricity at Komati.	+M	4	1	4	4	5	+65	-	+M	Optimise operations to ensure generation of required electrical output.	H
Health risk from elevated PM10 concentrations	M	4	2	3	4	2	26	12	M	Implement emissions control such as chemical and wet suppression during construction operations to 50% efficiency. Ensure operation of the as dams as per good practice. Vegetate ash dam walls and completed areas as soon as possible.	H
Nuisance from elevated dustfall rates	L	3	2	3	4	3	36	24	L	Implement measures to reduce air quality impacts	H

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Loss of groundwater resource to local users	L	3	4	3	4	2	28	16	L	Implement measures to reduce groundwater impacts.	M

Table 11: Cumulative Impacts Resulting from the Komati Ash Dam Extension 3

ENVIRONMENTAL IMPACT	Current degradation	Cumulative impact	DISCUSSION
Change in the natural topography	L	L	No affect on the local topography as the ash dam will have the same profile and height as existing dams.
Loss of land capability	L	L	Site capability will be reduced from potentially arable to permanently restricted. However loss of the site does not significantly alter the current situation.
Contamination of groundwater	M	M	Currently concerns surrounding groundwater pollution. Current situation may improve following remedial measures. No change to the current level of degradation is predicted from ash dam extension 3.
Contamination of surface water	M	L	Clean and dirty water are not adequately separated as dirty seepage water enters the Gras Dam. Cumulative impact will reduce in significance with implementation of remedial measures. No impact of ash dam extension 3.
Loss of runoff to the catchment	L	L	Site is currently part of dirty water system and will remain so until final closure.
Change of land use	L	L	Land use is restricted to power station activities and will remain so. No change to impact.
Loss of biodiversity	M	M	Site is currently impacted by power station activities and ash dams and has reduced biodiversity. Small, additional local loss.
Loss of habitats	M	M	Site is currently impacted by power station activities and ash dams. Small, additional local loss, but no influence on cumulative impact.
Exceedance of standards for PM10 concentrations during construction	M	M	Region is affected by elevated background PM10 concentrations. Slight, but insignificant change for a short duration during construction.
Exceedance of standards for PM10 concentrations during operation	M	M	Region is affected by elevated background PM10 concentrations. No change during operations.
Exceedance of standards for dustfall rates during construction	L	L	Region is affected by elevated dustfall levels. No change during construction.
Exceedance of standards for dustfall rates during operation	L	L	Region is affected by elevated dustfall levels. No change during operations.

ENVIRONMENTAL IMPACT	Current degradation	Cumulative impact	DISCUSSION
Change in ambient noise levels during construction	L	L	Existing noise from power station re-commissioning. No change to cumulative impact.
Change in ambient noise levels during operation	L	L	Ensure that all machinery working on site is properly maintained and fitted with appropriate silencers.
Disruption of natural views	H	H	Power station infrastructure dominates local scenery. New dam will not alter the overall impact.
Health risk from elevated PM10 concentrations	M	M	Region is affected by elevated background PM10 concentrations. Slight change for a short duration during construction. No real impact from ash dams.
Nuisance from elevated dustfall rates	L	L	Region is affected by elevated dustfall levels. No change as a result of ash dam extension 3.
Loss of groundwater resource to local users	L	L	No users in the vicinity. Contamination levels will not restrict use for at least 50 years. No impact as a result of ash dam extension 3.

7.2 Discussion of Significant Impacts from the Powerline Deviation

7.2.1 Topography

The deviation of the powerline will not result in any significant changes to the natural topography of the route. No impact is expected.

7.2.2 Soils and Land Capability

Deviation of the powerline route over a servitude area of approximately 18 ha is not expected to result in significant topsoil losses. Only the footprint area of each tower will be directly impacted and the total area is not of significance. The feet of each tower must be properly planted, and the ground surface re-contoured so as to minimise the risk of erosion causing topsoil losses.

Erosion may result along areas of the powerline servitude disturbed by the service track and tower footprints. As the powerline route generally crosses only flat land and the soils are not known to be erosive, any impacts are expected to be of low significance. Erosion control in the form of berms and side drains should be installed where the service road crosses steep areas.

Use of the land as a powerline servitude will not alter the land capability significantly as the only land physically altered is the area under the tower feet, and this is an insignificant area.

7.2.3 Groundwater

The deviation of the powerlines is unlikely to result in any impacts on groundwater. During construction there is potential for the spillage of chemicals such as paints and hydrocarbons from machinery and equipment. Any chemicals or fuels kept on site must be stored within a bund and should be handled over an impervious surface. If more than 50L of any hazardous product are kept on site then a spill kit must be available.

7.2.4 Surface Water

Runoff from the powerline servitude may contain greater sediment loads should erosion of the service track result. Erosion control in the forms of berms and side drains should be installed where the road crosses steep areas. If erosion develops along the servitude then remedial action should be taken.

7.2.5 Land Use

Development of the powerline servitude will restrict the use of approximately 18 ha of land. Approximately half of the route is currently planted under maize, with the remainder as natural or secondary grasslands used for grazing. As little as 0.1 ha of the servitude area will be completely unusable as it falls within the tower footprints, while the remainder will have restricted use and access but can still be used as agricultural land. Land use agreements between Eskom and the land users will define the allowable land uses, but it is likely that all current land uses can continue. Impacts on the land use are of low significance.

7.2.6 Ecology and Biodiversity

The powerline route crosses land that has been disturbed by various agricultural uses, both current and historical. There are no wetlands, streams, rocky outcrops or other habitat types known to support important species biodiversity within the servitude. In addition only a very small portion of the servitude will directly impacted on by the tower footprints. Establishment of the powerline servitude will also not affect the local habitat structure, the connectivity of habitats or the functioning of the habitat in any real manner as the powerline only impacts on the habitat at each of the tower footprints. As no loss of biodiversity or important habitat is expected from the powerline route no impacts of significance are expected.

Powerlines are however known to interfere with the flight paths of larger bird species and frequent fatalities are recorded from certain areas, electrocutions are also known to kill perching birds. The location of these powerlines, adjacent to existing power station infrastructure means that it is unlikely that there are any low level bird flight paths within the area. Susceptible species such as cranes, bustards and vultures are not known to frequent the habitats adjacent to the powerline route and thus no bird-powerline interactions are expected.

7.2.7 Air Quality

The deviation of the powerlines will not result in any impacts on air quality. Local lair quality should be considered when determining the maintenance regime for these powerlines.

7.2.8 Cultural Heritage

No heritage sites or artefacts were discovered along the powerline route (Appendix 14) and it was thus recommended that the development of the powerlines can continue. No impacts of significance are expected.

Should any archaeological or burial sites be exposed then construction activities should be suspended and the find reported to SAHRA for investigation and evaluation.

7.2.9 Visual

The construction of the powerline deviations will add an additional element to the current views in the area. The powerline towers for the 275 kV line are 34 m tall and will thus be highly visible in the relatively even landscape. However, the area is currently characterised by significant electrical generating infrastructure, such as ash dams, cooling towers, chimney stacks and numerous powerlines, thus the deviation of 2 km of powerline, comprising a total of 21 towers will not contribute to a significantly altered view. The impacts are of low significance, although the cumulative impact is of high significance.

7.2.10 Social and Economic

The establishment of a servitude for the powerlines will restrict the use of approximately 18 ha of land. Such restrictions may alter or compromise how the current land user/owner makes use of the land and impact on the user's ability to produce a crop or generate income. Eskom will enter into an agreement with the land user on the permissible uses of the land within the servitude. Generally grazing and dryland agriculture are permissible within servitudes and thus there are unlikely to be significant impacts on the economic use of the land.

The proposed powerline servitude passes within 100 m of residences at three points along its route. The establishment of a powerline adjacent to the residence of local farm residents may result in the residents being exposed to high levels of electromagnetic fields (EMFs). While there are no confirmed cases of biological or health impacts from EMFs (World Health Organisation) there are cases where EMFs have been suspected to result in heath consequences. Provided that the residences are beyond the standard servitude prescribed for powerlines of that electrical capacity, no impacts are expected.

Table 12: Environmental Impacts associated with the Komati Powerline Deviations

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Soils and Land Capability											
Loss of available topsoil	-	1	1	1	4	5	35	20	L	Protect access track from erosion	M
Loss of land capability	-	3	1	1	5	5	50	32	L	Agreement with land user on land uses.	H
Groundwater											
Pollution of groundwater from chemical spillage during construction	-	4	2	3	4	2	26	13	L	Work over an impervious surface. Storage of chemicals in a bund. Spill kit to clean spills.	H
Surface Water											
Sedimentation of surface water from erosion	L	3	3	3	4	2	26	24	M	Protect access track from erosion	M
Land Use											
Change of land use	-	3	1	1	5	5	50	32	L	Negotiate use agreements between Eskom and land user. Ensure that the establishment of the servitude has minimal interference with agricultural practice on the land.	H
Ecology											

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Disruption of habitats	L	3	1	1	4	5	45	32	L	Management of the servitude should consider the current state of the environment and ensure no further degradation. Control of alien plant species.	H
Collisions and electrocutions of birds	-	3	3	1	4	3	33	20	L	At this stage no mitigation is prescribed as there are no known bird receptors. Should collisions occur then avoidance devices should be attached to the lines.	M
Cultural Heritage											
Disturbance of cultural or historical sites during construction	-	4	1	1	5	2	22	11	L	Report any archaeological finding to SAHRA. Provide opportunity for the necessary investigations.	H

ENVIRONMENTAL IMPACT	Current degradation	Intensity	Frequency	Extent	Duration	Probability	Impact Significance		Cumulative impact	Environmental Management	Mitigation Confidence
							Without Mitigation	With Mitigation			
Visual Environment											
Disruption of natural views	H	1	1	2	5	5	45	45	H	No mitigation will be effective.	-
Social & Economic Environment											
Disruptions of land use and loss of economic potential	-	3	1	1	4	4	36	18	L	Negotiate land use agreements between Eskom and land user. Ensure that the establishment of the servitude has minimal interference with agricultural practice on the land.	H
Increase in health risk to neighbouring residents from EMF	-	3	3	1	4	2	22	11	L	Ensure powerline servitude passes beyond existing residences. Inform residents of the dangers of living or working within a servitude.	H

Table 13: Cumulative Impacts Resulting from the Komati Powerline Deviations

ENVIRONMENTAL IMPACT	Current degradation	Cumulative impact	Discussion
Pollution of groundwater from chemical spillage during construction	-	L	Slight risk as a result of hydro-carbons, oils, paints and chemicals that may be used.
Sedimentation of surface water from erosion	L	M	Creation of access track and disturbance of tower footprint areas will increase erosion risk.
Change of land use	-	L	Registration of servitude will impact land uses. Negotiate land use agreements between Eskom and land user.
Disruption of habitats	L	L	Habitats already altered by agricultural practices. No cumulative impact.
Disruption of natural views	H	H	Views are dominated by power station infrastructure. No change to impact from deviation.
Disruptions of land use and loss of economic potential	-	L	Servitude may affect land use and impact on user's economic returns. Increased, but low cumulative impact.

8. DRAFT ENVIRONMENTAL MANAGEMENT PLANS

Draft environmental management plans for the proposed developments have been prepared as a requirement of the EIA Regulations (Sub-regulation 32(2)(o) of GN R 385). Separate EMPs have been prepared for the ash dam extension and powerline deviations. Each of the EMPs, once approved by DEAT, is a legal document and Eskom is overall accountable and responsible for the implementation thereof, and for any contractor non-compliance.

The EMP details the actions/mitigation measures to be put in place for each project to ensure the protection of the environment and lessen the environmental impacts associated with the proposed projects across its life cycle. The EMP includes actions to be implemented during the following project phases:

- Planning and Design;
- Construction;
- Operation; and
- Rehabilitation and Closure.

The EMP includes environmental management measures that will be taken to address the environmental impacts identified in the EIA process. It is structured to include:

- The project activity/aspect requiring management;
- The management objective arising from these activities/aspects;
- The objectives of each of the actions to be implemented;
- The person responsible for the implementation of that action; and
- The time period within which each of the actions should be implemented.

8.1 Ash Dam Extension 3

8.1.1 Planning and design

Very limited activities are required at the ash dam site during planning. In addition the ash dam site is already disturbed as a result of historic and re-commissioning activities at the power station and thus activities will not result in impacts of significance. Thus no mitigation and management measures are required during the planning and design phase.

In order to prevent and mitigate the effects of impacts during the operational phase of ash dam extension 3 it is essential that management measures are included in the planning and design phase of the project. The engineers were aware of many of the groundwater and surface water impacts typically associated with an ash dam and extension 3 has thus been designed to good practice standards in order to mitigate environmental impacts. The following features have been included in the design of ash dam extension 3 to minimise groundwater pollution through seepage and runoff:

- A toe drain;
- A herringbone under-drain;
- A seepage cut-off trench; and
- A return water sump and pump.

8.1.2 Construction Phase

Ash dam extension 3 is an addition to the existing ash disposal dams at Komati Power Station. , The initial site preparation for the footprint of ash dam extension 3 and the installation of ashing infrastructure is addressed under the construction EMP detailed in Table 12 below. However, ongoing development and upward growth of the ash dam takes place as part of ashing operations and as such will be dealt with in the operations EMP.

Table 14: Ash Dam Construction Environmental Management Plan

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Roles and Responsibilities			
To define roles and responsibilities for the implementation of the Construction EMP.	Ultimate responsibility for the implementation of and compliance with the Construction EMP rests with Eskom.	Eskom	On approval of EMP
	Eskom is to appoint an Environmental Representative (ER) responsible for implementing/ overseeing implementation of RoD and EMP conditions and the for the auditing of contractor compliance with the EMP.	Eskom	On approval of EMP
	Eskom is to ensure that adherence to the EMP is included as a contractual commitment for all contractors.	Eskom	In all project tenders and contracts
	Each contractor is to ensure compliance with EMP by their personnel and sub-contractors.	Eskom	At appointment, continuous
	The contractor(s) is /are responsible for the appointment of a designated member of his workforce as an Environmental Control Officer (ECO) to be responsible for environmental issues during construction.	Contractor	At appointment, continuous
	Any exceptions from compliance with the EMP are to be reported to the project manager at scheduled project meetings.	ECO and ER	During construction
Monitoring and Compliance			
To ensure the effective implementation of	The contractor's ECO is to undertake daily EMP	ECO	Implement immediately and repeat daily

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
the EMP.	compliance assessments using a basic checklist.		
	The Eskom ER is to undertake weekly site inspections during construction.	ER	Implement immediately and repeat weekly
	The Eskom ER is to undertake detailed EMP compliance audits once a quarter during construction and again at the completion of construction.	ER	Implement immediately and repeat quarterly
To ensure the protection of air quality standards.	Eskom is to install 2 air quality monitoring stations as per specialist recommendations.	Eskom	Implement immediately
Environmental Awareness			
To ensure that all members of the construction workforce are aware of their responsibilities toward environmental protection and the EMP requirements.	All personnel involved in the project are to undergo environmental induction and awareness training, which should be provided by the contractor(s). Records of such training to be kept as proof.	Contractor	On appointment of contractor
Public Relations			
To minimise disturbance to neighbours and surrounding communities.	Permission is to be obtained from land owners before any member of the construction workforce enters private property.	Eskom and Contractor	Two weeks prior to access.
	All machinery and vehicles to be maintained in good working order to minimise noise generation.	Contractor	During construction
	A complaints register is to be established and maintained by the ECO. The contractor's ECO must report all	ECO	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	complaints to the Eskom ER.		
	Complaints are to be investigated and report back or progress is to be given to the complainant within 48 hours of the complaint.	ER	From the start of construction.
Topsoil Management			
To salvage available topsoil for use in rehabilitation.	Topsoil must be stripped from the designated footprint area of ash dam extension 3. As a minimum, the first 200 mm of soil material should be considered as topsoil. Where deeper topsoil is encountered these should be stripped and stockpiled to assist in rehabilitation.	Contractor	From the start of construction.
To minimise the loss of topsoil from the ash dam site.	Topsoil stockpiles must not be located within 100 m of a watercourse. Stockpiles should not be profiled steeper than 1:2.	Contractor	From the start of construction.
	Stockpiled topsoil must be protected from erosion until its use in rehabilitation by an upslope berm and toe channel. Stockpiles must be maintained until their use in rehabilitation.	Contractor and then Eskom	From the start of construction.
Air Quality Management			
To minimise the generation of PM10 and dustfall from the ash dam construction site.	Only the area required to facilitate ash dam construction should be stripped of vegetation and topsoil.	Contractor	From the start of construction.
	Regulate vehicle speed on unpaved roads to 40 km/h or	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	less.		
	Implement dust control/ suppression on all roads and disturbed areas. Aim for at least 50% control efficiency.	Contractor	From the start of construction.
	Vegetate, or apply dust control to any topsoil stockpile that will exist for longer than 4 months.	Contractor and then Eskom	From the start of construction.
Surface Water Management			
To separate clean and contaminated storm water at the ash dam site.	Storm water controls, to divert clean storm water away from the ash dam site and to keep dirty water within the site, must be implemented and maintained.	Contractor	From the start of construction.
To prevent the release of contaminated run-off into the environment.	Run-off from areas where ash, chemicals, fuels, oils and greases are handled, batch plants and washing areas is to be contained on site and prevented from being released into the environment.	Contractor	From the start of construction.
	The dirty water control systems, including trenches, drains, sumps, pumps and dams are to be put in place during the initial construction phases. These systems must be maintained.	Contractor	From the start of construction.
To prevent the sedimentation and erosion of the local rivers and tributaries.	Erosion controls must be implemented around the construction site. All disturbed areas, including trenches and drains, as well as known water flow paths must be regularly inspected for erosion. Remedial action must be taken to reduce water flow speeds, prevent erosion and	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	repair damage.		
Groundwater Protection			
To prevent the release of contaminated seepage water into the environment.	Construct herring-bone under-drain on ash dam footprint. The trenches must be maintained in a functional state.	Contractor	From the start of construction.
	Construct cut-off seepage trenches downstream of ash dam site to divert dirty water to the dirty water dam. The trenches must be maintained in a functional state.	Contractor	From the start of construction.
Protection of Natural Ecology			
To ensure that the area of impact on vegetation is kept to a minimum.	Only vegetation within the ash dam footprint area is to be cleared or removed.	Contractor	From the start of construction.
	Construction vehicles and personnel are not to disturb vegetation beyond the construction site/	Contractor	From the start of construction.
To ensure that the area of impact on fauna and flora is kept to a minimum.	The collection of animals or plant material or the picking of plants on site or the surrounds is prohibited.	Contractor	From the start of construction.
To ensure that the area of impact on fauna and flora is kept to a minimum.	Construction areas are to be accessed via the designated access roads only. Where additional roads are required these are to be authorised through appropriate authorisation processes.	Contractor	From the start of construction.
To ensure that the area of impact on fauna and flora is kept to a minimum.	Use existing lay down areas or areas within the ash dam footprint as far as practicable. Lay down areas are to be kept to a minimum size.	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Protection of Heritage Resources			
To ensure the protection of heritage resources	Should archaeological artefacts or human remains be unearthed during construction, operations are to be ceased and the find reported immediately to the ECO. Work in that area is only to continue when authorised by the ECO after consultation with the South African Heritage Resources Agency (SAHRA).	Contractor	From the start of construction.
	It is an offence to remove historical artefacts from where they are found on site.	Contractor	From the start of construction.
Incident Reporting			
To ensure that all environmental incidents are reported and remedial action is implemented.	All environmental incidents are to be reported to the ECO immediately.	Contractor	As and when required
	The ECO must verify and document each environmental incident. All environmental incidents must be reported to the ER.	ECO	As and when required
	All environmental incidents are to be investigated and the appropriate preventative and remedial actions identified and implemented.	ECO and ER	As and when required
Spill Prevention			
To contain and manage spillage of	All hazardous chemical substances are to be stored in	Contractor	From the start of construction..

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
hazardous chemical substances	bunded areas. The bund should have capacity to contain 110% of the volume of the chemical substances stored there.		
	Material Safety Data (MSD) sheets for all chemicals to be kept on site.	Contractor	From the start of construction.
	When hazardous chemicals are stored on site then a spill kit must be available.	Contractor	From the start of construction.
	An emergency procedure for the cleanup of spillages must be developed. The contractor's site manager must be familiar with the procedure and equipment. Job specific training, to be provided to members working in such areas, must include awareness of hazardous chemicals and emergency procedures.	Contractor	From the start of construction.
	Chemical spills are to be regarded as an environmental incident.	Contractor	From the start of construction.
	Hazardous chemicals (including those used for cleaning and spill clean ups) are not to be released into environment. These materials are to be contained and disposed as hazardous waste.	Contractor	From the start of construction.
To prevent and contain spillages of fuels, oils and greases.	All fuel tanks used in construction are to be aboveground and bunded in accordance with the requirements for	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	flammable liquids. Receptacles must comply with SANS100-1:2003 (SABS089-1:2003). Environmental authorisation to be obtained should 30 000 litres or more of fuel be stored on site.		
	New and used oil as well as hazardous workshop waste is to be stored within bunded areas in accordance with the requirements for flammable liquids.	Contractor	From the start of construction.
	All areas where fuel is handled are to be provided with impervious surfaces to prevent seepage and leakage.	Contractor	From the start of construction.
	All vehicles are to be checked for leaks before commencing work on site, and should be inspected weekly.	Contractor	From the start of construction, weekly
	Drip trays with adequate capacity are to be placed beneath parked vehicles which drip oil.	Contractor	As required.
	All equipment that leaks fluid must be repaired immediately or removed from site when necessary.	Contractor	As required.
	Servicing of vehicles is only to take place within designated areas within the construction camp.	Contractor	From the start of construction.
	Servicing and repair areas to be provided within impervious services.	Contractor	From the start of construction.
	Should it be necessary to carry out repair or maintenance	Contractor	As required.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	of vehicles and machinery in the field, a temporary impervious surface is to be put in place into prevent contamination of soils in the area where oil, grease or fuel can be spilled.		
Waste Management			
To minimise waste production	Waste materials that can be returned to the supplier must be identified and proper arrangements are to be made for make this to happen.	Contractor	During construction.
	Recyclable materials are to be salvaged and arrangements made for these to be removed from site for recycling.	Contractor	During construction.
To ensure the appropriate disposal of hazardous waste.	All hazardous waste produced on site is to be consolidated and kept in a receptacle within a bunded area.	Contractor	During construction.
	Hazardous waste is to be removed from site for disposal at a permitted hazardous landfill site.	Contractor	During construction.
	All used oils and lubricants as well as hazardous workshop waste is to be disposed at a permitted facility.	Contractor	During construction
	Soils that have become contaminated with fuel, oils or greases are to be bioremediated or disposed of as hazardous waste.	Contractor	As required.
To ensure the appropriate disposal of general waste.	All general waste is to be removed and disposed at a permitted waste disposal site that can accept such waste.	Contractor	During construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	All areas are to be kept free of litter. Littering will not be tolerated.	Contractor	During construction.
	The burning of waste on site is prohibited.	Contractor	During construction.
Control of Invasive Weed Species			
To prevent the proliferation of weed species	The establishment of invasive weeds on areas disturbed during construction is to be prevented. A weed management programme is to be implemented.	ECO	Immediate
Dirty Water Management			
To prevent the release of contaminated water into the environment.	Dirty water from areas where ash, chemicals, fuels, oils and greases are handled is to be contained on site and prevented from being released into the environment.	Contractor	During construction.
	All dirty water should be directed to the dirty water dam via berms or trenches, or collected in a sump and pumped to the dirty water dam.	Contractor	During construction.
To ensure the appropriate management of sewage.	If ablutions are not available the chemical toilets are to be provided at strategic points where construction activities are being undertaken. There should be at least 1 toilet for every 15 workers.	Contractor	During construction.
	Sewage waste from chemical toilets is to be disposed of at a recognised sewerage facility.	Contractor	During construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Construction Site Rehabilitation			
To promote the restoration of natural ecology in areas disturbed by construction.	All infrastructure that will not be used during operation is to be removed from site once construction is completed.	Contractor	At completion of construction.
	All waste material is to be removed from site once construction is completed and appropriately disposed in accordance with the legal waste management requirements.	Contractor	At completion of construction.
	All soils that have become contaminated with oils, fuels, greases are to be bioremediated or lifted and disposed as hazardous waste once construction is completed.	Contractor	At completion of construction.
	Lay down, camp, working, stockpile, road and other compacted areas, not being used for other projects, are to be ripped to 150 mm to break compacted layers.	Contractor	At completion of construction.
	All areas being rehabilitated are to be seeded following ripping with a seed mix approved by Eskom. A weed management programme is to be implemented.	Contractor	At completion of construction.
	All construction areas undergoing rehabilitation must be inspected by the Eskom ER immediately following rehabilitation and again 6 months later. The ER must declare the site rehabilitation satisfactory before the contractor is absolved of responsibility.	ER	At completion of construction, and 6 months later.

8.1.3 Ash Dam Operational Phase

Environmental impacts during ash disposal (operational phase) at the Komati Ash Dam extension 3 will be managed in accordance with the operational EMP as detailed in Table 13. Operation of the ash dam is the responsibility of Eskom's Generation Division, but may be sub-contracted to one or more contractors. Standard operating procedures that exist for Komati Power Station and the ash dams, such as the Environmental Management System as well as other valid licences and authorisations must also be adhered to.

Table 15: Operations Environmental Management Plan.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Roles and Responsibilities			
To define roles and responsibilities for the implementation of the Construction EMP.	Ultimate responsibility for the implementation of and compliance with the operations EMP rests with Eskom.	Eskom	From operation of ash dam.
	Eskom is to appoint a Komati Power Station Environmental Practitioner (EP) responsible for implementing/ overseeing implementation of RoD and EMP conditions and the for the auditing of contractor compliance with the EMP.	Eskom	From operation of ash dam.
	Eskom is to ensure that adherence to the EMP is included as a contractual commitment for any contractor(s) employed at the ash dam site.	Eskom	In all project tenders and contracts
	Each contractor is to ensure compliance with EMP by their personnel and sub-contractors.	Contractor	During operations, continuous
	The contractor(s) is /are responsible for the appointment of	Contractor	At appointment of a contractor

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	a designated member of his workforce as an Environmental Control Officer (ECO) to be responsible for environmental issues during their project.		
	Any exceptions from compliance with the EMP are to be reported to the project manager at scheduled project meetings.	ECO and EP	During operation
Monitoring and Compliance			
To ensure the effective implementation of the EMP.	The contractor's ECO is to undertake daily EMP compliance assessments. Non-compliances are to be recorded.	ECO	Implement from appointment of contractor and repeat daily
	The Eskom EP is to undertake an EMP compliance audit on a quarterly basis.	EP	Implement from commencement of operations and repeat quarterly
	An annual EMP compliance assessment report is to be produced by an independent party.	Eskom	Implement from commencement of operations and repeat annually
To ensure the protection of groundwater quality standards.	Monitoring of groundwater parameters at monitoring boreholes.	EP	Implement from commencement of operations and repeat quarterly
To ensure the protection of surface water quality standards.	Monitoring of surface water parameters at monitoring points.	EP	Implement from commencement of operations and repeat weekly
To ensure the protection of air quality standards.	Monitoring of dustfall rates at air quality monitoring stations.	EP	Implement from commencement of operations and repeat monthly

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Environmental Awareness			
To ensure that all members of the Eskom workforce are aware of their responsibilities toward environmental protection and the EMP requirements.	All Eskom personnel involved in the project are to undergo environmental induction and awareness training, which should be provided by the Eskom EP.	EP	From commencement of operations, and when required.
To ensure that all members a contractors workforce are aware of their responsibilities toward environmental protection and the EMP requirements.	Each contractor is to provide environmental induction and awareness training, to his personnel involved in the project.	ECO	From commencement of operations.
Public Relations			
To minimise disturbance to neighbours and surrounding communities.	Notify local residents of changes to operational practices that could result in impacts or disturbances.	EP	When required
	A complaints register is to be established and maintained.	ECO or EP	Continued from construction.
	Complaints are to be investigated and report back is to be given to the complainant within 48 hours of the complaint.	EP	From operation of ash dam.
Technical Management Ash Dam of Extension 3			
To ensure the safe operation of ash dam extension 3.	Manage water on the ash dam as per GN 704. Maintain a freeboard on the daywall for the 1:50 year rainfall event + 800 mm.	Eskom	From operation of ash dam.
	Standpipe piezometers, to detect water levels in the ash	Eskom	From operation of ash dam, monthly.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	dam walls are to be installed around the perimeter of ash dam extension 3. The ash dam engineer is to specify the location of the piezometers. These should be read and interpreted on a monthly basis.		
	Conduct annual stability analysis of ash dam extension 3.	Eskom	From operation of ash dam, annually.
	Daywalls of ash dam extension 3 should be inspected on a regular basis for cracking and erosion.	Eskom	From operation of ash dam, as per schedule. Daily inspection by the operator. Monthly inspections by the operator and Eskom. Annual inspections by the operator, Eskom and a professional engineer.
	Conduct daily inspection of the ash delivery pipe system.	Eskom	From operation of ash dam, daily.
To minimise the pollution risk of ash disposal.	No hazardous materials or liquids may be introduced into the ash dam without written permission from the authorities.	Eskom	From operation of ash dam.
Topsoil Management			
To minimise the loss of topsoil from the ash dam site.	Stockpiled topsoil must be protected from erosion until its use in rehabilitation by an upslope berm and toe channel. Remedial action to prevent losses must be taken if erosion occurs. Stockpiles must be maintained until their use in rehabilitation.	Eskom or Contractor	From operation of ash dam.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Air Quality Management			
To minimise the generation of PM10 and dustfall from the ash dam.	Daywalls, and completed surfaces of the ash dam must be vegetated as soon as possible. Follow Eskom rehabilitation guidelines.	Eskom or Contractor	From operation of ash dam.
	Disturbance of completed or dry areas of the ash dam by vehicles or machinery must be avoided. Vehicles only to drive on designated roads.	Eskom or Contractor	From operation of ash dam.
Surface Water Management			
To separate clean and contaminated storm water at the ash dam site.	Storm water control to divert clean storm water away from the site must be maintained in terms of GN 704.	Eskom or Contractor	From operation of ash dam.
To prevent the release of contaminated run-off into the environment.	Run-off from contaminated areas must be contained on site and prevented from being released into the environment. All containment measures must be designed and maintained in terms of GN 704.	Eskom or Contractor	From operation of ash dam.
	The dirty water control systems, including trenches, drains, sumps, pumps and dams are to be maintained in terms of GN 704.	Eskom or Contractor	From operation of ash dam.
	Monitor surface water qualities in water courses down-stream of the ash dam site for changes in chemistry (as per Section 8.1.5.2).	EP	Immediate, weekly.
To prevent the sedimentation and erosion of	Erosion controls must be maintained around the site.	Eskom or Contractor	From operation of ash dam.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
the local rivers and tributaries.	Remedial action must be taken to reduce water flow speeds, prevent erosion and repair damage.		
Groundwater Protection			
To prevent the release of contaminated seepage water into the environment.	Maintain cut-off seepage trench in a functional state.	Eskom or Contractor	From operation of ash dam.
	Monitor groundwater qualities around ash dam site for changes in chemistry (as per Section 8.1.5.1).	EP	Immediate, quarterly
Protection of Natural Ecology			
To ensure that the area of impact on vegetation is kept to a minimum.	Only vegetation within the operational areas of the ash dam is to be disturbed.	Eskom or Contractor	From operation of ash dam.
To ensure that the area of impact on fauna and flora is kept to a minimum.	The collection or trapping of animals or plant material or the picking of plants on site or the surrounds is prohibited.	Eskom or Contractor	From operation of ash dam.
	Ash dam is to be accessed via the designated access road or via existing roads. Where additional roads are required these are to be authorised through appropriate authorisation processes.	Eskom or Contractor	From operation of ash dam.
Incident Reporting			
To ensure that all environmental incidents are reported and remedial action is implemented.	All environmental incidents are to be reported to the ECO immediately.	Contractor	As and when required
	The ECO must verify and document each environmental	ECO	As and when required

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	incident. All environmental incidents must be reported to the EP.		
	All environmental incidents are to be investigated and the appropriate preventative and remedial actions identified and implemented.	ECO and EP	As and when required
Spill Prevention			
To prevent the spillage of ash into the environment.	All ash delivery pipelines are to be maintained in a functional state and inspected daily.	Eskom or Contractor	From operation of ash dam, daily.
To contain and manage any ash spillage.	Develop an emergency procedure for control and clean-up of an ash spillage. The site manager must be familiar with the procedure and equipment. Job specific training must include awareness of hazards and emergency procedures.	EP	Immediate
	Ash spills that extend beyond the ash dam surface are to be regarded as an environmental incident.	Eskom or Contractor	Immediate
	Hazardous chemicals (including those used for cleaning and spill clean ups) are not to be released into environment. These materials are to be contained and disposed as hazardous waste.	Eskom or Contractor	From operation of ash dam.
To prevent and contain spillages of chemicals, fuels, oils and greases.	Should it be necessary to carry out repair or maintenance in the field, a temporary impervious surface is to be put in place into prevent contamination of soils.	Eskom or Contractor	As and when required

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Waste Management			
To ensure the appropriate disposal of general waste.	All general waste is to be removed and disposed at a permitted waste disposal site that can accept such waste.	Eskom or Contractor	From operation of ash dam.
	Waste bins are to be provided and all areas are to be kept free of litter. Littering will not be tolerated.	Eskom or Contractor	From operation of ash dam.
	The burning of waste on site is prohibited.	Eskom or Contractor	From operation of ash dam.
Control of Invasive Weed Species			
To prevent the proliferation of weed species	A weed management programme is to be implemented at the ash dam site. The programme should aim to control weeds as defined in the Conservation of Agricultural Resources Act (Act 43 of 1983).	EP	From operation of ash dam.
Dirty Water Management			
To prevent the release of contaminated water into the environment.	Dirty water must be contained on site and prevented from being released into the environment as Komati Power Station is a zero effluent disposal site.	Eskom	From operation of ash dam.
	Storm and dirty water control systems must be maintained in a functional state in terms of GN 704.	Eskom	From operation of ash dam.

8.1.4 Rehabilitation and Closure

Rehabilitation of ash dam extension 3 involves the vegetating of areas of the ash dam surface where operations have been completed. The establishment of vegetation should occur continuously during the construction of the daywalls, on steps that have been completed. Rehabilitation should be completed as follows:

- Scarify the surface to break any crust that may have developed;
- Cover with topsoil to a depth of at least 150 mm (other organic materials may be substituted); and
- Vegetate either by,
    - Seeding with appropriate seed mix; or
    - Planting grass sods.

Rehabilitated areas must be monitored and maintained on a quarterly basis until such time as the ground has stabilised and the vegetation is deemed self-sustaining. Supervision of rehabilitation and monitoring is the responsibility of the Komati Power Station Environmental Practitioner. Maintenance should include follow-up seeding and the repair of erosion.

Closure of the ash dam will require the long term maintenance of the dam structure and the vegetation cover. A specific closure plan has not yet been developed for the Komati Power Station ash dam site. Final closure of all the ash dams will be managed in accordance with a closure plan to be developed by Eskom in accordance with the relevant authorities. Eskom will embark on the development of a plan for closure at least two years prior to the planned closure of the site.

8.1.5 Environmental Monitoring

8.1.5.1 Groundwater

A number of groundwater monitoring boreholes exist in and around Komati Power Station (Figure 21) and it is recommended that these boreholes continue to be used for monitoring. Boreholes B2 and B3 lie within the footprint of ash dam extension 3 and will have to be sealed. It is recommended that an additional borehole (BH) is drilled to the west of ash dam extension 3 to monitor potential contamination between ash dam extension 3 and Komati Village (Figure 21).

Groundwater monitoring is to be conducted by the Komati Power Station Environmental Practitioner on a quarterly basis and should include measurement of the following parameters:

- pH
- Electrical Conductivity (EC)

- Calcium (Ca)
- Potassium (k)
- Chloride (Cl)
- Nitrate (NO_3)
- Sulphate (SO_4)
- Magnesium (Mg)
- Sodium (Na)
- Aluminium (Al)
- Total Iron (Fe)
- Total alkalinity

Groundwater depth in the monitoring boreholes should be recorded on a monthly basis and daily records should be kept of rainfall.

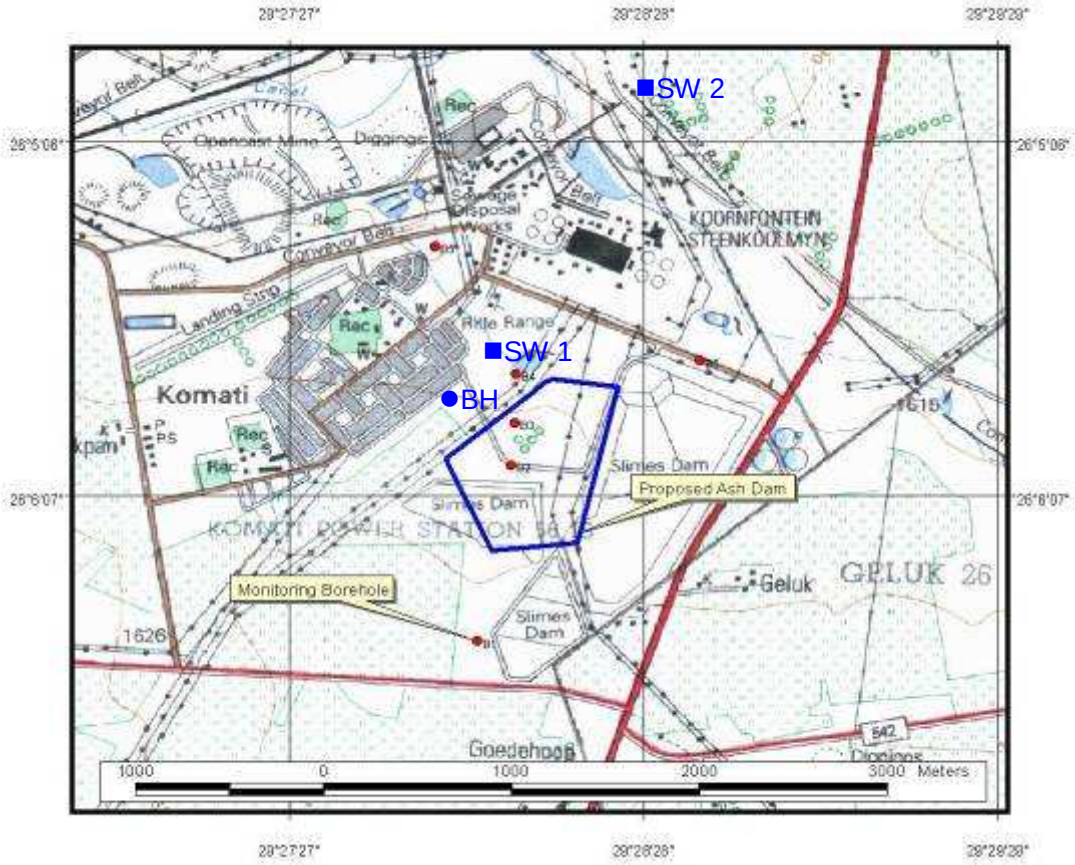

Figure 21: Additional Surface and Groundwater Monitoring for the Komati Ash Dam Extension 3

8.1.5.2 Surface Water

It is recommended that surface water monitoring be implemented downstream of ash dam extension 3, immediately below the Gras Dam (SW 1) and in the unnamed tributary of the Koringspruit River, downstream of the power station (SW 2) (Figure 21). Monitoring should be conducted by the Komati Power Station Environmental Practitioner on a weekly basis and should include the following parameters:

- Electrical Conductivity (EC)
- Total Suspended Particles
- Chloride (Cl)
- Sulphate (SO_4)
- Magnesium (Mg)
- Sodium (Na)

8.1.5.3 Air Quality

A dust fallout network must be established around the ash dam complex and should include dust fallout buckets at a position west of the ash dam, near to Komati Village, and another north of the ash dam (Figure 22). Monthly sampling should be conducted by the Komati Power Station Environmental Practitioner.

Figure 22: Proposed Dust Bucket Locations at Komati Power Station

8.1.5.4 Vegetation Establishment and Erosion Control

Rehabilitated areas of ash dam extension 3 should be inspected every 6 months by the Komati Power Station Environmental Practitioner to assess the success of vegetation establishment. Rehabilitated areas must be monitored and maintained to ensure that the vegetation cover is self-sustaining. Maintenance should include follow-up seeding and the repair of erosion where necessary.

8.1.5.5 Alien Invasive Plants

The ash dam complex should be inspected by the Komati Power Station Environmental Practitioner on an annual basis for the presence of alien invasive plants as defined in the Conservation of Agricultural Resources Act (Act 43 of 1983). An annual report, documenting the presence, distribution and abundance of all alien invasive plants across the site should be produced. The report should make comparisons with previous data to assess the effectiveness of alien plant control at the ash dam complex. A strategy must be developed that outlines the methods and timeframes for the controls required to manage alien invasive plants at the ash dam complex.

8.1.5.6 EMP Compliance Monitoring and Reporting

Construction

Eskom's Environmental Representative appointed to the project should develop an EMP checklist for daily use by the contractor's ECO during construction. The Eskom ER must carry out weekly site inspections during construction and the Eskom ER should complete an EMP audit quarterly and at the completion of construction.

Operation

The entity in charge of the ash dam operations must ensure continuous compliance with the EMP. Quarterly EMP audits must be conducted by the Komati Power Station Environmental Practitioner during operation and an annual EMP compliance audit report must be produced by an independent environmental practitioner.

8.2 Transmission Powerline Deviation

8.2.1 Planning and design

Very limited activities are required along the powerline route during planning and thus impacts of significance are not expected. The main concern is access to the servitude and public relations. Eskom has and must continue to contact the landowner to arrange access to any private land. Negotiations to acquire the servitude must be finalised before clearing or construction of the powerline commences. Eskom must also establish land use agreements with potential users of the servitudes.

Planning during route selection for the two powerlines was done to ensure that sensitive sites and receptors were avoided as far as possible. The proposed powerline route does not cross any wetlands, rivers or dams and the tower footprints have not been placed within any identified sensitive habitats.

8.2.2 Powerline Deviation Construction Phase

Construction activities for the 275 kV and 88 kV powerline deviations are addressed under the construction EMP detailed in Table 14 below. Construction will be undertaken by an Eskom appointed contractor(s).

Table 16: Transmission Line Construction Environmental Management Plan

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Roles and Responsibilities			
To define roles and responsibilities for the implementation of the Construction EMP.	Ultimate responsibility for the implementation of and compliance with the Construction EMP rests with Eskom.	Eskom	On approval of EMP
	Eskom is to appoint an Environmental Representative (ER) responsible for implementing/ overseeing implementation of RoD and EMP conditions and the for the auditing of contractor compliance with the EMP.	Eskom	On approval of EMP
	Eskom is to ensure that adherence to the EMP is included as a contractual commitment for all contractors.	Eskom	In all project tenders and contracts
	Each contractor is to ensure compliance with EMP by their personnel and sub-contractors.	Eskom	At appointment, continuous
	The contractor(s) is /are responsible for the appointment of a designated member of his workforce as an	Contractor	At appointment, continuous

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	Environmental Control Officer (ECO) to be responsible for environmental issues during construction.		
	Any exceptions from compliance with the EMP are to be reported to the project manager at scheduled project meetings.	ECO and ER	During construction
Monitoring and Compliance			
To ensure the effective implementation of the EMP.	The contractor's ECO is to undertake daily EMP compliance assessments using a basic checklist.	Contractor	Implement immediately and repeat daily
	The Eskom ER is to undertake weekly site inspections during construction.	ER	Implement immediately and repeat weekly
	The Eskom EP is to undertake detailed EMP compliance audits once a quarter during construction and again at the completion of construction.	ER	Implement immediately and repeat quarterly
Environmental Awareness			
To ensure that all members of the Eskom workforce are aware of their responsibilities toward environmental protection and the EMP requirements.	All Eskom personnel involved in the project are to undergo environmental induction and awareness training, which should be provided by the Eskom ER.	ER	From commencement of construction,
To ensure that all members of a contractors	Each contractor is to provide environmental induction and	ECO	From commencement of construction and

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
workforce are aware of their responsibilities toward environmental protection and the EMP requirements.	awareness training, to his personnel involved in the project.		when required.
Public Relations			
To minimise disturbance to neighbours and surrounding communities.	Permission is to be obtained from landowners before any member of the Eskom or contractor's workforce enters private property along the servitude route.	Eskom ad Contractor	Two weeks prior to access.
	Eskom personnel and contractors working along the servitude are to carry their Eskom/Contractor ID.	Eskom and Contractor	Continuous
	All access controls are to be left as they were found. Damage to gates or fences must be reported to the affected land owner and repaired by the responsible party. Temporary arrangements to ensure continued access control must be facilitated by the responsible party.	Eskom and Contractor	From the start of construction.
	A servitude purchase agreement must be concluded prior to the commencement of vegetation clearing or construction activities.	Eskom	Prior to construction.
	Laydown and working areas may only be sited within the powerline servitude or within Eskom property.	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	All machinery and vehicles to be maintained in good working order to minimise noise generation.	Contractor	From the start of construction.
	Working hours are not to extend beyond 6 am to 6 pm.	Contractor	From the start of construction.
	A complaints register is to be established and maintained.	ECO	From the start of construction.
	Complaints are to be investigated and report back or progress is to be given to the complainant within 48 hours of the complaint.	ER	From the start of construction.
	No construction workers are to be housed along the route.	Contractor	From the start of construction.
Topsoil Management			
To minimise the loss of topsoil from the powerline servitude route.	Soil excavated from the tower feet foundations must be dispersed and levelled in the immediate area.	Contractor	From the start of construction.
	Topsoil along the servitude access route must be protected from erosion.	Contractor	From the start of construction.
Surface Water Management			
To prevent the sedimentation and erosion of the local rivers and tributaries.	Erosion controls must be implemented at construction sites with an erosion risk. Remedial action must be taken to reduce water flow speeds, prevent erosion and repair damage.	Contractor	From the start of construction.
Protection of Natural Ecology			
To ensure that the area of impact on fauna	Laydown or working areas must be preferentially sited on	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
and flora is kept to a minimum.	previously disturbed ground and should be kept to a minimum size. All activities must be restricted to within these working areas.		
	Only vegetation within the powerline servitude area is to be damaged or altered in anyway. Only vegetation within the tower footprint is to be removed.	Contractor	From the start of construction.
	No fires to be permitted on site.	Contractor	From the start of construction.
	The collection of animals or plant material or the picking of plants on site or the surrounds is prohibited.	Contractor	From the start of construction.
	Construction areas are to be accessed via the designated access road or via existing roads only.	Contractor	From the start of construction.
	Where additional roads are required these are to be authorised through appropriate authorisation processes.	ECO	From the start of construction.
Protection of Heritage Resources			
To ensure the protection of heritage resources	Should archaeological artefacts or human remains be unearthed during construction, operations are to be ceased and the find reported immediately to the ECO. Work in that area is only to continue when authorised by the ECO after consultation with the South African Heritage Resources	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	Agency (SAHRA).		
	It is an offence to remove historical artefacts from where they are found on site.	Contractor	From the start of construction.
Incident Reporting			
To ensure that all environmental incidents are reported and remedial action is implemented.	All environmental incidents are to be reported to the ECO immediately.	Contractor	As and when required
	The ECO must verify and document each environmental incident. All environmental incidents must be reported to the ER.	ECO	As and when required
	All environmental incidents are to be investigated and the appropriate preventative and remedial actions identified and implemented.	ECO and ER	As and when required
Spill Prevention			
To contain and manage the spillage of cement.	Cement mixing is to be carried out within the tower footprints.	Contractor	From the start of construction.
	Spillages of cement and cement water should be contained on-site with soil berms.	Contractor	From the start of construction.
	Excess cement should be removed from site on completion	Contractor	Completion of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	of cement mixing.		
	Cement-encrusted soil should be broken up and turned over to allow infiltration and vegetation growth.	Contractor	Completion of construction.
To contain and manage spillage of hazardous chemical substances	All hazardous chemical substances are to be stored in bunded areas. The bund should have capacity to contain 110% of the volume of the chemical substances stored there.	Contractor	From the start of construction.
	Material Safety Data (MSD) sheets for all chemicals are to be kept on site.	Contractor	From the start of construction.
	When hazardous chemicals are stored on site then a spill kit must be available.	Contractor	From the start of construction.
	An emergency procedure for the cleanup of spillages must be developed. The site manager must be familiar with the procedure and equipment. Job specific training must include awareness of hazardous chemicals and emergency procedures.	ECO	Immediate
	Chemical spills are to be regarded as an environmental incident.	Contractor	From the start of construction.
	Hazardous chemicals (including those used for cleaning	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	and spill clean ups) are not to be released into environment. These materials are to be contained and disposed as hazardous waste.		
To prevent and contain spillages of fuels, oils and greases.	Fuel and other petrochemicals must be stored in receptacles that comply with SANS100-1:2003 (SABS089-1:2003).	Contractor	From the start of construction.
	All areas where fuel is handled are to be provided with impervious surfaces.	Contractor	From the start of construction.
	All vehicles and machinery are to be checked for leaks before commencing work on site and weekly thereafter.	Contractor	From the start of construction.
	Drip trays are to be placed beneath parked vehicles which drip oil.	Contractor	From the start of construction.
	All equipment that leaks fluid must be repaired immediately or removed from site when necessary.	Contractor	From the start of construction.
	Servicing of vehicles and machines is only to take place within designated workshop areas that are provided with impervious surfaces.	Contractor	From the start of construction.
	Should it be necessary to carry out repair or maintenance of vehicles and machinery in the field, a temporary	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	impervious surface is to be put in place into prevent contamination of soils in the area where oil, grease or fuel can be spilled.		
Waste Management			
To minimise waste production	Waste materials that can be returned to the supplier must be identified and arrangements are to be made to make arrangements for this to happen.	Contractor	From the start of construction.
	Recyclable materials are to be salvaged and arrangements made for these to be removed from site for the purpose of recycling.	Contractor	From the start of construction.
To ensure the appropriate disposal of hazardous waste.	All hazardous waste produced on site is to be consolidated and kept in a suitable receptacle, within a bunded area.	Contractor	From the start of construction.
	Hazardous waste is to be removed from site for disposal at a permitted hazardous landfill site.	Contractor	From the start of construction.
	Soils that have become contaminated with fuel, oils or greases are to be bioremediated or disposed of as hazardous waste.	Contractor	From the start of construction.
To ensure the appropriate disposal of general waste.	All general waste is to be removed and disposed at the municipal waste disposal site.	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	Littering will not be tolerated. All areas are to be kept free of litter.	Contractor	From the start of construction.
	The burning of waste on site is prohibited.	Contractor	From the start of construction.
Control of Invasive Weed Species			
To prevent the proliferation of invasive alien weed species	Existing populations of invasive weeds on the servitude are to be removed in accordance with the categorisation of the invader species. The programme should aim to control weeds as defined in the Conservation of Agricultural Resources Act (Act 43 of 1983).	Eskom	During servitude clearing
Dirty Water Management			
To prevent the release of contaminated run-off into the environment.	Run-off from areas where chemicals, fuels, oils and greases are handled, batch plants and washing areas, is to be contained on site and prevented from being released into the environment.	Contractor	From the start of construction.
To ensure the appropriate management of sewage.	Chemical toilets and washing facilities to be provided at strategic points where construction activities are being undertaken. These facilities must be serviced on a regular basis. These facilities must not be situated near any water courses or water bodies.	Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Construction Site Rehabilitation			
To promote the restoration of natural ecology in areas disturbed by construction.	All infrastructure that will not be used during operation is to be removed from site.	Contractor	At completion of construction.
	All waste material is to be removed from site and appropriately disposed in accordance with the waste management requirements.	Contractor	At completion of construction.
	Lay down, stockpile and other compacted areas are to be ripped to 150 mm.	Contractor	At completion of construction.
	All rehabilitated areas are to be seeded with a seed mix approved by Eskom.	Contractor	At completion of construction.
	All laydown and working areas must be inspected by the ER on completion of construction. The ER must declare the site rehabilitation satisfactory before the contractor is absolved of responsibility.	ER	At completion of construction.

8.2.3 Powerline Deviation Operational Phase

Environmental impacts during operation of the powerline deviation at Komati Power Station will be managed by Eskom's Transmission Divsion in accordance with the operational EMP, existing Environmental Procedures and Policies and the Transmission's Environmental Management System. The specific management actions for these lines are detailed in Table 15.

Table 17: Operations Environmental Management Plan.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Roles and Responsibilities			
To define roles and responsibilities for the implementation of the operations EMP.	Ultimate responsibility for the implementation of and compliance with the operations EMP rests with Eskom.	Eskom	On approval of EMP
	Eskom is to appoint a Transmission Environmental Manager (TEM) responsible for implementing/ overseeing implementation of RoD and EMP conditions and the for the auditing of contractor compliance with the EMP.	Eskom	Immediate
	Eskom is to ensure that adherence to the EMP is included as a contractual commitment for all contractors doing maintenance or repairs.	Eskom	In all project tenders and contracts
	Each contractor is to ensure compliance with EMP by their personnel and sub-contractors.	Contractor	Immediate, continuous

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	The contractor(s) is /are responsible for the appointment of a designated member of his workforce as an Environmental Control Officer to be responsible for environmental issues during maintenance or repairs.	Contractor	Immediate
	Any exceptions from compliance with the EMP are to be reported to the powerline manager.	ECO or TEM	During construction
Monitoring and Compliance			
To ensure the effective implementation of the EMP.	The contractor's ECO is to undertake daily EMP compliance assessments. Non-compliances are to be recorded.	ECO	Implement from appointment of contractor and repeat daily
	The TEM is to undertake annual EMP compliance audits.	TEM	Implement immediately and repeat annually.
Public Relations			
To minimise disturbance to neighbours and surrounding communities.	Permission is to be obtained from landowners before any member of the workforce enters private property along the servitude route.	Eskom or Contractor	Prior to access.
	Permissible land uses and the management of servitude vegetation are to be clearly defined in the land use agreement.	Eskom	Continuous
	All access controls are to be left as they were found.	Eskom and Contractor	From the start of construction.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	Damage to gates or fences must be reported to the affected land owner and repaired by the responsible party. Temporary arrangements to ensure continued access control must be facilitated by the responsible party.		
	No fires are to be permitted within the servitude, except as part of an agreed vegetation management strategy.	Eskom and Contractor	Continuous
	Eskom personnel and contractors working along the servitude are to carry Eskom/contractor IDs.	Eskom and Contractor	Continuous
Protection of Natural Ecology			
Protection of birds from collisions with power lines.	Collision of birds with the power lines are to be recorded including the type of bird, the date and the point of collision.	Eskom and Contractor	Continuous
	Should significant bird collisions occur then an investigation, in conjunction with the Endangered Wildlife Trust, must be conducted to identify solutions.	TEM	If required
To ensure that the area of impact on vegetation is kept to a minimum.	Only vegetation within the powerline servitude area is to be managed. Vegetation management in the servitude must be done in terms of Eskom's Environmental Procedure 32-247.	Eskom	Continuous

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
To ensure that the area of impact on fauna and flora is kept to a minimum.	The collection of animals or plant material or the picking of plants on site or the surrounds is prohibited.	Eskom	Continuous
	The use of herbicides to control vegetation on the powerline servitude may only been done in terms of approved Eskom Policies.	Eskom	Continuous
	Servitude areas are to be accessed via the designated access road or via existing roads. Where additional roads are required these are to be authorised by the ECO.	Eskom	Continuous
Incident Reporting			
To ensure that all environmental incidents are reported and remedial action is implemented.	All environmental incidents are to be reported to the ECO/TEM immediately.	Contractor	As and when required
	The ECO/TEM must verify and document each environmental incident. All environmental incidents must be reported to the TEM.	ECO/TEM	As and when required
	All environmental incidents are to be investigated and the appropriate preventative and remedial actions identified and implemented.	ECO and TEM	As and when required

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Waste Management			
To ensure the appropriate disposal of general waste.	Littering will not be tolerated. All areas are to be kept free of litter.	Eskom	Continuous
	The burning of waste on the servitude is prohibited.	Eskom	Continuous
Servitude Vegetation Management			
To ensure safe clearances between powerlines and vegetation.	Vegetation management along the servitude should be carried out in terms of Eskom's Environmental Procedure No. 32 – 247.	Eskom	Continuous
To maintain fire fuel loads at levels where the risk is low.	Vegetation management along the servitude should be carried out in terms of Eskom's Environmental Procedure No. 32 – 247.	Eskom	Continuous
To ensure that vegetation does not compromise access for inspection, maintenance and repair.	Vegetation management along the servitude should be carried out in terms of Eskom's Environmental Procedure No. 32 – 247.	Eskom	Continuous
Control of Invasive Weed Species			
To prevent the proliferation of invasive alien weed species.	A weed management programme is to be implemented on the servitude. The programme should aim to control weeds as defined in the Conservation of Agricultural Resources Act (Act 43 of 1983).	Eskom	Annually

8.2.4 Rehabilitation and Closure

A specific closure plan has not yet been developed for the powerline deviation at Komati Power Station. Rehabilitation and closure of the powerline servitude will be managed in terms of the basic principles outlined in Table 16 below. Final closure of the servitude will be managed in accordance with a closure plan to be developed by Eskom in accordance with the relevant authorities. Eskom will embark on the development of a plan for closure at least two years prior to the planned closure of the servitude.

Table 18: Rehabilitation and Closure of the Powerline Deviation Route.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
Rehabilitation and Closure			
To promote the re-establishment of normal land use or natural ecology	Dismantle power lines and tower structures.	Eskom	On decommissioning of powerline.
	Recyclable materials to be removed to appropriate facility.	Eskom	On decommissioning of powerline.
	Non-recyclable materials to be disposed of in accordance with legal requirements.	Eskom	On decommissioning of powerline.
	Concrete tower feet are to be excavated and removed. Tower footprint area is to be profiled to natural topography. The footprint is to be prepared with a seed mixture of local indigenous grass as approved by Eskom.	Eskom	On decommissioning of powerline.

Objectives and Goals	Management and Monitoring Actions	Implementation Programme	
		Responsibility	Implementation & Frequency
	Compacted areas along the power line route are to be ripped to promote the natural re establishment of vegetation.	Eskom	On decommissioning of powerline.

8.2.5 Monitoring

8.2.5.1 Vegetation Management

Vegetation with the powerline servitude must be monitored every 6 months and managed in order to ensure that safe clearances are maintained, that fuel loads for fires are minimised and that access for inspection, repair and maintenance is not compromised. Eskom guidelines, policies and standards are to provide guidance on the management of vegetation within powerline servitudes. See: Eskom's Environmental Procedure Number 32 – 247 (Appendix 16).

8.2.5.2 Alien Invasive Plants

The powerline servitude should be inspected on an annual basis for the presence of alien invasive plants as defined in the Conservation of Agricultural Resources Act (Act 43 of 1983). An annual report, documenting the presence, distribution and abundance of all alien invasive plants along the servitude should be produced by the TEMR. The report should make comparisons with previous data to assess the effectiveness of alien plant control on the servitude. A strategy must be developed that outlines the methods and timeframes for the controls required to manage alien invasive plants along the servitude.

9. ENVIRONMENTAL IMPACT STATEMENT

9.1 Ash Dam Extension 3

The EIA concluded that development of ash dam extension 3 on Site 7, the preferred site, is not subject to any fatal flaws. The majority of impacts that may affect the site or local receptors are of medium to low significance and no impacts of high significance that cannot be mitigated will result. The use of a brownfields site for ash dam extension 3, in preference to a greenfields site, is important and means that the project will introduce few, additional environmental impacts that do not affect the site already. The brownfields site and adjacent areas have been altered by power station and ash dam activities and are currently degraded, thus impacts of the ash dam extension will be of lower significance than for a greenfields site.

As a result of the relatively small size of the proposed ash dam extension and the current levels of degradation at the site, the development of ash dam extension 3 is not expected to result in significant impacts or contribute substantially to the existing cumulative impacts. Key negative impacts associated with ash dam extension 3 include the change in site topography, the loss of land capability, the possible contamination of groundwater, the loss of local habitats and the disruption of receptor views. These impacts, following mitigation, were all rated of medium significance. The impacts on topography, land capability, habitat and receptor views only rate of medium significance as they result in definite, long term and irreversible changes or losses to the site. However, the impacts are confined to the site and there is no real effect on receptors or the current levels of degradation when considered in terms of the adjacent power station and ash dams.

Contamination of groundwater was identified as the most important issue relating to the development of ash dam extension 3. Groundwater contamination from all sources at Komati Power Station is currently an impact of concern and evidence of contamination due to the existing sources has been recorded in the surrounding monitoring boreholes. Pollution of the groundwater from sources at Komati Power Station could continue over the long term and cause widespread changes to groundwater chemistry that would impact on ground and surface water quality. The addition of ash dam extension 3 will enlarge the source area for contaminants from the ash dam complex and increase the groundwater pollution risk.

Groundwater modelling for ash dam extension 3 predicted a marginal, westerly increase in the extent of the groundwater contamination plume when compared to the current plume. However, with the inclusion of the remedial measures currently being implemented at the ash dam complex and the improved seepage controls in ash dam extension 3, the magnitude and rate of spread of the contamination plume from the ash dam complex is expected to reduce. Thus contaminant levels will rise more slowly and take longer to reach the unnamed tributary of the Koringspruit River.

While the direct impact of groundwater contamination from ash dam extension 3 is of medium significance, the development of ash extension 3 does not contribute substantially to the existing groundwater contamination risk. Thus the development of ash dam extension 3 is not expected to worsen the current or future levels of groundwater pollution resulting from Komati Power Station.

The implementation of design and mitigation measures for ash dam extension 3 will be important to ensure that the identified impacts remain of medium significance. The effective implementation of the remedial measures at the ash dam complex, as well as improved control of all water at the Komati Power Station, are expected to reduce the significance of the cumulative groundwater contamination impacts. Ground and surface water monitoring will be vital to detect contamination plumes.

In addition, it must be considered that ash dam extension 3 is an essential development that is required to facilitate the continued operation of the Komati Power Station.

9.2 Powerline Deviations

The EIA of the powerline deviation did not identify any fatal flaws that should prevent the deviation being implemented along the proposed route. Impacts such as the loss of land capability, the change of land use, loss of habitat and the disruption of views were rated of medium significance. Mitigation can be implemented to reduce the significance of these, and all other impacts to acceptable levels. Most important will be the development of a land use agreement with local land users to ensure continued use of agricultural land.

9.3 Recommendations

Synergistics Environmental Services (Pty) Ltd, as independent environmental practitioners, conclude that there is no reason why the development of ash dam extension 3 and the related deviation of the powerlines should not be granted authorisation by the competent authority in terms of the National Environmental Management Act as the project does not ultimately worsen the current situation or contribute significantly to current levels of degradation associated with Komati Power Station and the ash dams. The recommendations set out in the draft EMP should be included as a condition of project implementation and the project should be implemented as per the designs.

10. DECLARATION

The environmental impact assessment was based on the nature and scope of the project as described in Section 1.4 and Section 4 of this report. Information in these sections has been supplied by Eskom and Jones & Wagener, as consulting engineers.

We, the undersigned herewith declare that this EIA report represents an objective assessment of the environmental issues associated with the proposed development of ash dam extension 3 and the deviation of transmission and distribution lines at the Komati Power Station.

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Appendix 1: Minutes of Authority Meeting

Appendix 2: DEAT Application Form

Appendix 3: Copies of the Press Advertisements (Project Notifications)

Appendix 4: Copy of Poster

Appendix 5: Proof of Notification and Consultation with Land Owners and Local Authorities

Appendix 6: Background Information Document

Appendix 7: Database of Registered, Interested and Affected Parties

Appendix 8: Minutes, Presentations and Attendance Register from Public Information Meeting

Appendix 9: DEAT Acceptance of Scoping and Plan of Study for EIA

Appendix 10: Exemption Application Documentation

Appendix 11: Ash Dam Extension 3 Site Selection Report

Appendix 12: Groundwater Impact Assessment Report

Appendix 13: Air Quality Impact Assessment Report

Appendix 14: Heritage Assessment Report

Appendix 15: Ecological Survey

Appendix 16: Eskom's Environmental Procedure (No. 32 – 247) "For vegetation clearance and maintenance within overhead powerline servitudes and on Eskom owned land"

Appendix 17: Proof of Submission of the Draft EIR to Provincial Authorities