





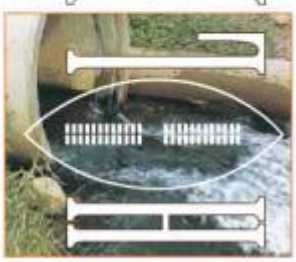
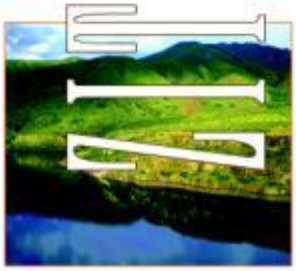

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Kendal Power Station - Continuous Ash Disposal Facility

Proponent:

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2000

DEA Reference Number: 14/12/16/3/3/3/63

NEAS Reference Number: DEA/EIA/00001508/2012

December 2012..... Project: 12810

DRAFT SCOPING REPORT

YOUR COMMENT ON THE DRAFT SCOPING REPORT

The Draft SR is available for comment from **07 December 2012 to 04 February 2013**. This Draft SR has been distributed to the authorities, and copies thereof are available at strategic public places in the project area (see below).

List of public places where the Draft Scoping Report is available:

PLACE	Address / Contact details
Phola Public Library	013 645 0094
Ogies Public Library, 61 Main Street, Ogies	013 643 1150
Delmas Public Library	013 665 2425
Emalahleni Public Library – 28 Hofmeyer Street	013 653 3116
Kungwini Public Library	013 932 6305
Kendal power station – Security Reception	013 647 6002

The report is also available electronically from the Public Participation office or on the Zitholele web site: http://www.zitholele.co.za, or the Eskom website http://www.eskom.co.za/eia (Kendal)

You may comment on the Draft Scoping Report by:

- Completing the comment sheet;
- Writing a letter, or producing additional written submissions; and
- Emailing or telephoning the public participation office.

DUE DATE FOR COMMENT ON THE DRAFT SCOPING REPORT IS 04 February 2013

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AN EIA AND WMLA CONSISTS OF SEVERAL PHASES

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ABBREVIATIONS

CO_2 ..... Carbon Dioxide
DMR ..... Department of Mineral Resources
DEA ..... Department of Environmental Affairs
DWA ..... Department of Water Affairs
DWEA ..... Department of Water and Environmental Affairs (Ministry)
IEA ..... Integrated Environmental Authorisation
EAP ..... Environmental Assessment Practitioner
ECA ..... Environment Conservation Act
EIA ..... Environmental Impact Assessment
EIR ..... Environmental Impact Report
EMP ..... Environmental Management Programme
GNR ..... Government Notice Regulation
HDI ..... Historically Disadvantaged Individuals
I&APs ..... Interested and Affected Parties
IEM ..... Integrated Environmental Management
IEP ..... Integrated Energy Plan
ISEP ..... Integrated Strategic Electricity Planning
kV ..... Kilo Volts
MVA ..... Mega Volt Ampere
NEMA ..... National Environmental Management Act
NEM:WA ..... National Environmental Management: Waste Act
NERSA ..... National Energy Regulator of South Africa
NIRP ..... National Integrated Resource Plan
SIA ..... Social Impact Assessment
SO_2 ..... Sulphur Dioxide
SR ..... Scoping Report
ToR ..... Terms of Reference
WMLA ..... Waste Management License Application

1 INTRODUCTION

1.1 WHO IS THE PROPONENT?

Eskom Holdings SOC Limited (Eskom) is the main South African utility that generates, transmits and distributes electricity. Eskom was established in 1923 by the South African government and today supplies ~95% of the country's electricity. The utility is the largest producer of electricity in Africa, is among the top seven utilities in the world in terms of generation capacity and among the top nine in terms of sales. Eskom plays a major role in accelerating growth in the South African economy by providing a high-quality and reliable supply of electricity.

1.2 CONTINUATION OF KENDAL ASH DISPOSAL FACILITY (THE PROJECT)

Kendal Power Station is a coal-fired power station situated south west of the town of Ogies and become operational in 1993 (see **Figure 1-1**).

It has an indirect dry-cooling system that uses a cooling tower and water. However, the principle of operation is similar to that used in a car radiator. Heat is conducted from the water by means of A-frame bundles of cooling elements arranged in concentric rings inside the tower. Cooling water (clean water) flowing through these elements, cools down as the cold air passes over them and returns to the condenser. This is referred to as a closed system as there is no loss of water due to evaporation and uses significantly less water in its cooling processes than conventional wet cooled power stations. Kendal has six (6) 686 megawatt (MW) and is currently the largest coal-fired power station in the world and holds several Eskom performance records. The station's cooling towers are the largest structures of their kind in the world with a height and base diameter of 165m. Kendal has six 686 megawatt (MW) units that generates 4 116 MW.

The current ash disposal facility of the Kendal Power Station is running out of space due to the poor quality coal accessible for combustion, which produces more ash than was planned. In addition the life span of Kendal has also been extended to 2053, which would render the available ash disposal space inadequate to accommodate continuation of disposal.

Alternatives have been considered (and are discussed in detail in Chapter 4), and it is envisaged that the continuation of the Kendal Ash Disposal Facility (also referred to in this report as *the project*) will include the following components (discussed in more detail in Chapter 3):

- Continuing the current ash disposal activity onto Eskom owned land with an estimated footprint of ~310ha (including associated infrastructure);
- Expansion of the emergency dump area (See **Figure 1-2**) – Emergency dumping area;

- Unnamed Stream diversion – Water Use License Application (WULA);
- The construction of new and/or expansion of existing storm water management infrastructure; and
- Access and maintenance roads to and from the site, and associated infrastructures such as culverts and channels.

Zitholele has been appointed to undertake the following for the project;

- Environmental Impact Assessment (EIA) – According to the National Environmental Management Act ([NEMA] Act No 107 of 1998, as amended 2010)
- Waste Management License (WML) - According to the National Environmental Management: Waste Act ([NEM:WA] Act No 59 of 2008)
- Water Use License Amendment (WUL) – According to the National Water Act (Act No. 36 of 1998).

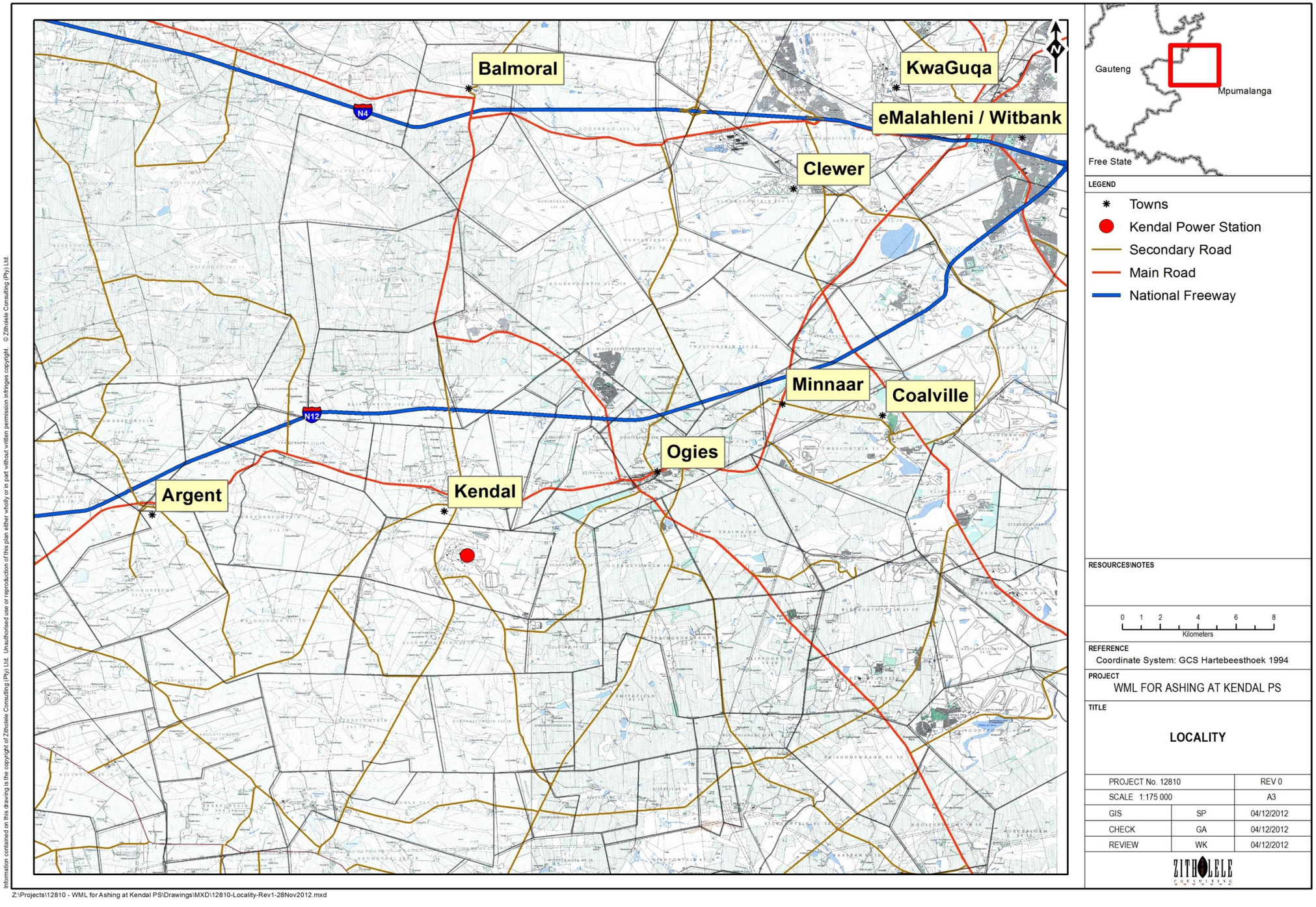

Figure 1-1 - Location of the Project

Figure 1-2 - Expansion of emergency dump

1.3 CONTEXT AND OBJECTIVES OF THIS REPORT

This Draft Scoping Report (Draft SR) is a key component of the EIA and WML authorisation process and is compiled for stakeholder consumption; for the purposes of review and comment; and to address the requirements for Scoping and the Plan of Study (PoS) for the EIA as outlined in the NEMA EIA regulations. The aim of this Daft SR is to:

- Indicate the methodology followed to identify and evaluate alternatives;
- Provide information to the authorities as well as Interested and Affected Parties (I&APs) on the proposed project as well as a description of the baseline environment;
- Indicate how I&APs have been afforded the opportunity: to contribute to the project; to verify that their issues, raised to date, have been considered; and to comment on the findings of the impact assessments;
- Define the Terms of Reference (ToR) for specialist studies to be undertaken in the EIA; and
- Present the findings of the Scoping Phase in a manner that facilitates decision-making by the relevant authorities.

This report will be subjected to a public review for 40 days, and once completed, comments received will be utilised to generate the Final Scoping Report (Final SR), which will then be submitted to the competent authority for decision making.

1.4 ENVIRONMENTAL IMPACT ASSESSMENT PRACTITIONER (EAP) DETAILS

Waste related activities requiring an EIA are listed in terms of the NEM:WA and associated listings. Furthermore, the NEM:WA requires that EIA's for listed waste activities be undertaken in terms of the NEMA EIA Regulations. In terms of the NEMA EIA Regulations, the proponent must appoint an Environmental Assessment Practitioner (EAP) to undertake the environmental assessment of an activity regulated in terms of NEMA. In this regard, Eskom appointed Zitholele Consulting to undertake the EIA for the proposed project, in accordance with the aforementioned regulations.

Zitholele Consulting is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development.

Zitholele Consulting has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations. The details of the EAP representatives are listed below.

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Mr. Gernie Agenbag graduated from the University of North West (Potchefstroom campus) with a BSc. in Environmental Science and BSc Honours in Environmental Management in 2007. Over the past few years Gernie has been involved in a variety of environmental projects and has undertaken environmental authorisations for electrical generation and transmission, conservation, residential, infrastructure related as well as industrial developments.

Warren Kok, as Project Director and Public Participation Lead

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Warren Kok will be the designated Project Director on behalf of Zitholele. Warren will ensure regulatory compliance, quality assurance and overseeing the Public Participation and Technical Environmental Team. Warren will hold final responsibility for the compilation of the EIA / EMP Reports. Warren holds a B.Hon degree in Geography and Environmental Management from Rand Afrikaans University (2000) and a Higher Certificate in Project Management from Damelin. He is a certified Environmental Assessment Practitioner (EAP) who is registered with EAPASA. Warren has in excess of 10 years' experience in environmental consulting in South Africa. His experience spans both the public and private sector. The majority of his work experience has been gained in the mining sector in South Africa, where he has been responsible for undertaking and managing Integrated EIA Processes. Warren has successfully undertaken countless integrated EIA processes that require integration of the MPRDA, NEM:WA, WULA and NEMA regulatory processes. Many of these projects are considered landmark projects in South Africa's environmental mining sector and included several hazardous waste facilities. He is ideally skilled and experienced to manage this project to its conclusion. He is currently a Senior Environmental Practitioner for Zitholele Consulting, responsible for overseeing and managing project teams in the Environmental Division, mentoring staff, liaising with clients and public stakeholders at all levels.

2 LEGAL REQUIREMENTS

Environmental legislation in South Africa was promulgated with the aim of, at the very least, minimising and at the most preventing environmental degradation. The following Acts and Regulations are applicable to The Project:

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT (NO 108 OF 1996)

Section 24 of the Constitution states that:

Everyone has the right

ii) to an environment that is not harmful to their health or well-being; and

iii) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-

- *prevent pollution and ecological degradation;*
- *promote conservation; and*
- *secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development*

The current environmental laws in South Africa concentrate on protecting, promoting, and fulfilling the Nation's social, economic and environmental rights; while encouraging public participation, implementing cultural and traditional knowledge and benefiting previously disadvantaged communities.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (NO 59 OF 2008)

In July 2009 the NEM:WA was promulgated, and amongst others makes provision for licensing and management of waste disposal facilities. The Minister of the Department of Water and Environmental Affairs, under Section 19 (1) of the NEM:WA, has published a list of waste management activities, which has or is likely to have, a detrimental effect on the environment in GNR 718 of 3 July 2009. The schedule has listed activities in two different categories:

For **Category "A"** activities: a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a Basic Assessment, as stipulated in the EIA regulations under section 24 (5) of the NEMA as part of a Waste Management Licence Application.

For **Category "B"** activities: a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a S&EIR process, as stipulated in the EIA

regulations under section 24(5) of the NEMA as part of a Waste Management Licence Application.

The activities of the project that require a waste management license in terms of these regulations are listed in **Table 2-1**. It should be noted that the activities listed for the project fall within Category B and will therefore require a full Scoping and EIA process be undertaken for the licensing of the proposed project.

Table 2-1: Relevant GNR 718 Listed Activities.

NOTICE NUMBER, CATEGORY AND DATE	ACTIVITY NUMBER (as listed in the waste management activity list) :	Description of Listed Activity
GNR 718, Category B, 2009	9	The disposal of any quantity of hazardous waste to land.
	11	The construction of facilities for the activities listed in Category B of this Schedule.

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998)

The NEMA provides a framework for environmental law reform in South Africa and covers three areas, namely:

- Land, planning and development;
- Natural and cultural resources, use and conservation; and
- Pollution control and waste management.

The law is based on the concept of sustainable development. The objective of the NEMA is to provide for co-operative environmental governance through a series of principles relating to:

- The procedures for state decision-making on the environment; and
- The institutions of state which make those decisions.

The NEMA principles serve as:

- A general framework for environmental planning;
- Guidelines according to which the state must exercise its environmental functions; and
- A guide to the interpretation of NEMA itself and of any other law relating to the environment.

2.3.1 *What are the NEMA principles?*

Some of the most important principles contained in NEMA are that:

- Environmental management must put people and their needs first;
- Development must be socially, environmentally and economically sustainable;
- There should be equal access to environmental resources, benefits and services to meet basic human needs;
- Government should promote public participation when making decisions about the environment;
- Communities must be given environmental education;
- Workers have the right to refuse to do work that is harmful to their health or to the environment;
- Decisions must be taken in an open and transparent manner and there must be access to information;
- The role of youth and women in environmental management must be recognised;
- The person or company who pollutes the environment must pay to clean it up;
- The environment is held in trust by the state for the benefit of all South Africans; and
- The utmost caution should be used when permission for new developments is granted.

2.3.2 *Environmental Impact Assessment Regulations: 543 of 18 June 2010*

In June 2010, an amended set of NEMA Environmental Impact Assessment Regulations was promulgated, GNR.543. These regulations govern amongst others the listing of activities that require Environmental Authorisation (EA), the authorisation procedures themselves, and the public participation process for authorisation procedures.

It should be noted that although the main activity of the project triggers the need for a waste management license in terms of NEM:WA, certain activities that will be undertaken as part of the project are also listed activities in terms of NEMA, and therefore also require an EA prior to proceeding with the project. All potential listed activities that may be triggered as a result of this project are listed in **Table 2-2**, although, some of these activities may not be undertaken dependent on the preferred alternative selected during the impact assessment phase of the project.

Table 2-2: Relevant NEMA Listed Activities

NOTICE NUMBER AND DATE:	ACTIVITY NUMBER (to the relevant or notice) :	DESCRIPTION OF THE LISTED ACTIVITY
Construction of the waste disposal facility and associated infrastructure		
GN R. 545 of 2010	Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, industrial or institutional use where the total area to be transformed is 20 hectares or more.
GN R. 544 of 2010	Activity 24	The transformation of land bigger than square 1000 metres in size, to residential, retail commercial, industrial or institutional use, where at the time of coming into effect of this Schedule such land was zoned as open space, conservation or has en equivalent zoning.
GN R. 544 of 2010	Activity 18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (i) a watercourse;
GN R. 544 of 2010	Activity 26	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
Construction of a conveyor belt for the transportation of waste to the proposed disposal facility.		
GN R. 545 of 2010	Activity 6	The construction of facilities or infrastructure for the bulk transportation of dangerous goods – iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons per day;
Construction of power lines and substations to service the project and/or realignment of existing infrastructure.		
GN R. 544 of 2010	Activity 29	Regardless the increased output of the facility, the development footprint will be increased by 1 hectare or more.
Construction of a return water dam and/or alteration of existing dams for the management of storm water.		
GN R. 544 of 2010	Activity 12	The construction of facilities for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of Activity 19 of GNR 545.
The construction of access roads for the construction and or long term servicing of all planned infrastructure for the project and/or the realignment and expansion of existing roads.		

NOTICE NUMBER AND DATE:	ACTIVITY NUMBER (to the relevant or notice) :	DESCRIPTION OF THE LISTED ACTIVITY
GN R. 544 of 2010	Activity 22	The construction of a road outside urban areas: i) With a reserve wider than 13,5 metres; ii) Where no reserve exists where the road is wider than 8 metres, or iii) For which an EA was obtained for the route determination in terms of Activity 5 of GN 387 of 2006 or Activity 18 of GN 545 of 2010.
GN R. 544 of 2010	Activity 47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre i) With a reserve wider than 13,5 metres; ii) Where no reserve exists where the road is wider than 8 metres, Excluding widening or lengthening inside urban areas.
The crossing of rivers by road, conveyor or storm water structures, potential storm water outlets.		
GN R. 544 of 2010	Activity 11	The construction of: i) Canals: ii) Channels; iii) Bridges; iv) Dams; v) Bulk storm water outlet structures; vi) Buildings > 50m2 vii) Infrastructure or structures > 50m^2

Based on the aforementioned list of activities that may be triggered by the project a full Scoping and Environmental Impact Reporting authorisation procedure is required in terms of the NEMA Regulations as amended (June 2010) and published in GNR 543.

2.4 ENVIRONMENT CONSERVATION ACT (NO 73 OF 1989)

The Environment Conservation Act (ECA) is a law that relates specifically to the environment. Although most of this Act has been replaced by the NEMA there are still some important sections that remain in operation. These sections relate to:

- Protected natural environments;
- Special nature reserves;
- Limited development areas; and
- Regulations on noise, vibration and shock.

2.5 THE NATIONAL WATER ACT (NO. 36 OF 1998)

There is a small stream to the North of the existing ash disposal facility that will have to be diverted to accommodate the continuous ash disposal facility. As a consequence, this project will require a water use license in terms of Section 21 of the NWA. A full list of water

uses to be licensed will be identified during the early stages of the EIA phase. The list of potential water uses that will require licensing is given in the table below.

Table 2-3: Potential applicable Section 21 Water Use Licenses

Water Use	Description	Potential Section 21 Water Uses
Section 21 (a)	Taking of water from a water resource.	Using water for dust suppression on roads or waste disposal facility; and Borehole water abstraction.
Section 21 (b)	Storing of water.	Raw water storage (clean, untreated water) / reservoirs. Storing of water in return water dams, pollution control dams, and or storm-water control dams.
Section 21 (c)	Impeding or diverting the flow of water in a water course.	Activities within or near wetlands, or activities affecting wetlands. Stream diversion.
Section 21 (d)	Engaging in a stream flow reduction activity contemplated in Section 36 of the Act.	To be confirmed.
Section 21 (e)	Engaging in a controlled activity: S37(1)(a) irrigation of any land with waste, or water containing waste generated through any industrial activity or by a water work.	Water used for dust suppression (to be confirmed).
Section 21 (f)	Discharging waste or water containing waste into a water resource.	To be confirmed.
Section 21 (g)	Disposing of waste in a manner which may impact on a water resource.	Construction of a ~310 ha waste disposal facility. Storage of contaminated water in a pollution control dam / balancing dam / evaporation dam.
Section 21 (h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.	To be confirmed.
Section 21 (i)	Altering the bed, banks, course, or characteristics of a watercourse. This includes altering the course of a watercourse (previously referred to as a river diversion).	Stream diversion.
Section 21 (j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity, or for the safety of people.	To be confirmed.
Section 21 (k)	Using water for recreational purposes.	To be confirmed.

2.6 THE NATIONAL HERITAGE RESOURCES ACT (NO. 25 OF 1999)

The objectives of the National Heritage Resources Act ([NHR] No 25 of 1999) are to:

- Introduce an integrated and interactive system for the management of the national heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;

- Lay down general principles for governing heritage resources management throughout the Republic;
- Introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- Establish the South African Heritage Resources Agency (SAHRA) together with its Council to co-ordinate and promote the management of heritage resources at national level;
- Set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- Control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- Enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- Provide for the protection and management of conservation-worthy places and areas by local authorities; and to provide for matters connected therewith.

The proposed construction of this project comprises certain activities (e.g. changing the nature of a site exceeding ~310ha and linear developments in excess of 300m) that require authorisation in terms of Section 38 (1) of the NHR. Section 38 (8) of the NHR states that, if heritage considerations are taken into account as part of an application process undertaken in terms of the ECA, there is no need to undertake a separate application in terms of the National Heritage Resources Act. The requirements of the National Heritage Resources Act have thus been addressed as an element of this EIA process, specifically by the inclusion of a Heritage Assessment.

2.7 ADDITIONAL RELEVANT POLICY DOCUMENTATION AND GUIDELINES

The policy and waste regulations pertinent to the ash facilities are in the process of being revised by government, and the most recent draft regulations have not yet been promulgated. Cognisance will be taken of these requirements.

2.8 THE COMPETENT AUTHORITY (CA) AND CO-OPERATIVE GOVERNANCE

The Competent Authority (CA) for issuing a Waste Management License (WML) where waste is concerned is the Department of Environmental Affairs (DEA) and the applicant is a State Owned Entity (SoE), thus the CA is the DEA. The DWA and Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) will however remain key commenting authorities.

3 PROJECT DESCRIPTION

3.1 PROJECT MOTIVATION

The following project motivations are relevant:

- Environmental authorisation was not previously required for the Kendal Ash disposal facility, due to the fact that no environmental regulations were in place when construction started. Nonetheless an area earmarked for disposal of the ash was delineated during the planning stages of the power station.
- Kendal Power Station is running out of space due to the poor quality coal accessible for combustion which produces more ash than was planned.
- The life span of Kendal has also been extended to 2053.

3.2 DESCRIPTION OF THE WASTE STREAM

3.2.1 *Sources of Waste to be disposed*

This project will address the following waste stream produced at Kendal Power Station:

- Fly and coarse ash from coal burning operations;

3.2.2 *Waste Classification*

The waste classification regulations pertinent to the ash facility are in the process of being revised by government and the most recent regulations (DEA's draft waste regulations, 2011) have not yet been promulgated. Due to The Project constituting to the continuation of an existing activity, it is proposed that no lining system be used. This concept will however need to be approved by the Department of Water Affairs.

3.2.3 *Waste Volumes and Densities*

The following waste volumes and densities are anticipated for the continuing of the existing facility. These will be used as design parameters for the facility. .

Table 3-1: Estimated tonnages and volumes used in the design of the ash facility

Tonnages per year (tonnes per 6 units per year):	4.6 mill tons/y
Density (tonnes per m^3):	0.85
Volume per year (m^3 per 6 units per year):	5.4 mill m^3/y
Desired lifespan (years):	19
Desired total volume(m^3 per 6 units per 60 years):	Max dump opt = 103 Mill m^3

3.3 DESCRIPTION OF THE PROPOSED WASTE DISPOSAL FACILITY

3.3.1 *Location*

The proposed site is situated adjacent and to the North of the existing and currently used disposal facility as per **Figure 3-1**. A comparative assessment of the site will be undertaken during the impact assessment phase.

3.3.2 *Footprint and Lifespan*

The footprint required by the new facility was calculated to be approximately 310 hectares. The facility is anticipated to accommodate an ash volume of 103 Million m^3 and have a dump height of 60m. Side slopes of 1[v]:5[h] were used with an approach slope of 1[v]:20[h]. The model information is summarised in **Table 3-2.**

Table 3-2: Model Information

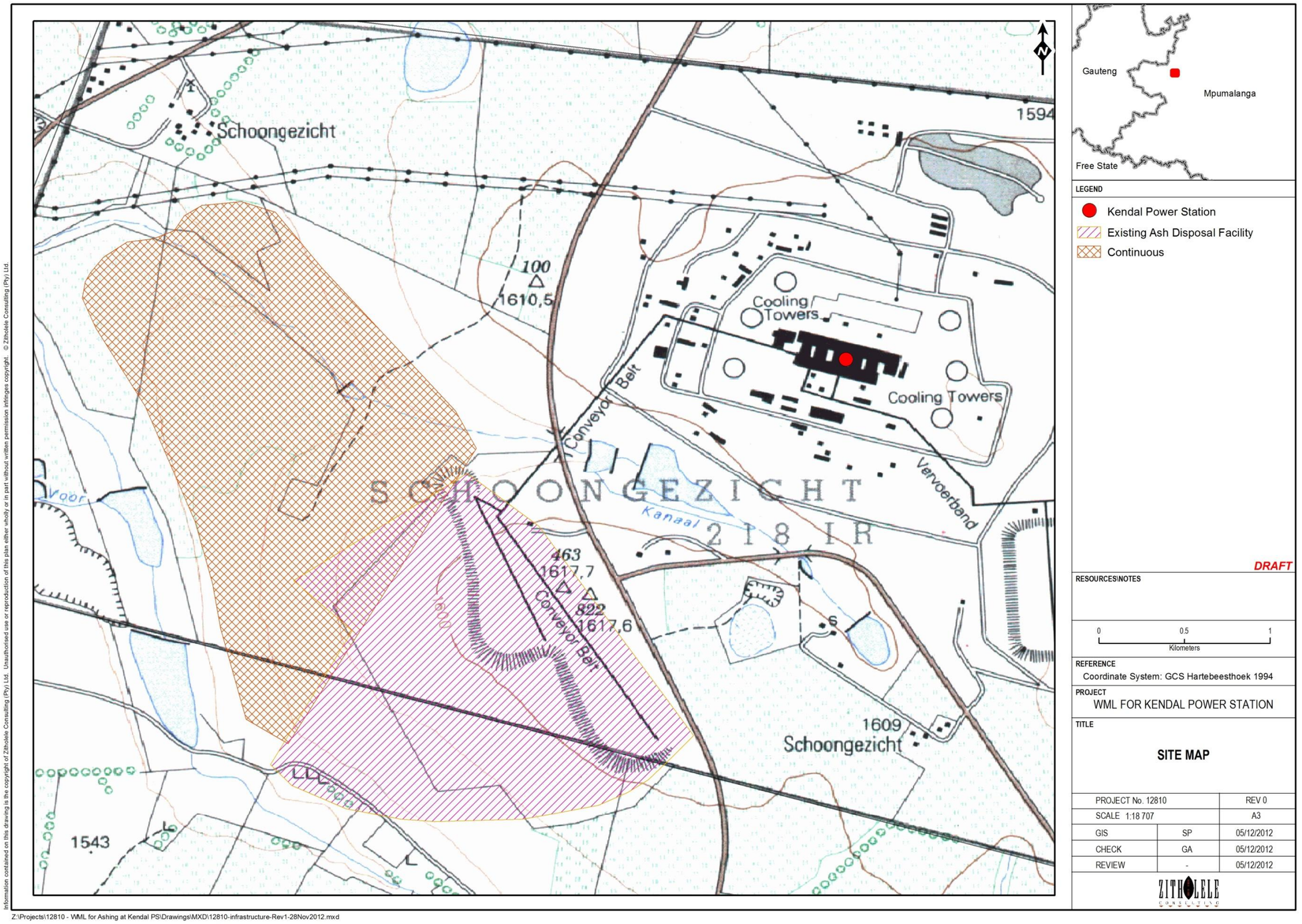
Max Height from NGL: (m)	Volume (Million m^3)	Footprint Area (ha):	Life (Years):	Conveyor Shift Type:
60	103	400	21	Radial Shifts

3.3.3 *Height*

The footprint and geotechnical conditions will influence the height of the continuous disposal facility as shown above. Further details to be provided at a later stage.

3.3.4 *Geotechnical Conditions and Foundation Design*

The geotechnical studies proposed as part of the specialist studies shall be used in the design process of the ash disposal facility.



Z:\Projects\12810 - WML for Ashing at Kendal PS\Drawings\MXD\12810-infrastructure-Rev1-28Nov2012.mxd

Figure 3-1: Proposed Site

3.3.5 *Operation of the facility*

The current operations at the facility shall continue to the North by means of extending the current stacker and spreader. Management activities will include dust suppression from return water dams and re-vegetation of the stable areas of the dump will commence as part of the re-vegetation and rehabilitation of the area. The final design will determine how the return water dams will function and where these will constructed.

3.3.6 *Closure of the facility*

During closure the proposed ash disposal facility will be capped and rehabilitated. As indicated above, some re-vegetation will be undertaken over the life of the facility as shown in **Figure 3-2** below which is an example of an existing facility. More detailed information on the capping and closure of the facility will be generated in the EIA phase of the project.

Figure 3-2: Example of an existing ash disposal site with capped and rehabilitated area in the foreground

3.4 PROPOSED ASSOCIATED INFRASTRUCTURE

The following associated infrastructure is envisaged for the continuation of the ash disposal facility.

3.4.1 *Clean and Dirty Water Separation (return water dams and trenches / drains)*

A clean and dirty water separation system will be designed for the facility dependant on the slope. Dirty storm water from the facility will be collected and channelled to a return water dam. The capacity requirements will be determined by an engineering investigation that will be undertaken during the EIA phase. Clean water cut-off canals/trenches/drains will be established to divert clean water back into the natural environment.

3.4.2 *Pipelines or canals*

A network of pipelines or canals, design dependant, will be installed to amongst others: transport water to and from the return water dams; transport water for dust suppression and to transport water collected from the waste facility to the return water dam.

3.4.3 *Internal and external Access Roads*

Access roads will be established, initially to allow for construction vehicles, but some of these roads may be retained post construction to allow for maintenance of the facility. The location of these access roads has not yet been determined, and will form part of the next phase of assessment.

3.4.4 *Fencing and Access Control*

It is envisaged that the access roads and disposal site will be fenced off for safety and security reasons.

3.4.5 *Storm Water Drainage and Monitoring Boreholes*

As part of the site design, on-going monitoring of the site storm water drainage features will be undertaken and additional monitoring boreholes to be installed for monitoring. Monitoring to be conducted with reference to applicable standards. As part of the conceptual designs a storm water management plan will be developed to ensure that storm water is adequately addressed.

3.4.6 *Relocation of existing Service Infrastructure*

Any services on the proposed property shall be identified as part of the impact assessment phase and the rerouting of any of these services will be investigated and potential corridors identified. It is envisaged that wherever possible the rerouting of services will be addressed as a component of this EIA and not as a separate study undertaken at a later date.

3.4.7 *Construction area*

The construction area for the ash disposal site will be the footprint of the disposal site, as well as any additional features required as part of the construction i.e. an access road, conveyors, new pipelines/canals, and areas to be rehabilitated. At this stage the full size of the site and associated infrastructure is estimated to be in the order of 310 ha. The exact surface area is still to be determined by the design of the facility. Construction activities will be limited to the areas mentioned above.

3.4.8 *Expansion of the E-dump*

The E-dump, as per **Figure 1-2** above, will need to be extended in order to ensure appropriate space in case of emergency.

3.5 MAJOR ACTIVITIES OF THE PROJECT EXECUTION

The major phases for the proposed project (including the EIA), prior to and after construction, are explained in the table below.

Table 3-3: Major phases for the proposed project.

NO	PHASE	ACTIVITY DETAILS
	PRECONSTRUCTION PHASE	
1	Application and Scoping	The Scoping Phase, as its name implies, determines the scope of the project appropriately (i.e. alternatives, consultation requirements, extent of specialist studies, impact assessment methodology and approach, issues / concerns to be addressed, and reporting for decision-making). This is undertaken through an inclusive stakeholder engagement process, which allows for all sectors of society to be involved, including the proponent, the various spheres of government, the regulator, the immediately affected parties, interest groups or individuals, the consulting team, and the public at large. This phase of the project is structured and minimum requirements are regulated through legislation.
2	EIA	An EIA is being undertaken to ensure that all environmental, social and cultural impacts are identified. During this phase the specialist studies as identified during the Scoping Phase are undertaken, and issues / concerns identified are addressed. This phase of the project is also undertaken in consultation with all stakeholder groups as identified during the Scoping Phase. This phase of the project is a necessary precursor to obtaining EA from the CA, without which the project cannot proceed any further.
3	Approval from authorities.	
4	Appeal	Once authorities have issued their decision an appeal process will commence. During this phase both the proponent and other stakeholders have the opportunity to appeal the decisions, or conditions thereof.
5	Property acquisition (if required)	Purchase of property if the chosen site is not on existing Eskom property.
6	Structure foundation investigation	Investigations will be undertaken to ensure that the foundation specifications are in line with the underlying geology.
	CONSTRUCTION PHASE	
7	Site establishment	The first stage of the construction phase is the establishment of contractors on site. This must be undertaken in line with the conditions of EA.
8	Relocation of services	The relocation of services is imperative, and will be undertaken during the initial phases of the project to ensure that the supply of services is not interrupted.
9	Structures	**Fencing** - Provide a safe and secured waste disposal area to restrict access and prevent injuries to livestock.
		Formation and lining - Provide a ground formation/lining compacted to the correct standard on which to build the ash disposal site.
		Drainage - Provide water drainage channels within the site.
10	Rehabilitate facilities made redundant.	Rehabilitation of facilities that are made redundant, such as pipelines / pump stations that will no longer be required, due to the implementation of this project.
11	Rehabilitate the construction area	The area where construction activities have taken place must be rehabilitated to minimise environmental degradation by following the Environmental Management Programme that is compiled in conjunction to the EIA.
	OPERATIONAL PHASE	
12	Operations for continuation of ash disposal	Current operations to be continued onto the proposed new portion by means of adjusting the spreader and stacker.

NO	PHASE	ACTIVITY DETAILS
13	Rehabilitation and closure of existing ash dam.	The current and continuous ash disposal facility shall be rehabilitated as required.
DECOMMISSIONING AND CLOSURE PHASE		
14	Decommissioning of the ash site and its infrastructure	Once the ash disposal site is no longer in use and is no longer required a decommissioning process may commence.

4 CONSIDERATION OF ALTERNATIVES

4.1 HOW ALTERNATIVES WERE IDENTIFIED

The optimal goal in establishment of a waste disposal facility and associated infrastructure (such as conveyors, pipelines and return water dams) is to effectively minimise the negative environmental and social impact while ensuring safety, reliability, and cost savings for the facility.

A structured approach was utilised to ensure that a defensible approach was utilised in the consideration of alternatives. Initially, the project team determined the need and motivation for the proposed project (NEMA, 1998). Once the need was established, potential solutions that can fulfil that need were identified, at this point no alternative solutions have been excluded. When dealing with waste related projects, this discussion typically is structured around the waste hierarchy (National Management Waste Strategy [NMWS], 2010) as shown in **Figure 4-1**.

Figure 4-2: Waste hierarchy (NMWS, 2010)

The essence of the approach is to group waste management measures across the entire value chain in a series of steps, which are applied in a descending order of priority. The foundation of the hierarchy, and the first choice of measures in the management of waste, is waste avoidance and reduction. Where waste cannot be avoided, it should be recovered, reused, recycled and treated (NMWS, 2010). Waste should only be disposed of as a last resort. Remediation on the other hand is part of the rehabilitation process and is ongoing until the decommissioning of the power station.

In working through these systematic hierarchical steps alternative solutions are generated. Waste management could be a single solution best suited to the type of waste, or a combination of several solutions. In each of these steps alternatives can be evaluated and excluded as being not feasible. Once feasible solutions are identified a process of evaluation can commence to evaluate the environmental, social, and technical acceptability of these solutions for the site may be considered to improve the positive aspects or reduce the negative aspects of each solution. A graphical representation of the approach utilised is shown in **Figure 4-3.**

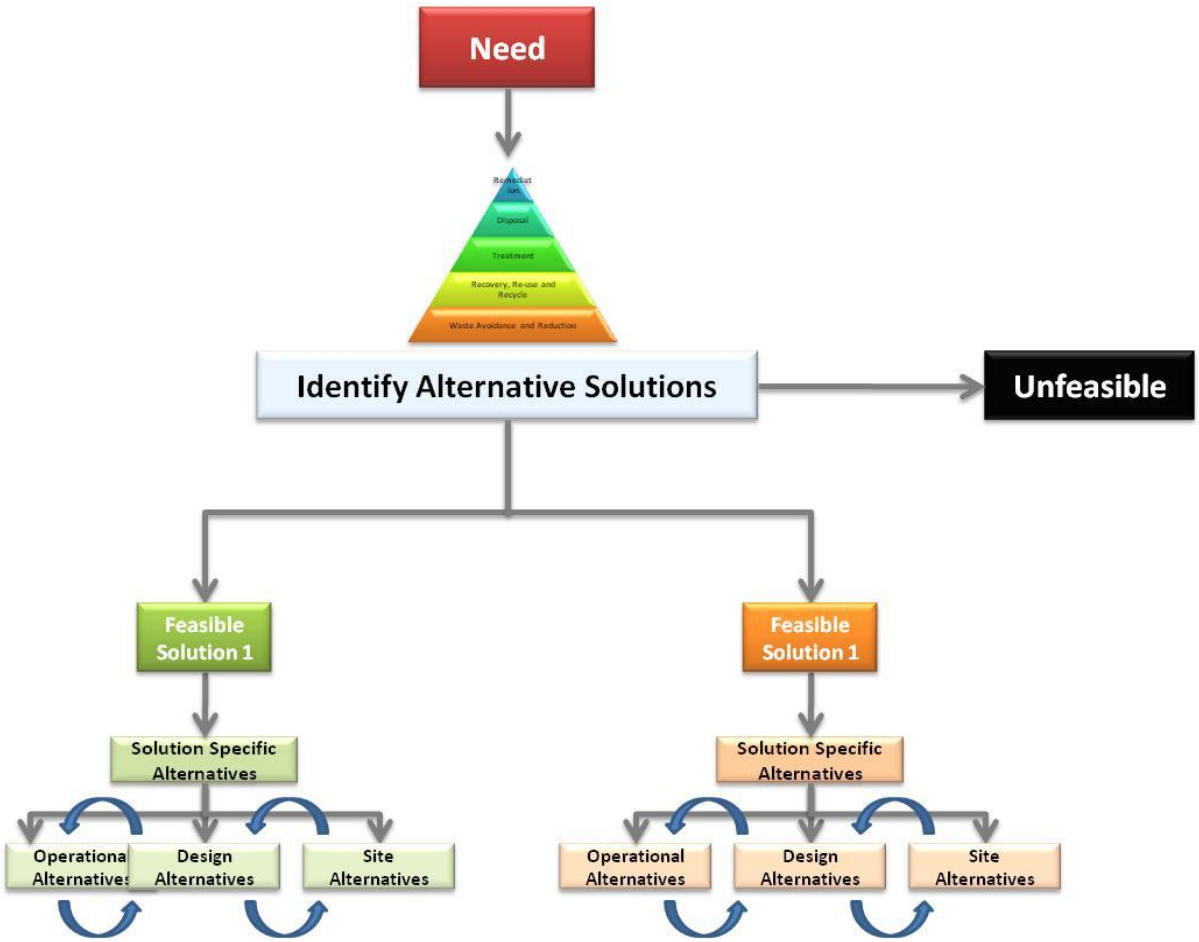


Figure 4-3: Alternatives identification and evaluation process.

4.2 ALTERNATIVE WASTE MANAGEMENT SOLUTIONS

The need most simply stated for this project is that "*Kendal Power Station is running out of space for disposal of its ash waste stream that is currently generated."* It is currently envisaged that ash disposal at Kendal shall be required until 2053 and that the proposed Project will contribute approximately 19 years worth of ash disposal. A discussion of the alternatives identified in an attempt to identify solutions for the aforementioned "need", according to the waste hierarchy, is detailed in Chapter 4 and summarised below:

- **Avoidance and Minimisation:**
  - Not a feasible solution.
- **Recovery / Recycling / Re-use:**
  - Not a feasible solution.
- **Treatment**
  - No feasible solution.

- **Disposal**

  - Continuation of current ash disposal activities. This solution is the only feasible solution at present that can accommodate the current situation and need of the waste stream.

  - Another possible option would be to optimise the footprint by means of piggy-backing on the existing dumping area and increase its height. However this solution has currently proved not feasible due to the time required for procurement of the spreader and stacker equipment.

- **Remediation**

  - Not a feasible solution

Table 4-1: Discussion of alternatives identified according the Waste Hierarchy

Waste Hierarchy	Current Status and Information	Discussion
Waste avoidance and reduction	Kendal Power Station became operational in 1993 and have ever since produced ash as a by product of electricity generation. The waste generated requires responsible management and disposal. The waste streams are currently a by-product of the technology utilised at the power station. In order to prevent the waste from being generated the power station would require the use of another energy generating technology i.e. nuclear, wind or solar power generating technology. It is considered unfeasible to change the technology, and therefore no preventative measures are available. In order to minimise the generation of ash a low ash-content fuel source can be utilised. The cost of such a fuel source is currently an order of magnitude greater than the current fuel source. This will result in an exponential increase in energy costs, with consequential knock-on effect on the economy. The current fuel source is of too low standard for export, and will result in the coal source not being mined, or spoiled. The spoiling of the lower quality coal will be a waste of the resource, costing the country in lost revenue and waste management costs.	The potential solutions identified to reduce / avoid the generation of waste ash include: 1) Change the technology utilised to generate power i.e. wind, solar, nuclear power; and 2) Change the fuel source to a low ash content coal source. Both alternatives are considered to be unfeasible for the following reasons. 1) The loss of the currently produced electricity. 2) The above shall plunge South Africa into an energy crisis. 3) Alternative energy generating technologies are much more costly, or have other technical problems, that will result in the increase of energy costs in South Africa or are technically unfeasible. 4) The cost of a low ash-content fuel source is currently an order of magnitude greater than the current fuel source. This will result in an exponential increase in energy costs with consequential knock-on effect on the economy. 5) The current fuel source is of too low standard for export, and will result in the coal source not being mined, or spoiled. The spoiling of the lower quality coal will be a waste of the resource.

Waste Hierarchy	Current Status and Information	Discussion
Recovery / Reuse / Recycling / Energy Recovery	There are many re-use alternatives available for the current waste stream, including: 1) Concrete production; 2) Embankments and other structural fills; 3) Grout and flowable fill production; 4) Waste stabilization and solidification; 5) Cement clinkers production - (as a substitute material for clay); 6) Mine reclamation; 7) Stabilization of soft soils; 8) As aggregate substitute material (e.g. for brick production); 9) Mineral filler in asphaltic concrete; 10) Agricultural uses: soil amendment, fertilizer, cattle feeders, soil stabilization in stock feed yards, and agricultural stakes; 11) Other applications include cosmetics, toothpaste, kitchen counter tops, floor and ceiling tiles. The ash is the final product from an energy recovery process. The calorific value of the ash waste is too low to recovery additional energy in an economical manner.	After some discussion it was determined that: 1) Kendal currently sell approximately 7% of ash to contractors
Treatment	Currently no viable treatment options have been identified	Coal ash is not treated at the current facility.
Disposal	Given the aforementioned it is reasonable to assert that the continuation of ash disposal at Kendal is required.	Having considered alternative solutions along the waste hierarchy it is inevitable that the power station need to continue producing electricity and that the by-product need to be disposed of. Three alternative disposal solutions were identified for the disposal of the waste stream: 1) Continuation of current activities and ash disposal ; and 2) Footprint optimisation study – piggy-back on existing dump area. 3) In-pit Ash Disposal Specific solution alternatives are discussed and are documented below.
Disposal		**<u>Continuation of current activities</u>** The current ash disposal facility needs to be expanded to ensure the

Waste Hierarchy	Current Status and Information	Discussion
		continual production of electricity. **Footprint optimisation study** By optimising the currently impacted footprint, Kendal will be able to minimise its future footprint and minimise environmental impact. This will however not be sufficient for the lifespan of Kendal and is therefore more a optimisation strategy to minimise future impact. This will be investigated during the process. **In-pit Ash Disposal** The ash generated by the power plant could possibly be disposed of in the open voids created by the adjacent collieries to the West of the existing as dump. The following conditions however prevent this alternative from being explored further at this juncture: 1) There is insufficient information at present to accurately model the impacts of the ash waste stream on the groundwater regime if in-pit ash disposal is undertaken. 2) There is currently insufficient information of the predicted outcome of the mining operation on the groundwater regime. 3) The costs to undertake a theoretical prediction of the impact to the environment from in-pit ash disposal is not warranted as it will not increase the certainty of the decision. 4) Insufficient information pertaining to the available space. 5) Due to the urgency of the Kendal situation, it would not be possible to get have all studies, negotiations etc done in time. The costs to undertake a theoretical prediction of the impact are high, and will not increase the certainty of the decision to undertake in-pit ash disposal at this stage. In-pit disposal will be included into the Scoping Report and EIA as an alternative and provide the motivation for why this option is not feasible at this juncture, but was not prepared to exclude this possible solution entirely, and would recommend that studies be undertaken in future when the conditions are more favourable.

Waste Hierarchy	Current Status and Information	Discussion
Disposal		**Design Alternatives** The design for the continuous disposal facility will be based on the geotechnical conditions. The specialist study is included in the plan of study. Footprint of the facility It is desirable from an environmental perspective that the footprint of the facility be reduced from the outset to the smallest possible footprint and as such supports the optimisation strategy.
Disposal		**Location Alternatives** The natural area for expansion is northwards onto Eskom owned property. Therefore there are no location alternatives identified.
Remediation	Ongoing rehabilitation of the disposal ash dump.	Ensure that capping and rehabilitation of the ash facility is addressed as a component of the design and daily activities at Kendal.

4.3 ALTERNATIVES SPECIFIC TO THE ASH DISPOSAL FACILITY

Having determined that the only feasible solution to the project need is continuation of the current ash disposal activities, the following alternatives have been identified:

4.3.1 *Operational Alternatives*

Footprint optimisation

By optimising the currently impacted footprint, Kendal will be able to minimise its future footprint and minimise environmental impact. Optimisation options include the following:

- Optimal operation of the spreader and stacker as per design specifications
- Piggy-back on the already impacted and disposal area – This will however not be viable for this project due to the time required for procurement of the spreader and stacker equipment.

The above are being investigated for technical feasibility, and their results will make input into the process.

4.3.2 *Design Alternatives of the Ash Dump*

The design for the continuation of the current disposal facility will be based on the geotechnical conditions and to be determined by the specialist geotechnical study as included in the Plan of Study for EIA.

Footprint of the facility

It is desirable from an environmental perspective that the footprint of the facility be reduced from the outset to the smallest possible footprint and as such supports the footprint optimisation study.

4.3.3 *Location Alternatives*

Due to the natural continuation of the current facility being to the north and onto Eskom owned property, it is proposed that there are no feasible location alternatives to allow Kendal power station to continue with its role in the country's electricity supply.

4.4 THE "NO GO" PROJECT ALTERNATIVE

The No Project or "No-Go" alternative will also be assessed further in the EIA process. This alternative presents that the power station will have to stop disposal of its ash and stops operating all together.

Should the “No-Go” alternative be the preferred alternative, Eskom will have to shut-down the Kendal Power Station. The environmental and social impacts will be assessed and compared to the aforementioned alternatives.

5 SCOPING PROCESS

5.1 PROJECT INCEPTION PHASE

On appointment, Zitholele arranged a project meeting between Eskom and the Zitholele project team. During the inception meeting the following was discussed:

- Project Scope and Requirements;
- Project Schedule;
- Identification of key stakeholders and role players; and
- Discussion of the identification of ash disposal site.

A site visit was undertaken in order to familiarise the project team with the area.

5.2 PRE-APPLICATION CONSULTATION WITH RELEVANT AUTHORITIES

Initial consultation with the DEA was undertaken through email correspondence. In this manner it was established that:

- This application will be considered by the Integrated Permitting System sub-directorate of the DEA; and
- An integrated EA and WML process must be undertaken.

5.3 CONSIDERATION OF ALTERNATIVES, SITE SELECTION AND SCREENING

This phase consisted of:

- The identification of alternatives solutions to meeting the project need;
- Identification of solution specific alternatives; and

The results of this phase have been discussed extensively in Chapter 4.

5.4 NOTIFICATION OF LAND-OWNERS

Eskom are the sole owner of the proposed area planned for the continuation of ash disposal.

5.5 Compilation, submission and acknowledgement of application forms

The Integrated EIA and WML application form (attached as **Appendix B**) for the proposed project was submitted to the DEA on 05 October 2012.

5.6 IDENTIFICATION OF STAKEHOLDERS

The identification of key stakeholders was done in collaboration with Eskom, the local municipalities and other organisations in the area. Having undertaken work previously in the area, Zitholele already have a stakeholder database that was used as a departure point for this project. The identification of stakeholders is on-going and is refined throughout the process. As the "on-the-ground" understanding of affected stakeholders improves through interaction with various stakeholders in the area the database is updated.

The stakeholders' details are captured in an electronic database management software programme that automatically categorises every mailing to stakeholders, thus providing an on-going record of communications - an important requirement by the authorities for public participation. In addition, comments and contributions received from stakeholders are recorded, linking each comment to the name of the person who made it.

According to the NEMA EIA Regulations, a register of I&APs (Regulation 55 of GNR 543) must be kept by the public participation practitioner. Such a register has been compiled and will be updated with the details of involved I&APs throughout the process (See **Appendix D**).

5.7 INITIATION OF PUBLIC PARTICIPATION

The opportunity to participate in the EIA and the availability of the draft scoping report for comment was announced between 23 November 2012 and 30 October 2012 as follows:

- Registered mail and emails to identified potentially affected stakeholders – these include adjacent and surrounding landowners. A notification letter, map of the site, description of the proposed site and a comment sheet. Please refer to **Appendix D** for proof of notification)
- A Background Information Document (BID) containing details of the proposed project, including a map of the project area, a registration / comment sheet and a letter of invitation to stakeholders to become involved was distributed via mail and email to all potential interested and affected stakeholders. See **Appendix F**.
- Stakeholders were also invited to visit the Zitholele/Eskom websites where all documents for public review are available – http://www.zitholele.co.za/, www.eskom.co.za/eia (Kendal continuous ash disposal).

Figure 5-1: BID documents placed on site – Appendix C

- Advertisements were placed in the following newspapers (**Appendix C**):

Table 5-1: Advertisements placed during the announcement phase

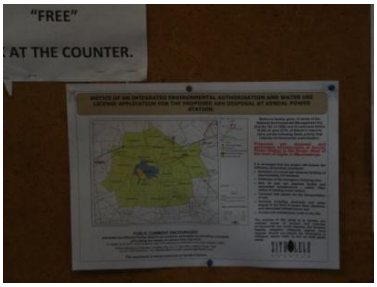
NEWSPAPER	DATE
Streeknuus	28 November 2012
Witbank News	29 November 2012
The Echo	29 November 2012
Springs Advertiser	28 November 2012
Citizen	28 November 2012
Beeld	26 November 2012

- Site notice boards were positioned at prominent localities on 23 November 2012 on all roads surrounding the site area. These notice boards were placed at conspicuous places and at various public places (Figure 5-2). See **Appendix C** which provides a detailed register of where the site notices were placed (photos included) and a map indicating the placement of the notices.

Kendal Power Station Ash Plant

Road Outside Leeufontein

Ogies Public Library



Emalahleni Library – Site notice board

Kriel Public Library

Corner Groen & Sprinkbok Laan Kriel

Figure 5-2: Site notice boards were put up in the area.

5.8 COMMENT AND RESPONSE REPORT

The issues raised in the announcement phase and draft scoping report comment period shall be captured in an Issues and Responses Report (IRR). The IRR will be updated to include additional I&AP contributions that may be received as the Scoping Phase proceeds, and as the findings of the EIA become available. The following versions of the IRR shall be compiled (every version is an update of the previous version):

- Version 1 appended to the Final Draft Scoping Report and will include all comments received during the notification and draft scoping period.
- Version 2 appended to the Draft Environmental Impact Assessment Report
- Version 3 appended to the Final Environmental Impact Assessment Report

5.9 SCOPING OF SPECIALIST STUDIES

During the Scoping Phase it is the responsibility of the EAP to determine the scope of specialist studies that are to be undertaken with input from stakeholder during the subsequent EIA phase of the project. Zitholele have compiled Terms of Reference (ToR) for identified specialist studies, based on the availability of published materials; the size and magnitude of the project; anticipated impacts associated with the project; comments received to date, and experience with other related projects. These ToRs for specialist studies are documented in **Chapter 8**.

5.10 DRAFT SCOPING REPORT - OBTAINING COMMENT AND CONTRIBUTIONS

The Draft SR is available for public review from **Friday, 07 January 2012 to Monday, 04 February 2013**. The availability of the Draft SR for public review was announced together with the initial announcement of the project as per section 5.7 above.

The following opportunities are available during the Scoping Phase for contribution from the I&APs:

- Completing and returning the registration/comment sheets on which space was provided for comment.
- Providing comments telephonically or by email to the public participation office.
- Attending **public meeting** that has been widely advertised (see table below) and raise comments there.

Table 5-2: Two stakeholder meetings have been advertised and will be held as part of the public review period of the Draft Scoping Report

DATE	TIME	VENUE AND ADDRESS
Tuesday, 29 January 2013	14:00 and 18:00	Venue for the meetings shall be at the El Toro Conference facility situated on the R545 just south of the N12 freeway.

The above mentioned meetings shall be held separately but will contain and address the same information. The reason is to accommodate different people and time slots.

Issues relevant to the project will be considered and where necessary will be carried forward into the Impact Assessment phase. The minutes of the public meeting will be attached to the Final Scoping Report in the form of a Comments and Response Report.

The Draft SR will be updated based on comments received from all stakeholders (i.e authorities, land owners, community organisations, and I&APs).

This Draft SR was made available and distributed for comment as follows:

- Left in public venues within the vicinity of the project area (these are listed in **Table 5-3** below);
- Published on the Eskom and Zitholele websites;
- Mailed to I&APs who requested a copy of the report; and
- Copies will be made available at the stakeholder meeting.

I&APs can comment on the report in various ways, such as completing the comment sheet accompanying the report, and submitting individual comments in writing or by email.

Table 5-3: List of public places where the Draft Scoping Report is available

Contact	Location	Contact
Printed Copies		
Phola Public Library		013 645 0094
Ogies Public Library, 61 Main Street, Ogies		013 643 1150
Delmas Public Library		013 665 2425
Emalahleni Public Library – 19 OR Thambo Street		013 653 3116
Kungwini Public Library		013 932 6305
Kendal power station – Security Reception		013 647 6002
Electronic Copies		
Lorraine Ndala	www.eskom.co.za/eia (Kendal continuous ash disposal).	011 800 4622
Patiswa Mnqokoyi	www.zitholele.co.za (Kendal continuous ash	011 207 2077
Patiswa Mnqokoyi	CD on request via email from Zitholele Consulting.	Phone 011 207 2074 or send email request to patiswam@zitholel.co.za

5.11 FINAL SCOPING REPORT

Using the comments received from stakeholders the Draft SR will be updated and finalised. All comments received will be added to the IRR and attached to the Final SR as an appendix.

The Final SR once updated with additional issues raised by I&APs may contain new information. The Final SR will be submitted to the DEA for decision making. The Final SR will be distributed to those I&APs who specifically request a copy, but will be available at the same public venues as the Draft Report.

6 ISSUES IDENTIFIED DURING THE SCOPING PHASE

Due to the combined project notification and scoping comment period, no issues or comments have been raised till date. All comments and issues shall be included in the Final Scoping Report.

7 RECEIVING ENVIRONMENT

The site environment is described in the section below.

7.1 CLIMATE

7.1.1 *Data Collection*

Climate information was attained using the climate of South Africa database. Due to the close vicinity of the Kusile Power Station, the Air Quality Impact Assessment report which was done by Airshed Planning Professionals[1] for the Phola-Kusile overland conveyor system was used. The weather related information extracted from the weather report was obtained from the Kendal 2 monitoring station in close proximity to Kendal Power station.

7.1.2 *Regional Description*

The site area displays warm summers and cold winters typical of the Highveld climate. The region falls within the summer rainfall region of South Africa, rainfall occurs mainly as thunderstorms (Mean Annual Precipitation 662 mm) and drought conditions occur in approximately 12% of all years. The mean annual potential evaporation of 2 060 mm indicates a loss of water out of the system.

The area experiences frequent frosts, with mean frost days of 41 days. In addition to frost the area is prone to hail storms during the summer time. Winds are usually light to moderate, with the prevailing wind direction north-westerly during the summer and easterly during winter.

Ambient Temperature

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume is able to rise), and determining the development of the mixing and inversion layers. Minimum, mean and maximum temperatures for Kendal 2 for the period January 2005 – April 2011 are illustrated in **Figure 7-1** below.

Annual average maximum, minimum and mean temperatures for Kendal 2 are given as 27°C, 10°C and 16°C, respectively, based on the January 2005 to April 2011 record. Average daily maximum temperatures range from 31°C in December to 20°C in June, with daily minima ranging from 15°C in January to 3°C in July.

[1] Air Quality Impact Assessment for the 'AIR QUALITY SPECIALIST IMPACT ASSESSMENT FOR THE PROPOSED NEW PHOLA-KUSILE COAL CONVEYOR, NKANGALA DISTRICT MUNICIPALITY, MPUMALANGA'. Report No.: APP/09/SYN-03B Rev 0.2, 2011.

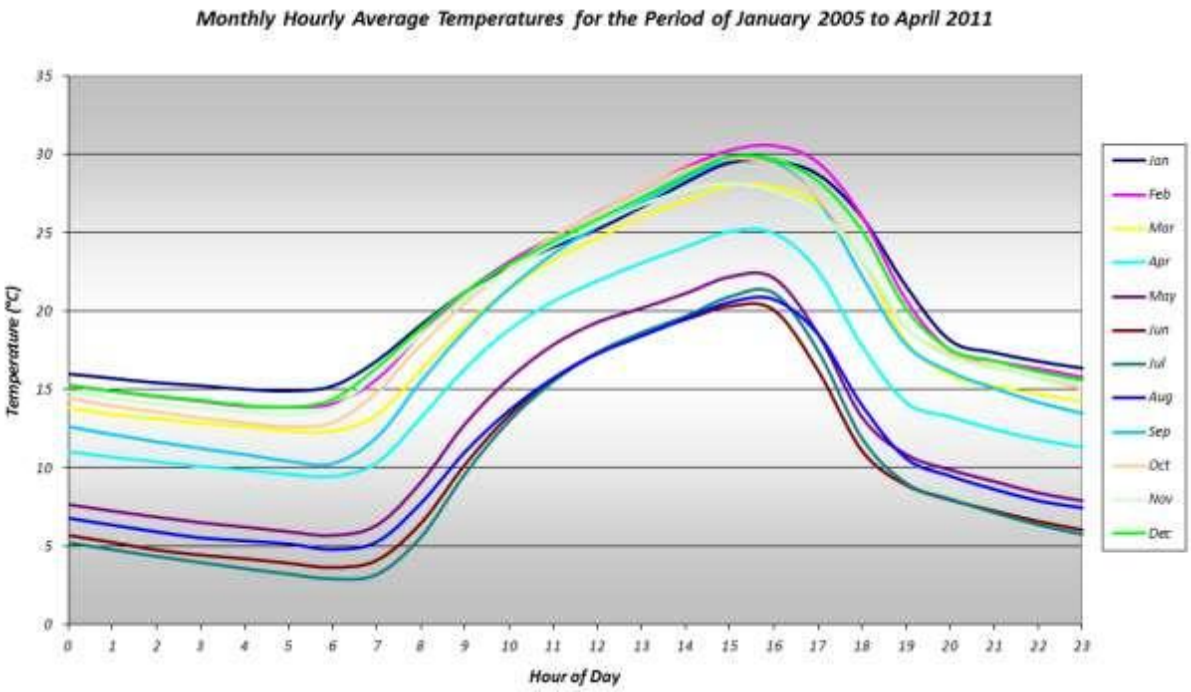


Figure 7-1 - Diurnal temperature profile at Kendal 2 monitoring station for the period

Meso-Scale Wind

The predominant wind direction at Kendal 2 for the period January 2005 to April 2011 is from the west-northwest (~16% frequency of occurrence). Calm periods and low wind speeds are more prevalent during the night-time, as is to be expected. The gentle slope of the terrain may account for the increased frequency of occurrence of west-northwesterly winds during the day-time and increased east-southeasterly winds during the night-time.

During winter months (July to August), the enhanced influence of westerly wave disturbances is evident in the increased frequency of southwesterly winds at Kendal 2 (**Figure 7-3**). An increase in the frequency of easterly and east-southeasterly winds during summer months (December to February) reflects the influence of easterly wave systems. Autumn months are associated with a greater frequency of calm wind conditions, with the smallest number of calms occurring during spring months.

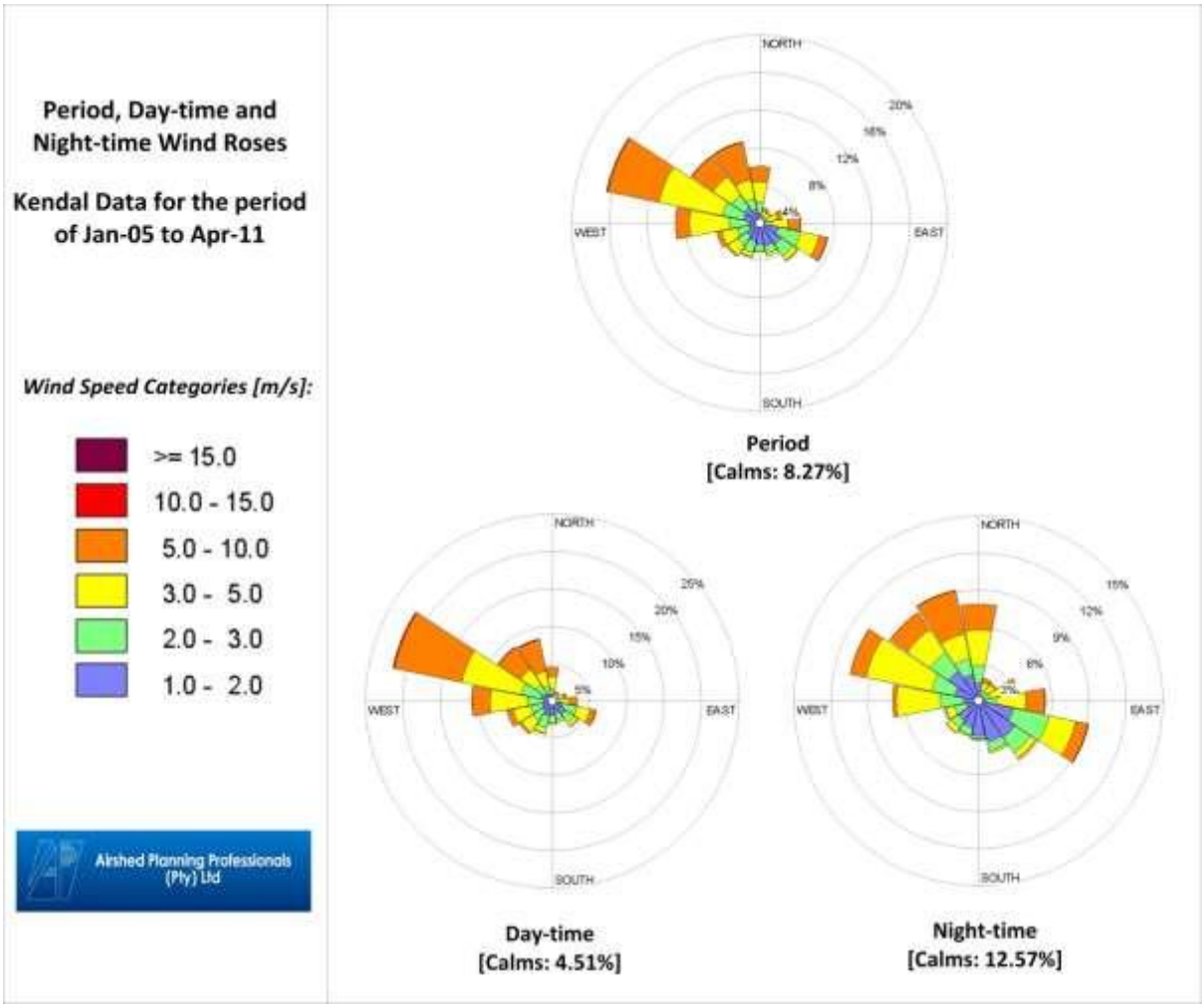


Figure 7-2: Period, day- and night-time wind roses for the Kendal 2 monitoring station (January 2005 to April 2011)

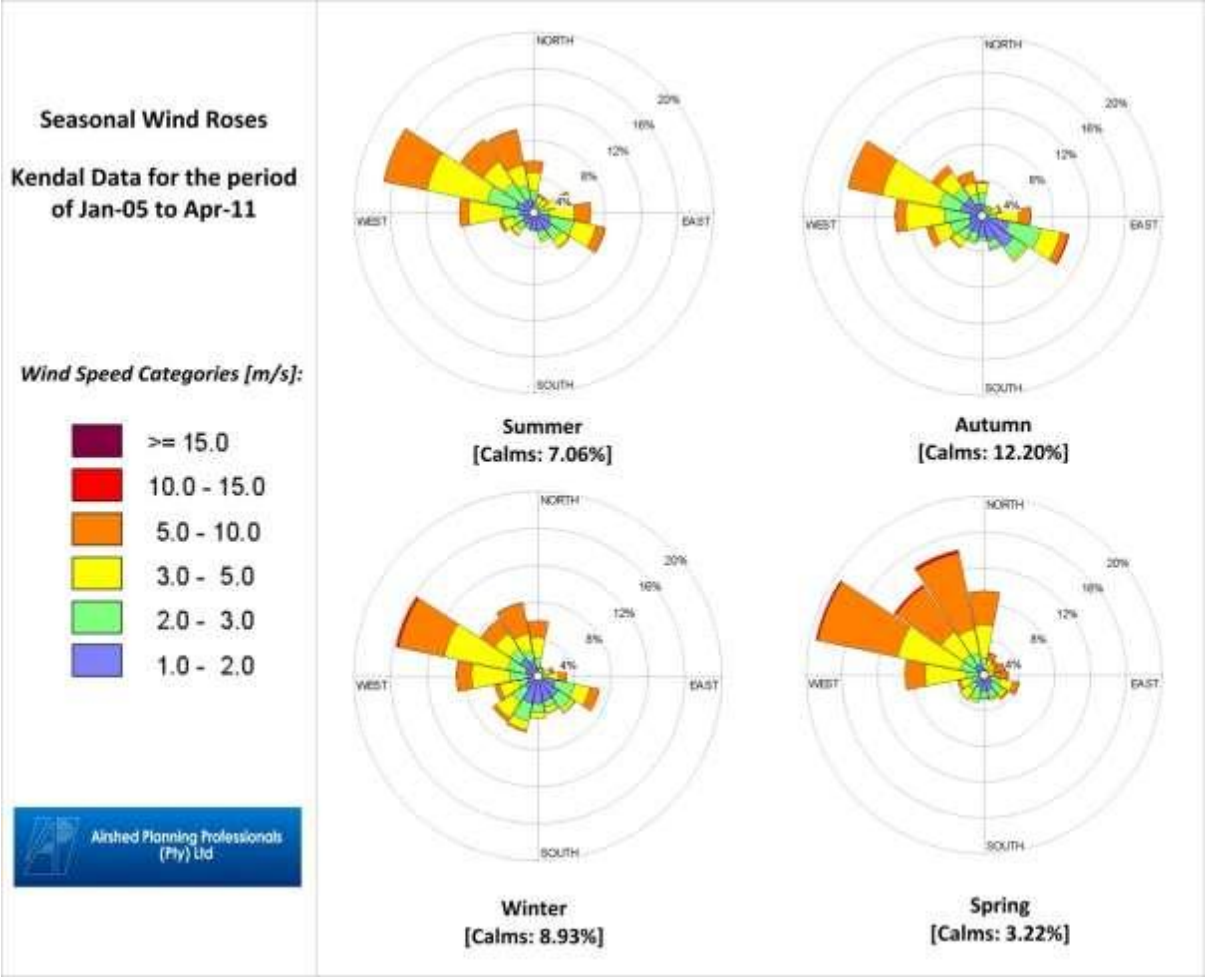


Figure 7-3: Seasonal wind roses for the Kendal 2 monitoring station (January 2005 to April 2011)

7.2 GEOLOGY

7.2.1 *Methodology and Data Sources*

The geological analysis was undertaken through the desktop evaluation using a Geographic Information System (GIS) and relevant data sources. The geological data was taken from the Department of Water Affairs Geology data.

7.2.2 *Regional Description*

The geology in the areas mainly consists of the following as per Figure 7-4 below:

Table 7-1 - Site Geology

Group	Main rock types
Karoo Super group/Ecca Group	Arenite, Shale, Coal
Bushveld complex	Granite
Transvaal Super group/Rooiberg Group	Rhyolite

The above table will be updated once the result of the Geotechnical assessment is available.

7.2.3 *Sensitivities*

With regards to the construction of an ash disposal facility geological sensitivities to consider include:

1) Areas of unstable geology, which in this instance refer to the areas of deep clay layers. The clay deposits tend to shrink and swell and can slip under the foundation of the ash disposal facility. Special foundation designs will need to be made to accommodate this type of geological founding conditions.

2) Areas of shallow soils or rock outcrops also present problematic founding conditions and are also deemed to constitute sensitive geology. In such areas cut to fill operations may be required to create suitable ash storage areas / capacity, resulting in permanent damage to in-situ geology.

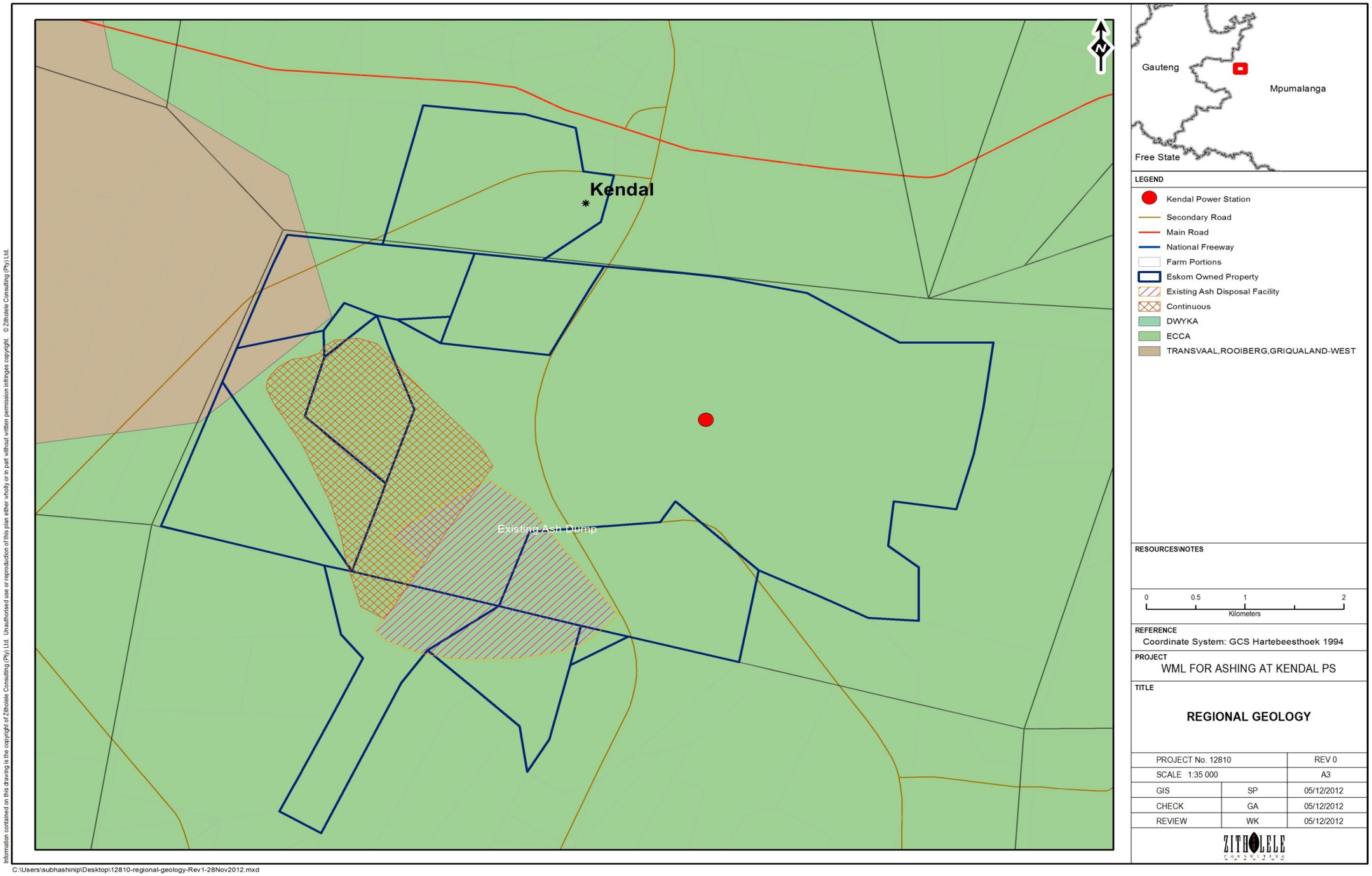


Figure 7-4: Site Geology of the area

7.3 SOILS AND LAND CAPABILITY

7.3.1 *Data Collection*

7.3.2 *Regional Description*

The soils in the region are mostly derived from the geology of the region (as described above). The harder geologies (such as granite and quartzite) weather into rocky and sandy soils, while the softer geologies have weathered into deeper red or brown sandy soils (sandstone and dolerite). The soils in the region form a typical Highveld plinthic catena with shallow soils on the crests of slopes, deeper sandy apedal soils on the slopes and soils with some plinthic clay layers in the foot slopes. In the valleys the clays accumulate and in some cases harden into ferricrete (hardpan / ouklip). The site for the continuation of ash are classified as having a high potential for being arable land as per **Figure 7-5** below which provides an illustration of the soils on site.

7.3.3 *Sensitivities*

The sandy apedal soils as well as the deeper plinthic soils mentioned above result in the wide spread occurrence of high potential arable soils in the region. These soils are considered to be sensitive because:

1) Arable soils in South Africa are considered to be valuable because it constitutes such a small percentage of the total soil distribution in the country;

2) The arable soils in the region underpin the basis of agricultural activities in the area;

3) The ash disposal facility will result in the sterilisation of a large area of soil;

7.4 TOPOGRAPHY

7.4.1 *Data Collection*

The topography data was obtained from the Surveyor General's 1:50 000 toposheet data for the region, namely 2628 and 2629. Using the latest aerial photography of the area Zitholele was able to develop a digital elevation model of the region as shown in **Figure 7-6** below.

7.4.2 *Regional Description*

The topography of the region is a gently undulating to moderately undulating landscape of the Highveld plateau. Some small scattered wetlands and pans occur in the area, rocky outcrops and ridges also form part of significant landscape features in the wider area. The altitude ranges between 1 260 – 1 620 metres above mean sea level (mamsl). **Figure 7-6** below provides an illustration of the topography of the region as well as the ridges.

7.4.3 *Sensitivities*

Ridges on the Highveld typically constitute areas of high biodiversity. In Mpumalanga these areas have also been significantly transformed over the years. Once transformed, restoration / rehabilitation is difficult or impossible. Thus ridges are deemed to be sensitive features. When considering the figure above it can be seen that the site is not on a ridge and hence this sensitivity is avoided.

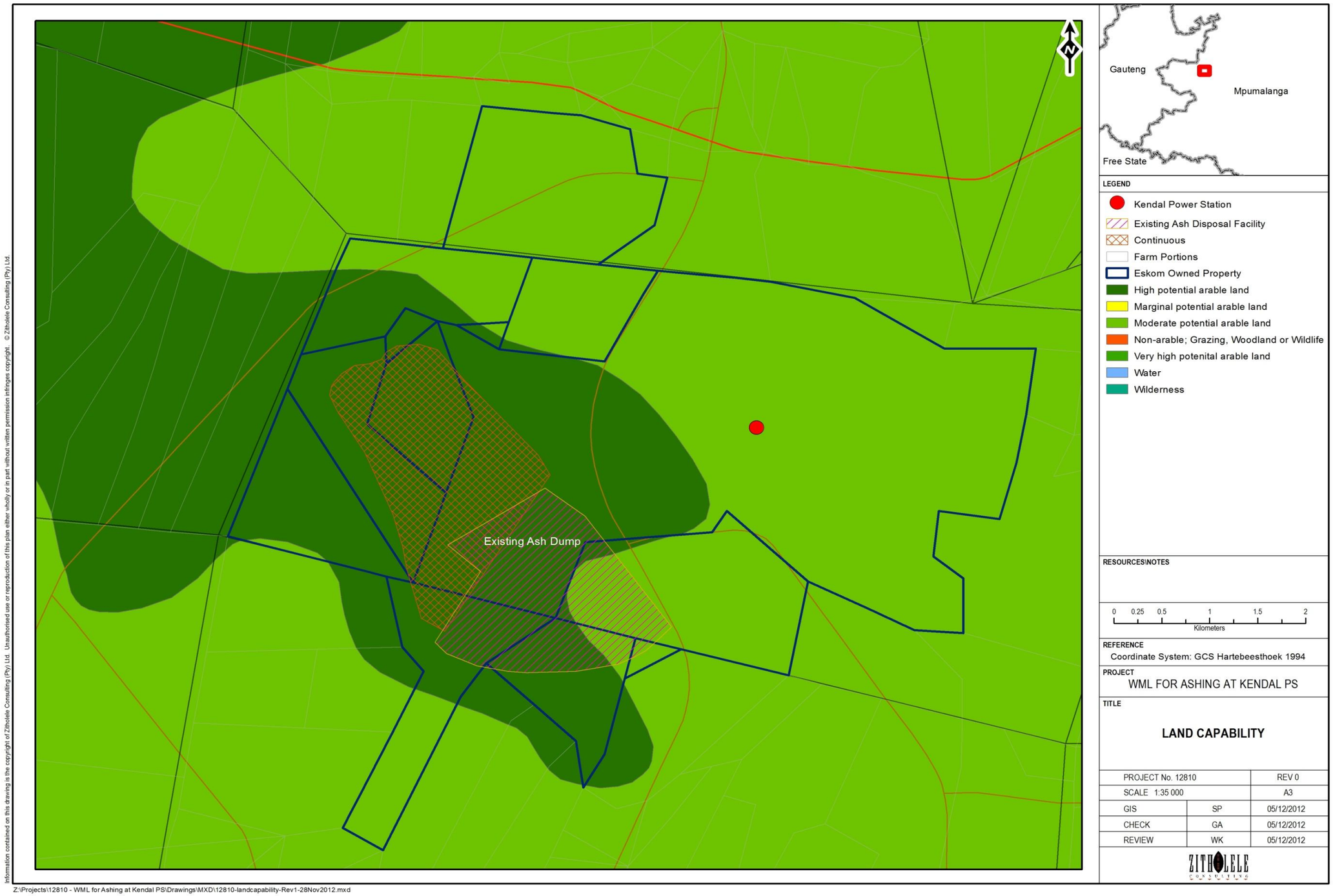


Figure 7-5 – Land Capability of the soils within the study site

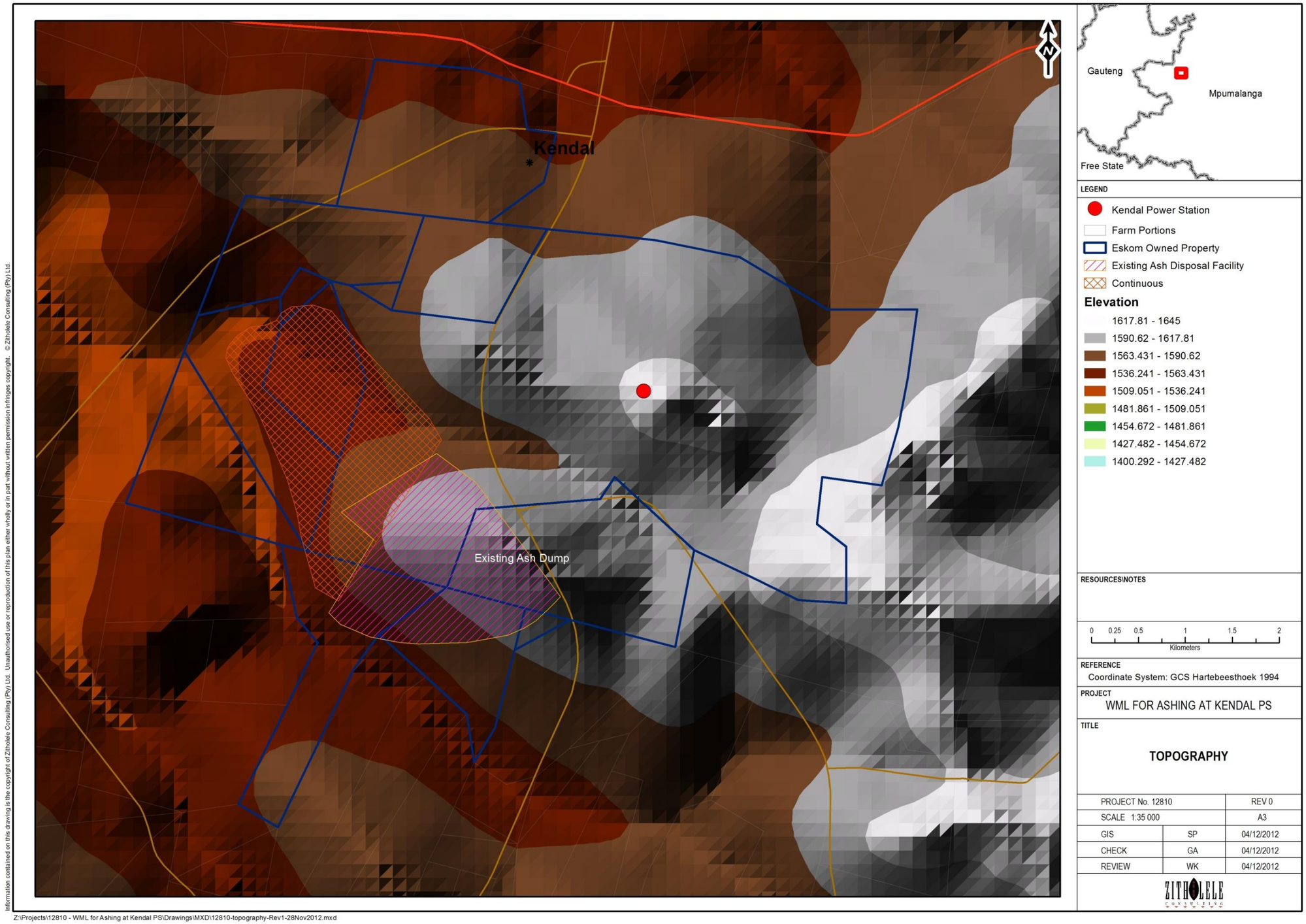


Figure 7-6: Topography of the area.

7.5 SURFACE WATER

7.5.1 *Data Collection*

The surface water data was obtained from the WR90 database from the Water Research Council and the National Freshwater Ecosystem Priority Area (NFEPA) database from DWA. The data used includes pans, dams, wetlands, catchments, river alignments and river names.

7.5.2 *Regional Description*

The proposed area to the north of the existing ash disposal facility falls within the B20E catchments. The main drainage feature of the area is the Wilge River which drains northwards, including several tributaries to the Wilge River situated to the West of the proposed site. The expansion to the north will impact on an unnamed drainage line which shall be investigated in full during this process.

7.5.3 *Sensitivities*

The unnamed drainage line and possible wetland supports a number of faunal and floral species uniquely adapted to these aquatic ecosystems and therefore all surface water bodies are earmarked as sensitive features. Unfortunately due to the continuation of the current activities the unnamed drainage line will be negatively impacted and possible diverted. This still need to be investigated and is part of the proposed specialist investigations.

Please note the sensitivity of wetlands is typically determined by its structure, function and composition (which is discussed in more detail in Chapter 7.7 and Chapter 7.8 of this report).

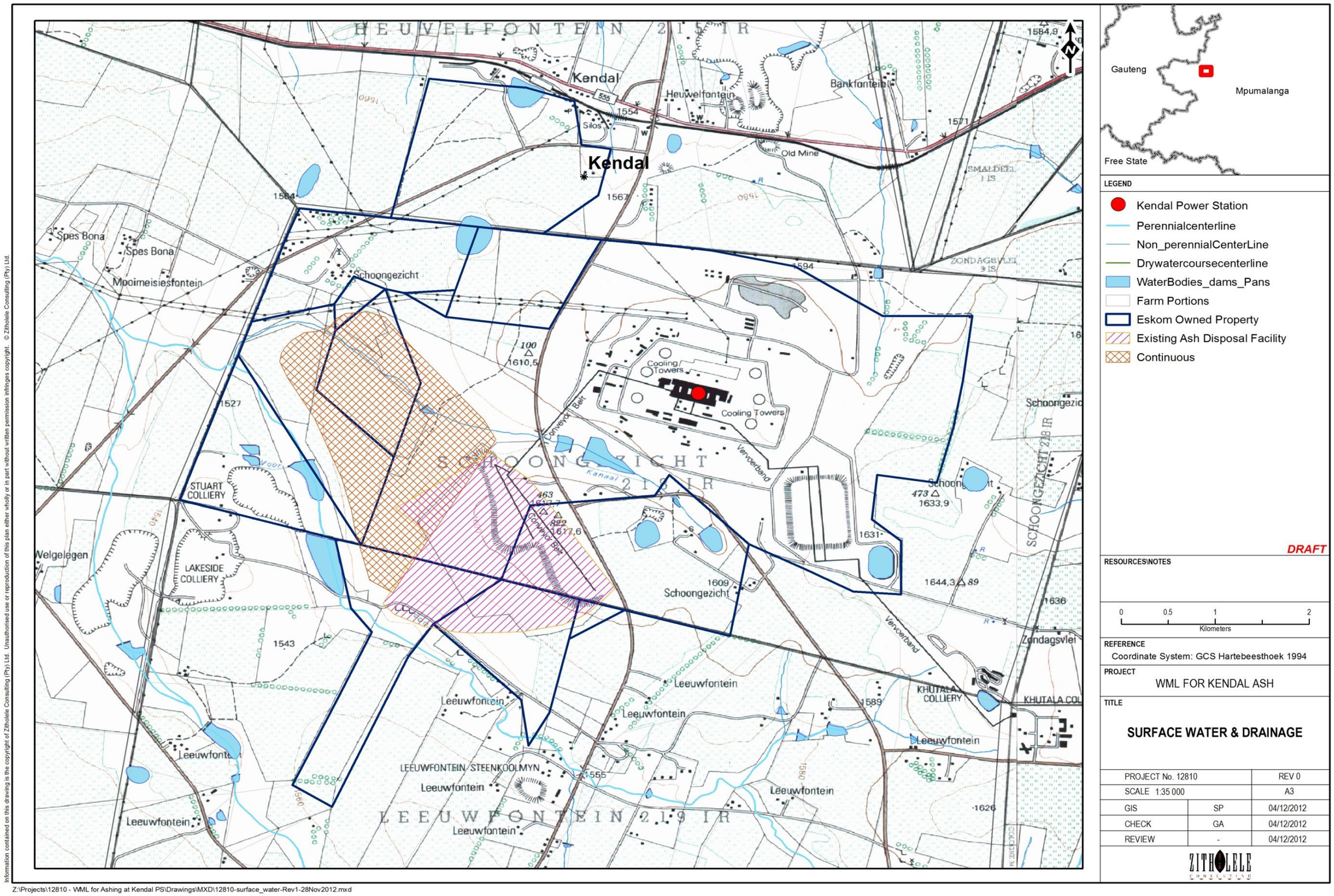


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Figure 7-7: Surface water and drainage features of the study site.

7.6 LAND USE

7.6.1 *Data Collection*

The land use data was obtained from the CSIR Land Cover database (2006) and supplemented with visual observations on site.

7.6.2 *Regional Description*

From the maps below it can be seen that the site are located on high potential arable land. The land use in the area is dominated by maize cultivation and grazed fields (mostly cattle).

The site is leased to a farmer for agricultural use by means of centre pivots and the lease shall be terminated in due course. The rest of the site is undeveloped and natural ground.

7.6.3 *Sensitivities*

Sensitive land use features include:

- Intensive and specialised agricultural activities;

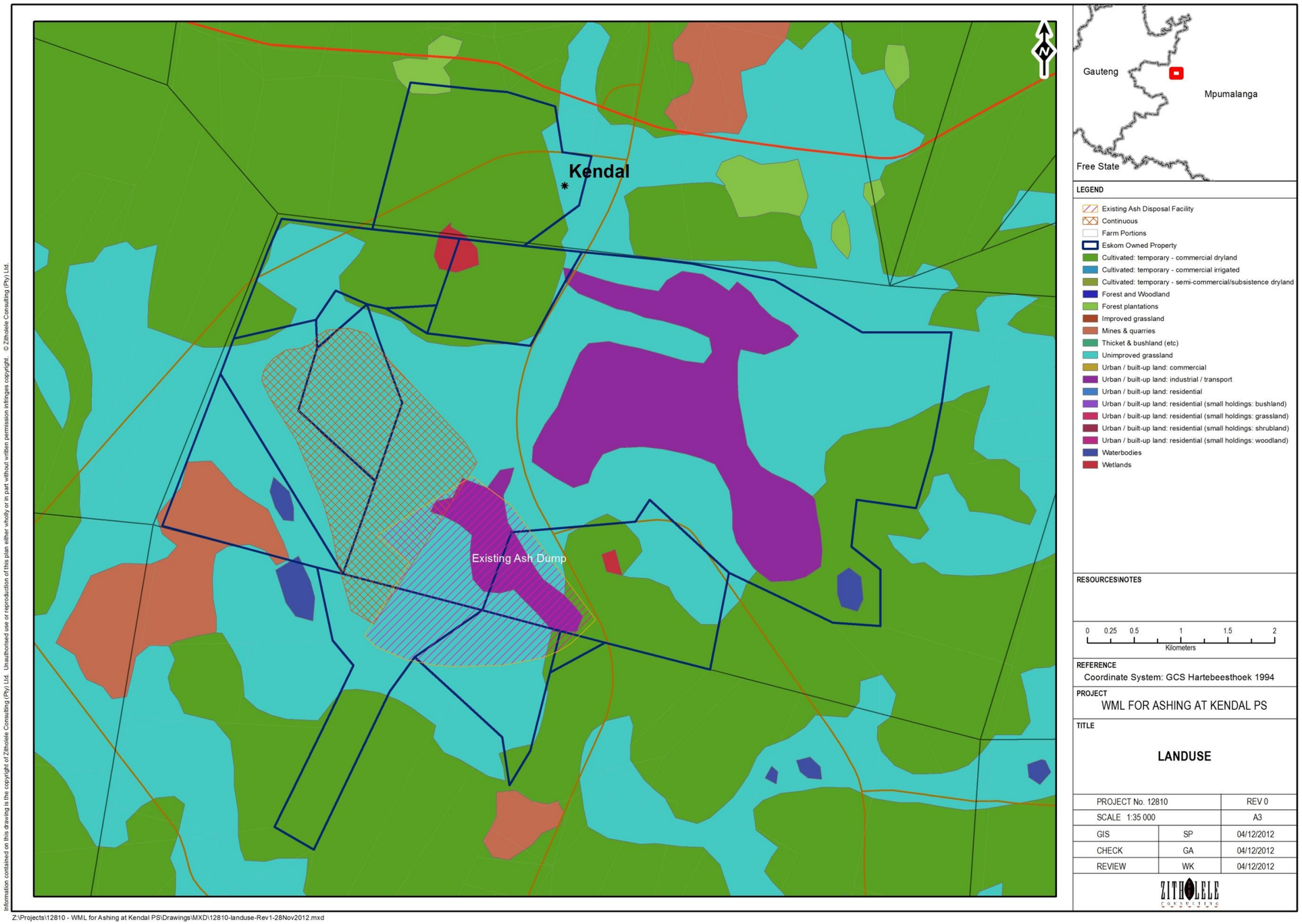


Figure 7-8: Land Use Map of the study site.

7.7 FAUNAL BIODIVERSITY

7.7.1 *Data Collection*

A literature review of the faunal species that could occur in the area was conducted. C-Plan data provided from the Mpumalanga provincial department was used to conduct a desktop study of the area. This data consists of terrestrial components; ratings provide an indication as to the importance of the area with respect to biodiversity.

7.7.2 *Regional Description and Sensitivities*

The biodiversity rating for the site (**Figure 7-9**) is rated from least concern to no natural habitat remaining. Protected species may occur in the area and the report to be updated once the specialist studies are completed.

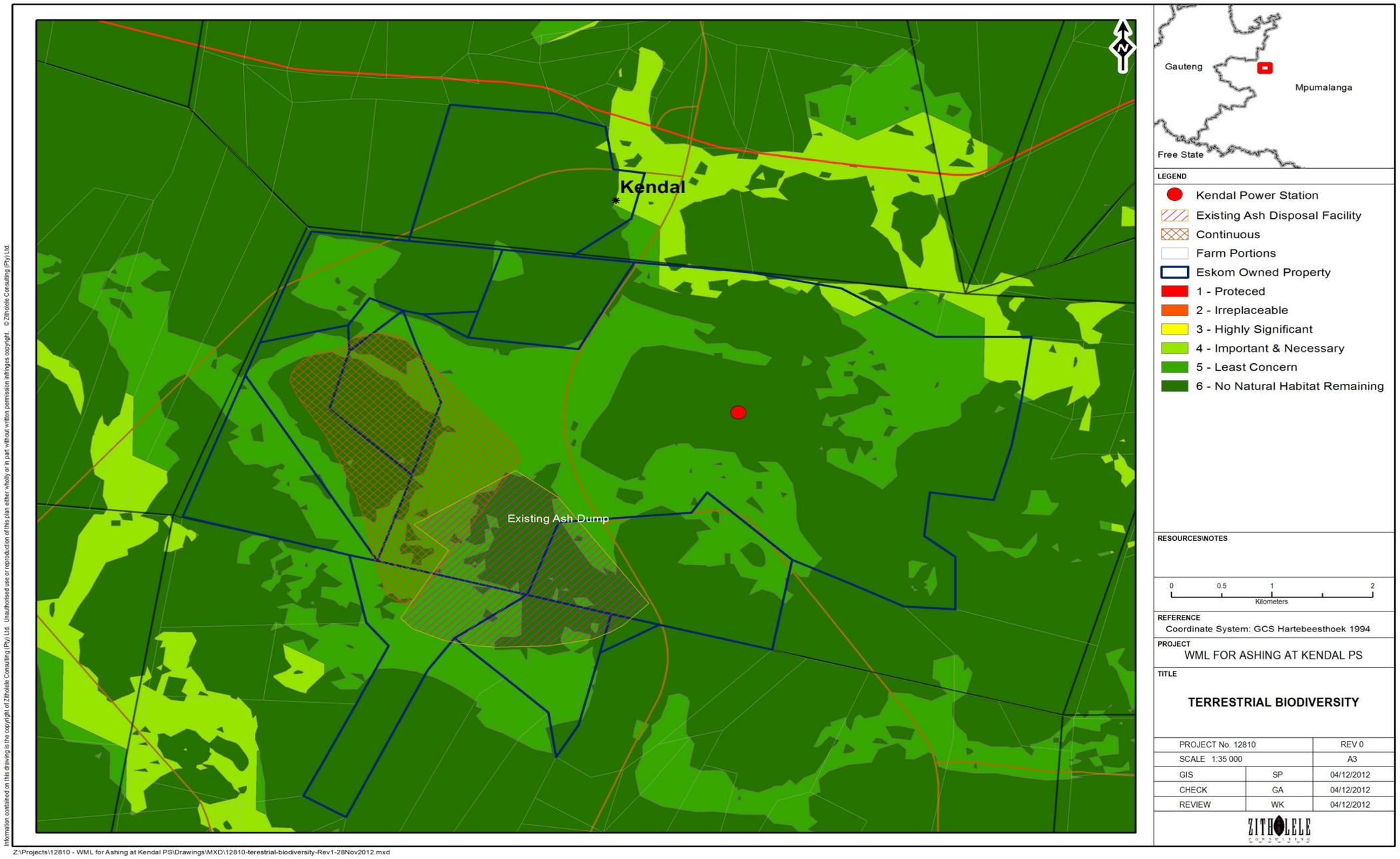


Figure 7-9: Biodiversity of the study site.

7.8 FLORAL BIODIVERSITY

7.8.1 *Methodology and Data Sources*

The floral data below is taken from The Vegetation of South Africa, Lesotho and Swaziland (Mucina and Rutherford 2006).

7.8.2 *Regional Description*

According to the South African National Biodiversity Institute, the site falls within the Grassland Biome, where most of the country's maize production occurs. The vegetation of the area is classified as Soweto Highveld Grassland, extending from Mpumalanga to Gauteng and to a very small extent into Free State and North West.

The site comprises of the Rand Highveld Grassland as classified by Mucina and Rutherford[2].

Rand Highveld Grassland

Rand Highveld Grassland is found in the highly variable landscape with extensive sloping plains and ridges in the Gauteng, North-West, Free State and Mpumalanga Provinces. The vegetation type is found in areas between rocky ridges from Pretoria to Witbank, extending onto ridges in the Stoffberg and Roossenekal regions as well as in the vicinity of Derby and Potchefstroom, extending southwards and north-eastwards from there. The vegetation is species rich, sour grassland alternating with low shrubland on rocky outcrops. The most common grasses on the plains belong to the genera *Themeda*, *Eragrostis, Heteropogon* and *Elionurus*. High numbers of herbs, especially *Asteraceae* are also found. In rocky areas shrubs and trees prevail and are mostly *Protea caffra, Acacia caffra, Celtis africana* and *Rhus spp*.

This vegetation type is poorly conserved (approx 1 %) and has a target of 24 % of the vegetation type to be conserved. Due to the low conservation status this vegetation type is classified as endangered. Almost half of the vegetation type has been transformed by cultivation, plantations, urbanisation or dam-building. Scattered aliens (most prominently *Acacia mearnsii*) are present in the unit.

7.8.3 *Sensitivities*

Rand Highveld Grassland

This vegetation type is poorly conserved (approx 1 %) and has a target of 24 % of the vegetation type to be conserved. Due to the low conservation status this vegetation type is

[2] The Vegetation of South Africa, Lesotho and Swaziland, Muccina and Rutherford 2006.

classified as endangered. Almost half of the vegetation type has been transformed by cultivation, plantations, urbanisation or dam-building. Scattered aliens (most prominently *Acacia mearnsii*) are present in the unit.

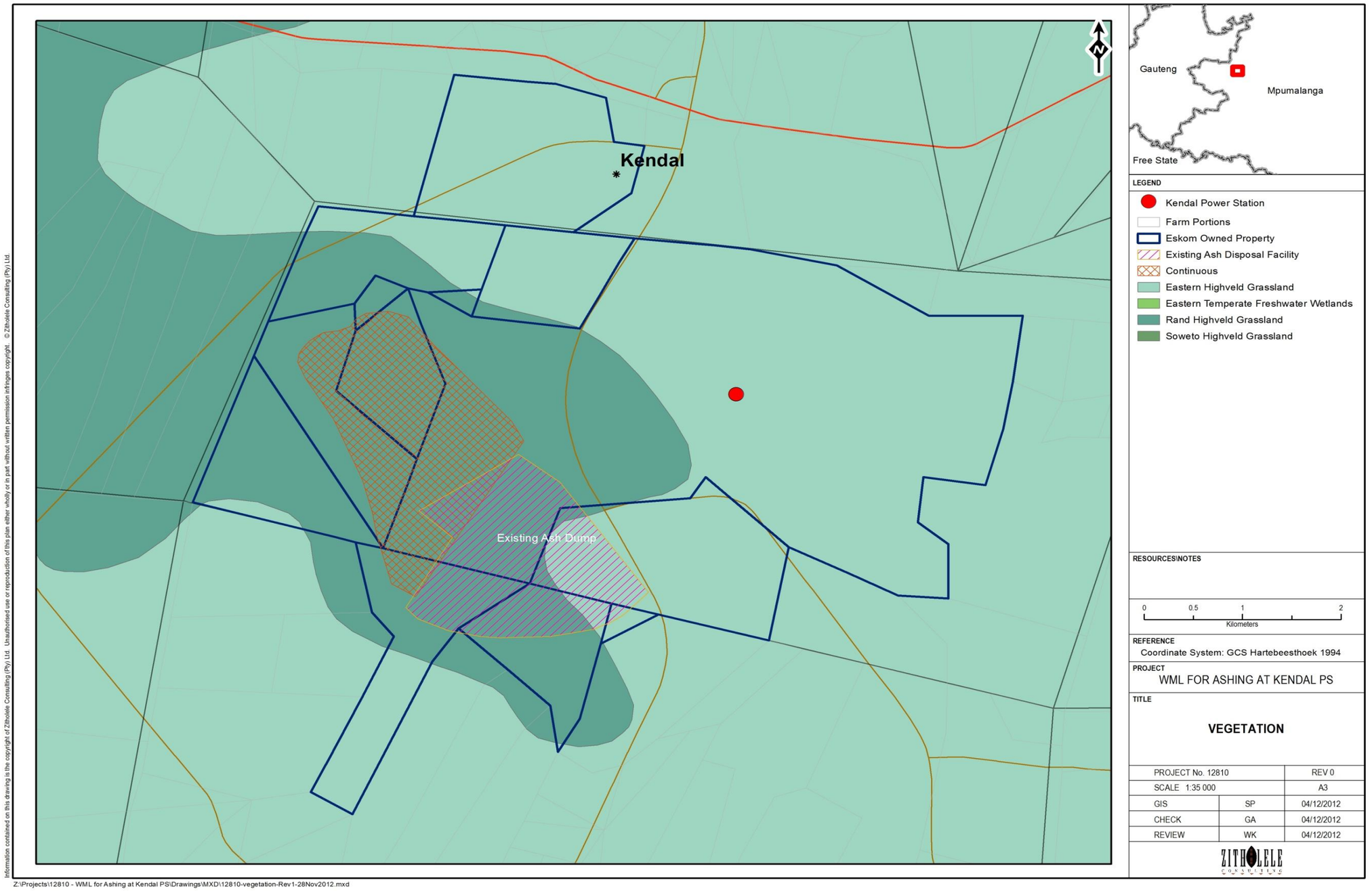


Figure 7-10: Vegetation of the study site.

7.9 INFRASTRUCTURE

7.9.1 *Methodology and Data Sources*

Infrastructure was identified using the 1:50 000 topocadastral maps of the area, and information provided by Eskom regarding existing services.

7.9.2 *Regional Description*

The following infrastructure types are found on site:

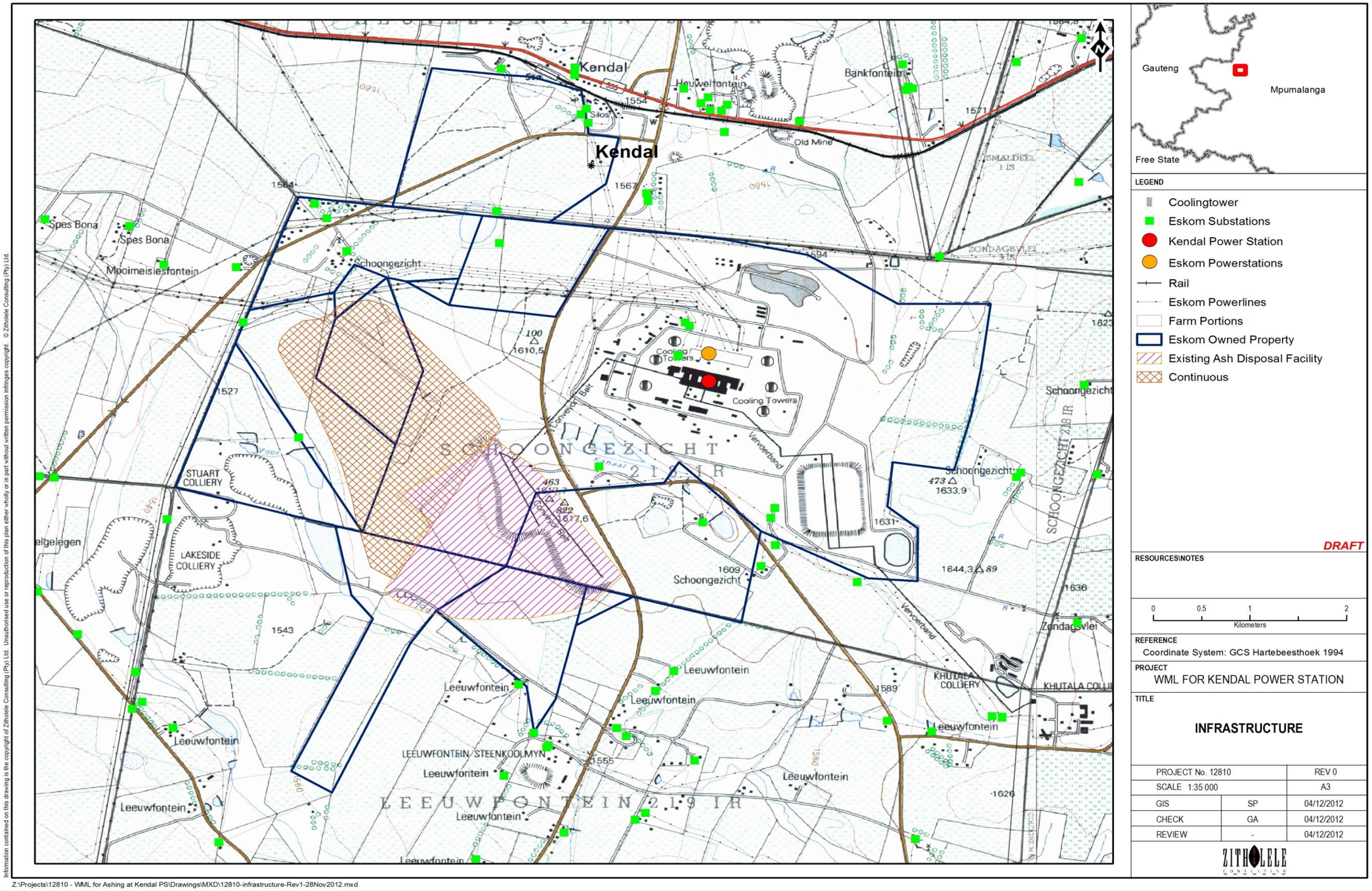
- Agricultural centre pivot and electrical cabling
- Powerlines

7.9.3 *Sensitivities*

All identified infrastructure is considered sensitive and the relocation thereof to be investigated should it be required.

7.10 CULTURAL AND HISTORICAL RESOURCES

The regional area has several small cultural sites including graveyards, old buildings and some old battlefields but. It is not anticipated to find any cultural resources on site but will be further investigated as part of the EIA and specialist studies.



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7-11- Infrastructure of the Study Site

8 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

The proposed project is anticipated to have a range of impacts to the biophysical and socio-economic environment. The main purpose of the EIA process is to identify and evaluate potential impacts and to determine possible mitigation measures and management plans to address such impacts that may arise.

The potential environmental impacts identified during the Scoping Phase, which will be investigated further in the EIA phase of the project, are summarised in **Table 8-1** below.

Table 8-1: Potential Environmental Impacts to be investigated in the EIA Phase.

Environmental Element	Potential Impact
Geology	Permanent destruction of geological strata caused by: • Cut and fill operations;
Soils and Land Capability	Soil resources will be sterilised by: • The establishment of the ash disposal facility over a large area; • The construction of roads that will be permanent for the construction and maintenance of the proposed project. Some soil will be lost through: • Erosion during the construction phase over exposed areas; • Pollution of soils (i.e. hydro-carbons from construction / maintenance vehicles); Some soils will only be temporarily impacted through compaction during the construction phase and will be rehabilitated.
Topography	Altered topography caused by: • Deposition of ash on surface over a large area; • The construction of cut off drains and berms; and • Profiling for the construction of surface infrastructure.
Surface and Ground Water	Reduction in surface water flow caused by: • Alteration of surface water drainage patterns causing run-off to be impeded or entrained. Pollution of surface / ground water resources caused by: • Surface water runoff over exposed soils may result in the sedimentation or increased turbidity of surface water features. • Surface water features may become contaminated by hydro-carbons from construction / maintenance vehicles, dust, ash, or gypsum. • Leachate from the facility may percolate into, and contaminate, ground / surface water features. • Depending on the hazardous rating of the ash – pollutants could have a human / animal health impact if groundwater is contaminated, and is being used.

Environmental Element	Potential Impact
Terrestrial Ecology	Vegetation and habitat will be lost or the quality reduced because of the: • Establishment of the waste facility approximately 300 ha; • Establishment of associated infrastructure (i.e. roads, and dams); • Possible displacement of species • Propagation of alien invasive species and • Health implications due to pollution/ash deposition and • Impact on sensitive species / habitats.
Avi-fauna	Avi-fauna may be negatively impacted in the following way: • Disturbance of breeding birds, particularly the Red Listed species through the construction and operational activities. • Habitat destruction through the construction of associated infrastructure during the construction phase of the project e.g. roads and the clearing of footprint.
Air Quality	Decrease in air quality as result of increased airborne dust particulates caused by: • Vehicles traversing dirt roads during construction and operation; • Dust from the exposed surfaces of the ash facility during operations; • Dust blown from the conveyor belt during operations.
Social	Impacts to human health may be caused by: • Increased airborne particulates. Individuals, families, or small communities, may need to be relocated because: • There is no area large enough to accommodate the facility that is unpopulated. • People may be located too close to the proposed boundary of the facility. Social perceptions will be altered because: • The sense of place will alter; • They may have a positive / negative attitude to Eskom; • Safety and security perceptions are inclined to be dependent on the influx of people to and from an area.
Land Use	Property values may decrease as a result of: • The change in land use of land affected by the project; • The visual impact created by the project; and • Perceived security risks introduced by the proposed project. Spatial planning may be negatively affected because: • The proposed project may conflict with existing / future planned uses – Current the proponent is not aware of any future developments on the site owned by Eskom. • The land use of the site selected for the disposal facility will be altered, mostly agricultural uses at present (including grazing and crop farming is practiced).

Environmental Element	Potential Impact
Infrastructure	Infrastructure may need to be relocated including roads, power lines, pipelines and buildings, perhaps causing the interruption of these services, because: • It is not possible to avoid the infrastructure due to the size of the project.
Heritage and Paleontological Resources	This is dependent upon the receiving environment. At present it is not anticipated that significant impacts will occur.

9 PLAN OF STUDY FOR EIA

9.1 INTRODUCTION

In terms of Chapter 5 of the NEMA EIA regulations, EIA refers to the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application. This includes an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed development as well as the cumulative impacts thereof. Mitigatory measures for each significant impact are to be determined. Alternative land uses or developments, their impacts and their cumulative impacts will also be considered and compared with those of the proposed development. Details of the Public Participation Process (PPP) followed during the course of the assessment will be given and it will be indicated how issues raised by stakeholders have been addressed. Knowledge gaps will be identified and descriptions of the arrangements for monitoring and management of the environmental impacts will be given.

9.2 TERMS OF REFERENCE FOR SPECIALIST STUDIES

Based on the available data and the sensitivities identified the following specialist studies will be conducted in the EIA phase:

- Soils, land capability and agricultural potential;
- Geology and Geotechnical investigations (Phase 1 geotechnical investigations);
- Surface water resources (aquatic) and wetlands (including wetlands delineation);
- Groundwater resources.
- Air quality;
- Noise pollution;
- Visual impact;
- Ecology (Terrestrial flora and fauna and Avifauna assessment);
- Heritage impact studies;
- Traffic impact studies;
- Socio-economic investigations;
- Ash classification
- Conceptual designs of the ash dump; and
- Legal investigation of all other environmental relevant legal requirements that sit outside of the EIA as well as provide legal opinion to the project.

The findings of these studies will be reflected in the EIA Report. The proposed Terms of Reference (ToR) for each of these specialist investigations is indicated below.

9.2.1 *ToR: Ash Classification*

The objectives of this study will be:

- Collect ash samples
- Classify the ash according to the authorised and correct waste regulations(Minimum requirements).; and
- Determine if the ash from the site is classified as Hazardous or General Waste.
- Based on classification, recommend appropriate mitigation measures

9.2.2 *ToR: Ash Disposal Site Design and Operating Manual*

A specialist disposal facilities design engineer has been appointed to complete the conceptual design of the ash disposal site, included in this scope is:

- Site visit of the project area;
- Generate conceptual layout drawings
- Compile design drawings for the continuous ash disposal facility;
- Submit drawings to DEA and DWA for review and make any alternations required;
- Include any mitigation measures prescribed by specialist into the design for example storm water drainage; and
- Review and amend current site operating manual to be relevant for the new site.

9.2.3 *ToR: Terrestrial Ecology*

An ecological investigation will be conducted on the site and associated infrastructure. The objectives of these studies will be to:

- Review existing ecological information available;
- Conduct a site visit during the summer seasons to determine the general ecological state of the proposed site, determine the occurrence of any red data and/or vulnerable species, or any sensitive species requiring special attention.
- Compile a detailed description of the baseline environment;
- Provide a ranking assessment of the suitability of the proposed site;

- Provide mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project; and
- Compile an ecological report, indicating findings, preferred site recommendations and maps indicating sensitive and/or no-go areas.

9.2.4 *Avi-fauna*

The following methodology is proposed:

- The study site will be inspected to gain a firsthand impression of the bird habitat.
- The existing environment will described and the bird communities currently existing within the zone of influence of the proposed ash dump and associated infrastructure (including the roads) will be identified and described.
- Different bird micro-habitats will be described as well as the species associated with those habitats.
- Trends and conditions in the environment that affect the avifauna as it currently exists within the zone of influence will be identified and analysed
- Gaps in baseline data will be highlighted and discussed. An indication of the confidence levels will be given. The best available data sources (both published and unpublished literature) will be used to establish the baseline conditions, and extensive use will be made of local knowledge if available (e.g. local bird clubs/amateur ornithologists/landowners) who are familiar with the study area.
- Bird sensitive areas will be mapped in a sensitivity map for easy reference, and particular emphasis will be placed on habitat for Red Data and endemic species.
- A full description of potential impacts (direct and indirect) will be provided, relative to these specific developments.
- The potential impact on the birds will be assessed and evaluated according to the criteria that are required by the EAP.
- Practical mitigation measures will be recommended and discussed.
- If a need for the implementation of a monitoring programme in the EMP phase is evident, it will be highlighted and a programme proposed.

9.2.5 *ToR: Heritage and Archaeological*

A Heritage Impact Assessment will be conducted to comply with Section 38 of the National heritage Resources Act (No 25 of 1999). Specific objectives of this study will be:

- Desktop study (consulting heritage data banks and appropriate literature);
- Site visit of the project area;

- Determine whether any of the types and ranges of heritage resources as outlined in Section 3 of the Act (No 25 of 1999) do occur in the project area;
- Determine what the nature, the extent and the significance of these remains are;
- Determine whether any heritage resources (including graves) will be affected by the development project;
- If any heritage resources are to be affected by the development project mitigation measures has to be undertaken and management proposals have to be set for heritage resources which may continue to exist unaffected in or near the project area.
- Compile a report which would:
  - Clearly identify possible archaeological, cultural and historical sites within the study site;
  - Identify the potential impacts of construction and operation of the proposed development on such resources, with and without mitigation;
  - Offer an opinion on a preferred site in terms of this specialist field;
  - Provide mitigation measures to ameliorate any negative impacts on areas of heritage significance; and
  - Include a map illustrating the salient aspects of the report.

9.2.6 *Social Impact*

The objective of the Social Impact Assessment is to assess possible positive and negative social impacts associated with the projects, to ensure social license to operate for Eskom and to incorporate the voice of the community in environmental processes which affects their lives on a day-to-day basis. The following are included in the Social Impact Assessment:

- Social Baseline study;
- Scoping report;
- Social Impact Assessment report identifying social impacts and suggesting mitigation measures.

It is proposed that the following methodologies are followed:

- The SIA will commence with a baseline study of the study area and site which will include an in-depth literature review of available literature. This will include relevant legislation and existing provincial and municipal documents and studies, as well as any additional literature that is deemed to be applicable to the study. This study will focus on the local and regional level.
- Necessary demographic data will be obtained from Statistics South Africa and Municipal Integrated Development Plans.

- A scoping exercise consisting of an initial site visit and information search will be conducted. Stakeholders will include town councils, tribal councils, land owners, the relevant farmer's associations, community representatives and political leaders, amongst others.
- The initial site visit will be followed up with a longer period of field work to obtain additional information and communicate with key stakeholders. A preliminary report listing issues identified during this process will be submitted after the fieldwork is completed.
- All public meetings arranged by the stakeholder engagement team will be attended by the social scientists.
- Information will be obtained via focus groups, formal and informal interviews, participatory rural appraisal, observation, the internet and literature reviews. Minutes and notes will be kept of all interviews and focus groups. At this stage it is foreseen that four to five focus groups as well as a number of individual interviews will be conducted in each phase of the project, but more detailed planning regarding this can only be done once more detailed information is given, and key stakeholders have been identified.
- An interview schedule might be utilised instead of formal questionnaires. An interview schedule consists of a list of topics to be covered, but it is not as structured as an interview. It provides respondents with more freedom to elaborate on their views.
- The final SIA report will focus on current conditions, providing baseline data. Each category will discuss the current state of affairs, but also investigate the possible impacts that might occur in future. Recommendations for mitigation will be made at the end of the report.
- The SIA will have a participatory focus. This implies that the SIA will focus strongly on including the local community and key stakeholders.
- The public consultation process needs to feed into the SIA. Information obtained through the public processes will inform the writing of the SIA and associated documents.

9.2.7 *ToR: Surface Water and Hydrology*

The surface water data will be obtained from the WR90 database from the Water Research Council. The data that will be used includes catchments, river alignments and river names. In addition water body data will be obtained from the CSIR land cover database (1990) to show water bodies and wetlands. This information will be ground-truthed during a site visit.

A surface hydrology assessment will be undertaken and will consist of the following:

- A Desktop Assessment;

- Site investigation;
- Water sampling and analysis;
- Compilation of a baseline environmental description;
- Interaction with the design team during design interactions;
- Assess impacts and identify mitigation measures; and
- Compile a management and monitoring programme for the site.

The purpose of the surface hydrology study will be to address the following:

- Description of the surface hydrology:
  - Occurrence of drainage lines, springs, pans, dams, wetlands etc;
  - Characteristics of surface water features;
  - Precipitation patterns;
  - Determination of Floodlines for the 1:50 and 1:100 year flood events;
  - Surface water runoff patterns;
  - Water quality;
  - Sediment transport potential; and
  - Regional context of surface water resources.
- Description of impacts to surface water resources (quality and quantity):
  - Potential impacts in light of the vision for the area;
  - Potential impact on baseline conditions;
  - Possible use of surface water during construction and operation and the impacts thereof;
  - Trace the likely source path receptor pathways to determine all potentially significant, direct, indirect, and cumulative impacts;
  - Identify inter-connectedness of impacts to other environmental elements i.e. wetlands, groundwater, and aquatics; and
  - Assess pollution risk.
- Identify management measures to reduce negative impacts and exacerbate positive impacts. Compile a management plan appropriate to the requirements of the EIA process documenting such measures.

9.2.8 *ToR: Wetland Delineation*

The objectives of this study will be to:

- Review existing information available for the area;
- The riparian zone and wetlands will be delineated according to the Department of Water Affairs (DWA;
- During the site investigation the following indicators of potential wetlands will be identified:
  - Terrain unit indicator;
  - Soil form indicator;
  - Soil wetness indicator; and
  - Vegetation indicator.
- Assess the status of each of the wetlands identified and assess the potential impacts on the wetlands;
- Compilation of a wetland delineation report that is sufficient to address the requirements of a water and waste license applications, the EIR and management practices including mitigation measures; and
- Recommendations toward study site.

9.2.9 *ToR: Geohydrology*

The geohydrological assessment will consist of:

- A review of all existing groundwater information available from the power station and formulate a baseline status;
- A Hydrocensus compiled by a specialist
- A geophysical investigation (Electromagnetic and magnetic);
- The Drilling of Monitoring Boreholes;
- Infiltration Tests;
- Aquifer Tests;
- Hydrochemical sampling and analysis;
- The development of a Flow and Mass Transport Models; and
- Pollution plume simulation.

A report will be compiled that includes:

- A description of the groundwater flow regimes and the depth of the water table;
- A description of the aquifer parameters, classification and vulnerability;

- A description possible groundwater contamination or flooding;
- Assess possible pollution risks;
- A review of the current groundwater monitoring regime and make recommendations on any amendments required;
- Suggest mitigation measures to prevent any impacts to the groundwater;
- Highlight the current trends in the groundwater regime that could influence the design of the new ash disposal site; and
- Be of a sufficient standard to address the requirements of a water and waste license application, the EIR and management practices.

9.2.10 *ToR: Geotechnical assessment*

Geotechnical assessment undertaken on will consist of:

- Review of existing and available geological and geotechnical information;
- A site visit to verify available aerial photographs and to investigate the depth and properties of regolith by excavations and soil sampling;
- Approximately 20 test pits will excavated on the site to characterise land forms or terrain units and anomalies identified during the API. Samples of representative soils will be collected for laboratory testing;
- Dynamic penetration tests (DCP) will be carried out at the site of each test pit to determine the variation in in-situ stiffness over the upper 1m of the profile; and
- Soil samples from the test pits will be tested for classification, compaction characteristics and strength/stiffness properties. Problem soils, if presents, will be tested to quantify the degree of the problem condition (e.g. collapse potential).
- Compiling a map will be compiled indicating features observed;
- Identifying and assessing significance of potential geotechnical constraints to the proposed development;
- Proposing mitigation measures that could reduce or eliminate the identified constraints; and
- Compiling a report that will be compiled based on the findings of the study.

9.2.11 *ToR: Traffic*

The traffic study will include the following:

- Undertake a site visit, taking cognisance of the traffic in the area;

- Undertake a review of existing information and conceptual plans of the study area;
- Provide an opinion on the existing and predicted traffic impact during and after construction of the ash dump site and assess the general impact of the project on traffic.
- Provide mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project; and
- Compilation of a Traffic Impact Opinion Report.

9.2.12 *Air Quality Assessment*

The Air Quality Assessment will include a Baseline Characterisation and an Impact Assessment that will include the following:

- A desktop literature review and information gathering exercise will be conducted to determine and/or describe the following in a technical report:
- Description of the material characteristics of the ash material, where known.
- Identification of expected sources air emissions and likely air quality parameters of potential concern on site, based on potential health effects to identified sensitive receptors.
- Identification of applicable air quality standards, legislation and guidelines which would constitute project adherence / compliance requirements, including those specified by the World Bank.
- An assessment of regional baseline ambient air quality and climatic data / information. Depending on the availability of baseline monitoring data this assessment would involve quantitative (statistical) analysis of the available data and/or reliance on literature review information. GAA will purchase MM5 modelled climatic data for use in the modelling. If monitoring data of sufficient quality is available this will be used to verify the modelled data.
- The methodology and findings of the site screening exercise based on air quality criteria. These findings will be consolidated into the motivation of a preferred project site (after considering input from all of the specialist studies) and recommendations for forwarding the preferred site into the EIA phase.

Provided that the baseline and screening level air quality assessment findings support the requirement for a detailed air quality impact assessment, the following will be conducted and documented in an Air Quality Impact Report during the EIA phase of the project:

- Compilation of an emissions inventory for sources associated with the preferred ash disposal site. Emission sources surrounding the proposed development will also be included in the emissions inventory to determine potential cumulative health impacts on surrounding receptors.

- Dispersion modelling (using the AERMOD modelling code) will be conducted for the preferred site, covering the construction, commissioning, operating and decommissioning phases of the proposed project. GAA provisionally anticipates modelling total suspended particulates (TSPs) and inhalable particulate fractions (PM10, and PM2.5) as parameters, although this list will depend on the availability of suitable emission factors and the relevance of the pollutants to the specific project activities.
- Interpretation of the modelled baseline and project scenario results and a description of the air quality impacts using the assessment methodology adopted for the EIA process.
- Provision of a professional opinion in regards to:
  - Incorporation of air quality criteria into the Environmental Impact Report (EIR) and Environmental Management Plan (EMP) documents.
  - Management interventions to control and/or mitigate the identified project air quality impacts.

9.2.13 *Noise Assessment*

The Noise Assessment will include the following:

- **Site visit:** A site visit will be conducted in order to familiarise the consultant with the environment of the proposed development. Possible noise issues and the nearest noise sensitive receptors will be identified.
- **Noise measurements:** Although major environmental noise measurements are not expected to be necessary, samples of the noise emission levels of existing noise sources, such as pumping stations, will help during the assessment of possible noise issues.
- **Modelling and calculations:** In order to illustrate the reasoning behind the assessment of noise related issues, sample calculations will be made. Please note that no in-depth modelling will be made.
- **Assessment of the results:** The results of the observations and calculations will be assessed in terms of the applicable Mpumalanga noise regulations and the guidelines provided in SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'.
- **Reporting:** A professional opinion will be written describing methodology, results and findings of the noise study.

9.2.14 *ToR: Aquatic Ecology*

A surface water aquatic ecological assessment in accordance with the River Health Programme (RHP) will focus primarily on the biological responses as an indicator of

ecosystem health, with only a vague cause-and-effect relationship between the drivers and the biological responses. The minimum tools required for this assessment include:

- Drivers: Habitat and in situ Water Quality; and
- Responses: Fish, Aquatic Invertebrates and Riparian Vegetation.

The methodologies that will be adopted for the assessments are based on methodologies widely accepted by and utilized in the RHP of South Africa. The RHP is a national monitoring program used to monitor and assess South Africa's freshwater resources. An integrated ecological state assessment report will include:

- Habitat: Integrated Habitat Assessment System (IHAS) and the Index of Habitat Integrity (IHI);
- Water quality: pH, Dissolved oxygen concentration and saturation, temperature and conductivity (TDS)
- Fish: Fish Assessment Integrity Index (FAII);
- Aquatic invertebrates: South African Scoring System (SASS, version 5); and
- Riparian vegetation: Riparian Vegetation Index (RVI).

9.2.15 *ToR: Soils and Land Capability/Agricultural Potential*

The objectives of this study will be:

- Review existing information available from land type maps, previous reports and GIS information;
- A field visit to verify the aerial photographic study observations. Additionally, during the visit, the depth and properties of regolith will be judged from natural exposure (dongas) and hand augering where applicable. The following soil characteristics will be documented:
  - Soil horizons;
  - Soil colour;
  - Soil depth;
  - Soil texture (Field determination)
  - Wetness;
  - Occurrence of concretions or rocks; and
  - Underlying material (if possible).
- Assess the potential impacts and their significance on the agricultural potential of the site;

- Propose mitigation measures to reduce or mitigate potential impacts;
- Compile a report detailing the findings of the assessment; and
- Recommendation pertaining to proposed site.

9.2.16 *ToR: Visual Assessment*

The proposed methodology to be adopted for the visual assessment includes the following tasks:

- Examine the baseline information (contours, facility, dimensions, vegetation, inter alia);
- Determine the area from which any part of the facility may be visible (viewshed);
- Identify the locations from which views of the facility may be visible (observation sites), which include buildings and roads;
- Analyse the observation sites to determine the potential level of visual impact that may result from the facility; and
- Identify measures available to mitigate the potential impacts.

Visual impact is defined as the significance and/or severity of changes to visual quality of the area resulting from a development or change in land use that may occur in the landscape.

Significance or severity is a measure of the response of viewers to the changes that occur. It represents the interaction between humans and the landscape changes that they observe. The response to visible changes in the landscape may vary significantly between individuals.

Perception results from the combination of the extent to which the proposed facility is visible (level of visibility) and the response of individuals to what they see. A major influence on the perception of people in relation to the proposed facility will be the visual character and quality of the landscape in which it would be located. Natural landscape areas such as national parks, mountain areas or undeveloped sections of coast are valued for their high visual quality. The introduction of buildings, dumps and associated infrastructure may be seen as a negative impact on these areas of high visual quality.

The potential visual impact of the proposed facility will primarily result from changes to the visual character of the area within the viewshed. The nature of these changes will depend on the level of the visual contrast between buildings/structures and the existing landscape within which they would be viewed.

The degree of contrast between the facility and the surrounding landscape will result from one or more of the following visual characteristics:

- Colour;
- Shape or form;
- Scale;
- Texture; and
- Reflectivity.

9.3 IMPACT ASSESSMENT METHODOLOGY

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 9-1**.

Table 9-1: Quantitative rating and equivalent descriptors for the impact assessment criteria

Rating	Significance	Extent Scale	Temporal Scale
1	VERY LOW	*Proposed site*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

9.3.1 *Significance Assessment*

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating

scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km^2) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 9-2** below.

Table 9-2: Description of the significance rating scale

Rating		Description
5	Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

9.3.2 *Spatial Scale*

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 9-3.**

Table 9-3: Description of the significance rating scale

Rating		Description
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

9.3.3 *Duration Scale*

In order to accurately describe the impact it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 9-4**.

Table 9-4: Description of the temporal rating scale

Rating		Description
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

9.3.4 *Degree of Probability*

Probability or likelihood of an impact occurring will be described as shown in **Table 9-5** below.

Table 9-5: Description of the degree of probability of an impact occurring

Rating	Description
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

9.3.5 *Degree of Certainty*

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used as discussed in **Table 9-6**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 9-6: Description of the degree of certainty rating scale

Rating	Description
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

9.3.6 *Quantitative Description of Impacts*

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale as described below:

Impact Risk = (SIGNIFICANCE **+** *Spatial* **+** Temporal) X Probability

3 **5**

An example of how this rating scale is applied is shown below:

Table 9-7: Example of Rating Scale

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
	LOW	*Local*	Medium-term	*Could Happen*	
Impact to air	**2**	***3***	**3**	**3**	**1.6**

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 9-8** below.

Table 9-8: Impact Risk Classes

Rating	Impact Class	Description
0.1 – 1.0	**1**	**Very Low**
1.1 – 2.0	**2**	**Low**
2.1 – 3.0	**3**	**Moderate**
3.1 – 4.0	**4**	**High**
4.1 – 5.0	**5**	**Very High**

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

9.3.7 *Cumulative Impacts*

It is a requirement that the impact assessments take cognisance of cumulative impacts. In fulfilment of this requirement the impact assessment will take cognisance of any existing impact sustained by the operations, any mitigation measures already in place, any additional impact to environment through continued and proposed future activities, and the residual impact after mitigation measures.

It is important to note that cumulative impacts at the national or provincial level will not be considered in this assessment, as the total quantification of external companies on resources is not possible at the project level due to the lack of information and research documenting the effects of existing activities. Such cumulative impacts that may occur across industry boundaries can also only be effectively addressed at Provincial and National Government levels.

Using the criteria as described above an example of how the cumulative impact assessment will be done is shown below:

Table 9-9 - Example of cumulative impact assessment

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
Initial / Existing Impact (I-IA)	**2**	**2**	**2**	*1*	0.4
Additional Impact (A-IA)	**1**	***2***	**1**	*1*	0.3
Cumulative Impact (C-IA)	**3**	***4***	**2**	*1*	0.6
Residual Impact after mitigation (R-IA)	**2**	***1***	**2**	*1*	0.3

As indicated in the example above the Additional Impact Assessment (A-IA) is the amount that the impact assessment for each criterion will increase. Thus if the initial impact will not increase, as shown for temporal scale in the example above the A-IA will be 0, however, where the impact will increase by two orders of magnitude from 2 to 4 as in the spatial scale

the A-IA is 2. The Cumulative Impact Assessment (C-IA) is thus the sum of the Initial Impact Assessment (I-IA) and the A-IA for each of the assessment criteria.

In both cases the I-IA and A-IA are assessed without taking into account any form of mitigation measures. As such the C-IA is also a worst case scenario assessment where no mitigation measures have been implemented. Thus a Residual Impact Assessment (R-IA) is also made which takes into account the C-IA with mitigation measures. The latter is the most probable case scenario, and for the purpose of this report is considered to be the final state Impact Assessment.

9.3.8 *Notation of Impacts*

In order to make the report easier to read the following notation format is used to highlight the various components of the assessment:

- Significance or magnitude- IN CAPITALS
- Temporal Scale – in <u>underline</u>
- Probability – in <u>*italics and underlined*</u>
- Degree of certainty - in **bold**
- Spatial Extent Scale – in *italics*

9.4 ENVIRONMENTAL IMPACT REPORT

Once the Scoping Report and the Plan of Study for the EIA is accepted by the DEA, Zitholele will begin the Environmental Impact Report.

The Environmental Impact Report will include the activity description; site / area and corridor assessments; public participation; a description of the issues and assessment of the site. The specialist studies results will be summarised and integrated into the Environmental Impact Report.

The WMLA Report will include all the technical information generated by the Design of the Facility, the Site Survey and the Operating Plan. In addition all the documents required by DEA for the waste license will also be included. These include the emergency and response plan, the closure and rehabilitation plan and the waste hierarchy implementation plan.

9.5 ENVIRONMENTAL MANAGEMENT PROGRAMME

An Environmental Management Programme (EMP), in the context of the Regulations, is a tool that takes a project from a high level consideration of issues down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. The objectives of an EMP are to minimise disturbance to the environment, present mitigation

measures for identified impacts, maximise potential environmental benefits, assign responsibility for actions to ensure that the pre-determined aims are met, and to act as a "cradle to grave" document. The EMP will be drafted according to the findings in the Scoping Report and EIR.

9.6 PUBLIC PARTICIPATION DURING THE EIA PHASE

The purpose of public participation during the Impact Assessment Phase is to present the findings of the EIA phase and to avail the Draft EIR to the public for comments. I&APs will be afforded an opportunity to verify that their issues have been considered either by the EIA specialist studies, or elsewhere. Also, I&APs will comment on the findings of the Draft EIR, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. An EA reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

The public participation process for the EIAs will involve the following proposed steps:

- Announcement of the availability and public review of the Draft EIR;
- Host a public meeting for the stakeholders to review the Draft EIR;
- Announcement of the availability of the Final EIR;
- Notification of the authorities' decision with regard to EAs

Below information is provided about each step.

9.6.1 *Announcing the availability of the Draft EIR and the EMP*

A letter will be circulated to all I&APs, informing them in terms of progress made with the study and that the Draft EIR and EMP are available for comment. The report will be distributed to public places and also presented at a stakeholder meeting. Advertisements will be placed in the same newspapers used in the scoping phase to announce the public review period of the Draft EIR.

9.6.2 *Public review of Draft EIR and EMP*

The EIA Guidelines specify that stakeholders must have the opportunity to verify that their issues have been captured and assessed before the EIA Report will be approved. The

findings of the specialist assessment will be integrated into the Draft EIR. The report will be written in a way accessible to stakeholders in terms of language level and general coherence. The Draft EIR will have a comprehensive project description, motivation and also the findings of the assessment and recommended mitigation measures. It will further include the Issues and Responses Report, which will list every issue raised with an indication of where the issue was dealt with in the EIR. The findings of the assessment and recommended mitigation measures will also be incorporated into the EIR.

As part of the process to review the Draft EIR and EMP, one stakeholder workshop with an open house component will be arranged to afford stakeholders the opportunity to obtain first-hand information from the project team members and also to discuss their issues and concerns. Contributions at this meeting will be considered in the Final EIR.

9.6.3 *Announcing the availability of the Final EIR and EMP*

A letter will be circulated to all I&APs, informing them in terms of progress made with the study and that the Final EIR and EMP are available for comment. The reports will be distributed to the same public places (See Chapter 5 with the venues) as the previous reports for I&APs to review.

9.6.4 *Progress feedback*

After comments from I&APs have been incorporated, all stakeholders on the database will receive a personalised letter to report on the status of the process, to thank those who commented to date and to inform them that the Final EIR and EMP have been submitted to the lead authority for consideration. I & APs will be advised on the next steps in the process.

9.6.5 *Announce authorities decision*

Registered I&APs will be notified by individual letters of the results from the authorities. Should it be a requirement from the authorities an advertisement will be placed in the same newspapers which were used during the scoping and impact assessment phases.

9.7 SUBMISSION OF FINAL EIR AND DECISION MAKING

Using the comments generated by the PPP the Draft EIR will be updated and finalised. All comments received will be added to the IRR and attached to the Final EIR as an appendix.

The Final EIR once updated with additional issues raised by I&APs may contain new information. The Final EIR will be submitted to the DEA for decision making, and will be distributed to those I&APs who specifically request a copy. I&APs will be notified of the availability of the report by letters, advertisements and emails.

9.8 OVERALL EIA PROJECT SCHEDULE

Table 9-10: Primary milestones of the Project

Milestones	Date
Final Scoping Report	Feb - March 2013
Undertake Specialist Studies	March – May 2013
Draft EIR and EMP	June 2013
Stakeholder Engagement on EIR / EMP	June – July 2013
Finalise EIR and Draft EMP	August 2013
Submission to Relevant Authorities	September 2013
Environmental Authorisation	Dec 2013 – Jan 2014
Appeal Period	To be confirmed in the Impact Assessment Phase
Negotiations with landowners and Site specific EMP	To be confirmed in the Impact Assessment Phase
Construction (including EMP Auditing)	To be confirmed in the Impact Assessment Phase

10 CONCLUSION AND WAY FORWARD

Eskom appointed Zitholele Consulting to undertake the EIA, WML and WUL application for the continuation of the current ash disposal Facility at Kendal Power Station which also includes associated infrastructure such as the e-dump, return water dams etc. This Scoping study is being undertaken with the aim of identifying potential aspects of concern (both positive and negative) on the biophysical environment and identifying issues, concerns and queries from I&APs. This Draft SR documents the process followed, the findings and recommendations of the Scoping study, and the proposed Plan of Study for the EIA Phase to follow.

The way forward recommended by this study is as follows:

- Upon completion of the public review of the Draft SR all additional comments and issues received will be worked into the Final SR;
- The Final SR is then to be submitted to authorities for review and approval;
- Upon approval of the Final SR, execute the Plan of Study for the EIA phase of the project, including amendment required by conditions recommended by the competent authority; and
- Commence with engineering design and WML application.

ZITHOLELE CONSULTING (PTY) LTD

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