KIPOWER (PTY) LTD

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF A 600MW INDEPENDENT POWER PLANT AND ASSOCIATED INFRASTRUCTURE FOR KIPOWER (PTY) LTD NEAR DELMAS IN MPUMLANGA

FINAL SCOPING REPORT

(DEA Ref No.: 12/12/20/2333; NEAS Ref No.: DEA/EIA/0000364/2011)

Report No.: JW058/10/C182- RevC

FOR REVIEW BY AUTHORITIES INTERESTED AND AFFECTED PARTIES
DUE DATE FOR COMMENTS: 20 July 2012

JUNE 2012

PURPOSE OF THIS REPORT

KiPower (Pty) Ltd is a subsidiary of Kuyasa Mining, which also owns Delmas Coal and iKhwezi Colliery located approximately 20km to the south-east of the town of Delmas in the Victor Khanye Municipality, within the Nkangala District Municipality of the Mpumalanga Province.

KiPower wishes to establish a new 600MW power plant in close proximity to Delmas Coal, utilising coal from this mine as the fuel for the power plant. Associated with the power plant, would be an ash disposal facility that must also be located in close proximity to the plant.

As part of the authorisation process, an Environmental Impact Assessment (EIA) is required. The EIA must comply with the requirements of the Environmental Impact Assessment Regulations of 2010.

This Final Scoping Report complies with the EIA Regulations of 2010 and contains a description of the project, the terms of reference for specialist assessments, issues of concern raised by interested and affected parties and the project motivation.

According to EIA Regulations, interested and affected parties (I&APs) were given the opportunity to comment on the proposed project and the Draft Scoping Report from Thursday, 22 March to Friday, 11 May 2012. I&APs have an opportunity to comment on this Final Scoping Report while it is being submitted to the National Department of Environmental Affairs (DEA) for a decision on whether or not KiPower may proceed with the impact assessment phase for the proposed project. I&APs must submit their comments to the DEA and send a copy to Jones & Wagener. All I&AP comments on this report will be recorded and forwarded to the DEA as these are received. **Please make your comments on this report by Friday 20 July 2012.**

Please use the contact details given below should you wish to obtain a copy of this report. This report is available on the following websites for stakeholders to comment on: www.jaws.co.za; andwww.zitholele.co.za. In addition, hard copies of the report are available at the following public places and upon request:

Contact	Location	Contact Tel
Ms Lydia Mehlape	Delmas Public Library, Delmas	Tel: 013 665 2425
Reception	Delmas Coal	Tel: 013 665 7000
Thandiwe Mbongwa/ Marius van Zyl	Jones & Wagener, 59 Bevan Road, Rivonia	Tel: 011 519 0200
Mr Andre Joubert	Zitholele Consulting, Thandanani Park, Matuka Close, Halfway Gardens, Midrand	Tel: 011 207 2077

EIA Public Participation Office
André Joubert / Florence Rambuda
Zitholele Consulting (Pty) Ltd
P O Box 6002, Halfway House, 1685
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DOCUMENT APPROVAL RECORD

Report No.: JW058/10/C182- RevC

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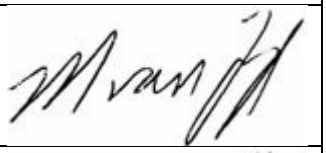
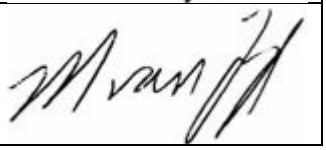
Prepared	EIA Coordinator	P Sewmohan	30/5/2012	
Reviewed	Project manager	M van Zyl	19/6/2012	
Approved	Project Manager	M van Zyl	22/6/2012	

RECORD OF REVISIONS AND ISSUES REGISTER

Date	Revision	Description	Issued to	Issue Format	No. Copies
6/6/2012	Rev B	Final Scoping Report	A Joubert	Hardcopy/CD	1
6/6/2012	Rev B	Final Scoping Report	T Mbongwa	Hardcopy	1
6/6/2012	Rev B	Final Scoping Report	C Nienaber	Electronic	1
6/6/2012	Rev B	Final Scoping Report	M Saliwa	Hardcopy/CD	1
6/6/2012	Rev B	Final Scoping Report	T Aziz	Electronic	1
6/6/2012	Rev C	Final Scoping Report	DEA; MDEDET; DWA; DMR; Victor Khanye Municipality	Hardcopy/CD	5 for DEA; 1 each for other authorities

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ABBREVIATIONS AND TERMS USED IN THIS REPORT

Abbreviation/ term	Definition / explanation
2010 EIA Regulations	Regulations R543, R544 and R545 promulgated in terms of NEMA in June 2010
AEL	Atmospheric Emissions Licence
CFB	Continuous Fluidised Bed Boiler. Type of reactor where the different chemicals are kept in suspension using air or liquid. The bed refers to the body of suspended particles. The bed is termed fluidised since the particles move as in a liquid/ fluid manner.
CRR	Comments and Responses Report
DEA	National Department of Environmental Affairs
DEIR	Draft Environmental Impact Report
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EIR	Environmental Impact Report
FSR	Final Scoping Report
GDP	Gross domestic product. Measure of economic value
Giga Watt	1×10^9 Watts
GN 704	Government Notice 704, which regulates how water is managed on a mining site. Used as a best practice guideline for industrial sites.
HP	High pressure
I&AP	Interested and Affected Party
IPP	Independent Power Producer
J&W	Jones & Wagener Consulting Civil Engineers
kV	Kilo-Volt. Measure of electricity generation or usage.
LP	Low pressure
m^3	Cubic meters. Measure of volume. 1 m^3 = 1,000 litres
MHI	Major Hazard Installation; in terms of the MHI Regulations promulgated under the Occupational Health and Safety Act.
MW	Mega Watt (measurement of electricity generation or usage)
NEMA	National Environmental Management Act, Act 107 of 1998 as amended
NEM:AQA	National Environmental Management: Air Quality Act, Act 39 of 2004
NEM:WA	National Environmental Management: Waste Act, Act 59 of 2008
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act, Act 25 of 1999
NIP	Novel Integrated Desulphurisation
NO_x	Oxides of nitrogen. Noxious gas, for which there are emission standards in South Africa
NWA	National Water Act, Act 36 of 1998, as amended
OHSA	Occupational Health and Safety Act, Act 85 of 1993, as amended

PP	Public participation
SAPP	Southern African Power Pool
Sorbent	Chemical or substrate used to absorb liquids or gases
SO_2, SO_x	Sulphur dioxide, oxides of sulphur. Noxious gas, for which there are emission standards in South Africa
Rpm	Revolutions per minute – measure of speed of a turbine or engine.

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1. INTRODUCTION

KiPower (Pty) Ltd is a subsidiary of Kuyasa Mining, which also owns Delmas Coal and iKhwezi Colliery located approximately 20km to the south-east of the town of Delmas in the Victor Khanye Municipality, within the Nkangala District Municipality of the Mpumalanga Province of South Africa.

KiPower wishes to establish a new 600MW power plant in close proximity to Delmas Coal, utilising coal from this mine as the fuel for the power plant. Associated with the power plant would be an ash disposal facility that must also be located in close proximity to the plant.

According to the EIA Regulations, interested and affected parties (I&APs) must be given the opportunity to comment on the proposed project and the Scoping Report before it is submitted to the DEA. I&APs had an opportunity to comment on the Draft Scoping Report (DSR) from Thursday, 22 March to Friday, 11 May 2012. **Comments received from I&APS were added to this Final Scoping Report (FSR). I&APs have an opportunity to comment on the Final Soping Report from Wednesday, 27 June to Friday, 20 July 2012.**

The FSR is being submitted to the DEA for a decision on whether or not KiPower may proceed with the impact assessment for the proposed project. All I&AP comments on this report must be forwarded to the DEA and a copy submitted to J&W.

1.1 Project scope

The new power plant scope is based on an initial 600MW project. However, KiPower may wish to expand the power plant up to 2000MW in the long term. Sufficient coal is available from Delmas Coal to supply a 2000MW plant. This authorisation process only deals with the 600MW power plant.

As is standard practice for large industrial developments, the design life of the power plant is planned at 30 years. The ash from the power plant would need to be disposed of on anew ash disposal facility.

1.2 Contact details

1.2.1 Proponent

Project applicant:	**Kuyasa Mining (Pty)Ltd on behalf of KiPower (Pty) Ltd**		
Trading name (if any):	**KiPower**		
Contact person:	**Mr Ayanda Bam**		
Physical address:	**2 Neven Street, Witbank, Mpumalanga**		
Postal address:	**Private Bag X 7250, Witbank, Mpumalanga 1035**		
Email:	**ayanda@kuyasamining.co.za**	Fax:	**013 690 3545**

1.2.2 Landowners

Please refer to Section 2.1 regarding the location of specific facilities and infrastructure.

1.2.3 Environmental assessment practitioner

Contact person:	**Marius van Zyl**		
Company	**Jones and Wagener Consulting Civil Engineers (Pty) Ltd**		
Postal address:	**PO Box 1434,Rivonia, 2128**		
E-mail:	**Vanzyl@jaws.co.za**	Fax:	**011 519 0201**

1.3 Independent Environmental Assessment Practitioner

Jones & Wagener Consulting Civil Engineers (J&W) is the independent environmental consultant appointed to conduct the EIA. The project has been registered with the Department of Environmental Affairs (DEA), as the delegated authority mandated to issue integrated NEMA and NEM:WA licenses. J&W is an established consulting practice based in Rivonia, Johannesburg that specialises in waste management, tailings and environmental projects. There are two certified EAPs and five environmental practitioners with more than 50years' experience amongst them.

The EAP on this project is Marius van Zyl, assisted by Prav Sewmohan, and CV's are provided in **Appendix A;** various other personnel and specialists are contributing to this EIA process.

1.4 Project engineering consultant

There are two key engineering consultants as well as various sub-consultants involved in this project:

1.4.1 Power plant engineering consultant

Engineering consultant	**Black & Veatch Corporation**		
Contact person:	**Mr Tariq Aziz**		
Postal address:	**11401 Lamar Avenue, Overland Park, KS, 66211 USA**		
E-mail:	**azizt@bv.com**	Fax:	**+1 913-458-9020**

1.4.2 Ash disposal facility engineering consultant

Engineering consultant	**Jones and Wagener Consulting Civil Engineers(Pty Ltd**		
Contact person:	**Mr Donovan Rowe**		
Postal address:	**PO Box 1434,Rivonia, 2128**		
E-mail:	**rowe@jaws.co.za**	Fax:	**011 519 0201**

1.5 Compliance with EIA Regulations

This report complies with the requirements of Section 28(1) of Regulations R543 (2010 EIA Regulations) as indicated in Table 1.1.

Table 1.1: Compliance with Section 28(1) of Regulation 543

Regulation Requirement	Section in this Report
Details of the EAP who prepared this report, and the expertise of the EAP to carry out scoping procedures	Section 1.3
A description of the proposed activity	Section 2
A description of any feasible and reasonable alternatives that have been identified	Section 3
A description of the property on which the activity is to be undertaken	Section 2.1
A description of the environment that may be affected by the activity and the manner in which the activity may be affected by the environment	Section 4
An identification of all legislation and guidelines that have been considered in the preparation of the scoping report	Section 1.6
A description of environmental issues and potential impacts including cumulative impacts that have been identified	Section 6
Details of the public participation process conducted in terms of Regulation 27(a), including: (i) The steps taken to notify potentially interested and affected parties of the application (ii) Proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given (iii) A list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application (iv) A summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues.	Section 5 Appendix D
A description of the need and desirability of the proposed activity	Section 2.9
A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community affected by the activity	Section 3

Regulation Requirement	Section in this Report
Copies of any representations, and comments received in connection with the application or the scoping report from interested and affected parties	Section 5 Appendix D
Copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants	Section 5 Appendix D
Any responses by the EAP to those representations and comments and views	Section 5 Appendix D
A plan of study for the environmental impact assessment, which sets out the proposed approach to the environmental impact assessment of the application, which must include: (i) A description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken (ii) An indication of the stages at which the competent authority will be consulted (iii) A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity (iv) Particulars of the public participation process that will be conducted during the environmental impact assessment process	Section 6
Any specific information required by the competent authority	None requested
Any other matters required in terms of 24(4)(a) and (b) of the Act.	None

1.6 Applicable legislation

1.6.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

Section 24 of the Constitution states that: Everyone has the right:

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

(b) 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.

1.6.2 National Environmental Management Act (Act 107 of 1998), as amended (NEMA)

The National Environmental Management Act, 107 of 1998, as amended, (NEMA), specifies that where an activity requires permission by law and may significantly affect the environment, it is necessary for an applicant to undertake an EIA, which meets the minimum requirements of section 24(7) of NEMA.

The EIA must be presented to all organs of state that are required to grant (or refuse) the permission that is required by law to undertake the proposed activity. The minimum requirements of section 24(7) of NEMA are regulated in terms of Regulations 543, 544 545 and 546 of June2010. The activities identified in these regulations that are applicable to this project are listed in Table 1.2 below.

Table 1.2: Activities requiring EIA under NEMA regulations

Relevant notice:	Activity No (s)	Description of listed activity
R544 18 June 2010	11.	Bridge crossings may be required for the transfer of coal, ash, waste and/or water depending on the final site selection scenario for the power plant and ash disposal facility. There may also be service and access roads associated with convenor systems and the power plant that may be closer than 32 metres from a watercourse or crossing a watercourse.
	12.	Water and storm water storage facilities on site will be required as part of the water management infrastructure for the plant. These may exceed 50,000 m^3 depending on the site specific drainage conditions.
	13.	Dangerous goods may be stored on site such as diesel and chemical reagents. It is unlikely that the storage capacity would exceed 500 cubic meters.
	18.	Conveyors, construction roads and service roads may cross watercourses resulting in the disturbance of embankments.
	20.	The power plant will fall within the mining rights area of Kuyasa Mining and an amendment of the mining rights may be required for the project.
	22	An access road to the power plant will be required. This will tie into the existing provincial road that runs to the north of the mine.
	47	Widening of existing access roads may be required
R545 18 June 2010	1.	The proposed plant is for 600MW.
	5.	Air emissions licence, waste and water use licences will be required for the power plant.
	6	Conveyors for ash and coal transport may be required if road haulage is not used.
	15.	The power plant will require in excess of 20 hectares.
R546 18 June 2010	14.	Clearing of area bigger than 5 hectares outside an urban area.

1.6.3 National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA)

In terms of Government Notice 718 of 2009, promulgated under NEM:WA, an EIA must be conducted and submitted to the DEA for authorisation in terms of the NEM:WA (2008) for waste management facilities associated with the KiPower Plant.

The Department may consult with other national, provincial and local government departments before finalising its decision regarding the project. The DEA has to consult with the Department of Water Affairs (DWA) before a licence can be issued for the waste activities to be undertaken at the KiPower.

The activities listed under this notice that are applicable to this project are given in Table 1.3. In addition to the above, the DEA has also recently published draft regulations pertaining to the classification of waste and the disposal of waste (DEA, 2011a and 2011b). These regulations may be promulgated before the Power Plant and

ash disposal facility are constructed, and therefore their requirements will be taken into account during the authorisation process. The DWA Minimum Requirements and latest liner design specification for different category waste disposal sites will also be used to guide the design of waste and ash storage and disposal facilities.

Table 1.3: Activities requiring EIA under NEM:WA regulations

ACTIVITY No.	Description of Activity
Category A 3(1)	It is expected that more than 100m^3 of general waste will be stored on site, especially during the construction phase of the power station
Category A 3(2)	It is expected that more than 35m^3 of hazardous waste will be stored on site, especially during the construction phase.
Category A 3(5)	At the waste recycling plant/salvage yard of the power plant more than 1 ton of general waste may be sorted for recycling purposes per day.
Category A 3(9)	Should a garden waste composting plant be constructed it may have the capacity to treat more than 10m^3 of garden waste per day.
Category A 3(11)	More than 2000m^3, but less than 15 000m^3 of sewage water will be treated at the onsite sewage works per annum.
Category A 3(12)	During the construction and operational phase, it is likely that diesel and oil spills will be treated in situ.
Category A 3(18)	The construction of any of the above activities will trigger this activity
Category B 4(9)	This activity is triggered by the disposal of the boiler ash onto a waste disposal facility if the boiler ash classifies as hazardous waste.
Category B 4(10)	This activity is triggered by the disposal of the boiler ash onto a waste disposal facility if the boiler ash classifies as general waste.
Category B4(11)	The construction of any of the above facilities triggers this activity.

1.6.4 National Water Act, 1998 (Act No. 36 of 1998), as amended (NWA)

The NWA guides the management of water in South Africa as a common resource. The act aims to regulate the use of water and activities which may impact on water resources through the categorisation of 'listed water uses' encompassing water extraction, flow attenuation within catchments, as well as the potential contamination of water resources, where the Department of Water Affairs (DWA) is the administering body in this regard.

A water use license application for the power plant will be submitted to the DWA, and will utilise the specialist studies undertaken for the EIA process.

The DWA Minimum Requirements and latest liner design specification for different category waste disposal sites will be used to guide the design of water-holding structures, long term stockpile and/or storage areas.

In addition, water use licenses will be applied for any river and wetland crossings (for coal and ash conveyors, and construction, access and service roads and water pipelines).

1.6.5 National Environmental Management: Air Quality Act(Act 39 of 2004) (NEM:AQA)

Power generation and coal combustion are Listed Activities under the NEM:AQA. This means that the power plant must be licensed. The licence requires provision of all point and non-point emissions deriving from the facility.

The latest air quality standards and emissions standards will be used to guide the design of the power plant and ash facility.

1.6.6 National Heritage Resources Act, 1999

This Act serves to protect and preserve, where possible, archaeological and cultural heritage artefacts and sites. Approval for pipelines and new facilities are required and the heritage specialist report will be submitted to the South African Heritage Resources Agency for consideration of the project.

1.6.7 Occupational Health and Safety Act, Act 85 of 1993

Employees on the facilities sites may carry out work which exposes them to the intake of hazardous chemical substances. The regulations under the Occupational Health and Safety Act of 1993 require that an employer shall ensure that employees are adequately trained and informed of the potential source of exposure, the risks of exposure, protection measures, personal protective equipment, maintenance of safety equipment, air sampling and medical surveillance, safe working procedures and emergency actions. This information should also be provided to the drivers of vehicles carrying any hazardous chemical substances.

Employers shall control the amount of exposure of employees to hazardous chemical substances by attempting to use a substitute for the compound or limiting the use of and the number of employees exposed. Labelling, packaging, transportation and storage of hazardous chemical substances must also be carried out in accordance with codes of practice published by the South African Bureau of Standards (SANS 10228 dealing with the identification and classification of dangerous substances and goods and SANS 10229 which deals with the packaging of dangerous goods for road and rail transportation).

1.6.8 Land zoning

There are two sets of regulations that govern the zoning and re-zoning of land, which are briefly outlined below. Either of these regulations would be applicable to this project, depending on the nature of the project, the current zoning and which authority has jurisdiction over the land in terms of zoning. The re-zoning requirement will be dealt with during the impact assessment phase of the EIA process and the appropriate process will be chosen when more information on the sites for the power plant and ash facility are available.

1.6.8.1. Development Facilitation Act, 1995

The Development Facilitation Act, 1995 was specifically aimed at creating a single legal mechanism to deal with all the diverse aspects of land development in an integrated fashion. This may include the simultaneous subdivision/consolidation of the affected land portions and the cancellation of whatever conditions of title or servitudes encumber the site. This process allows a prospective applicant to approach a single provincial planning tribunal for authorisation rather than to submit the matter to the municipal sphere of Government. The planning tribunal, at provincial level, has wide powers to incorporate and decide on various issues including the possibility of

cancelling servitudes, amending zoning provisions and authorising subdivision of land (where relevant).

1.6.8.2. Town Planning and Townships Ordinance, 1986 (Ordinance 15 Of 1986)

As an alternative to the Development Facilitation Act, a similar application may be submitted and processed under Ordinance 15 of 1986 (the Ordinance). The important difference in this regard lies in the fact that, in terms of the Ordinance, the decision making authority rests with the Municipality, in this case the Victor Khanye Municipality. In the first alternative, the decision lies with a provincial tribunal appointed by the Premier. Whilst an application in terms of the Development Facilitation Act requires of the applicant to comply with various mandatory requirements (i.e. specialist reports by a conveyancer, engineers, land surveyor, geotechnical expert, environmental consultant and the town planner), the Ordinance does not, *per se*, enforce the same mandatory requirements as part of the submission. However, in both alternatives, the applicant is usually required to provide the same information/specialist reports, albeit at different stages throughout the application procedure.

1.6.8.3. Mpumalanga Conservation Act, 1998 (Act 10 of 1998)

Cognisance needs to be given to the requirements of this act in terms of endangered plant and animal species, as well as the control of invader species and weeds.

1.6.9 Local municipal regulations

Local regulations in terms of the following aspects will need to be taken into account in the development of the project, such as:

- Occupational health and safety;
- Protected natural environments;
- Limited development areas; and
- Noise, vibration and shock

2. DESCRIPTION OF THE PROJECT

This section provides an outline of the proposed project.

2.1 Location of the project

Delmas Coal and Ikhwezi Colliery are located approximately 20km as the crow flies south-east of Delmas town as shown in Figure 2.1. The power plant will be a mine mouth coal-fired power generation facility and it will be located as close to the mine as possible. This has the advantage that coal will not have to be transported over long distances and on public roads.

The location for the power plant is Site 5, on the farm Haverglen 269 IR, and is currently owned by BHP Billiton South Africa. The location for the ash disposal facility is Site 3, on the farmHaverklip265 IR, which is owned by Ikhwezi Colliery, a subsidiary of Kuyasa Mining.

A water supply pipeline will run from the existing Rand Water bulk supply line located south of the N17 Highway, via Devon, to the farm Enkeldebosch. From there, the water pipeline will be routed to the coal plant at Delmas Coal's North Shaft. From North Shaft, the pipeline will continue north to the power plant. The power plant will use air cooled condensers, therefore it will use significantly lower volumes of water than an equivalent power plant with wet cooling system. In addition, a dry ash management system will also be used.

In order to meet the required emissions standards, limestone or dolomite will be supplied via the existing rail that runs along the western boundary of Delmas Coal. A new rail spur will be added for unloading the limestone/dolomite onto an overland conveyor which will be used to deliver the limestone/dolomite to the power plant. There will be a short coal conveyor from Delmas Coal's North Shaft processing plant to the power plant, and an ash conveyor from the power plant to the ash disposal facility.

The farms that would be affected by the project are outlined in Table 2.1.

Table 2.1: Details of farms affected by the project

Facility/ infrastructure	Farm portions affected
Power plant	Haverglen 269 IR rem of 269. Owned by BHP Billiton. Land negotiation underway
Ash disposal facility	Haverklip 265 IR portions 3, 4, 5. Owned by Ikhwezi Investments (part of Kuyasa Mining)

2.1.1 Access

Access to the main entrance of the power plant site will require a tarred road upgrade of the existing gravel road leading from R50 toward the entrance of the power plant site – see Figure 2.1. Service roads will also be constructed alongside the coal and ash conveyors to allow for general maintenance on the conveyors, and to serve as emergency routes to deliver coal and transport ash in the event of a conveyor failure and/or depletion of temporary coal/ash storage reserves.

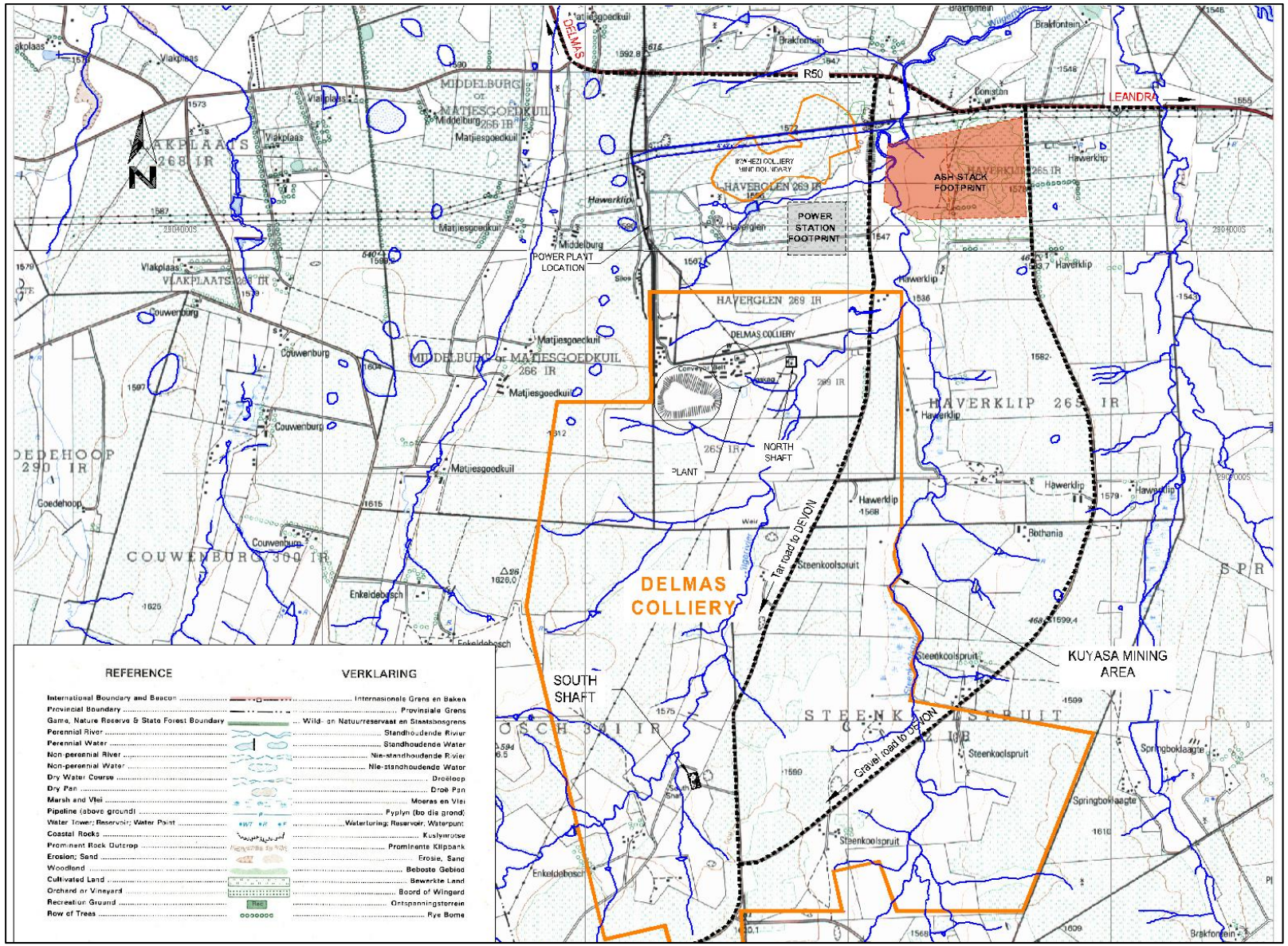

Figure 2.1: Location of project facilities

2.2 Power plant

2.2.1 Process Description

2.2.1.1. Coal supply

Delmas Coal will supply coal to the Kuyasa Power Plant from its No. 4 upper and No. 2 lower coal seams. Preliminary geological investigations indicate that Delmas Coal currently owns approximately 200million tonnes in coal reserves that will sufficiently support the 600 MW Power Plant. Additional coal reserves will be available through the extension of Kuyasa's mining rights to support any possible expansions to the first-phase of the KiPower Power Plant Project.

Delmas Coal will provide crushed coal to the power plant via an overland conveyor that extends from Delmas Coal to the power plant site. The coal will be stacked at an onsite coal storage facility for use in the power plant. More detail on the coal handling will be provided in the EIR.

2.2.1.2. Sorbent

To conform to South Africa's national standards for sulphur dioxide (SO_2) emissions of 500 mg/Nm^3, the Power Plant will require in-bed sorbent injection. Either dolomite or limestone can be used as a sorbent and trial combustion tests were conducted at Eskom's testing facility during September 2011 to February 2012 with both of these materials. The choice between dolomite and limestone will be made based on the process performance of these sorbents, their delivered costs and reliability of supply. More information about this will be made available in the EIR later in the EIA process.

To meet a design emissions limit of 400 mg/Nm^3, the Power Plant will require approximately 693,000 tonnes of dolomite per year at 85 percentage capacity factor or approximately 21 million tonnes of dolomite over an assumed 30 year economic plant life. Similarly the project will require about 440,000 tonnes of limestone per year at 85 percentage capacity factor corresponding to approximately 13 million tonnes of limestone over the assumed 30 years economic life of the plant. The sorbent will be delivered to a sorbent unloading station immediately north of Delmas Coal, or delivered directly to the project site.

2.2.1.3. Power plant units

Each of the Power Plant Project's four 150 MW units will consist of a single subcritical drum type, reheat circulating fluidised bed (CFB) boiler. Balanced draft within the boilers will be maintained by one full capacity induced draft fan per unit. South African SO_2 emissions limits will be controlled through combustion processes by directly injecting sorbent into the boiler's combustion chamber and if required to meet the environmental standards, supplemented by a Novel Integrated Desulphurisation (NID) system that utilises lime and recycled ash to absorb additional SO_2 particles escaping the CFB boiler. Nitrogen oxide (NO_x) emissions limits will be controlled through regulating combustion temperature by varying combustion air supplied by one full capacity primary air fan, and one full capacity secondary air fan. A pulse jet fabric filter (PJFF) system will control particulate emissions. Two reinforced concrete chimneys (one chimney per two units) will be equipped with continuous emissions monitoring

systems (CEMS) to monitor the plant's flue gas quality on continuous basis.

Each unit will consist of a 3,000 revolutions per minute (rpm) condensing steam turbine with air cooled condenser. The turbines will be hydrogen cooled and produce 150 MW at the generator output terminals. Power generated by each turbine would be stepped up to 275 kV by a three-phase generator step-up transformer per unit. Power would then be connected to a 275 kV double bus single breaker switchyard. Power from the switchyard will subsequently be connected to Eskom's 275 kV transmission system. The environmental authorisations for the switchyard will be undertaken by Eskom and is excluded from this authorisation process. The reason for this is that the switchyard will be constructed, owned and operated by Eskom.

2.2.1.4. Water use

KiPower plans to bring in potable water by tapping into a Rand Water line that runs between Springs and Devon to the south of the mine. Other potential sources of water are also being investigated to reduce and/or supplement this source of water in the long term. The power plant, although a dry cooling system, requires approximately 100 000 cubic meters per month. This quantity of water may be reduced significantly if additional NID desulphurisation of the flue gases is not required.

Plant makeup water supply for the power plant will be provided by a valve connection from Rand Water via the water supply to Delmas Coal. Water will be piped to the site and stored in water storage reservoirs. Two demineralisation water trains (plants) will treat, on average, approximately 43 m^3 per hour of water from the reservoirs for subsequent storage in a demineralised water storage tank. High quality demineralised water from the demineralised water storage tank will be sent to each power generation unit for cycle makeup water. Each unit's feed water heating cycle design includes three low pressure (LP) feed water heaters, a de-aerating feed water heater, and two high pressure (HP) feed water heaters for a six feed water heater cycle. Main cycle heat rejection would be accomplished with air-cooled condensers while auxiliary cooling will utilize fin-fan coolers. The Power Plant will be a zero liquid discharge (ZLD) facility utilizing a brine concentrator/crystallizer to minimize the facility's water consumption and eliminate wastewater discharge. Brine/crystalliser cake from the concentrator will be blended with the ash leaving the facility.

Bed ash (i.e. bed ash and flue gas desulphurisation (FGD) by-products) and fly ash, produced as a result combustion, will be pneumatically conveyed to ash storage silos and subsequently wetted to minimise dust generation and conveyed to the ash disposal facility as indicated in Figure 2.1.

Sorbent (limestone or dolomite) from the Delmas Coal rail link will be conveyed to the plant site by an overland sorbent conveyor to the on-site storage yard. Conveyors will convey the coal/sorbent from the storage yard to the tripper gallery where the tripper conveyor system would unload the coal and sorbent to their respective coal and sorbent bunkers prior to being fed into the CFB boilers.

Each of the boilers will require approximately three weeks of maintenance outage every two years. The availability of the Power Plant is expected to be 88 percent.

2.2.2 Plant design basis

Table 2.2 outlines the design basis for the plant.

Table 2.2: Design basis for the power plant

Unit No.	Design Basis (using dolomite as a sorbent)	Check Basis (using limestone as a sorbent)
Gross Plant Output, MW	600	600
Auxiliary Load, MW	76.4	76.4
Net Plant Output, MW	523.6	523.6
Boiler Efficiency (HHV Basis), percent	86.3	86.7
Net Plant Heat Rate (HHV Basis), kJ/kWh	11,659	11,605
Net Plant Thermal Efficiency (HHV Basis), percent	30.9	31.0
Fuel Burn Rate, tonnes per hour	375	373
Capacity Factor, percent	85	85
Plant Raw Water Requirement, m3/hr	156	152
Bed Ash Production, tonnes/hr	130	119
Fly Ash Production, tonnes/hr	87	80
Sorbent Consumption, tonnes/hr	93	59
NID Lime Consumption, tonnes/hr	1.5	1.5

2.2.3 Power Plant Dirty Water Management System

Dirty water from the power plant footprint will be collected in a pollution control dam. This water will be re-used in the power plant as make-up water. Water from clean areas will be allowed to discharge to the environment. As was stated, the Power Plant will be a zero liquid (effluent) discharge (ZLD) facility.

2.3 Ash management system disposal facility

An ash management system is required for the Power Plant ash. An ash management system would have the following components, each described in more detail below:

- Ash handling systems.
- The ash stack.
- Water handling systems.

2.3.1 Ash handling systems

This would typically comprise an overland conveyor to transport ash from the power station to the ash stack site. The dry ash would be conditioned by the addition of water at the power station to ensure dust generation is minimised. At the ash stack site the conveyor would discharge onto a loading cone on a concrete lined platform, alternatively into a truck loading silo, from where it would be loaded into haul trucks and driven to the active component of the stack. A road would be constructed next to the conveyor to act as a maintenance access road, as well as a haul road for trucks to carry out emergency ash transportation in the case that conveyor maintenance and repair is required.

Depending on the final site layout, it may be feasible to extend the conveyor up the ash stack as it develops so that the final ash discharge point is closer to the active ash disposal cell. In this scenario it is likely that an ash stacker will be used.

2.3.2 Ash stack

The ash stack is essentially a landfill where only the ash and brine generated by the power station is to be deposited. This would be a lined facility to minimise pollution risks to the environment. The liner or barrier design would be governed by the waste classification of the ash material by means of the Department of Environmental Affairs waste classification regulations and/or the Department of Water Affairs "Minimum Requirements for the Disposal of Waste by Landfill" (DWAF, 1998) for the disposal of waste and the regulations governing the design of waste disposal facilities.

The ash stack must be sized to accommodate the ash generated over the life of the facility, at present this is 30 years. This is a sizeable footprint and so it is best to sub-divide the ash stack site into a number of developmental phases or cells. This has the following advantages:

- Reduced up-front capital expenditure.
- Reduced catchment area for impacted surface water.
- Reduced risk of exposed landfill liner being damaged as it is exposed for less time.
- Reduced impact to the environment in that portions of the site are only developed when needed.

The ash stack will be formed either by haul trucks loading ash from the loading platform, driving up haul roads on the facility to its plateau and dumping the ash with a bulldozer performing final shaping activities or by using an ash stacker. The side slopes will be shaped to an overall slope of 1:4.5, equivalent to 1:3.7 slope (15 degrees), with 8m wide benches every 10m vertical intervals. The peak height above ground level will be in the order of 40m. Depending on the final site's geotechnical stability characteristics, the need to construct a single or even multiple low level ash platforms to precede the advance of the main stack can be determined.

The phasing of the site into cells that will rise to full height does mean that concurrent rehabilitation can commence relatively early in the life of the site. As the earthworks for a new phase is done, the topsoil and spoil from this activity would be placed on top of the previous cells, reducing handling costs and the need to form intermediate stockpiles. The topsoil will also be of a better quality than that which has been left in stockpiles for many years.

From a water handling perspective, the ability to construct in phases over the full height reduces the amount of rain water that come into contact with the ash, so reducing the size and cost of the dirty water handling systems.

2.3.3 Water handling systems

A major component of the facility will be its water handling. This comprises systems to handle and separate both clean and dirty water. Government Notice GN704 (also R77) although aimed at the mining industry, forms a best practice guideline and will be used in the design of the water handling facilities.

2.3.3.1. Clean Water Systems

Clean storm water from upstream of the site must be deviated around the site as much as possible such that it remains clean. Once portions or phases of the ash stack are rehabilitated, grassed and drainage/erosion controls provided, the storm water arising off these must also be discharged into the environment.

A further source of clean water may be groundwater arising from under the footprint of the site. If required, groundwater control drains (sub-surface drains) will be placed under the liner to collect this water. It will be released back into the environment if it is proved to be clean and meets the DWA water release specifications.

2.3.3.2. Dirty Water Systems: Storm water

The dirty water systems must handle contaminated run-off from the active cell and any filled cells that have not been rehabilitated. It should be noted that the size of each cell and hence the phasing planning, has a large impact on the size of the dirty water dams.

2.3.3.3. Dirty Water Systems: Leachate

The dirty water systems must also handle leachate generated within the body of the ash stack. Given that the leachate flow would be of relatively small flows spread over long durations, the over-riding design criteria for a dirty water system would be the storm water run-off.

2.3.3.4. Pollution Control Dam (s)

All dirty water will be channelled or piped to a pollution control dam. The liner design of this dam would also be governed by the waste classification of the potential leachate by means of the Department of Water Affairs: Minimum Requirements for Waste Disposal by Landfill or the proposed new standards of the DEA. The dam would have to be sized appropriately by means of a water balance study to ensure that the risk of spilling is minimised to a maximum rainfall over 24-hour period with a 1:50 year occurrence (1:50 year rainfall event). Water will be extracted from the dam into an irrigation system that will dampen down the advancing face of the ash, side slope dozing activities, as well as exposed surfaces that are yet to be rehabilitated. Haul roads on the stack are also a source of dust. The dam must incorporate a water tanker standpipe so that tankers can be filled easily. An interconnection pipe between the power station and the dam may be provided to ensure flexibility of water handling. Depending on the final site topography, it may be necessary or advantageous to have multiple smaller dams rather than one large single dam.

2.4 Access and supply of materials

The provincial R50 road runs to the north of Delmas Coal, and North shaft is accessed directly off this road – see Figure 2.1. It is likely that both the power plant and the ash disposal facility would require access onto this road for construction and operations.

There is a rail link that runs to the west of the mine, and some raw materials, such as the dolomite or limestone to be used for air emissions control, can be brought in via this route as well. This rail link is used to export coal from Delmas Coal.

2.5 Transmission connections

Existing 275 kV Eskom transmission lines run within 500 metres of the proposed site. In addition, new 400 kV power lines parallel to these existing lines are proposed by Eskom and have been authorised. These are shown in Figure 2.1**.**

Electricity from the KiPower Plant will be fed into the Eskom system via a switch yard.

2.6 Construction labour requirements

Construction labour requirements for the power plant and ash facility is expected to peak at about 3000 workers. Construction is expected to require 30 months for the power plant, and during this time the ash facility preparation, access road, conveyors and river crossings will be constructed. Depending on the contractor that will undertake the detailed design and implementation, some 500 skilled workers that are not South African, are expected to be used for highly specialised functions during construction.

A contractor's lay-down area will be created within either the power plant site or the ash facility site. This area will have access control and will be used for storage of materials and equipment, as well as for offices and workshops to service the contractor's personnel on site. Temporary toilets, washrooms, change rooms and kitchen facilities will be included in the lay down area. No accommodation for staff will be allowed.

Construction staff will be required to take up accommodation in the nearest towns of Delmas, Devon and Leandra. Shuttle facilities will be provided for construction staff to access the site.

2.7 Power Plant labour requirements

During operations, some 200 to 250 permanent positions will be created. These will range from unskilled to highly specialised positions. No accommodation for staff will be allowed on site.

2.8 Project implementation schedule

It is anticipated that the permitting processes will be concluded by end of 2012. As a result, construction is planned to commence early in 2013 and to be completed by late 2015. The power plant and ash facility operation will therefore likely commence in 2016.It is likely that the power generating units will commence operation as each one is completed. The Power Plant will therefore follow a staggered start-up process.

2.9 Project motivation (need and desirability)

2.9.1 South African energy forecasts

The Integrated Resource Planning (IRP) document dated 25 March 2011 (Revision 2) from the Department of Energy forecasts energy and electricity needs to 2030. The plan provides an indication of new electricity capacity required to meet energy needs between 2010 and 2030. It includes electricity generation from coal, nuclear, hydro-electric import, gas and renewable energy sources. The plan indicates that some 42.6 giga Watts of new electricity generation would be needed by 2030.[1] Of this, some 6.3 giga Watts of coal-based electricity is predicted, in addition to already planned and committed power plants of Eskom. This additional requirement is only 15% of the total new requirement, with electricity based on renewable energy constituting 42% of new

[1]The current capacity is in the order of 44 giga Watts

capacity need and nuclear 23%. The remaining 21% is expected to come from imported hydro-electric power and from gas turbines. The 2nd revision document takes into consideration constraints and risks associated with carbon emissions, new technology uncertainties, water usage and security of supply. In conclusion, coal based electricity generation will continue to grow in South Africa for the foreseeable future while other forms of electricity are developed. The Department of Energy IRP indicates that it wishes to reduce dependence on coal, but in terms of security of supply, coal-based electricity will continue to dominate South Africa's energy sources until other sources are considered reliable and can effectively replace coal.

From the available data collected from the Southern African Power Pool (SAPP) and the National Energy Regulator of South Africa (NERSA), and Eskom, electric power reliability issues are expected to continue at least until 2015 assuming all potential and planned SAPP, such as the Medupi Power Station, projects are implemented. Although Eskom is aggressively pursuing the construction of additional capacity resources, based on available data, it is anticipated that Eskom alone will not be able to reliably and efficiently support South Africa's grid in the foreseeable future. The Department of Energy's IRP clearly indicates that coal-based IPP capacity, using fluidised bed technology, will be required to meet our energy needs. Whilst coal-based power supplied 90% of South Africa's energy needs in 2010, it is expected to supply 65% of South Africa's energy needs by 2030. This still represents a growth in coal-based power supply over time albeit at a slower pace than total energy need.

Other participating SAPP countries have indicated potential projects to be implemented in the future. Provided that these potential projects receive the required funding and are implemented on schedule, South Africa's grid may sufficiently be supported in 2015 through the SAPP interconnection. This scenario would be unlikely, since according to SAPP's 2008 Annual Report, these projects have not secured financing. Uncertainties in these projects are highlighted for consideration by the Department of Energy in the next IRP revision due to be consolidated during 2012.In such a scenario, the first-phase of this Power Plant Project is feasible from a need for power perspective and will aid in providing invaluable grid stability and reliable, efficient power within South Africa.

2.9.2 KiPower IPP project specific advantages

As this is a mouth of mine power plant, the cost and environmental impacts of transporting coal over significant distances to remote power plants are significantly reduced. There is also a possibility that the coal discard generated by Delmas Coal may be used as an energy source, thereby optimising coal reserves and reducing discard dump liabilities. The latter possibility is still being investigated.

Delmas Coal's No.4 seam coal is a low grade coal not suitable for use in existing Eskom power stations, except if blended with higher grade coal. The use of CFB boiler technology in this project provides the ability to burn low grade coal, without sacrificing its boiler performance compared to conventional pulverized coal (PC) technology, for power generation. At the same time the project is able to meet strict emission requirements. Thus, this project will have the environmental benefit of utilising Delmas Coal's low grade coal, which is currently being discarded, while meeting the current national emission standard, unlike most other coal based power plants in South Africa.

3. CONSIDERATION OF ALTERNATIVES

3.1 Steam generator technology

Steam generator design for high pressure reheat boiler applications in conventional coal-fired power plants has evolved into two basic combustion and heat transfer technologies. Suspension firing of pulverized coal (PC) and circulating fluidized bed (CFB) combustion of crushed coal are the predominant technologies in use today. This project utilises the CFB boiler technology. Primary advantages of CFB boilers compared to PC boilers are as follow:

- CFB boilers have the capability for superior fuel flexibility compared to PC boilers. Since the combustion temperature of CFB boilers is below the ash initial deformation temperature, the slagging and fouling characteristics of alternative fuels are not a concern. As long as the CFB boiler auxiliaries such as fuel feed equipment and ash removal equipment are provided with sufficient capacity, a very wide range of fuel heating values and ash content can be burned in a CFB boiler without sacrificing its boiler performance. This allows the project to utilise low grade coals, which are currently being discarded, for power generation.
- Due to the long fuel residence time in the CFB boiler combustion loop, a very wide range of fuel volatile matter content can also be utilized. Fuel volatility ranges well below that needed to burn the fuel in suspension in a PC boiler can be efficiently burned in a CFB boiler.
- The lower combustion temperatures of the CFB boiler also result in a significant reduction in the NO_x emissions of the CFB boiler compared to a PC boiler.

Over the past 25 years, CFB boilers have been utilised for steam generation for electric power generation, the availability and reliability have improved and at this time are considered to be equivalent to PC boilers. Several improvements in the refractory system designs, fuel and sorbent feed system designs, and ash extraction equipment designs have been made that adequately address the initial problems encountered with these system components. Since the CFB boiler systems do not have pulverisers and do not have multiple burner systems with the large number of moving or controlled components, and have significantly fewer soot-blowers, many of the high maintenance components of conventional PC boilers do not exist with CFB boilers.

3.2 Ash disposal facility options

There are two key options for ash disposal: surface or underground disposal.

Underground disposal has been investigated for other projects in South Africa and is considered technically challenging, of high environmental impact and sometimes just unfeasible. Usually, ash filling in underground mine workings is done to provide stability to mine workings and to fill easily accessible voids that are not in use and will not drain to operational workings. In addition, water from the ash cannot be recovered from underground disposal operations and thus water needed for ash disposal becomes a significant requirement. This cannot be considered a primary storage technology as deposition rates and storage capacities vary from day to day as voids fill at differing rates, this could result in outages of the power station. Lastly, this option is difficult to license due to the environment and technical challenges. At Delmas Coal, due to ongoing operations, ash filling of old underground workings is not considered feasible.

Surface disposal is either carried out using wet ash/slurry or dry ash stacking:

- ***Wet ash*** dams have several environmental concerns associated with it, which include increased risks of soil and surface and ground water contamination over dry ash stacking. Water usage is higher for slurrying of ash and water management becomes more complex due to the volumes involved. Another disadvantage of this option is that development costs are high since most of the required footprint must be prepared upfront. The topography of the Delmas sites is not suited to wet dam disposal as the rates of rise are likely to be very high for sustained periods, with associated wet ash dam stability concerns. Wet ash dams, if operated poorly, can also generate significant dust from the top basin, which can only be rehabilitated at the end of the life of the facility.
- ***Dry ash*** stacking is preferred mainly because it uses less water. In addition, dry ash stacking has advantages over wet ash/slurry disposal. The ash body is more stable making it safer to construct and maintain. Concurrent rehabilitation, such as capping and grassing, can be carried out more easily on the surfaces thereby reducing dust generation potential as well as the impact on the natural drainage catchment areas. The associated water management systems are easier to construct, maintain and operate. The development costs are lower since the disposal operations can be phased more easily. This option is therefore the preferred technology for this project.

3.3 Power plant and ash disposal facility location

A comprehensive site selection process has been undertaken for siting the power plant and ash disposal facility. A site selection report was completed that identified a shortlist of sites for these two facilities. This report was updated to address comments from IAPs during the public review of the Draft Scoping Report, although the outcome remains the same. In addition, a pair wise comparison of the sites was completed, which confirmed the outcome of the site selection process (see **Appendix B**).The shortlisted sites were further assessed by developing concept designs and site layouts for the power plant and ash facility on the different shortlisted sites, and taking coal and ash haulage into consideration. Section 3.3.2 outlines the outcome of the assessment of the shortlisted sites. The site selection report is included in **Appendix B** and a brief summary is provided in Section 3.3.1.

3.3.1 Identification of suitable sites (brief summary of site selection report)

Both the ash disposal facility and the power plant require the following key criteria with respect to location:

- The area must preferably not be undermined due to long term ground stability risks associated with undermined areas.
- The area must not hold viable reserves of coal, which would be sterilised if the plant or ash were placed on it.
- The area should preferable have a low agricultural potential.
- Significant surface water resources must be protected due to the highly stressed nature of the local water sources.
- Known biodiversity sensitivities must be avoided, especially wetlands.
- The power plant and ash disposal facility must be within close proximity of the coal source and preferable each other.

Using available information on the above criteria, 9 areas were identified as potentially suitable for the power plant and ash facility, as shown in Figure 3.1.

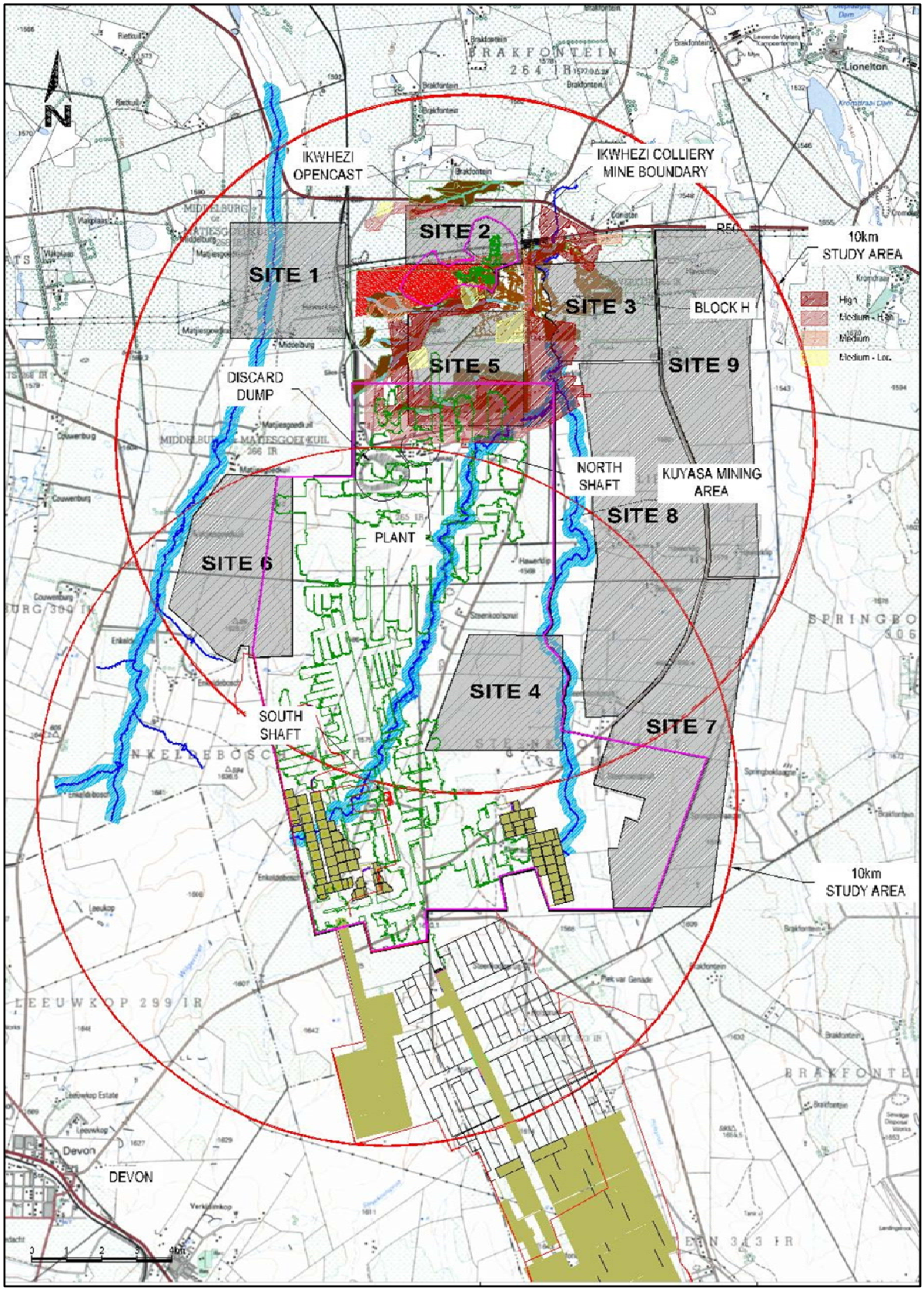

Figure 3.1: Initial 9 sites identified for the power plant and ash facility.

3.3.2 Initial screening of the sites (summary of site selection report)

Technical screening

Black & Veatch provided a technical screening for the nine sites using the following list of criteria that was appropriate for the siting of the power plant:

- Distance to coal supply: The distance to coal supply affects the capital and operating costs for the power plant.
- Topography: Levelling, excavations and filling of areas may be required to provide a suitably flat foundation for the plant and thus, topography will affect construction cost.
- Site constructability: Both construction cost and ease of operations and maintenance are factors of this criterion.
- Transmission connection: The power plant will feed into the national electricity grid managed by Eskom. Eskom 275 kV transmission lines (4 circuits) run in close proximity to some of the sites. The transmission connection permitting will be handled by Eskom.
- Water supply: The further the source of water, the longer (and more expensive) the pipeline required to get it to the plant.
- Distance to ash facility: As for coal, the distance to the ash facility will affect the capital and operating costs.
- Expansion potential: KiPower may wish to increase the plant up to 2000MW. In which case, sites that would allow for expansion within its footprint were favoured.
- Underground workings: Due to stability considerations, current and future underground workings should be avoided.
- Coal reserves: Where possible, coal reserves should be avoided to ensure future resources are not sterilised due to the presence of a power plant on the surface.
- Land ownership: Land owned by Kuyasa Mining or its subsidiaries is preferable since land acquisition costs will be avoided and rezoning applications can be simplified.
- Accessibility: The provincial R50 runs close to most of the northern-most sites. Nevertheless the intersection may need upgrading and for the more southern sites, the local road may need upgrading from the R50 to the plant site entrance. This will affect cost of the project and may influence operational costs later.

J&W engineers provided a technical screening of the sites using the following list of criteria that was appropriate for the siting of the ash facility:

- Capacity of site: This refers to the amount of ash that could be accommodated on the site. Sites that could not accommodate 30 years of ash production from a 600MW plant were screened out as multiple small facilities in general have a total impact higher than a single large one.
- Storage Efficiency: This refers to how the site could be maximally utilised for storage of ash, which reduces the footprint needed for the facility.
- Topography: The topography affects the water management beneath the facility. Additional drains, sumps and pumping systems to manage the facility will add to the cost.

- Drainage direction: Ideally the site should drain in one direction so that water can be effectively collected through drains and trenches. If a site straddles a ridge, the collection of water at the bottom of the facility becomes complicated and will require two sets of collection systems, which increases costs, management requirements and the risk of overtopping and spillage from the site.
- Slope: In order to ensure effective drainage of the site, a sloped site is preferred. On the other hand, a steep slope would have a higher risk of failure of the ash facility. Thus the slope of the site has to be considered from both a drainage and stability perspective. Normally a site with a slope between 2 and 4 degrees is favoured.
- Expansion potential: This refers to the potential to expand the facility beyond the 30-year 600MW ash generation scenario. Sites large enough to cater for expansion were favoured.
- Conveyor/truck access: This refers to access to the site for a conveyor and/or haul road for the ash to be brought to the site.
- Land ownership: Land owned by Kuyasa Mining or its subsidiaries is preferable since land acquisition costs will be avoided and rezoning applications can be simplified.
- Potential to fit plant and ash on site: Sites that could accommodate both the ash disposal facility and the power plant were favoured as a single complex is preferred for easier operations as well as for land acquisition.
- Geotechnical: the type of geology would influence how strong foundations will be; what the seepage potential of the site would be, soil profile, soil properties, founding conditions, etc.

Environmental screening

Environmental specialists that will be involved in the detailed assessment of this project screened the sites for its use as a power plant or ash disposal facility based on the following key environmental components and using available information about the sites:

- Ground water: Ground water pollution from various sources associated with a either the power plant or the ash facility could occur. These include pollution control dams, chemical storage areas, transmission oils, water treatment plant, coal stockpile area and offices, workshops and ablutions. Thus, sensitive ground water areas, where people are dependent on ground water for potable and agricultural use, or where ground water feeds a key surface water resource, such as rivers and wetlands, should be avoided. Mitigation measures to prevent ground water pollution can and will be built into the project, however, ground water sensitivity was taken into account in the site selection process.
- Surface water: Surface water pollution from various sources associated with a power plant and ash facility can occur. These include overflows from pollution control dams, contaminated storm water from storage areas such as coal and other raw materials, oils and greases from workshops and equipment, etc. As for ground water, sensitive surface resources should be avoided. Mitigation measures can be built into the project, which will influence the cost. Nevertheless, the sensitivity of surface water resources was considered in the site selection process.
- Economic: This assessment is from an external perspective. It is not related to the construction and operation costs associated with the plant and ash facility, which

are already included in the technical assessment. The loss of land for agricultural use; impact on Land Values and the potential impact on Local Businesses were considered.

- Ecology: Potential impacts on flora and fauna in the area were considered. Information from previous studies in the area as well the Mpumalanga Provincial Department database[2] was used. Wetlands/rivers and biodiversity were considered.
- Aesthetic/other: This assessed potential impacts associated with visual intrusion, proximity to people and cultural/archaeological issues.

A rating and ranking process was carried out to determine the most suitable sites, as detailed in the site selection report.

Suitable sites for power plant:

The outcome was that Sites 3 and 5 are most suitable for the power plant.

Suitable sites for ash facility:

Sites 5, 8 and 9 were considered to be the most suitable for the ash facility – see Appendix B. During this initial site selection, Site 3 was considered too small for the ash facility due to the presence of opencast pits. This view was revised later in a re-assessment of the site selection process, as indicated in Section 3.3.4.

3.3.3 Land acquisition

Power plant

The shortlisted sites for the power plant were Sites 3 and 5. Site 3 is owned by Ikhwezi Colliery and is available to KiPower. Site 5 is owned by BHP Billiton and is in the process of being purchased by Kuyasa Mining and will thus be available to KiPower. Thus both sites were considered further.

Ash facility

Land acquisition discussions were initiated by Kuyasa Mining with the owners of Sites 8 and 9. The owners indicated the following requirements:

- Purchase price in the range of R45,000 to R60,000 per hectare.
- Requirement that Kuyasa Mining purchase all their land and associated assets in the Delmas area, and not only land required for the KiPower project.
- Relocation costs for the owners and their staff.

Land purchases in the Delmas area range from R8,000 to R30,000 per hectare, depending on the assets and infrastructure associated with the land (see land value assessment in **Appendix B**). The high purchase price on Sites 8 and 9 will result in land acquisition costs of about R30 to R50 million. The land acquisition cost was then taken into consideration in the comparison of the shortlisted sites. Based on the re-assessment, Sites 5 and 3 were considered the preferred sites for ash disposal.

[2]MDEDET, 2011: CD of various shape files from MDEDET head office provided January 2011.

3.3.4 Consideration of Sites 3 and 5 for the power plant and ash facility

Site 3

Site 3 has historical partly opencast pits which require rehabilitation. Should these pits be rehabilitated to an appropriate level, the area can be used for ash disposal. Recent trends in the coal mining and power generation sector of South Africa shows a move towards using previously disturbed areas for ash disposal, such as rehabilitated open cast areas and residual pits. An assessment of the available space on Site 3, taking rehabilitation of the pits into consideration, was undertaken by J&W, and it was found that 30 years of ash from a 600MW power plant can be stored on the site.

Site 5

Undermining of site 5 was noted in the initial site selection investigation. The undermining information was limited to No. 4 seam. Recent data from Kuyasa Mining indicates that No. 2 seam mining operations extend significantly beneath Site 5 (see Figure 3.2). As a result of the undermining on Site 5, the area that can be used for the power plant and ash facility is significantly constrained. There is, however, sufficient space for either facility, but not for both.

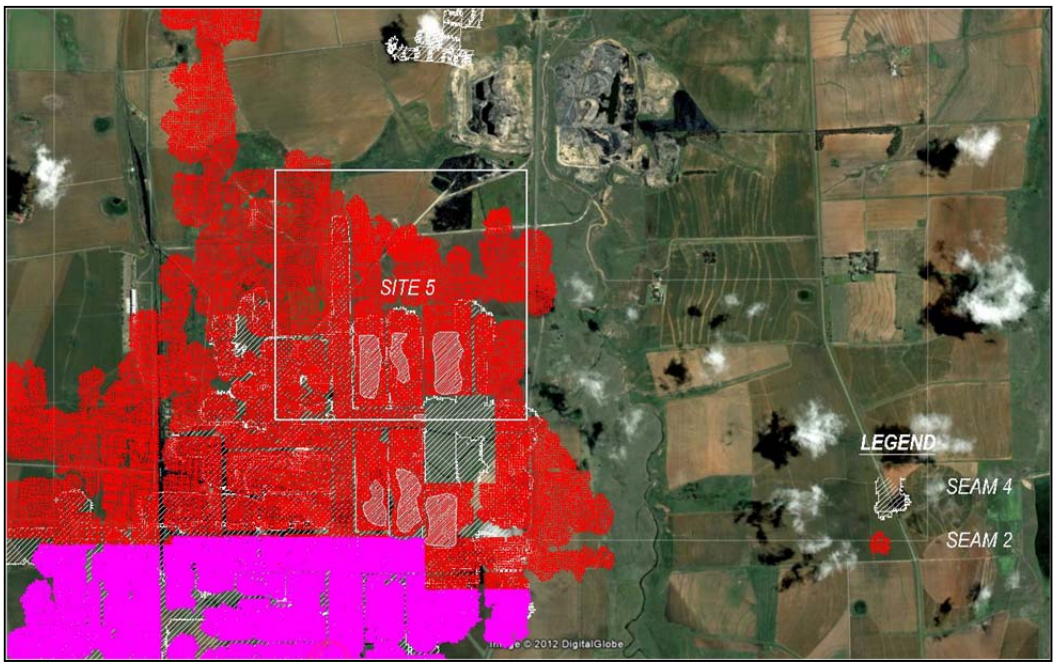

Figure 3.2: No 2 and No 4 seam undermining on Site 5

3.3.5 Cost comparison for different shortlisted site alternatives

A cost comparison was done by J&W and is given in **Appendix B**. Costs based on a concept level design for the ash facility, taking into consideration site specific characteristics, were compared for the following site configuration options:

- Power plant at Site 3, ash at Site 5;
- Power plant at site 3, ash at Site 8;
- Power plant at site 3, ash at Site 9;
- Power plant at site 5, ash at Site 3; and

- Power plant at site 5, ash at Site 8.

Costs include components such as:

- Conveyor infrastructure for:
  - coal from North Shaft boundary to the Power Plant, to leading to the ash stack; and
  - ash from Power Plant to ash facility.
- Load out facility at the stack;
- Ash stack landfill;
- Contaminated storm water handling;
- Minor pumps for irrigation water; and
- Final closure shaping and rehabilitation.

The power plant costs are not likely to differ significantly for the different site options. Cost comparisons for the ash disposal facility are presented in Figure 3.3.

The operational costs involved in moving coal from the shaft to the power station and ash from station to the ash disposal site (conveyors), as well as, the truck component are given in Table 3.1. These are expressed in real costs per annum. Locating the ash at Site 3 and power station at Site 5 is the cheapest alternative for any given ash disposal facility liner type (the liner type will be determined based on the results of the waste classification study and site specific conditions). The next best alternative is the power station remaining at Site 5, but Site 8 being used for ash. These results are intuitive, given that the power station transports three times as much coal as ash.

Savings on minimising coal transportation thus has a far bigger impact than minimising ash transportation.

3.3.6 Site selection outcome

Power plant

The power plant will be located on Site 5 as shown in Figure 3.4, outside of the areas that are undermined. Some infrastructure may impinge on undermined areas, but a stability analysis has confirmed this will not pose a risk (see **Appendix B**). Detailed geotechnical assessments will be done prior to detail design.

Ash facility

The ash facility will be located on Site 3 as shown in Figure 3.4, with rehabilitation of the existing pit to accommodate the ash facility. The costs for the rehabilitation of the pits will be borne by Ikhwezi Colliery, a subsidiary of Kuyasa Mining.

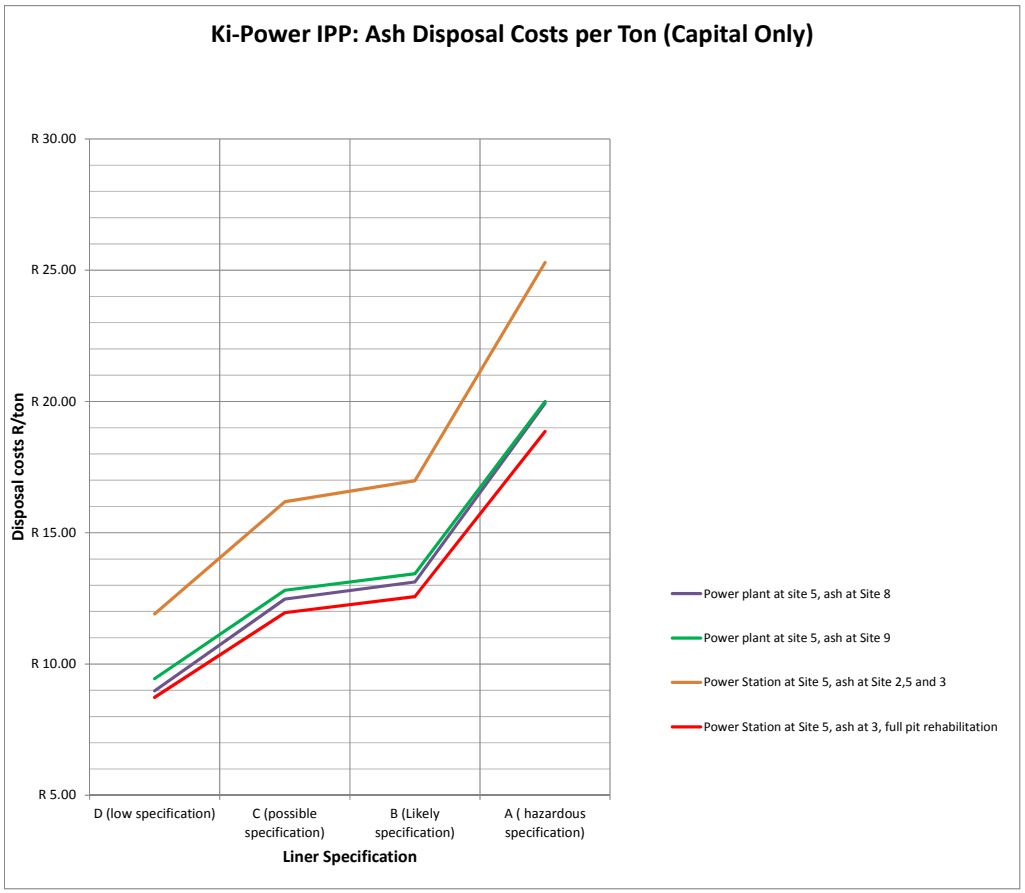

Figure 3.3: Cost comparison of different site options

Table 3.1: Comparison of operating costs for different ash disposal sites.

Options	Operating Costs / ton	% Difference from lowest
Power plant at site 5, ash at Site 8	R 23.21	0%
Power plant at site 5, ash at Site 9	R 23.89	3%
Power Station at Site 5, ash at Site 2,5 and 3	R 24.26	5%
Power Station at Site 5, ash at 3, full pit rehabilitation	R 23.96	3%

Options	Materials Handling Costs per Year	% Difference from lowest
Power plant at site 5, ash at Site 8	R 42,500,200	0%
Power plant at site 5, ash at Site 9	R 43,605,850	3%
Power Station at Site 5, ash at Site 2,5 and 3	R 44,205,250	4%
Power Station at Site 5, ash at 3, full pit rehabilitation	R 43,719,250	3%

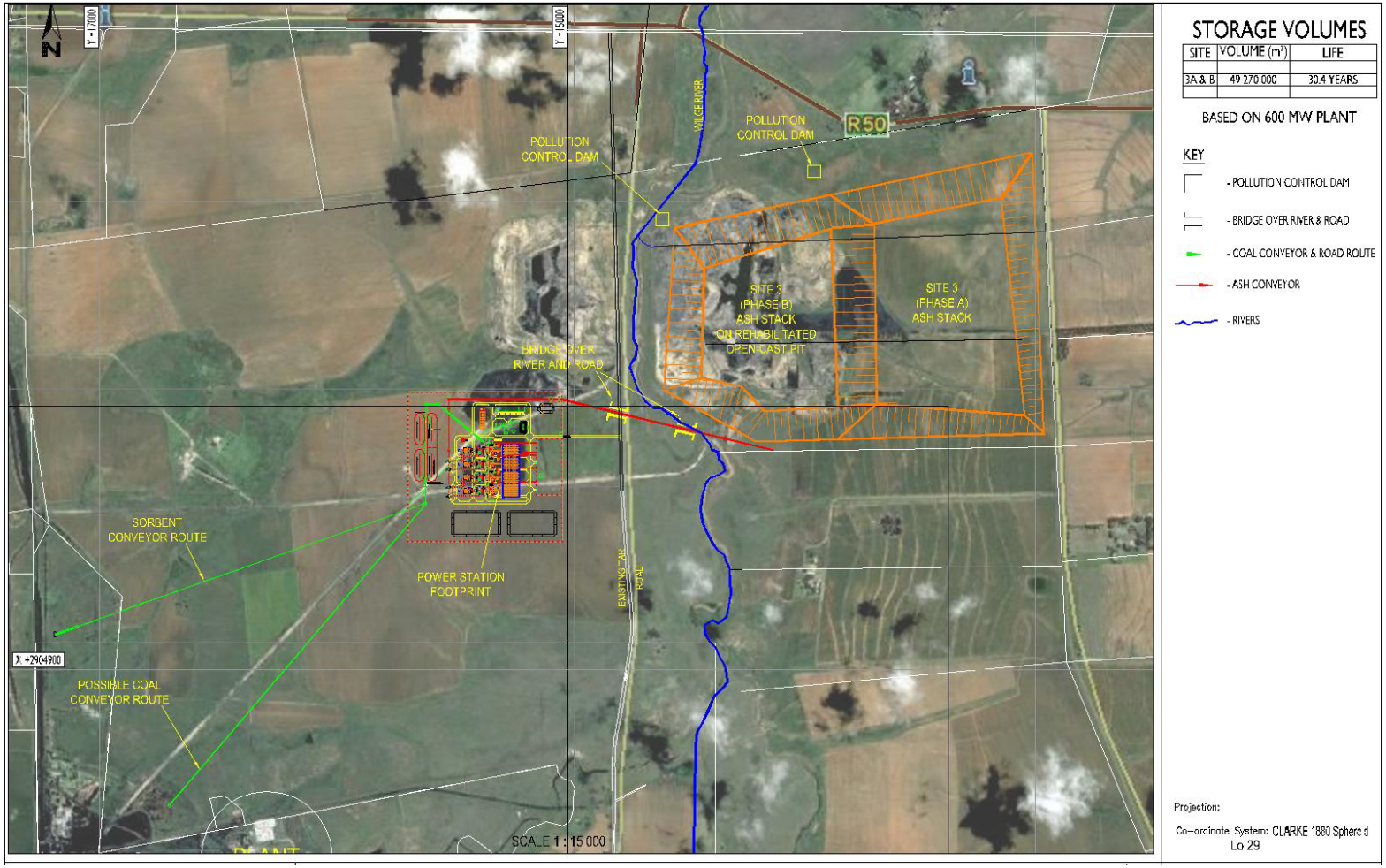

Figure 3.4: Preferred power plant site and ash stack location

3.4 Water supply alternatives

This aspect of the project is being handled in a separate licensing and authorisation process, as the water supply alternative will also provide water to Delmas Coal. Unlike other coal mines, Delmas Coal is a water deficit mine.

A summary of the alternatives are provided here for completeness.

There are several water supply options available to this project as follows:

- Rand Water: A bulk supply pipeline runs west to east just south of the N17, passing close to Devon and Leandra. There are 2 existing manhole points just south of Devon and Leandra where a side leg pipeline supply can be installed for KiPower and Delmas Coal. In addition, Rand Water has indicated it plans a new supply line from this bulk water line to Delmas town. A pipeline can be installed from this proposed line to the power station and mine. Concept routes for the pipelines were developed and cost estimates were developed for comparative purposes only, as follows
  - Option 1 – from tie-in near Leandra: R57mil
  - Option 2 – from tie-in near Devon: R51mil
  - Option 3 – from tie-in near Delmas: (R83mil)

It is clear that the Devon tie-in line is the cheapest alternative.

- Blommeland dolomitic aquifer: This farm has dolomitic water and uses this source of ground water for its own use. Whilst the yield has not been quantified, it is reported by the farm owner that significant volumes are available. A full investigation is needed to determine the sustainable yield of ground water on this farm as an alternative water source to KiPower. An investigation is being initiated to do so. If this proves to be a viable, sustainable source of water, further work to licence its use and develop a well-field and pipeline to the Power Plant will be undertaken. It is anticipated that the investigative work to confirm sustainable yield and the licensing process will be lengthy. Thus, this source could assist in reducing the use of Rand Water in the long term and will be investigated for this reason.
- SamQuarz Quarry: The quarry has indicated that it discharges significant volumes of water from its operations, in excess of a few mega litres per day. However, discussions with the mine have not progressed to sufficient technical detail to confirm these figures.
- Further work will be done to confirm this source, ensure water use licensing can be carried out and other licences can be obtained. Thus, this source could assist in reducing the use of Rand Water in the long term and will continue to be investigated for this reason.
- Keaton Energy: This new mine has indicated it may have a positive water balance in the future as its operations develop. The mine is undertaking a study to determine how much water it could have in future. Thus, this source could assist in reducing the use of Rand Water in the long term and will continue to be investigated for this reason.
- Springboklaagte Mine: This is a proposed mining development to the east of the KiPower project area. The authorisation processes have recently commenced and it will be some time before it is known if any water may become available over time, as its operations develop. Thus, if excess water is available, this source could assist in reducing the use of Rand Water in the long term and will continue to be investigated for this reason.

Thus, Rand Water will be pursued as the secure water supply for immediate development. Other sources will continue to be developed to replace, reduce or supplement the Rand Water over time. A separate licensing process, which will consider route options, will be undertaken for this pipeline supply project.

3.5 Coal and ash haulage

Due to the short distances, conveyor systems are preferred for coal and ash haulage. Service roads along the conveyors will ensure trucks can be used should there be down-time on the conveyors.

Conveyors are preferred over truck haulage for the following reasons:

- Lower operating costs over short distances;
- Better environmental mitigation is possible and can be included up front in the design; and
- Higher reliability.

3.6 Limestone/dolomite

The CFB technology utilises a sorbent to minimise sulphur dioxide emissions from the power plant stack. Two potential sorbents are available: limestone and dolomite. Both can be supplied commercially in South Africa. Limestone usage would be lower than dolomite due to its higher calcium content (calcium reacts with the sulphur dioxide to form calcium sulphate[$CaSO_4$] in the CFB reactor). Tests are being run at a SANAS accredited laboratory to determine the reactor performance using local limestone and dolomite. The tests results will be considered in the selection of the sorbent. These results will be reported in the EIR later in the EIA process.

3.7 Labour

A social impact assessment is being carried out for this project and labour recruitment options will be considered for this project. The results will be reported in the EIR later in the EIA process.

4. ENVIRONMENTAL CONTEXT

This chapter provides a summary of the environmental context based on existing information for the area from the Delmas Coal Integrated Water Use License Application and iKhwezi Colliery Integrated Water Use License Application. A more detailed description will be included in the EIA report, drawing from the various specialists studies to be undertaken for the impact assessment phase of the process.

4.1 Regional soils and geology

The geology in this area is typically Karoo with dolerite sills and dolomite found in some areas.

Transported sandy soils to clayey residuals are found over the area. The area is dominated by farming, which is well suited to the arable soils found in the area.

4.2 Topography

The area is typically gentle rolling hills and vales, with many shallow drainage areas where seasonal pans and wetlands over broad floodplains exist. The area is part of the Highveld region, and lies at an altitude of around 1540 metres above sea level.

4.3 Climate

4.3.1 Rainfall

The Delmas area is characterised by warm wet summers and cold dry winters. The rainfall in the region is almost exclusively due to summer (October to March) showers and thunderstorms. Mpumalanga's mean annual rainfall is recorded at 736mm and the proposed project area is positioned in an area that receives on average between 500 and 750mm of rain per annum (MDEDET, 2005). The annual average rainfall from the nearby Devon weather station is 654mm (iKhwezi EMPR Amendment).

4.3.2 Temperature

Temperature data from the nearby town of Delmas shows the warmest months of the year are December, January and February with an average temperature of 20ºC. June, July and August are the coldest months of the year with the average temperatures being in the region of 7.4ºC (Delmas Coal IWULA).

4.3.3 Evaporation

The mean monthly evaporation recorded in the 1997 Delmas Coal EMPR is 155mm (Symons Tank method) and 61mm ("A" Pan method) (Delmas Coal IWULA).

4.3.4 Wind

Wind blows predominantly from the east and east-south-east, although winds from the north, north-west and west are also common. The wind rose for the region is given in Figure 4.1.

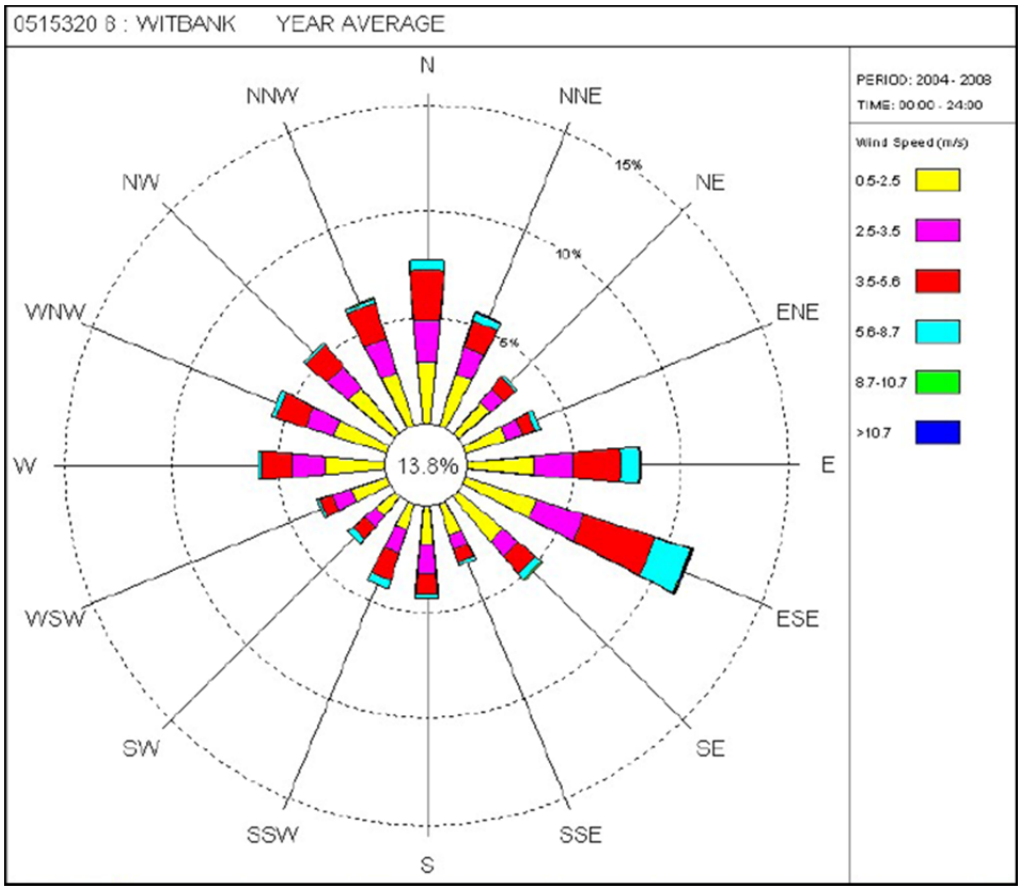

Figure 4.1: Wind rose for the region

(Source: Black and Veatch Feasibility Assessment)

4.4 Land use

The Delmas area is characterised by mainly agricultural activities. However, significant mining activities also exist in the area. With new and proposed coal mines in the region, the predominantly agricultural setting may become a mixed agricultural-mining setting.

4.5 Surface Water

KiPower will be situated within the Olifants Catchment Water Management Area. The area falls within the B2 sub-drainage region, the largest sub-catchment of the Limpopo Basin. The quaternary catchment area is B20E and the water management area (WMA) 4.

The Olifants River Catchment is of considerable economic importance as a significant number of mining, industrial and agricultural activities (including intensive irrigation schemes) are concentrated within the catchment. This catchment is a principal sub-catchment of the Limpopo River and covers an area of approximately 54 570 km^2 within the eastern parts of South Africa.

The Olifants River originates in the Highveld grasslands in Gauteng and Mpumalanga province and meanders North-east into Mozambique. In the upper reaches of the Olifants River, it is joined by a number of major tributaries including the Klein Olifants, Elands River, Wilge River and Bronkhorstspruit, before it passes through the Drakensburg Mountains and descends over the escarpment toward the Kruger National Park.

KiPower itself will fall within in the Wilge River Sub-Catchment of the Olifants River, which drains a relatively small area. This perennial river covers an approximate distance of 120km, before it reaches its confluence with the upper Olifants River, upstream from the Loskop Dam. Its perennial flow is largely maintained by a network of wetlands, as well as tributaries, including the Kromdraaispruit, Bronkhorstspruit, Saalboomspruit and Grootspruit. The proposed project falls within the upper reaches of the Wilge River (Delmas Coal IWULA).

4.6 Groundwater

Geohydrological evaluations for the 1997 Delmas Coal EMPR were performed by Jasper Muller & Associates (JMA). The information has been summarised below.

4.6.1 Groundwater Table

The average depth of the water tables is 12.98 metres below the surface. The deeper water levels observed in the northern part of the area were determined not to be a cause of mining related activities but rather to the groundwater abstraction by local farmers from the underlying dolomitic aquifer.

4.6.2 Groundwater Zone

The regional ground water zone likely to be influenced around Delmas Coal is referred to as a shallow Karoo type aquifer. On a local scale, these aquifers can be extremely complex due to the very nature of depositional and structural characteristics of the host rock in which the groundwater occurs and moves.

Preferential flow zones will exist primarily on dolerite/sediment contact zones, as well as on the sediment/coal contact zones. The permeability of these preferential flow zones is expected to vary between 1.0 and 10.0 m/day, with localised permeabilities of up to 50.0 m/day not being unrealistic.

No significant volumes of water are anticipated to occur in the dolerites as they are considered to be mostly un-weathered.

4.7 Air quality

The Delmas region falls within the Highveld Air Quality Priority Area due to the significant number of existing coal-fired power stations and metallurgical industries in the area. With emissions from power stations and significant agricultural activity in the area, ambient air quality can be expected to be poor due mainly to dust, sulphur dioxide and oxides of nitrogen emissions from existing power stations, coal mines and agricultural fields.

4.8 Heritage

A heritage survey done by Cultmatrix in June 2010 indicated that an archaeological site was identified in the area – see **Appendix C**. It dates to the recent historical past. This

is a small family grave yard consisting of only two graves. The graves are fenced by a metal construction. The two graves are the following:

- Dirk Jakobus Gerhardus Stephanus Botha, 13 August 1890 - 25 January 1940; and
- Wilhelmina Hart Botha (born Browne), 9 February 1900 – 27 April 1966

It is possible that there may be some other graves located close to the two identified graves, but these are not inside of the fence and due to the dense vegetation it is difficult to ascertain their locations.

A detailed assessment will be done during the impact assessment.

4.9 Socio-economic Environment

A social baseline was carried out for the proposed power station in 2009 and 2010 by MasterQ – see **Appendix C**. A short summary is included here.

In 2001, Delmas had a total population of 56,199 people. The population size decreased by some 5,747 people between 2001 and 2007, so that, in 2007, the population size was estimated at around 50,452 people. In 2007 the population density in the area was around 32 persons per km^2, which is indicative of the mostly rural nature of the area.

Delmas has a fairly young population and in 2007 well over a third of the population (42.0%) were below the age of 15. The economically active population group (defined by StatsSA as the ages between 15 and 65) accounts for just over a half (54.1%) of the total population. It is noteworthy that the biggest decline in population between 2001 and 2007 was in the economically active population (by some 8,562 people), whereas the biggest increase in the population during the same period was in the age category 0-14 (by some 3,247 people).

4.9.1 Education levels

In 2001, a quarter (25.9%) of the population aged 20 years and older had no form of schooling. Coupled with those individuals who only completed some form of primary education (a further 28.3%), this means that, in 2001, more than half (54.2%) of Delmas population had limited educational skills. The situation only improved marginally between 2001 and 2007. Although the number of people who had no form of education decreased drastically to 10.7%, those who completed Grade 12 also decreased to 12.7%, whereas those who only completed some form of primary or secondary education still accounted for more than two thirds of the population (71.8%).

4.9.2 Availability of municipal services in the area

Although the overall number of households in the Delmas area who make use of electricity for lighting has increased between 2001 and 2007, large segments of the population still make use of coal for cooking and heating purposes.

At least three quarters of households within Delmas have their refuse removed once a week, which is much higher than the standard for the district where the majority of households make use of their own (informal) waste disposal sites. At least a quarter of households in Delmas access to water and sanitation services are below RDP standard.

According to the Delmas IDP (2009/10), water in the area is mostly supplied from boreholes. Numerous developments in the area, including residential and industrial

developments, have placed an enormous demand on the water supply, so much so that the demand for water now exceeds the supply (the demand is estimated at 18 Ml/day, while the boreholes are only able to supply 16 Ml/day). Currently the Rand Water supply is used to augment the water supply to Delmas.

Two sewer plants serve the Delmas area, one within Delmas itself with a capacity of 5 Mℓ/day and the other in Botleng with a capacity of 4 Mℓ/day. Both these plants are over capacity, with the Delmas plant receiving up to 8 Ml/day and the Botleng plant receiving approximately 6 Mℓ/day.

The Delmas Local Municipal area is serviced by 2 police stations, one in Delmas and one in Sundra. According to statistics supplied by the Crime Information Management Services of the South African Police Service, there was a steady decline in the crime rate of the area (measured against the Delmas and Sundra police stations' number of crimes reported for the years 2004/05, 2006/07 and 2008/09).

According to the Delmas IDP (2009/10), the area is serviced by one hospital, three primary health care clinics and three mobile clinics, of which only one is operational. In addition there are six private general practitioner practices and one private clinic. There are a total of 14 non-governmental organisations operating within the public health sector, but it appears as if most of these NGOs operate within the realm of HIV/AIDS care.

The Delmas Local Municipality has a Disaster Management Department whose responsibility it is to plan, prevent, respond, mitigate and rehabilitate any risks associated with significant events in the area. As part of their planning, the department has a Disaster Management Plan that is reviewed on a biannual basis. Some of the major shortcomings, as identified in the IDP, are a shortage in emergency response vehicles, limited emergency care products, and a shortage of trained and experienced staff.

4.10 Manner in which the project could affect the environment

The local environment has the following three major constraints which need to be considered in the project development.

4.10.1 Water

The Wilge and Olifants Rivers are both stressed catchments due to the extent of coal mining and industrial development in the region. The Wilge River catchment, and Olifants River catchment have little or no assimilative capacity for additional pollutants. In addition, volumes of water in these rivers need to be maintained to meet reserve requirements as well as agricultural and domestic use needs.

The project would therefore need to ensure that:

- Storm water contamination would be minimised by diverting clean water around infrastructure and the ash facility.
- Any dirty storm water would be properly contained and no spillages or leaks occur.
- Any excess dirty water is treated and re-used.

Black & Veatch (BV) has indicated that the power plant would be a zero effluent discharge plant. Contaminated storm water will be captured within the footprint of the power plant in a holding dam, and would be re-used, recycled, treated within the plant or used to moisten the ash before it can be conveyed to the ash facility. Process water, mainly used in the boilers, will essentially constitute a closed circuit, and water would

be required to make up for evaporative losses and the water in the ash that leaves the power plant.

4.10.2 Air quality

A significant volume of South Africa's coal reserves are found in Mpumalanga, resulting in a concentration of coal mines and power generation facilities. As a result, air quality and water quality impacts have become significant issues for communities in the area.

The Highveld region was declared an air priority area in November 2007 due to the significant number of power stations, mines and industries contributing to sulphur dioxide, particulate and nitrous oxide emissions in the region. Currently, national emission standards apply to the area although the legislation allows for stricter emission standards to be enforced in order to alleviate the current ambient pollutant levels. Thus, the power station may need to meet stringent emission standards in its design and operation.

From a national perspective, reliance on coal-based electricity will continue into the foreseeable future, as discussed in Section 2.9.1.Thus, whilst stringent emission limits may apply to mines and power generation facilities in the Highveld Priority area, development of such facilities are unlikely to be curbed, in order to ensure sufficient electricity supply for South Africa. As reliance moves to other sources of energy such as nuclear, gas and imported hydro-electricity, the number of new coal-based power facilities will reduce and eventually cease over time.

The Highveld Priority Area Air Management Plan was promulgated on 2 March 2012 (GN 144, 2012). The primary motive of the plan is to achieve and maintain compliance with ambient air quality standards across the priority area. A baseline assessment is included in the plan, highlighting geographical areas of concern where air quality interventions are to be focussed. The key pollutants of concerns are particulates, sulphur dioxide and nitrous oxide emissions. The baseline assessment indicates that dust from opencast mining haul roads contribute approximately half the PM10 emissions in the priority area, while power generation contributes 73% of the nitrous oxide emissions and 82% of the sulphur dioxide emissions in the area.

Stakeholders have highlighted the poor ambient air quality in the area as a key concern and have raised the issue that new power stations will exacerbate ambient conditions. The Highveld Priority Area Air Management Plan aims to equitably reduce industrial emissions by 2020 to achieve compliance with ambient standards, with strategic level interventions. However, the focus of the plan is on existing sources and it is not explicitly indicated how new sources should be addressed. Nevertheless, an air emission license application for a new development in the Vaal Priority Area has recently been approved. This new development would contribute to cumulative emissions in that priority area, while its design is based on being well within our emission standards. Thus, it is anticipated that regulatory departments will not stop new developments that contribute to the ambient situation. However, it is also anticipated that such new developments would be required to meet our emission standards, and focus is given to reducing existing sources in the near future through interventions. This approach is considered fair, since new developments would not be penalised for existing conditions, but need to take cognisance of existing conditions in its design. The KiPower development will use sorbents within the process to meet sulphur dioxide and nitrous oxide emission standards, and if necessary, additional interventions such as treatment of the flue gases can be implemented to meet stricter standards if this becomes the requirement for the area in future.

4.10.3 Location of the project

Stakeholders have expressed the concern that, with Kriel, Matla, Kelvin and Kendal power stations in close proximity, a new coal based power station in Delmas would significantly add to the emission loads in the area.

Nine hotspot areas were identified in the baseline assessment of the Highveld Priority Area Air Management Plan, where exceedances of ambient particulates, sulphur dioxide and nitrous oxide standards are experienced. Two hotspots where exceedances of all three pollutants are experienced are within the Secunda and Steve Tshwete municipalities. Four hotspots experience particulate and sulphur dioxide exceedances in Emalahleni, Ermelo, Ekurhuleni and Lekwa. Two hotspots in the Kriel and Delmas municipalities are based only on sulphur dioxide exceedances and the hotspot in Balfour on particulate exceedances. The hotspot in Delmas is in the north-eastern quadrant of the municipality, closer to Kriel, Matla and Kendal. Kelvin falls within the Ekurhuleni hotspot.

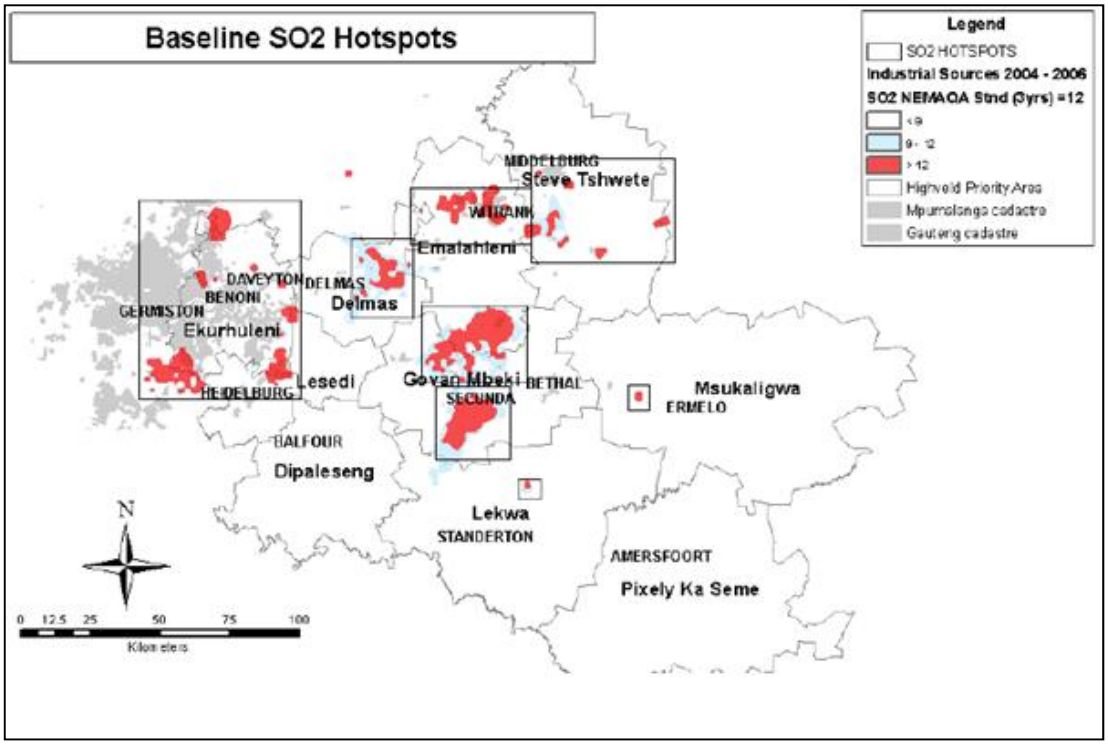

Figure 4.2: Highveld Priority Area SO_2 hotspots (from GN144)

In the site selection process, the location of the power plant and associated ash facility were limited to a 10km radius of the coal source, i.e. Delmas Coal. This was based on the project premise of a mine-mouth power plant and an economic limit of 10km indicated by the project development team. If the power plant is located further away from Delmas Coal, it would be closer to existing hotspots either in Kriel, Ekurhuleni, Balfour or Secunda. This would not reduce the impact of the power plant in the region and in fact, could exacerbate current unacceptable conditions in close proximity to these hotspots. Currently, the proposed location is outside of the hotspots. The dispersion modelling of the power plant emissions would predict ambient levels around the power plant, and it needs to be seen if the predicted ambient levels would exceed current standards. This will be done in the impact assessment phase of the EIA process. If necessary, more strict emission standards can be met by including

additional interventions in the design, such as flue gas treatment, which would reduce predicted ambient conditions around the plant.

4.10.4 Socio-economic conditions

The Delmas area has a high unemployment level, which poses an opportunity for the project in terms of labour provision. However, skills levels are generally low, and this may result in skilled labour being imported into the area. In 2001, a quarter (25.9%) of the population aged 20 years and older had no form of schooling - see **Appendix C**.

Opportunities to maximise local labour use should be investigated prior to construction so that local communities benefit from the project in terms of job creation and skills development.

5. PUBLIC PARTICIPATION DURING THE SCOPING PHASE

5.1 Application and commencement of process

The relevant application forms were completed and submitted in June and July of 2011 to the DEA. The DEA acknowledged receipt of the forms on 13 July 2011 and has issued the following reference numbers to the project:

- DEA Ref No.: 12/12/20/2333; and
- NEAS Ref No.: DEA/EIA/0000364/2011

5.2 Advertisement and site notices

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

Table 5.1: Advertisements placed during the announcement phase

NEWSPAPER	DATE
Springs Advertiser	20 July 2011
Streeknuus	20 July 2011
Beeld	21 July 2011

Site notice boards were positioned at prominent localities on 21 July 2011 on all roads in the study area. These notice boards were placed at conspicuous places and at various public places (see **Appendix D**, which provides a detailed register of where the site notices were placed and photographs).

5.3 Notice to potential IAPs

Notification letters (in both English and Afrikaans) were sent by registered mail on 24 June 2011 to all potentially affected stakeholders living on the alternative sites. The notification letter included a map of the study area, a background information document (BID), farms which are included in the potential alternative sites and a comment sheet. (See **Appendix D** for proof of notification).

A 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 interested and potentially affected stakeholders on 20 July 2011. (See **Appendix D** for the stakeholder database).

A collage of BIDs handed out during this exercise is also attached to **Appendix D**.

5.4 Register of IAPs

All IAPs that responded to the site notice, advertisements and notice are on the register of IAPs provided in **Appendix D**. The register includes all affected landowners, key authorities, ward councillors and municipal officers.

5.5 Landowner contact

A meeting was held on 11 August 2011 at Delmas Coal with potentially directly affected landowners to discuss the proposed project. All potentially affected landowners with

property on the alternative sites attended the meeting. The objectives of the meeting were to:

- Provide some background to the project;
- Explain the regulatory processes to be followed;
- Present and discuss the site selection process and findings; and
- Discuss the availability of land for the proposed project.

All landowners also indicated they would not have a problem in selling their property should it fall in the selected alternative for this proposed project. (See **Appendix D** for the attendance register and minutes of the meeting).

5.6 Issues raised

The issues raised in the announcement phase of the project were captured in a Comments and Responses Report (CRR) Version 1 and appended to the DSR. The CRR was updated to include additional Interested and Affected Parties contributions that were received during the Scoping Phase, and Version 2 is appended to this FSR (**Appendix D**).

The following versions of the CRR are compiled (every version is an update of the previous version):

- Version 1 appended to the Draft Scoping Report;
- Version 2 appended to the Final Draft Scoping Report;
- Version 3 appended to the Draft Environmental Impact Assessment Report; and
- Version 4 appended to the Final Environmental Impact Assessment Report.

5.7 Public review of this Draft Scoping Report

5.7.1 Comment period

I&APs had an opportunity to comment on the Draft Scoping Report from Thursday, 22 March to Friday, 11 May 2012.

5.7.2 Availability of DSR for comment

A letter was emailed, faxed and posted to registered IAPs to announce the availability of the Draft Scoping Report. A copy of the letter is included in **Appendix D**.

In addition, advertisements will be placed in The Springs Advertiser and Streeknuus newspaper to advertise the availability of the DSR for comment in the week of 19 March 2012. The report was available on the Jones & Wagener and the Zitholele Consulting websites for stakeholders to comment on: www.jaws.co.za and www.zitholele.co.za. In addition, copies of the report were available at the following public places and upon request:

Contact	Location	Contact Tel
Ms Lydia Mehlape	Delmas Public Library, Delmas	Tel: 013 665 2425
Reception	Delmas Coal	Tel: 013 665 7000
Thandiwe Mbongwa	Jones & Wagener, 59 Bevan Road, Rivonia	Tel: 011 519 0200
Mr Andre Joubert	Zitholele Consulting, Thandanani Park, Matuka Close, Halfway Gardens, Midrand	Tel: 011 207 2077

The Draft Scoping Report was made available on CD upon request.

5.7.3 IAP and Authorities meetings during public review of DSR

An Authority meeting and two meetings were held to provide IAPs with an opportunity to comment on the DSR and to meet and interact with the EIA team as follows, and the attendance registers and minutes of these meetings are given in **Appendix D**:

Meeting details	Authorities meeting	IAP and landowner meeting
Date	Thursday, 19 April 2012	Thursday, 19 April 2012
Venue	Conference Centre, Delmas Coal	Conference Centre, Delmas Coal
Time	14:00 to 15:30	16:00 18:00 (Open House) 18:00 to 19:30 (Public meeting)

5.8 Final Scoping Report

I&APs have an opportunity to comment on this Final Scoping Report from **Wednesday, 27 June to Friday, 20 July 2012.**

5.8.1 Availability of FSR for comment

A letter was e-mailed, faxed and posted to registered IAPs to announce the availability of the Final Scoping Report. A copy of the letter is included in **Appendix D**. The report is available on the Jones & Wagener and the Zitholele Consulting websites for stakeholders to comment on: www.jaws.co.za and www.zitholele.co.za. In addition, copies of the report are available at the following public places and upon request:

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Mr Andre Joubert	Zitholele Consulting, Thandanani Park, Matuka Close, Halfway Gardens, Midrand	Tel: 011 207 2077

The Final Scoping Report is available on CD upon request.

This Final Scoping Report (FSR) is being submitted to the DEA together will all comments received on this report for a decision on whether or not the EIA team may proceed or not with the impact assessment. Any comments received will be responded to and sent on to DEA, and will be included in the CRR Version 3.

6. PLAN OF STUDY FOR IMPACT ASSESSMENT

6.1 Introduction

A Plan of Study for the EIA is required in terms of the EIA regulations when a Scoping and EIA is undertaken. The objective is for the approving authorities, in this case the DEA, the DWA and MDEDET to verify that those issues and concerns identified by the EAP and I&APs are investigated and addressed in the Environmental Impact Assessment Phase of the project. Where significant impacts have been identified and mitigation measures developed, these measures have to be included in the EMPr.

6.2 Issues raised by IAPS during scoping

The following key issues were raised by IAPs during scoping:

- Construction impacts must be adequately covered in the impact assessment;
- Integration of the water balances for Delmas Coal and KiPower is needed to ensure there are no problems in future;
- The impact of the project on water and sheep must be investigated;
- Contamination of wetlands due to the ash stack;
- Emissions need to be minimised;
- Greenhouse gas emissions must be minimised;
- Impact of the project on the dam on Haverklip farm property;
- Sufficient notification must be given to landowners for any studies to be conducted;
- People may not enter private land without permission;
- Cumulative air quality impacts within a region already polluted by other power stations and mining developments;
- The ongoing use of coal for power generation;
- Cumulative traffic impacts due to other proposed developments;
- Financial provision for rehabilitation and closure;
- Current inadequate environmental management at Delmas Coal; and
- The site selection process.

These issues are responded to in the IRR attached to this report. Those dealing with impacts associated with the project are taken into consideration in the specialist studies being conducted for the project.

6.3 Specialist studies

The following specialist assessments will be carried out during the impact assessment. These were identified based on the issues raised to date, as well as, by the EAP and project team based on the nature of the project.

6.3.1 Air quality impact assessment

This study will be conducted by Airshed Planning Professionals. They will also prepare the licence applications for the required emissions licences for the Power Plant as required in terms of the provisions of the NEM:AQA. Since best practice measures can

be applied to address construction impacts, the air impact assessment will focus on operational impacts. There are two components to the study: establishing the baseline, and the impact assessment. In this study both the Power Plant and ash stack emissions will be covered, as well as coal stockpile and sorbent storage areas.

6.3.1.1. Baseline

The main aim of air quality management is to reduce the risk to human health and the environment due to air pollution. The air quality baseline assessment will therefore aim to provide an accurate reflection of the current air quality in the region, and the air quality assessment will superimpose the air quality effects of the different aspects of the project on the baseline. This will be done by undertaking the following tasks:

- Description of legal requirements and all relevant air quality guidelines and standards. This will include the air quality legislation for South Africa, taking into account the requirements according to the National Environmental Management: Air Quality Act, the conditions of the National Framework, the national ambient standards and the minimum national emission limits for listed activities (both now available as regulations). In addition, the study will also take into account that the KiPower Power Plant is located in the Highveld
- Collect and collate ambient and meteorological data from stations in the region. This will include wind speed, wind direction, temperature, precipitation, humidity, sigma theta (if available) and solar radiation. Ambient monitored data will be assessed as made available by the client or as published in accessible literature.
- Setup of a suitable model to simulate a three dimensional wind field for the area.
- Identify all existing sources of emissions in the region to ensure cumulative impacts can be assessed.

6.3.1.2. Impact assessment

The impact assessment is based on the use of a dispersion model that simulates the way emissions would move through air and thereby reach ground levels where people, animals and plants can be affected by them. A dispersion model helps to determine the areas and extent of potential impact. Airshed will use either the USA EPA AERMOD model(which has recently superseded the widely used Industrial Source Complex (ISC) model as regulatory model in the US) or AERMOD model from the UK. The following will be undertaken for the impact assessment:

- Compile an emissions inventory for the project including all sources of emissions and all pollutants of concern. The pollutants to be addressed will include the criteria pollutants (i.e. respirable dust, SO2, NOx, CO, Benzene and Ozone), but other relevant pollutants that may become apparent from the process description will also be simulated.
- Setup of a regional dispersion model (US.EPA approved CALPUF, AERMOD or ADMS model) for dispersion simulations.
- Assess the predicted impacts based on ambient air quality standards and occupational health screening criteria. Proposed and regulated South African Standards will be used. International standards and screening criteria will also be cited where appropriate.
- Based on the preferred site location and micro site selection, a monitoring network will be proposed and mitigation measures will also be listed.

- Inputs to the EMP as indicated by the impact assessment will be proposed.
- Emission license application forms to be submitted to the DEA or to the local licensing authority (the correct authority will be determined by project timing and by the schedule for transfer of licensing responsibilities between DEA, district municipality and provincial authority).

6.3.2 Surface water impact assessment

Since best practice measures can be applied to address construction impacts, the impact assessment will focus on operational impacts. The surface water assessment will be done by J&W surface water specialists. There are several components of this assessment as follows:

- Establishment of a baseline for water quality and quantity in local rivers to ensure cumulative impacts can be assessed. Monitoring data from Delmas Coal is available;
- Flood line determinations for river and wetland crossings by conveyors and access roads;
- Water balance for the power plant and assessment of the adequacy of storm water and process water systems;
- Water balance for the ash facility and assessment of the adequacy of storm water and process water systems;
- Impact of any potential spillage or leaks from the power plant and ash facility into the local surface water bodies.

6.3.2.1. Baseline

Existing monitoring information for the area will be used to determine the current profile for water quality and flows in the area.

6.3.2.2. Flood lines

Where needed, flood line determinations will be done for river and wetland crossings, to feed into the design of the crossings, as well as for use in the water use license applications for the wetland and river crossings. Flood lines for the section of the Wilge River running past the proposed ash facility will be done to feed into the design of the ash facility.

6.3.2.3. Power plant

The water balance for the power plant will be drawn up taking into consideration the site layout, design of water retaining structures and footprint of the plant. The plant design will also be assessed in terms of GN704[3]and the NEM:WA waste regulations to ensure adequacy of water management on the plant. The potential for spills will be determined based on the design by simulating water levels in water retaining structures over time, using historical rainfall records. Specifically, historical high rainfall events will be considered to determine potential spills due to heavy rains.

[3]The GN704 regulations, promulgated under the National Water Act, stipulate the design and management requirements for water management infrastructure.

6.3.2.4. Ash facility

The water balance for the ash plant will be drawn up taking into consideration the site layout, design of water retaining structures and footprint of the facility. The design will also be assessed in terms of GN704, the DWAF's Minimum Requirements, as well as the Department of Environmental Affairs' draft classification and disposal regulations to ensure adequacy of water management on the ash disposal facility. .

The potential for spills will be determined based on the design by simulating water levels in water retaining structures over time, using historical rainfall records. Specifically, historical high rainfall events will be considered to determine potential spills due to heavy rains.

6.3.2.5. Leaks and spills

Leaks and spills will be assessed based on the likelihood of occurrence assessed for the power plant and ash facility, as well as, the potential size and water quality of such spills. These will be simulated within the receiving local rivers to determine how the water quality in rivers could change due to spills and leaks. Where necessary, mitigation measures will be recommended to avoid ensure local receiving water quality objectives are not exceeded.

6.3.3 Ground water impact assessment

Since best practice measures can be applied to address construction impacts, the impact assessment will focus on operational impacts. The objective of this assessment will be to simulate the likely leakage rate of the dry ash disposal facility into the receiving environment when using the proposed barrier system. Once the leaking rate is known and the impact on the environment determined, the significance of the impact can be established. In the case that the impact is significant, the barrier system below the ash disposal facility can be adjusted for additional protection.

This assessment will be a combined assessment by JMA Consulting, Mr Albert van Zyl and Jones and Wagener. The assessment will undertake the following work:

6.3.3.1. Baseline

A hydro census of the area will be carried out to

- Determine all current users of ground water;
- Obtain water samples from existing boreholes;
- Determine the current water quality in the area, and;
- Determine water levels in boreholes.

This work will ensure cumulative impacts can be assessed.

6.3.3.2. Geochemical modelling

Simulated ash will be analysed to define the chemical composition of the ash dam and identify potential contaminants. These simulated ash samples will be produced at the Eskom coal testing facility. Samples with sorbent will be generated to ensure the sulphate generation potential is better understood. Samples will be subjected to the following analysis:

- Acid Base Accounting;

- Sulphur speciation;
- NAG;
- XRD;
- Total Acid Digest plus ICP-MS;
- Toxic Characteristic Leach Procedure (TCLP) plus ICP-MS;
- SPLP Plus ICP-MS; and
- Water extract plus cation and anion analysis.

6.3.3.3. Characterisation of potential leachate from ash facility

The objectives for the source term characterization are:

- To provide the likely and range of seepage volumes emanating from the ash material;
- To provide the likely and range of seepage loads from the ash material based on the predicted seepage volumes and seepage qualities though the ash; and
- To provide the likely and range of leakage volumes and loads through the engineered liner system.

Two scenarios will be considered, namely:

- An open waste surface with a theoretical receptor (groundwater user) at the base of the waste profile; and
- An open waste surface and an engineered liner system with a theoretical receptor at the base of the liner system.

It will be assumed that there is no lateral seepage from the facility.

The geo-hydraulic properties of the ash materials will be determined at an approved laboratory and will include permeability, water retentivity (ability of the ash to hold water), particle density and particle size distribution analyses. The seepage analysis will be conducted using the one dimensional code of the Soil Vision finite element numerical model, which allows consideration of both unsaturated and saturated flow conditions.

The seepage rates from the waste profile will be simulated as a function of site specific climatic conditions, geo-hydraulic properties of the ash materials, disposal strategy and rate of rise of the ash profile. Seepage volumes will be determined from the modelled seepage rates and the area of the waste facility. The liner performance modelling will be based on the predicted seepage rates and characteristics of the facility and drainage and liner (barrier) systems. The predicted leakage rates will be combined with the seepage qualities to calculate the leakage loads through the liner system. The leakage loads will be compared to the loading rates determined from the Minimum Requirements to establish whether compliance is being met.

6.3.3.4. Impact assessment for ash facility

The geochemical modelling and leachate characterisation will provide the basis for the impact assessment of the ash facility. Potential leachate migrating through the proposed barrier system into the natural ground water will be simulated in a ground water dispersion model to determine what the resultant change in ground water quality would be, how far the change would be experienced and who might be impacted by the

change. Should a significant impact be predicted, mitigation measures, such as an improved barrier system, will be recommended where needed to ensure potential impacts are curbed to stay within acceptable water quality standards.

6.3.4 Soils assessment

The soils assessment for the power plant area has been done previously and this information will be brought into the impact assessment. A survey of soil types will be done for the ash facility. Soil will be characterised in terms of agricultural potential.

Measures to conserve and re-use soils will be outlined in the study. This work will either be done by a J&W soils specialist or by another specialist yet to be appointed.

6.3.5 Ecology, wetlands and aquatics

Previous ecological surveys of the power plant site (Site 5) and the ash disposal facility (Site 3) has been carried out by Natural Scientific Services. This previous work will be updated and brought into the impact assessment.

6.3.5.1. Terrestrial assessment

- An initial desktop review of available literature
- A field visit investigating the following:
    a. Habitat / vegetation communities and the common/dominant plant species within these zones using approved vegetation sampling methods;
    b. Faunal species will be recorded by both trapping methods (in the remaining natural areas between all three components) and through visual observations (visual presence of animals or evidence of animals in the form of faeces, pellets, spoor, nests, burrows, feathers etc.); and
    c. Any additional information will be recorded for any other features that may have ecological significance.
- A report detailing the information from the assessment.

6.3.5.2. Aquatic assessment

The aquatic assessment will focus mainly on the Wilge River and tributaries entering the study area from the south and exiting in the north and will include the following:

- An initial desktop review of available literature
- A field investigation in the summer season – (High Flow regime). Water quality sampling (in situ variables) specific to bio monitoring will be performed at the same time the aquatic sampling is performed;
- A report detailing the information from the assessment.

6.3.5.3. Wetland assessment

The wetland assessment will include the following:

- Identification and classification of wetland types identified;
- Delineation of wetlands in accordance with the DWAF (2005) guidelines: “A practical field procedure for identification and delineation of wetlands and riparian areas”;

- Wetland Habitat Integrity Assessment. The methodology used will be dependent on the wetland types identified; and
- A report detailing the information from the assessment.

6.3.6 Traffic

Goba Consulting Engineers will undertake the traffic impact assessment. For projects of this nature, the impact of construction traffic needs to be quantified, as well as the transportation of abnormally dimensioned machine components, on the road network and the receiving environment. The site is well accessed by the national road network (N4 and N12) as well as various provincial roads. In this light, the following study elements will be undertaken as part of this work:

- The traffic impact of construction vehicles transporting large machine components to the site will be analysed. An appropriate route will be recommended and, should the load exceed legal requirements, an abnormal load permit will be required.
- During the construction of the power station and ash disposal facility, the impact of construction vehicle and employee movements on the external road network and any disruption to the normal traffic flow as a result, will need to be examined.
- The impact both of the abnormally loaded vehicles, as well as general construction traffic on the pavement structure will need to be assessed.

The following methodology to carry out the above scope of work is proposed:

- Compile a list of technical information to be obtained from the engineering team that is to include:
    a. Details of the traffic/truck volumes operating to/from the sites as well as the arrival/departure profiles during the construction of each module of the power station (i.e. Coal Fired Power Station, Electrical Substation, Transmission Power Line, Coal Washing Plant, Coal Conveyor Belt, Ash Dump, Water Reservoir, Water Treatment Plant and Access Road);
    b. Dimensions and mass details of machine components to be transported;
    c. Destination of the truck traffic;
    d. Other vehicle movements, such as transportation of ash to be transported to the ash disposal facility by truck; and
    e. Staff movements and transport during operation of the Power Plant.
- Conduct a desktop study to determine the most feasible route for transportation of abnormal loads, contact details of all relevant authorities, procedures to be followed to obtain necessary permits for abnormal loads, contact details of recognised structural engineers for a route clearance study, etc.
- Conduct site visits to:
    a. assess the road network to/from the various sites, including the accesses onto the external road network and key intersection(s) onto the national road network;
    b. Undertake a preliminary on-site route survey of the routes to identify any physical / engineering constraints and provide a summary of those aspects, which will require further in-depth study/survey in order to proceed. This is required for the abnormally loaded vehicles

- Obtain existing traffic counts on the external road network and where necessary arrange to undertake additional traffic count surveys and analyse this data;
- Undertake an assessment of the information provided in order to assess potential impacts on the surrounding primary, secondary and tertiary road network and any safety issues within the sites.
- Compile a traffic/transport impact assessment report that describes the issues, consequences and mitigation that may be required as a result of the proposed Power Plant.

6.3.7 Heritage

A heritage assessment will be carried out by a specialist, in compliance with the requirements of the National Heritage Resources Act of 1999 as amended. The heritage assessment will involve a detailed survey of the power plant and ash disposal facility sites, as well as major infrastructure routes for conveyors, roads and pipelines. The field survey will focus on:

- Identifying types and ranges of heritage resources;
- Describing and geo-referencing heritage resources;
- Mapping of heritage resources on (layered) maps;
- Indicating/assessing significance of heritage resources; and
- Proposing mitigation measures for heritage resources.

In the case that heritage resources, such as old buildings, have to be demolished, a secondary assessment will be required and application then made for a destruction licence. In the case of graves, application will also have to be made for the required permits to exhume and relocate these.

6.3.8 Socio-economic

MasterQ Research will conduct the socio-economic assessment. A scoping study has been completed in 2010, and the baseline information from this study has been summarised in Section 4.9. One of the key issues to be addressed in this assessment is construction related impacts.

6.3.8.1. Data collection

Additional depth will be added to data collected during the Scoping Phase such as:

- Issues/concerns raised as part of the issues and response register. Typically the public consultation process will include one on one interviews with key stakeholders, either face to face or telephonically, and focus group meetings – particularly with interest groups. As the various stakeholder groupings have different interests, all forms of I&AP consultation will be guided by a sector specific discussion guides. Where possible, the social and economic specialist will conduct their I&AP consultation on the same platform to prevent duplication and to curb costs as far as possible.
- Information on the project itself (i.e. project activities and timelines), as well as baseline data on the current and future social and economic processes in the area(s) and/or local communities likely to be affected. The following data will be studied:

- A desktop review of the latest versions of the Victor Khanye and Govan Mbeki Local, and Nkangala and Gert Sibande District Municipalities 'Integrated Development Plans (IDP); Spatial Development Frameworks (SDF) (if available); Environmental Management Frameworks (EMF) (if available); and State of Environment Reports (SOER) (if available).
- A desktop review of the Growth and Development Strategy (GDS), SDF and SOER of the Mpumalanga Province;

6.3.8.2. Economic Research Process

As a point of departure the social and economic specialist will try to understand the national, regional and local pressures in existence that may influence economic conditions. They will then look at the economic conditions themselves and the implications which arise from them. Finally they will research the resulting effects of a proposed project and all options in the economy at the 3 levels. Therefore, the aim is to make recommendations on the available options by adopting a holistic approach rather than focusing only on the resulting effects of a project.

The determination of economic benefits and opportunity costs will form an important information source for decision making on the developments and the manner of execution. The EA components would therefore form an integral part of the overall SEIA process. The EA will be conducted in parallel to and integrated into the SEIA Report and will consist of the following four steps:

- Step 1: Desktop and Field Research;
- Step 2: Data Modelling;
- Step 3: Data Interpretation and Impacts/Implications;
- Step 4: Report Composition.

Desktop and Field Research

Field research will take place in collaboration with the Social study and will include a site visit and I&AP consultation as outlined above.

Economic Data Modelling

The following expected economic impacts will be modelled:

- Output and Production: determine how the power plant will contribute to economic production and output on the domestic economy during both the construction as well as the operational phases.
- Employment: Determine how the power plant will contribute to employment in the domestic economy during both the construction as well as the operational phases.
- Quantification of localised production, employment and income losses close to the site for landowners, tenants and workers.
- Property impacts: how the development of the power plant may affect property values for specific land use types.
- Capital goods: Determine if there will by any loss of capital goods (such as buildings) due to the project and the cost of these.

- Determine economic displacement and hassle costs if there are possible monetary loss due to the displacement or increased level of difficulty in earning an income or conducting business.
- Benefits or loss to government in terms of tax and levies: determine which monetary values could be forfeited or gained by government as a result of the project.
- Cumulative economic effects in terms of changes to local industries and the local business climate due to power plant in the area by determining and specifying qualitative multiple project and progressive industrialisation of the area in terms of the local and regional economy.

Modern quantitative techniques are used to process obtained data and to place this in an understandable framework. The output of the analysis is most often a series of graphs and tables. The goal is to quantify economic costs and benefits using these methods in order to form a balanced picture of the economic viability of the project. A sensitivity analysis is often conducted to cater for a series of possible scenarios, e.g.:

Impact Assessment

This component of the socio-economic study will involve modelling the direct and indirect impacts of project activities on the socio-economic environment. Given the nature of the development, the following change processes are expected to occur, which in turn would lead to a number of socio-economic impacts:

- A change in land use, affecting people's sense of place, income, etc.;
- An influx of unemployed job seekers;
- Possible continuous conflict situations with neighbouring landowners and residents of nearby towns and settlements;
- Public resistance to the proposed project;
- Employment as a result of project activities; and
- A potential increase in crime during the construction phase.

Please note that this list is not exhaustive of the socio-economic impacts expected, but merely an indication of the types of change processes that might occur.

Important to note is that the findings of the SEIA will also rely on the findings of other specialist studies, most notably the Groundwater Study, the Air Quality Study, the Noise Impact Assessment Study, the Visual Impact Assessment Study and the Land Use map. The findings of these studies are often relevant to the SEIA as:

- Impacts on visual quality affects people's sense of place;
- Impacts on air quality affects people's health;
- Increased noise levels affects people's quality of life;
- Contamination of ground water can affect people's water sources; and
- Impacts on, for example, a decrease in agricultural land can lead to economic impacts.

Mitigation Measures

The identification of mitigation and/or enhancement measures entails the formulation of recommendations regarding measures to either prevent or reduce the effect of any of

the identified negative impacts, or to encourage or enhance any identified positive impacts. The predicted effectiveness of such mitigation measures will also be indicated by re-assessing al impacts post-mitigation.

6.3.9 Geo-technical

This work will be done by J&W's geotechnical specialists.

The objective of this work is to obtain a firm understanding of the material and soil conditions on the site for the purposes of the preliminary design of the Power Plant and ash disposal facility and obtaining the required licences. This detailed geotechnical fieldwork investigation will include test pitting, soil profiling, sampling and laboratory analysis, data interpretation and drafting of the geotechnical report. Laboratory testing will include foundation indicator and permeability testing in order to establish the suitability of the on-site soils for potential liner construction and capping of the ash disposal facility..The information will also be used by Black and Veatch for the foundation design of the Power Plant.

6.3.10 Noise

The noise assessment will be carried out by JH Consulting. A baseline noise survey and noise impact assessment will be carried out to measure the existing noise and predict the impact on the surroundings due to construction and operation of the plant and ash disposal facility, as well as recommend procedures and methods to mitigate such impact, if appropriate. The following are the minimum activities required to perform the assessment, assuming that the impact on sensitive receptors outside the boundaries of the site and/or specifically identified properties are required.

- The initial baseline noise measurement survey to determine existing noise levels at the boundaries of the surface infrastructure and any other possible plant sites, and at specific sensitive receptors if applicable;
- The prediction of the operational noise levels and public response at the boundaries and also at any specific individually identified potentially exposed properties outside the boundaries of the site; and
- Recommendation of mitigation methods should these be necessary or appropriate.

6.3.11 Visual

The visual assessment will be carried out by Newtown Landscape Architects.

6.3.11.1. Baseline survey

The study area will be visited and data collected and photographs taken. Data collected during the site visit will allow for a comprehensive description and characterization of the receiving environment and would identify issues that need to be addressed in the impact assessment phase for the selected sites, especially the ash disposal facility, which will be a permanent fixture of the area. It is understood that the process is iterative and contact with the client's personnel / project team throughout this and the second phase is required to ensure that issues that may affect development plans and could mitigate impact, need to be raised as soon as they are identified.

6.3.11.2. Evaluation Phase

This phase involves the determination of impacts and would utilize modelling techniques that establish visual intrusion, visibility and visual exposure of the project components. These criteria are required to rate the magnitude of the impact. The significance of the impact will be determined using the format / criteria provided by the EAP – see Section 6.4. Cumulative impacts, as wells the impacts of all phases of the project will be assessed.

6.4 Assessment of impacts

The significance (quantification) of potential environmental impacts identified during scoping and identified during the specialist investigations will be determined using a ranking scale, based on the following:

- Occurrence
  - Probability of occurrence (how likely is it that the impact may/will occur?), and
  - Duration of occurrence (how long may/will it last?)
- Severity
  - Magnitude (severity) of impact (will the impact be of high, moderate or low severity?), and
  - Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?)

Each of these factors has been assessed for each potential impact using the following ranking scales:

Probability: 5 – Definite/don't know 4 – Highly probable 3 – Medium probability 2 – Low probability 1 – Improbable 0 – None	Duration: 5 – Permanent 4 - Long-term (ceases with the operational life) 3 - Medium-term (5-15 years) 2 - Short-term (0-5 years) 1 – Immediate
Scale: 5 – International 4 – National 3 – Regional 2 – Local 1 – Site only 0 – None	Magnitude: 10 - Very high/don't know 8 – High 6 – Moderate 4 – Low 2 – Minor

The environmental significance of each potential impact will be assessed using the following formula:

Significance Points (SP) = (Magnitude + Duration + Scale) x Probability

The maximum value is 100 Significance Points (SP). Potential environmental impacts will be rated as very high, high, moderate, low or very low significance on the following basis:

- More than 80 significance points indicates VERY HIGH environmental significance.
- Between 60 and 80 significance points indicates HIGH environmental significance.
- Between 40 and 60 significance points indicates MODERATE environmental significance.
- Between 20 and 40 significance points indicates LOW environmental significance.
- Less than 20 significance points indicates VERY LOW environmental significance.

Both incremental and cumulative impacts will be assessed.

6.5 Environmental Impact Report (EIR) and EMPr

Findings and/or recommendations of the specialist studies will be integrated into a report that will be updated as comments are received from I&APs. The draft reports will be made available for a first public review, during which period a public meeting/open day will also be held. Once feedback from the IAPs has been received, these will be considered and included in the final EIR, EMPr and specialist studies.

The Final EIR together with a final construction and operation EMPr and supporting specialist reports will be submitted to DEA. At the same time the final documents will also be made available to the IAPs and commenting authorities for final review period. After the review period the DEA will commence processing the application for authorisation.

6.6 Integrated Water use license application

Additional information required for a water license application will be compiled into an Integrated Water Use License Application (IWULA) in addition to the EIR and EMPr. This draft report will also be subject to public review together with the Draft EIR and EMPr, and the final documents will also be made available for final scrutiny and comment when submitted to the DEA. The WULA will be supported by an Integrated Water and Waste Management Plan (IWWMP) which will be put together using the information from the specialist assessments.

6.7 Waste license application

Additional information required for a waste license application will be compiled in the draft Licence Application Report in addition to the EIR and EMPr. This draft report will also be subject to public review together with the Draft EIR and EMPr, and the final documents will also be made available for final scrutiny and comment when submitted to the DEA. The Licence Application Report will include:

- Preliminary design drawings;
- Operating plan;
- Closure plan;
- Monitoring plan;
- Emergency Response Plan, etc.

6.8 Atmospheric Emissions Licence (AEL)

Additional design information and the necessary application forms will be submitted to the DEA and MDEDET for consideration. A preliminary license is usually provided by

the local municipality based on the application. Once operation commences and the emission limits can be proven, the formal license will be issued.

6.9 Public participation during the impact assessment

Public participation will focus on the review of the Draft Environmental Impact Assessment Report (EIR) and draft Environmental Management Plan (EMPr).

The Draft EIR and EMPr will be compiled once the specialist assessments are completed. This report will meet the requirements of the EIA regulations of 2010.

In addition to the Draft EIR and EMPr, the waste license application (which will include an integrated water and waste management plan), the atmospheric emission license application, and the water use license application will also be made available for public comment.

The reports will be made available for a period of at least 40 calendar days to IAPs for comment. During this period at least one IAP meeting will be held to obtain their comments on the reports.

Thereafter the reports will be updated with IAP comments and submitted to DEA for decision-making. The final reports will also be made available on the applicable websites for IAPs to review before the DEA commence with their review and drafting of the authorisation.

Other authorisations, such as the rezoning application will similarly be made available to the public. As the authorisations and/or licences may not necessarily be issued at the same point in time, a number of notices may have to be placed to notify all of their availability. However, the IAP meeting will be held during the review of the EIA and EMPr since the specialist studies for the EIA will form the basis of the applications for the other license applications.

Once the authorisation, waste licences, emissions licence and water use license have been issued these will be made available via post, newspapers and websites for public review. This action then leads into the formal appeal period.

7. CONCLUSION AND RECOMMENDATIONS

This Final Scoping Report meets the requirements of the EIA regulations for the scoping phase as shown in Section1.5. In addition, the site selection process, which entailed the identification and evaluation of alternative locations for the Power Plant and ash disposal facility, the work carried out during the scoping phase of the project was sufficient to identify two favoured sites to be taken forward in the EIA phase of the project for in-depth investigations.

Based on the foregoing it is therefore recommended that:

- This Final Scoping Report is made available to I&APs and authorities for comment while it is being submitted to the DEA for consideration.
- All comments that may be received on this Final Scoping Report is submitted to the DEA and recorded in the CRR Version 3, which will be appended to the Draft EIA report.
- The DEA process the scoping report with a view to provide approval to proceed with the EIA phase of the KiPower Power Plant project.
- In the EIA phase the focus of the specialist studies and site assessments will be on Sites 3 and 5 for the Power Plant and long term ash disposal facility.
- Once the required authorisations and licences have been obtained for the Power Plant and ash disposal facility, the land rezoning process will commence.

8. REFEENCES

1. Department of Energy, ***Integrated Resource Plan for Electricity: 2010 Revision 2***, 25 March 2011.
2. GNN 144, ***NEM:AQA Highveld Priority Area Air Management Plan***, 2 March 2012.

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Appendix A

EAP CV's

1. Marius van Zyl
2. Prav Sewmohan

Appendix B

SITE SELECTION INFORMATION

1. Site selection report for power plant and ash disposal facility
2. Cost comparison of different power plant and ash facility site options
3. Property value analysis in Delmas area
4. Stability analysis on undermined areas
5. Paired assessment of sites, an additional assessment

Appendix C

SUPPORTING SPECIALIST BASELINES

1. Heritage assessment by Cult Matrix
2. Social baseline by MasterQ

Appendix D

PUBLIC PARTICIPATION DOCUMENTS

1. Advertisements
2. Site notices
3. Land owner notification and announcement BID and letters
4. IAP register
5. Correspondence to IAPs and landowners
6. Landowner meeting attendance register
7. Comments and response report
8. Comments received from IAPs