

T16930/2008 TITLE DEED  
200000359746 ASSET NO

176 wa

PIET MARE  
089-263 5453 (CEL)  
218 (33/44) (24) (25/27) (32)  
38  
T12142/94

GENERAL POWER  
STATION TERRACE

SCHOONGEZICHT

SCHOONGEZICHT 218-12

ASH DUMP

21/218

T12142/94  
082-35  
218 (2) (5)

VAN RENSBURG  
013-6481629 (S)(22)

22/219

6950065  
Acre

T57492/1987  
Acre

17/219  
BOTHA

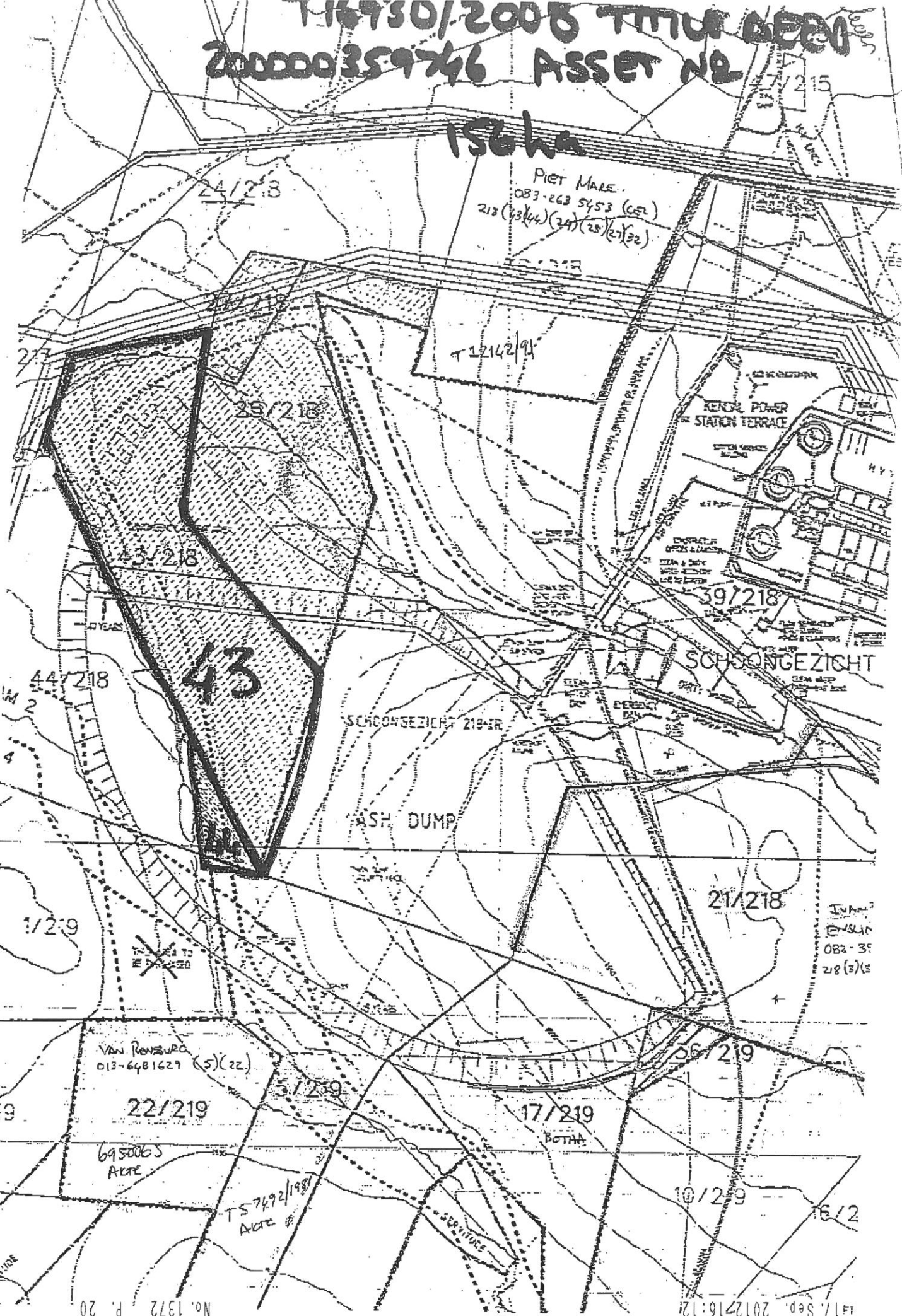
10/219

15/2

T 16930/2008 TITLE DEED  
200000359746 ASSET NO

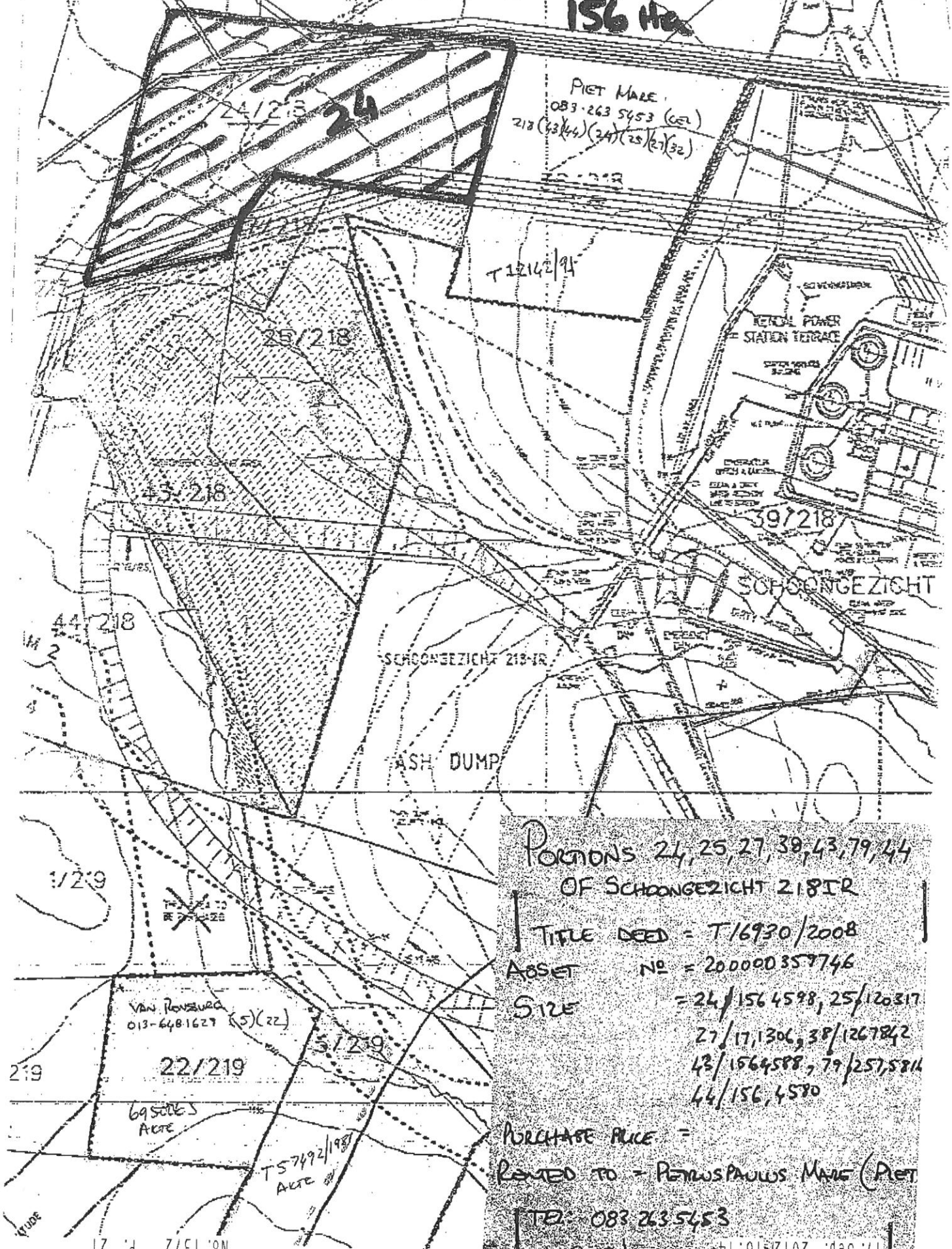
156 ha

PIET MARÉ  
083-263 5453 (CEL)  
212 (43)(44)(24)(25)(21)(32)





T 16930/2008 = TITLE DEED  
 200000359746 = ASSET NO  
 156 Ha



PIET MALE  
 083-263 5453 (CEL)  
 218 (33/44)(24)(25)(27)(32)

T 12142/94

39/218

SCHONGEZICHT

SCHONGEZICHT 218-IR

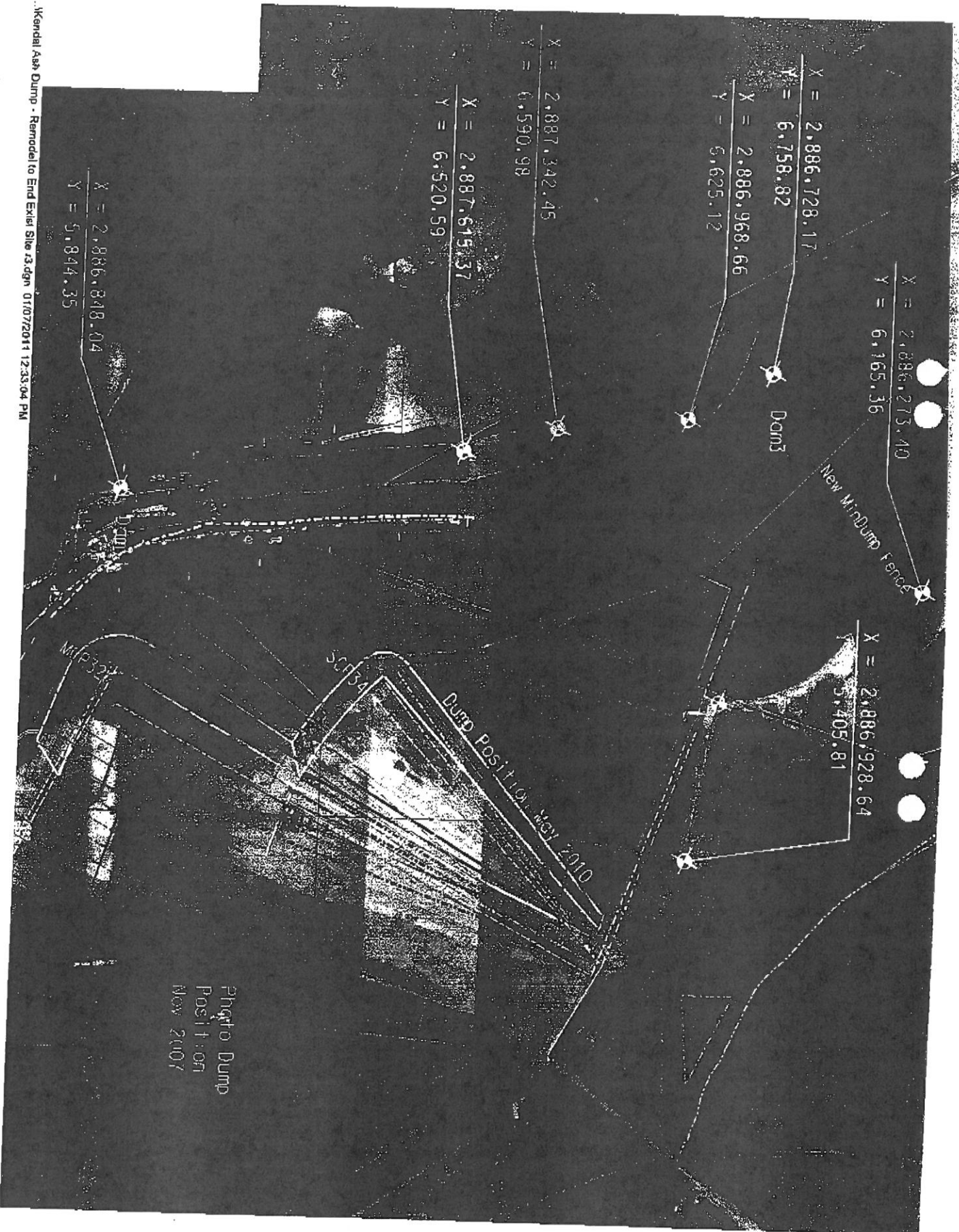
ASH DUMP

PORTIONS 24, 25, 27, 38, 43, 79, 44  
 OF SCHONGEZICHT 218-IR  
 TITLE DEED = T/16930/2008  
 ASSET NO = 200000359746  
 SIZE = 24/156,4598, 25/120,317  
 27/17,1306, 38/126,7842  
 43/156,4588, 79/257,5811  
 44/156,4580  
 PURCHASE PRICE =  
 RENTED TO = PETRUSPAULUS MALE (PIET)  
 TEL: 083 263 5453

VAN RENSBURG  
 013-6481627 (5)(22)

69 SQUARES  
 ACRE

T 57492/1987  
 ACRE



Kendal Ash Dump - Remodel to End Exit Site.dgn 01/07/2011 12:33:04 PM

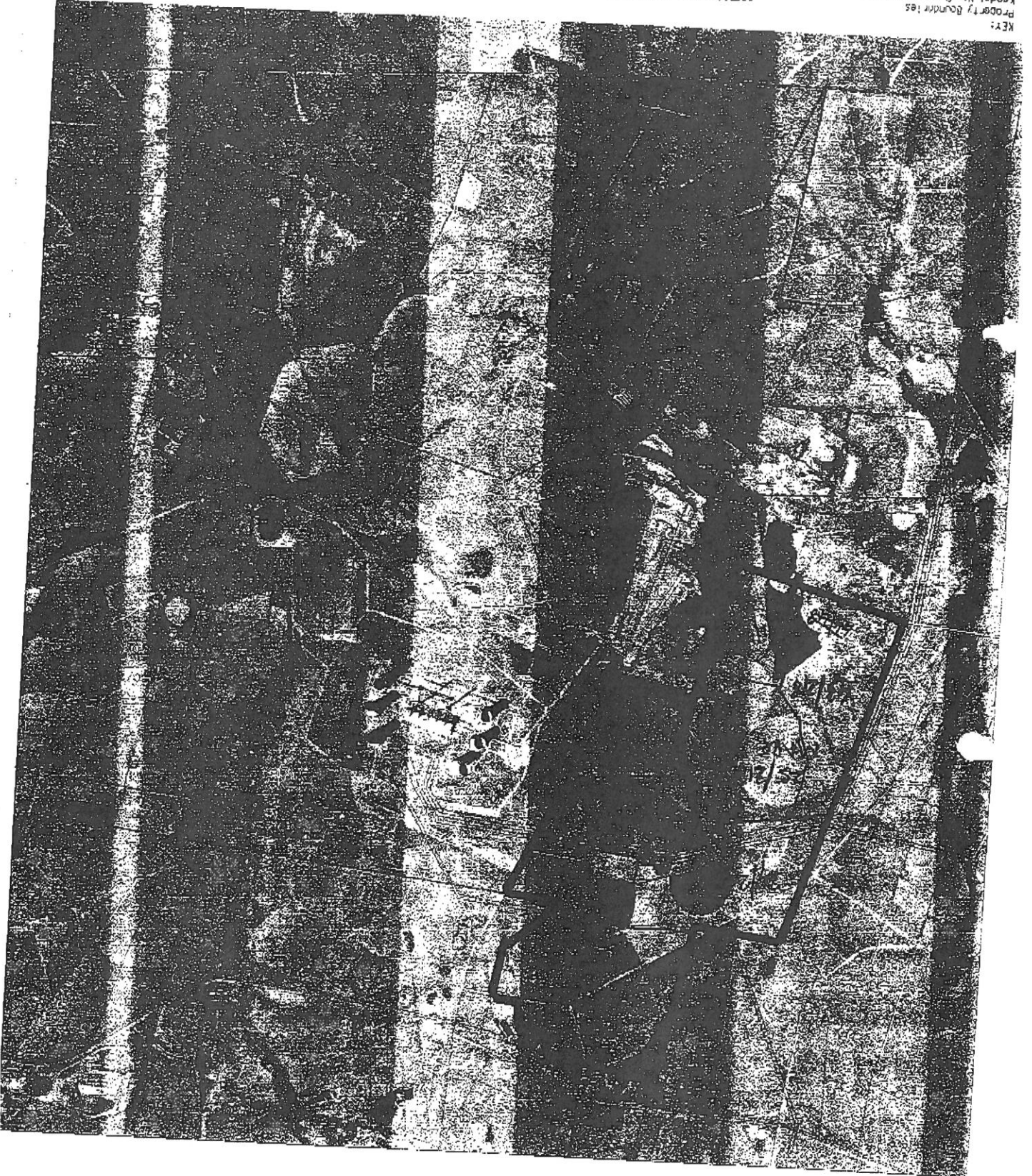


MARK

Survey February 2008  
Grid 2000m

KENDAL POWER STATION - PROPERTY BOUNDARIES

KEY:  
Property Boundaries  
Kendal New Property Boundaries



MAKE

Survey: February 2008  
Grid 2000m

KENDAL POWER STATION - PROPERTY BOUNDARIES

KEY:  
Property Boundary  
Kendal New Property Boundary  
Kendal New Property





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APPENDIX 4: LIST OF ORGANS OF STATE AND APPLICABLE AUTHORITIES

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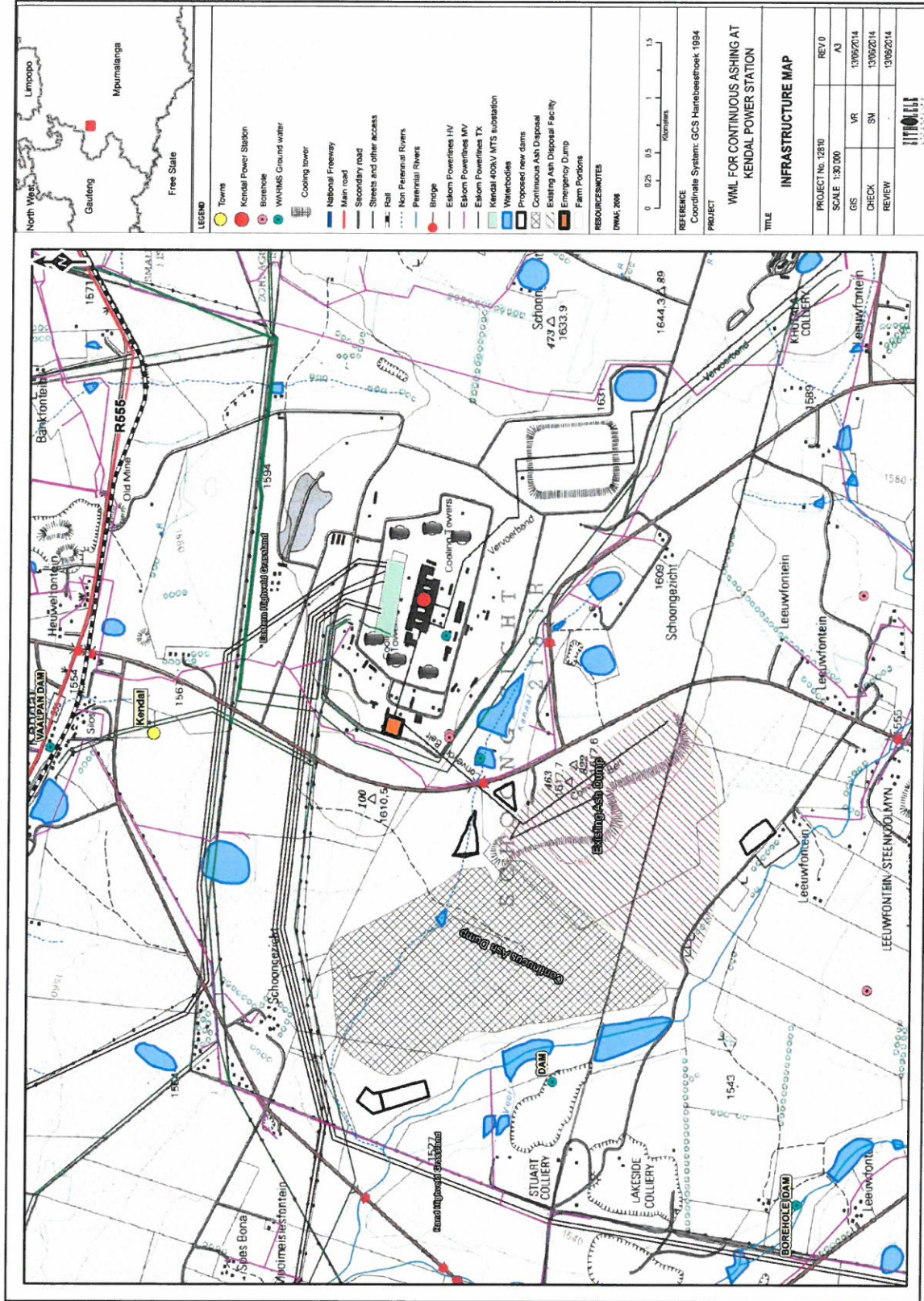
**NOT APPLICABLE**

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**APPENDIX 5: PROJECT MAP**

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Z:\PROJECTS\12810 - WMIL for Ashing at Kendal PSD\Drawings\MXD\Updated Maps for DBERT\28.10. Infrastructure Map - Rev-13 June 2014.mxd

Figure 1-1: Regional Map

ZITHOLELE CONSULTING

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**APPENDIX 6: LIST OF SGIDS**

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APPENDIX 7: PROJECT SCHEDULE

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**NOT APPLICABLE**

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## APPENDIX 8: DECLARATION BY THE APPLICANT

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1. The Applicant

I, Deidre Herbst, declare that I -

am, or represent<sup>1</sup>, the applicant in this application;  
have appointed / will appoint (delete that which is not applicable) an environmental assessment practitioner to act as the independent environmental assessment practitioner for this application / will obtain exemption from the requirement to obtain an environmental assessment practitioner<sup>2</sup>;  
will provide the environmental assessment practitioner and the competent authority with access to all information at my disposal that is relevant to the application;  
will be responsible for the costs incurred in complying with the Environmental Impact Assessment Regulations, 2010, including but not limited to –

- costs incurred in connection with the appointment of the environmental assessment practitioner or any person contracted by the environmental assessment practitioner;
- costs incurred in respect of the undertaking of any process required in terms of the Regulations;
- costs in respect of any fee prescribed by the Minister or MEC in respect of the Regulations;
- costs in respect of specialist reviews, if the competent authority decides to recover costs; and
- the provision of security to ensure compliance with conditions attached to an environmental authorisation, should it be required by the competent authority;

will ensure that the environmental assessment practitioner is competent to comply with the requirements of these Regulations and will take reasonable steps to verify whether the EAP complies with the Regulations;

will inform all registered interested and affected parties of any suspension of the application as well as of any decisions taken by the competent authority in this regard;

am responsible for complying with the conditions of any environmental authorisation issued by the competent authority;

hereby indemnify the Government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action which the applicant or environmental assessment practitioner is responsible for in terms of these Regulations;

will not hold the competent authority responsible for any costs that may be incurred by the applicant in proceeding with an activity prior to obtaining an environmental authorisation or prior to an appeal being decided in terms of these Regulations;

will perform all other obligations as expected from an applicant in terms of the Regulations;

all the particulars furnished by me in this form are true and correct; and

---

<sup>1</sup> If this is signed on behalf of the applicant, proof of such authority from the applicant must be attached.


<sup>2</sup> If exemption is obtained from appointing an EAP, the responsibilities of an EAP will automatically apply to the person conducting the environmental impact assessment in terms of the Regulations.





**Proposed Kendal Power Station Continuous Ash Disposal Facility Project**

I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.



Signature of the applicant<sup>3</sup>/ Signature on behalf of the applicant:

*Eskom Holdings SOC Ltd*

Name of company (if applicable):

*19.01.2015*

Date:

<sup>3</sup> If the applicant is a juristic person, a signature on behalf of the applicant is required as well as proof of such authority.

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## APPENDIX 9: EAP DECLARATION OF INTEREST

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The Environmental Assessment Practitioner

I, **Sharon Meyer Douglas**, declare that -

General declaration:

I act as the independent environmental practitioner in this application

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;

I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;

I will keep a register of all interested and affected parties that participated in a public participation process; and

I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not

all the particulars furnished by me in this form are true and correct;

will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and

I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

**Disclosure of Vested Interest (delete whichever is not applicable)**

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2010;


I have a vested interest in the proposed activity proceeding, such vested interest being:

Not Applicable

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Signature of the environmental assessment practitioner:

Zitholele Consulting (Pty) Limited

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Name of company:

13 January 2015

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Date:

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**APPENDIX 10: PROJECT DESCRIPTION**

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## APPENDIX 10: PROJECT DESCRIPTION

Although the proposed KPS Continuous Ash Disposal Facility (ADF) Project comprises of various elements, the focus of this project description is to provide the Competent Authority (CA) with a description of the project activities which trigger activities listed in the National Environmental Management Act (Act No. 107 of 1998) (NEMA) EIA Regulations Listing Notice 1 of 2010 (Government Notice No. R544) and Listing Notice 2 of 2010 (Government Notice No. R545). A number of the proposed project activities also trigger Waste Management Activities which are defined in Government Notice No. 921<sup>1</sup> promulgated in terms of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA).

### 1 EMERGENCY-DUMP

The E-Dump is located between the KPS and the existing ADF, on the Power Station terrace. The facility functions as an emergency storage area for ash in the event of the spreaders or stacker at the dump becoming inoperable or if the ash plant is not working properly. Once the equipment is operable, the ash is loaded onto the conveyor reporting to the ADF. This area is cleared by means of trucking the ash to the ADF, which is the emergency method of removal of the ash in the event that the on-loading conveyor is not available, in order to clear the emergency dump area as quick as possible.

#### 1.1 Description of Emergency Dump

The storage capacity of the E-Dump will be increased to accommodate the emergency temporary storage of ash for a period not exceeding seven days' ash production, in terms of current coal qualities. The total footprint area of the surface bed will therefore increase to 28 850m<sup>2</sup>, and will accommodate a total volume of 190,000 m<sup>3</sup>. The area will be bunded within a 1 metre high reinforced concrete wall.

The surface bed will be a concrete slab cast in 25 m<sup>2</sup> panels, with expansion joints in between the panels. The expansion joints will comprise of an expandable polypropylene filler and will be sealed off at the surface with a two component polyurethane sealant. This will render the joint water tight. The surface beds will be cast with a floor slope of 1 in 200 to facilitate the drainage of storm water towards the existing silt traps. It is proposed to use fibre reinforced concrete due to the ease of construction. The capacity of the existing E-Dump can only accommodate less than 2 days ash production, on the surface bed, in terms of the current coal qualities. The strength and durability of the concrete and its functionality will not be compromised by this choice of material. The existing storm water impoundment dam will not be upgraded. Water from the impoundment facility will be used in that area for wash water and dust suppression. Excess water from this area will gravitate to the Dirty Water Dam.

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<sup>1</sup> South Africa. 2013. National Environmental Management: Waste Act, 2008 (Act No.59 of 2008) List of Waste Management Activities that have, or are likely to have, a detrimental effect on the environment, 2013. (Notice 921). Government gazette 37083:3, 29 Nov.

The surface bed will be cast in 25 m<sup>2</sup> panels, with expansion joints in between the panels. The expansion joints will comprise of an expandable polypropylene filler and will be sealed off at the surface with a two component polyurethane sealant. This will render the joint water tight. The surface beds will be cast with a floor slope of 1 in 200 to facilitate the drainage of storm water off the beds. It is proposed to use fibre reinforced concrete due to the ease of construction. The strength and durability of the concrete and its functionality will not be compromised by this choice of material. An access road around the facility will facilitate the removal of ash.

## **1.2 Waste Classification of Ash**

A study was carried out to classify the ash produced by the combustion of coal and electricity generation process and to develop an appropriate barrier design for the proposed Continuous ADF. The key findings of the study showed that in terms of the Department of Environmental Affairs' Waste Classification System, the ash is classified as a Type 3 Waste (Low Hazard Waste), therefore requiring disposal on a facility with a Class C barrier system. This classification was mostly attributable to the leachable concentration of boron and the total concentration of barium and fluoride in the ash. The surface bed will be cast in 25 m<sup>2</sup> panels, with expansion joints in between the panels. The expansion joints will comprise of an expandable polypropylene filler and will be sealed off at the surface with a two component polyurethane sealant. This will render the joint water tight. The surface beds will be cast with a floor slope of 1 in 200 to facilitate the drainage of storm water off the beds.

## **1.3 E-Dump: Requirement for Environmental Authorisation – NEMWA (2008)**

Owing to the nature and composition of the ash that is generated by the combustion of coal, it is considered to be waste and falls within the ambit of the NEM:WA (2008). Although the increased footprint / continuation of the E-Dump will only be utilised during events where ash cannot be transferred from the KPS to the ADF via the conveyor system, the usage of the facility will necessitate and entail the disposal of hazardous waste (i.e. ash) to land. As such the proposed continuation of the E-Dump triggers Listed Activity 7 and Listed Activity 10 of Government Notice No. 921 (2013). These activities may therefore not proceed prior to the CA granting a Waste Management License for the particular activities.

## **1.4 E-Dump: Requirement for Environmental Authorisation – NEMA (1998)**

The ash will be temporarily stored at the E-Dump until such time that the ash can be unloaded and conveyed to the ADF via the conveyor-system or by trucks in an emergency. Ash in excess of 50 tons, up to a maximum of 190 000 m<sup>3</sup>, would be temporary stored at the E-Dump during a maximum deposition period of seven days. The ash will be removed and conveyed or trucked to the ash dump as soon as possible to ensure the E-Dump is available to allow the power station to continue operating when the ADF stacking system is not available. The ash

which is produced as a product of the combustion of coal is classified as hazardous waste. Therefore Listed Activity 6 of the NEMA (1998) EIA Regulations Listing Notice 2 (Government Notice No. R545) is triggered by the temporary storage of ash at the E-Dump. This proposed increase of the E-Dump storage capacity may therefore not proceed prior to the Competent Authority granting Environmental Authorisation for the particular activity.

## **2 CONTINUOUS ASH DISPOSAL FACILITY**

Following the completion of the design and construction of the ADF, the operating life of the KPS was extended to 60 years. As the capacity of the initial ADF was designed to accommodate the volume of ash that would be generated during the original 40 years' operating life of the KPS, plus an 8 year contingency, the storage capacity of the initial ADF would no longer suffice to accommodate the volume of ash that will be generated over the 60 year Operating Life, plus a 5 year contingency period. As a remedial measure to ensure that the KPS ADF has adequate storage capacity for the full operating life of the Power Station, it is proposed that the existing ADF be continued to accommodate ash disposal while the establishment of a new<sup>2</sup> ADF site takes place.

### **2.1 Alternatives considered for the Continuous Ash Disposal Facility**

In determining the air space required for the Continuous facility two broad options were considered. The options included:

- Option 1: Minimum Dump – The ADF is positioned between the two streams as previously described.
- Option 2: Maximum Dump (Preferred Option) – The positioning of the ADF requires the northern stream to be diverted.

A Trade-Off study as well as a Sustainability Assessment Study was carried out to determine the Best Practicable Environmental Option (BPEO) for the Continuous ADF. Factors which were considered in determining the BPEO and conceptualising possible alternatives included environmental considerations, engineering aspects and financial considerations. The key outcomes of the Trade-Off Study included conceptualising the above mentioned two options, which have subsequently been taken forward to the EIA Phase. Option 2 (Maximum Dump / Volume) was selected as the preferred alternative.

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<sup>2</sup> It must be pointed out that this Environmental Impact Report (EIR) and the S&EIR Process followed to date is only intended to provide information relating to the continuation of the existing ADF. This project is termed "Continuous ADF".



## 2.2 Preferred Alternative – Maximum Dump

The maximum volume option falls outside the existing design's footprint and will require the diversion of the stream located to the north-east of the proposed Continuous ADF. The physical parameters of the Maximum Dump are provided in **Table 1**.

**Table 1: Physical Parameters of the Maximum Dump**

<b>Total Footprint Area:</b>	583 hectares
<b>Remaining dump volume</b>	98 Mm <sup>3</sup> from January 2015
<b>Remaining life:</b>	15 years from January 2015
<b>Maximum Height</b>	60 meters
<b>Lined Area</b>	224 hectares

## 2.3 Ash disposal facility conceptual design

The ash is deposited onto the "dry" ADF by means of a conveyor stacker system. The transverse conveyors move the ash from the Power Station to Transfer House E. The E-Dump is located just to the north of the transfer house and was initially designed to provide a capacity of two days of ashing for emergencies such as breakdowns and maintenance to the overland conveyors etc.

From Transfer House E the ash is transported via the overland conveyors which cross under a provincial road and over the north eastern stream to Transfer House F at the ADF. The extendable conveyors transfer the ash from Transfer House F to the shiftable conveyors. The extendable conveyors were initially designed to extend in the direction of their current bearing as soon as the shiftable conveyors are perpendicular to the extendable conveyors. This method of deposition is called parallel shifting, but this deposition strategy cannot be implemented due to the new boundary extents of the existing area.

The shiftable conveyors are the stacker shiftable conveyor (Primary system) and the spreader shiftable conveyor (Standby system). These are used to deposit the ash onto the ADF. The current deposition strategy is to place ash only via radial shifting.

There are some limitations to these shiftable conveyor systems as the ash is only placed radially. Some of the limitations are:

- The maximum gradient the system can traverse is 1V:20H
- As the conveyor cannot bend in plan, the advancing face as well as the final face position cannot have any kinks or bends as this meant that the conveyor had a bend in place
- The maximum frontstack height the of the spreader system is approximately 45m and 62m for the stacker system

- The spreader system can only place a front stack where the stacker system can place a front stack and back stack.
- Shift intervals need to be kept to a minimum, between 4-6 months per shift.

The estimated time it would take to get all the authorisations in place as well as provide detailed designs, tender and construction would extend up to July 2017. During this time the KPS still needs to continually ash and thus a certain amount of ashing will still take place, as per the existing operation after the authorisation has been given as it would then be impractical to line the area. The proposed Continuous ADF will include an appropriate barrier system. Details pertaining the proposed liner system is provided below.

## 2.4 Liner System

A suite of regulations as well as norms and standards, aimed at the classification and disposal of waste, was published in Government Notice No. R.634<sup>3</sup>, R.635<sup>4</sup> and R.636<sup>5</sup> under the Section 73 of the NEM:WA (2008). The aforementioned regulations as well as norms and standards informed the classification and assessment of the ash (i.e. waste) to determine the mandatory method of disposal. In accordance with the provisions of Government Notice No. R.635 the proposed Continuous ADF facility will include an appropriate barrier system. Following the Waste Classification of the ash disposed of at KPS, it was recommended that a Class C liner be implemented because the ash was classified as Type 3 waste.

The Class C liner is made up of, amongst other materials, a 300 mm clay layer. Due to the lack of natural clay in close proximity to KPS, a Geosynthetic Clay Liner (GCL) was proposed as an alternative to the natural clay layer. This proposal was put forth to the Technical Compliance Unit at Department of Water and Sanitation (DWS) and the Department of Environmental Affairs (DEA) for approval. The DWA raised a concern that bentonite in the GCL will result in an increased permeability of the liner. This may occur due to the potential effect that divalent cations, such as calcium and magnesium, may have on the permeability of bentonite contained in the GCL. The DWA recommended additional tests to determine the Relative Abundance of Monovalent and Divalent Cations (RMD).

### 2.4.1 Ash Bentonite Tests

In response to queries raised by the DWA additional tests were carried out including Ash Bentonite Tests. The objectives of these additional tests were to:

<sup>3</sup> South Africa. 2013. National Environmental Management: Waste Act, 2008 (59 of 2008) Waste Classification Regulations, 2013. (Notice 634). *Government gazette*, 36784: 3, 23 Aug.

<sup>4</sup> South Africa. 2013. National Environmental Management: Waste Act, 2008 (59 of 2008) National norms and standards for the Assessment of Waste for Landfill Disposal, 2013. (Notice 635). *Government gazette*, 36784:22, 23 Aug.

<sup>5</sup> South Africa. 2013. National Environmental Management: Waste Act, 2008 (59 of 2008) National norms and Standards for disposal of waste to a landfill, 2013. (Notice 636). *Government gazette*, 36784: 34, 23 Aug.

- Conduct leach tests on the Kendal ash and analyse the leach solution for the major mono and divalent cations in order to calculate the RMD<sup>6</sup>;
- Conduct swell tests on the bentonite using the leach solution and verify whether or not the leach solution has an impact on the short term hydration of the bentonite.

The findings of the tests concluded that the long term permeability of the bentonite in the GCL may be negatively affected due to a low RMD. Long term hydraulic conductivity testing using facility specific ash leachate was recommended to establish the likely hydraulic conductivity of the GCL considered for the barrier system, once equilibrium with respect to cation exchange is realised. However, this will be a time consuming exercise and it is not guaranteed that the results will prove in Eskom's favour. Due to urgency of the proposed KPS Continuous ADF this option it is not recommended.

#### **2.4.2 Preferred Alternative – Liner System**

In light of the findings of the Ash Bentonite Test, as prescribed for a Class C liner sodium enriched bentonite blended at a rate of between 6 – 8% into in-situ silty material is recommended as opposed to making use of a clay layer as prescribed. Similar blended material has proven successful on other sites for similar applications. The permeability rate achieved in tests was less than  $10^{-7}$ cm/s, which meets the target for a barrier material.

The base material can be sourced from site and the bentonite is available on the local market. However, it is the opinion of the regulator that the bentonite in the enriched soil, although a small percentage, will still be subject to significant swell and hence compromise the integrity of the barrier system. It was advised that the in-situ material be used in lieu of clay, due to the grading of it, compacted to 98% Standard Proctor at between optimum and 2% wet to achieve a target permeability of  $10^{-5}$ cm/s. The proposed 1.5mm geo-membrane that is placed on top of the clay will need to be upgraded to 2mm.

The regulator also had a concern regarding the heat of the leachate that comes into contact with the geo-membrane. The regulator proposed that a cusped drain be placed on top of the geo-membrane, filled with 100mm layer of blended fly ash and in-situ soils. This will act as a leachate collection system as well as a void former between the leachate and geo-membrane. The KPS will need to address this as it is an operation requirement.

#### **2.4.3 Ash Disposal Facility: Annual tonnages**

The indicated annual tonnage of ash placed on the ash disposal facility is 5500kt/annum. This information is from a previous report (Report nr: 11613601-10981-2) in which Golder Associates Africa developed an industry waste management plan for Eskom where all the waste types and quantities of all the Power Stations were considered. The density of the ash

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<sup>6</sup> RMD: Relative Abundance of Monovalent and Divalent Cations



is 850kg/m<sup>3</sup> and thus the annual airspace required for the Continuous ADF is approximately 6.5Mm<sup>3</sup>/annum. Based on this the remaining life for the Continuous ADF is determined.

#### **2.4.4 Ash Disposal Facility: Rehabilitation of Continuous ADF**

It is proposed that the current system of top-soiling and grassing be continued on the Continuous ADF.

#### **2.4.5 Ash Disposal Facility: Toe Paddocks**

The slope available to facilitate self-cleansing velocities in the channels discharging to the pollution control dams could not be achieved. In order to prevent siltation within the channels and reduce the required velocities, it is proposed that paddocks be constructed at the toe of the advancing face to intercept run-off from the disposal facility and allow this to overflow to the discharge channels. These temporary structures will facilitate siltation. It is envisaged that the paddocks will be constructed from ash and will be located on top of the lined portion of the facility. The paddocks will be covered over when dozing the side slope down to the final 1:5 slope for rehabilitation of that section of the facility.

### **2.5 Ash Disposal Facility: Requirement for Environmental Authorisation – NEMA (1998)**

The footprint of the Continuous ADF will cover an area greater than 50 square metres. Furthermore continuing the ADF will necessitate the diversion of the stream forming the eastern border of the proposed Continuous ADF. The stream will be diverted in a northerly direction thereby bypassing the footprint of the proposed Continuous ADF. Taking the aforementioned into account the proposed Continuous ADF triggers Listed Activity 11(xi) and Listed Activity 15 of the NEMA (1998) EIA Regulations Listing Notice 1 (Government Notice No. R545) and Listing Notice 2 (Government Notice No. R545), respectively. In addition the proposed Continuous ADF will serve to store ash which is generated by the combustion of the coal and electricity generation processes of the KPS. The ash is conveyed from the KPS to the ADF by means of a conveyer system. The manner in which the ash is conveyed to the Continuous ADF along with the anticipated capacity of the ADF triggers Listed Activity 6 of the NEMA (1998) EIA Regulations Listing Notice 2 (Government Notice No. R545). The aforementioned project activities may therefore not proceed prior to the CA granting Environmental Authorisation.

### **2.6 Ash Disposal Facility: Requirement For Environmental Authorisation – NEM:WA (2008)**

Owing to the nature and composition of the ash that is generated by the combustion of coal, it is considered to be waste and falls within the ambit of the NEM:WA (2008). The continuation of the ADF together with the nature and composition of the ash triggers Listed Activity 7 and

Listed Activity 10 of Government Notice No. 921 (2008). These activities may therefore not proceed prior to the CA granting a Waste Management License for the particular activities.

### **3 STREAM DIVERSION**

The current extent of the Ash Disposal Facility is bordered by one perennial stream to the east and one non-perennial stream to the west. A non-perennial stream drains the north eastern site of the ash disposal facility. The stream to the East flows in a north-westerly direction whilst the stream to the West flows northerly. The two streams converge north of the existing ADF. In order to achieve the maximum volume footprint as required for the Continuous ADF, it is proposed that the stream forming the eastern border of the ADF be diverted in a northerly direction. The diversion channel will be sized to match the discharge capacity of the existing clean water dam spillway, as well as the additional storm water runoff to the east side of the diversion channel. This clean water dam spillway is located upstream of the culvert system across the district road adjoining the R555 and R50 national roads.

#### **3.1 Description of Stream Diversion**

The stream serves as a receptor for discharge from the existing clean water dam and the storm water runoff to the east below the culverts, located up-slope. The maximum discharge over the dam's spillway is 100m<sup>3</sup>/s, plus the storm water runoff to the east below the culverts. The diversion channel will be sized to cater for this flow while incorporating an additional freeboard of 1 meter. The preliminary sizing of the stream diversion channel includes a bottom width of 10 meters and a depth of 2 meters. The left and right side slopes are 1V:2.5 and 1V:3H respectively. A side berm will be constructed on the lower left bank to provide the 1 meter freeboard.

To ensure the provision of an optimal solution for the stream diversion, the following aspects will be investigated during the subsequent design phase:

- Investigating impact of stream diversion on downstream ecosystem;
- Establishing appropriate indigenous vegetation in the new stream diversion canal;
- Erosion mitigation in initial stages; and
- Probability of leachate of the existing facility migrating towards the stream diversion.

#### **3.2 Stream diversion: Requirement for Environmental Authorisation – NEMA (1998)**

The proposed stream diversion will entail the construction of a channel. Furthermore the construction activities associated with the diversion of the stream will inherently necessitate excavations within and the removal / moving soil from the stream. The proposed stream diversion therefore triggers Listed Activities 18 and 11(ii) of the NEMA (1998) EIA Regulations

Listing Notice 1 (Government Notice No. R544). The aforementioned project activities may therefore not proceed prior to the CA granting Environmental Authorisation.

### **3.3 Requirement for Environmental Authorisation – NEM:WA (2008)**

The proposed stream diversion will not entail any Waste Management Activities listed in Government Notice No. 921 and does therefore not fall within the ambit of the NEM:WA (2008).

## **4 FARM DAM**

A farm dam is located to the west of the existing ADF. The farm dam is in-stream on a diverted watercourse created in order to undertake open cast coal mining on its original course. Although the property associated with the farm dam is owned by Eskom SOC Limited, this area does not form part of the ADF water management philosophy. The dam is currently used by a farmer to irrigate two centre pivots, located on the footprint of the proposed extension. The irrigation activities will however cease once the construction of the Continuous ADF commences.

### **4.1 Lowering of the Farm Dam Wall**

The dam sustains a wetland located at the toe of the farm dam wall. The wetland is sustained via seepage through the farm dam wall. The height of the dam wall poses a significant institutional challenge for Eskom SOC Limited as the top water level may at times reach the surface levels of the final mine voids which are located adjacent to the farm dam. This is not ideal as flow enters the final voids when the level in the dam is high. By lowering the dam wall, the dam extent will be decreased, reducing the inflow into the final voids. However, the mine may decant uncontrollably into the farm dam, thereby contributing to flow from the dam entering the final voids. This matter falls outside the scope of Environmental Assessment Practitioner and should be tended to by the mining house.

The following works are proposed to prevent the continued flow from the farm dam entering the final voids:

- New lower earth dam wall to be built downstream of the existing farm dam to prevent overflow into mining voids and vice-versa (Preferred Option);
- Existing dam wall to be removed;
- Engineered seepage from the new dam to downstream of wall taken into consideration for wetland sustainability;
- Upstream approach channel and outlet channel to dam to be lined using reno mattress – flat gradients; and
- Channel designed for the 1:2 year storm flow velocities.



#### **4.2 Lowering farm dam wall: Requirement for Environmental Authorisation – NEMA (1998)**

The nature of the construction activities associated with lowering the farm dam wall will fundamentally entail excavations within and the removal / moving soil from the watercourse. The proposed lowering of the farm dam wall therefore triggers Listed Activities 18, 12 and Listed Activity 11(iv) of the NEMA (1998) EIA Regulations Listing Notice 1 (Government Notice No. R544). The aforementioned project activities may therefore not proceed prior to the CA granting Environmental Authorisation.

#### **4.3 Lowering farm dam wall: Requirement for Environmental Authorisation – NEM:WA (2008)**

The proposed lowering of the farm dam wall and associated activities will not trigger any Waste Management Activities listed in Government Notice No. 921 and do therefore not fall within the ambit of the NEM:WA (2008).

### **5 POLLUTION CONTROL DAMS**

To ensure sufficient capacity for the containment of contaminated run-off (“dirty water”) two additional Pollution Control Dams (PCDs) (PCD 1 and PCD5) are proposed. Existing Pollution Control Dams (PCDs) within the footprint of the KPS include a Dirty Water Dam and Emergency Dirty Water Dam. The capacities of PCD 1 and PCD 5 will be 120Mℓ and 76Mℓ (plus 2 days storage for dust suppression water) respectively. The sizing of these dams was achieved by developing a 50 year integrated station and ADF water balance model, to ensure the PCDs do not spill more than once in 50 years, as per GN704. These PCDs may be constructed within 32m of a watercourse. The coordinates for each of the proposed PCDs are shown in **Table 2**.

**Table 2: Dirty Water Channels Concept Design Parameters**

COORDINATES OF PROPOSED PCDs		
Description	Latitude (South)	Longitude (North)
<b>Pollution Control Dam 1</b>		
Point 1	-26.0848420	29.0705140
Point 2	-26.0841310	29.0715990
Point 3	-26.0854290	29.0726410
Point 4	-26.0863110	29.0723630
Point 5	-26.0859350	29.0708970
Point 6	-26.0854480	29.0710010
<b>Pollution Control Dam 5</b>		
Point 1	-26.0917880	29.0515210
Point 2	-26.0938170	29.0513570

### 5.1 Requirement for Environmental Authorisation – NEMA (1998)

As the construction of PCDs requires a Water Use Licence, Listed Activity 5 of the NEMA (1998) EIA Regulations Listing Notice 2 (Government Notice No. R545) will be triggered. Section 117 (c) of the National Water Act, 1998 (Act no. 36 of 1998) a dam with a safety risk means “any dam which can contain, store or dam more than 50 000 cubic metres of water, whether that water contains any substance or not, and which has a wall of a vertical height of more than five metres, measured as the vertical difference between the lowest downstream ground elevation on the outside of the dam wall and the non-overspill crest level or the general top level of the dam wall”. The vertical height of the proposed PCD 1 and PCD 5 is 6 meters and 8 meters respectively. The storage capacity of PCD 1 and PCD 5 is 120 000 m<sup>3</sup> and 76 000 m<sup>3</sup> respectively. The vertical height and storage capacity of the proposed PCDs (i.e. PCD 1 and PCD 5) therefore exceeds the thresholds provided in Section 117(c) of the NWA (1998) and are therefore also classified as a dams with a safety risk. The applicable provisions included in Government Notice No. 704<sup>7</sup>, promulgated in terms of the NWA (1998) must therefore be adhered to.

The proposed PCDs will extend over an area greater than 50 square metres and may fall within 32 m of various watercourses. Therefore Listed Activities 11(iv) and 11(xi) of the NEMA (1998) EIA Regulations Listing Notice 1 (Government Notice No. R544) will be triggered by the proposed PCDs. Furthermore Listed Activity 15 of the NEMA (1998) EIA Regulations Listing Notice 2 (Government Notice No. R545) will also be triggered due to the

<sup>7</sup> South Africa. 1999 National Water Act Regulations on use of water for mining and related activities aimed at the protection of water resources, 1999. (Notice 704). *Government gazette* 20119, 4 June.

footprint of the proposed PCDs. The aforementioned project activities may therefore not proceed prior to the CA granting Environmental Authorisation.

## **5.2 Requirement For Environmental Authorisation – NEM:WA (2008)**

The proposed PCDs will not trigger any Waste Management Activities listed in Government Notice No. 921 and do therefore not fall within the ambit of the NEM:WA (2008).

## **6 CLEAN WATER DAMS**

In addition to the existing power station Clean Water Dam, three additional Clean Water Dams (Dam 2, Dam 3 and Dam 4) are proposed for the rehabilitated ash dump storm water containment, in order to not mix this water with the highly impacted storm water from the open ash areas in Dam 1 and Dam 5. The capacities of Dam 2, Dam 3 and Dam 4 will be 257Mℓ, 76Mℓ and 32Mℓ (plus two days storage for irrigation water) respectively.

The proposed Clean Water Dams will be operated on a controlled release principle which is based on the receiving water quality. It is not the intention to impound clean water if not required, provided that the discharge quality is acceptable. If the water in these dams is deemed impacted, it will be irrigated onto the areas that it emanated from or utilised in the KPS Water Balance if possible.

### **6.1 Requirement for Environmental Authorisation – NEMA (1998)**

The footprint of the proposed Clean Water Dams will cover an area exceeding 20 hectares. The containment of water in the proposed Clean Water Dams also constitutes as the off-stream storage of water. Taking the aforementioned into account the proposed Clean Water Dams trigger Listed Activity 12 of the NEMA (1998) EIA Regulations Listing Notice 1 (Government Notice No. R544) as well as Listed Activity 15 of Listing Notice 2 (Government Notice No. R545). The aforementioned project activities may therefore not proceed prior to the CA granting Environmental Authorisation.

### **6.2 Requirement for Environmental Authorisation – NEM:WA (2008)**

The proposed Clean Water Dams will not trigger any Waste Management Activities listed in Government Notice No. 921 and do therefore not fall within the ambit of the NEM:WA (2008).

## **7 CONVEYANCE INFRASTRUCTURE (PUMPS, PIPELINES AND CHANNELS)**

The proposed operational philosophy around storm water management will involve the construction of new infrastructure. Conveyance infrastructure, including pumps, pipelines and channels, will be required for the following reasons:

- Conveyance of spills from one facility to the next;
- Conveyance of ash / dust suppression water from the relevant dams to the dedicated storage reservoirs;
- Conveyance of rehabilitated runoff water from the ADF to the dedicated storage reservoirs;
- Dust suppression from storage reservoir to open ash area of the ADF;
- Irrigation from storage reservoir to the rehabilitated area of the ADF; and
- Irrigation of the Power Station terrace grassed areas from the Clean Water Dam.

### 7.1 Requirement for Environmental Authorisation – NEMA (1998)

The internal diameter of the pipelines and channels as well as the peak throughput may exceed 0.36 m and 120 l/s respectively. As the proposed conveyance infrastructure will also function to transfer water between impoundment (i.e. dams) Listed Activity 9 of the NEMA (1998) EIA Regulations Listing Notice 1 (Government Notice No. R544) will be triggered.

### 7.2 Requirement for Environmental Authorisation – NEM:WA (2008)

The proposed conveyance infrastructure will not trigger any Waste Management Activities listed in Government Notice No. 921 and does therefore not fall within the ambit of the NEM:WA (2008).

## 8 ACCESS ROAD

To accommodate construction vehicles travelling to and from the site during the Construction Phase it is proposed to construct a temporal short right turn lane on the north approach of D686 Road and the proposed Continuous ADF. The location of the access road is showed in **Table 3**.

**Table 3: Description of access road location**

LOCATION OF ACCESS ROAD		
Points along road	Latitude (South)	Longitude (North)
Point 1	-26.0974600	29.0482460
Point 2	-26.1094110	29.0391580
Point 3	-26.1096250	29.0621320
Point 4	-26.0825810	29.0671010

### 8.1 Requirement for Environmental Authorisation – NEMA (1998)

No road reserve has been defined for the proposed access road. It is however anticipated that the access road will exceed 8m in width. Therefore, Listed Activity 22 of the NEMA (1998) EIA Regulations Listing Notice 1 (Government Notice No. R544) will be triggered.



## **8.2 Requirement for Environmental Authorisation – NEM:WA (2008)**

The proposed access road will not trigger any Waste Management Activities listed in Government Notice No. 921 and does therefore not fall within the ambit of the NEM:WA (2008).

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**APPENDIX 11: WATER BALANCE**

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# SCENARIO 2, OPTION 3B - WATER BALANCE DIAGRAM

NOTE: FLOWS IN M<sup>3</sup>/A  
AOL: AVERAGE OPERATING LEVEL

