Lidwala
Environmental & Planning Services

Eskom Holdings SOC Limited

Eskom

Environmental Impact Assessment for the Proposed Continuous Ashing at the Majuba Power Station, Mpumalanga Province

DRAFT SCOPING REPORT

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EXECUTIVE SUMMARY

1 INTRODUCTION

1.1 Project Background

Eskom's core business is the generation, transmission and distribution of electricity throughout South Africa. Electricity by its nature cannot be stored and must be used as it is generated. Therefore electricity is generated according to supply-demand requirements. The reliable provision of electricity by Eskom is critical to industrial development and other poverty alleviation initiatives in the country.

If Eskom is to meet its mandate and commitment to supply the ever-increasing needs of end-users in South Africa, one of Eskom's options is to extend the life of its infrastructure of generation capacity and transmission and distribution powerlines.

Ideally, Majuba Power Station, envisages the continuation of dry ash disposal. Prior to the promulgation of Environmental laws such as the Environment Conservation Act, Eskom purchase a portion of land which they envisaged for the disposal of ash for the life of the Station (at that stage 45 years). As part of its planning processes, Eskom developed designs which were approved internally. With the promulgation of the environmental laws such the National Environmental Management Waste Act, Act 59 of 2008, in particular, Eskom would like to align its continued ashing activities with the requirements of the waste licensing processes.

1.2 Description of the Study Area

Majuba Power Station is located approximately 24 km southwest (SW) of Amersfoort and approximately 40km northnorthwest (NNW) of Volksrust in the Mpumalanga Province. The power station falls within the Pixley Ka Seme Local Municipality which falls within the Gert Sibande District Municipality.

A greater part of the study area is made up of agricultural, mining and power generation activities. The proposed study area, utilised in the screening study is within a 12km radius of the centre point of the Majuba Power Station Site (**Figure 1** and **2**).

Figure 1: Majuba Power Station forms the centre point of the study area

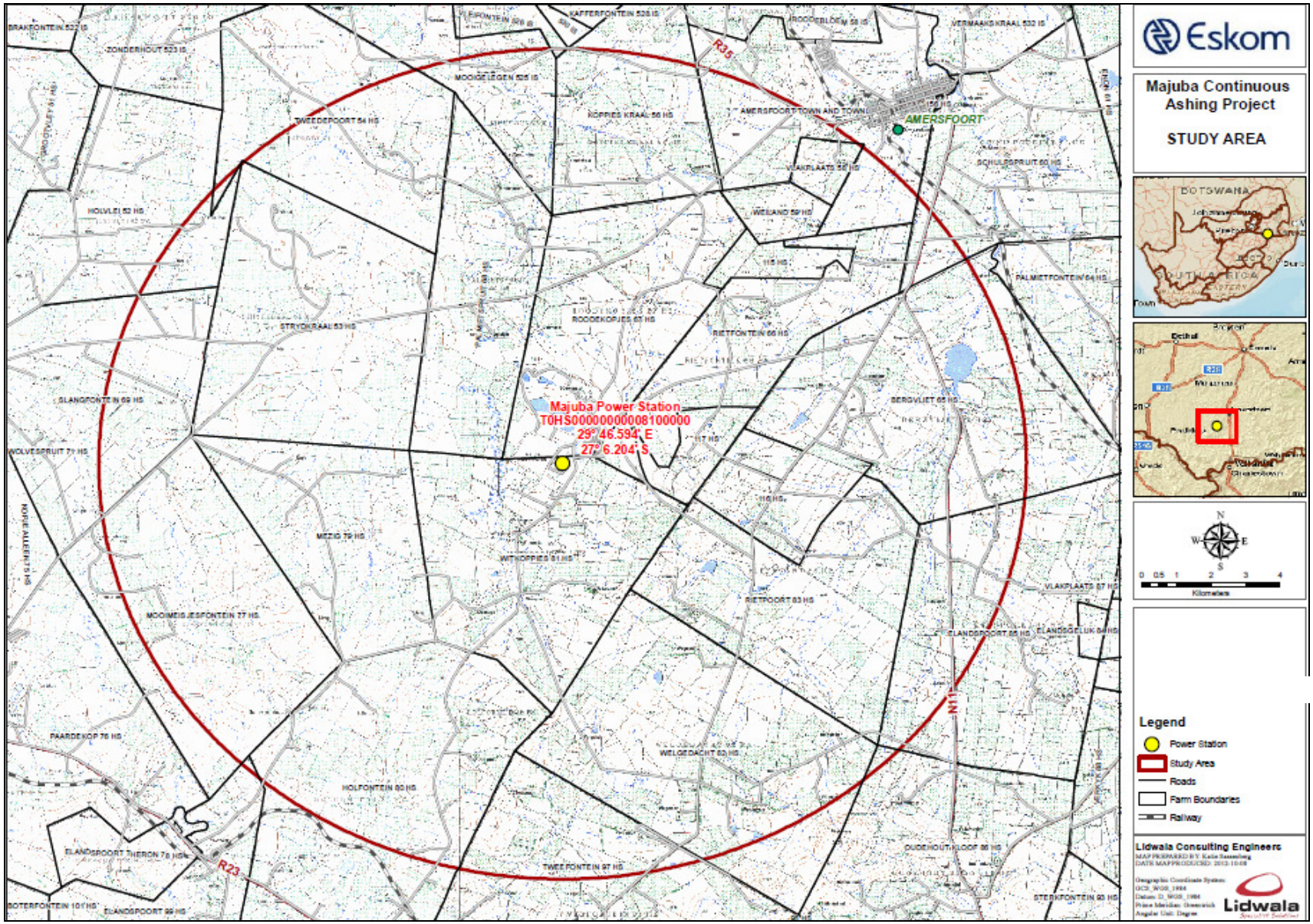

Figure 2: The greater study area overlaid onto a topographical map background

2 PROCESS TO DATE

The Environmental Impact Assessment (EIA) process for the proposed continuous ashing project is comprised of two main phases, namely the scoping phase and impact assessment phase. This report documents the tasks which have been undertaken as part of the scoping phase of the EIA. These tasks include the public participation process and the documentation of the issues which have been identified as a result of these activities.

To date, tasks that have commenced include the:

- Identification of stakeholders or I&APs;
- Notification and advertisements;
- Background Information Documents; and
- Ongoing consultation and engagement

More detail on the above is available in Chapter 3.

The Draft Scoping Report was released for public review and comment from **8 November 2012 to 7 December 2012**. During the review period a public participation process (PPP) will be undertaken, allowing Interested and Affected Parties (I&APs) to engage with the project proponents and independent environmental consultants. The PPP will consist of a public open day and meeting as well as one-on-one interactions where required. Issues raised by I&APs during the public participation process will be documented and included in the Final Scoping Report.

The relevant authorities required to review the proposed project and provide an Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. The National Department of Environmental Affairs (DEA) is the competent authority for this project. The Department of Water Affairs (DWA), and the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) are noted as key commenting authorities.

The scoping phase of an EIA serves to define the scope of the detailed assessment of the potential impacts of a proposed project. The environmental scoping phase has been undertaken in accordance with the requirements of sections 24 and 24D of the National Environmental Management Act (NEMA) (Act 108 of 1998), as read with Government Notices R 543 of the 2010 EIA Regulations. The objectives of the scoping phase are to:

- Ensure that the process is open and transparent and involves the Authorities, proponent and stakeholders;
- Identify the important characteristics of the affected environment;
- Ensure that feasible alternatives are identified and selected for further assessment;
- Assess and determine possible impacts of the proposed project on the biophysical and socio-economic environment and associated mitigation measures; and

- Ensure compliance with the relevant legislation.

3 SUMMARY OF THE LEGISLATION CONTEXT

The legislative framework applicable to this project is diverse and consists of a number of Acts, Regulations and Treaties which must be complied with. A summary of the key legislation is provided hereunder.

- National Environmental Management: Waste Act No 59 of 2008
- The National Environmental Management: Air Quality Act No 39 of 2004;
- National Water Act No 36 of 1998;
- GN R1179 (GG 16536 of 25 August 1995) – Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act No 85 of 1993;
- Hazardous Substances Act No 15 of 1973
- Constitution of South Africa, 1996 (with reference to noise)
- Explosives Act No 26 of 1956 and Regulation 1604 of 8 September 1972;
- National Environmental Management Act No 107 of 1998 (with reference to noise and prevention of pollution)
- National Environmental Management: Biodiversity Act No 10 of 2004 (in respect of Fauna, Flora and National Heritage Resources)
- Conservation of Agricultural Resources Act No 43 of 1989 (in respect of Fauna, Flora and National Heritage Resources)
- National Forest Act No 84 of 1998 (in respect of protected trees)
- National Veld and Forest Fire Act No 101 of 1998
- National Heritage Resources Act No 25 of 1999
- Promotion of Access to Information Act No 2 of 2000 (in respect of record-keeping and interested and affected parties and monitoring of environmental impacts)

A full legal review will be undertaken during the EIA phase of the project.

4 DESCRIPTION OF THE BASELINE ENVIRONMENT

The particular area required for the continuous ashing facility is approximately 550 ha. The area, originally identified by Eskom for continuous ashing, is located on the southern portion of the existing Majuba Power Station ash disposal facility. However, in order to allow for a robust environmental process, all land within a radius of 12 km was assessed in order to identify potential alternatives sites should sensitive environmental aspects limit the suitability of this particular portion of land. The Majuba Continuous Ashing EIA study area is therefore located within a 12 km radius around a centre point within the Majuba Power Station. The study area is approximately 450 square kilometres in size and includes a total of 40 different farms divided into 195 farm portions.

The study area is characterised by the strong undulating character typical of the Mpumalanga province with hills and koppies to the south and east. The natural topography of the area has been disturbed as a result of various mining, agricultural and power generation activities.

The climate in the study area can be described as typical highveld conditions with summers that are moderate and wet, while winters are cold and dry. Severe frost and snow are sometimes experienced. The area also falls within the mist belt. The mean annual precipitation is approximately 760 mm/year, with rain experienced predominantly in the summer months (October to April). Annual average maximum, minimum and mean temperatures are given as 26.3°C, 0.7°C and 15.1°C, respectively. The prevailing wind direction is recorded as being co-dominant with both easterly and west-north-westerly winds.

The Majuba Power Station falls within the Carboniferous to early Jurassic aged Karoo Supergroup. Sediments in this part of Mpumalunga Province fall within the Permian Ecca group which comprises of a total of 16 formations. The study area is underlain by Karoo Supergroup sedimentary rocks of the Vryheid and Volksrust Formations of the Ecca Group. These are largely comprised of sandstone, mudstone, shale, siltstone, and coal seams. The Volkrust Formation is predominantly argillaceous unit with interfingers with the overlying Beaufort Group and underlying Vryheid Formation. Considerable intrusive Karoo dolerite is also mapped in the area.

The study site corresponds to the Grassland Biome as defined by Mucina & Rutherford (VegMap, 2006). This unit is found in the eastern, precipitation-rich regions of the Highveld. Grasslands of these parts are regarded 'sour grasslands'. The following ecological types are represented within the 12km radius:

- Amersfoort Highveld Clay Grassland;
- Bloemfontein Karroid Shrubland;
- Eastern Temperate Freshwater Wetlands;
- Soweto Highveld Grassland; and
- Wakkerstroom Montane Grassland

The study area encompasses a 12km radius around the current infrastructure, and falls over five quaternary catchments in the Upper Vaal Water Management Area (WMA) with the Majuba Power Station located in C11J. Portions of the study area are located in a Freshwater Ecosystem Priority Area (FEPA) and these systems were identified as being in a good condition (NFEPA – Nel et al., 2011) and therefore need to be maintained in order to contribute to the biodiversity of the area. The remainder of the study area is located in an Upstream Management Area. Anthropogenic activities taking place in these areas need to be monitored in order to prevent the degradation of FEPAs and Fish Support Areas located downstream. According to the MBCP (Ferrrar & Lötter, 2007) the study area is located in an "Ecosystem Maintenance" sub-catchment.

Groundwater storage and transport in the unweathered Volkrust Formation is likely to be mainly via fractures, bedding planes, joints and other secondary discontinuities. The success of a water supply borehole in these rocks depends on whether one or more of these structures are intersected. In general the Volkrust Formation is considered to be a **minor aquifer**, with some abstractions of local importance.

5 PROJECT ALTERNATIVES

- *No-Go Alternative*

Ideally, Majuba Power Station, envisages the continuation of dry ash disposal. Prior to the promulgation of Environmental laws such as the Environment Conservation Act, Eskom purchase a portion of land which they envisaged for the disposal of ash for the life of the Station (at that stage 45 years). As part of its planning processes, Eskom developed designs which were approved internally. With the promulgation of the environmental laws such the National Environmental Management Waste Act, Act 59 of 2008, in particular, Eskom would like to align its continued ashing activities with the requirements of the waste licensing processes..

The need for this project is to allow the Majuba Power Station to continue ashing in an environmentally responsible and legally compliant manner for the duration of the remaining operating life of the power station.

In the event that the continuous ashing project does not proceed the power station will run out of land to legally dispose of its ash and the power station will ultimately be required to close down, which would contribute negatively to the provision of reliable base load power to the national grid.

Even though the 'no-go' alternative is considered to be unfeasible, it will still be investigated further in the EIA phase as an alternative as required by the EIA Regulations.

- *Technical Alternatives*

Due to the fact that Majuba Power Station utilises a dry ashing disposal method, it stands to reason that in order to continue ashing a dry ashing method should still be utilised.

In terms of alternative disposal options, the option of disposing of dry ash into old mine pits was identified. An old mine is located approximately 12km from the power station, however, the mine workings are underground and no open cast pit is available. Eskom has previously undertaken feasibility studies to compare the risks associated with in-pit ashing and conventional ashing (i.e. dry ash disposal). Although the feasibility studies were undertaken in August 2007, specifically looking at ashing options for the Medupi

Power Station in the Limpopo Province, it is felt that some of the conclusions made are still relevant to the Majuba situation.

Taking the comparative analysis into account (**Chapter 7**), the use of old mine pits / underground working is still considered unfeasible at this stage due to the numerous uncertainties and low confidence in terms of the clarity with regards to ultimate liability. This alternative is therefore not considered suitable for further investigation.

A further technical alternative to limit the need for ash disposal facilities includes the use of higher grade coal which may reduce the amount of ash produced in the power generation process. The power station was originally designed for 45 years and now its life time is extended to 60 years. The boilers are designed to use lower grade coal and the boiler plant would require a redesign for higher grade coal. In order for this alternative to be implemented would require the complete redesign and reconstruction of the power station. The combination of the costs involved in the reconstruction of the power station as well as the higher price of the higher grade coal would have a knock on effect in terms of the country's electricity prices. Therefore, this alternative is therefore not considered feasible.

- *Location Alternatives*

A screening study was initiated in order to assess where potential alternative sites are located within the study area that would be suitable for use for the proposed continuous ashing project. The study area was demarcated using a 12 km radius around the Majuba Power Station.

In order to ensure that sites are identified in the most objective manner possible, a sensitivity mapping exercise was undertaken for the study area. The purpose of such an exercise was to identify suitable areas within the study area that could accommodate the proposed ash disposal facility and associated infrastructure and to pro-actively identify sensitive areas (i.e. fatal flaws) that should be avoided.

Figure 3 shows the final sensitivity map that was utilised to identify the alternative areas (**Figure 4**) that require more detailed studies.

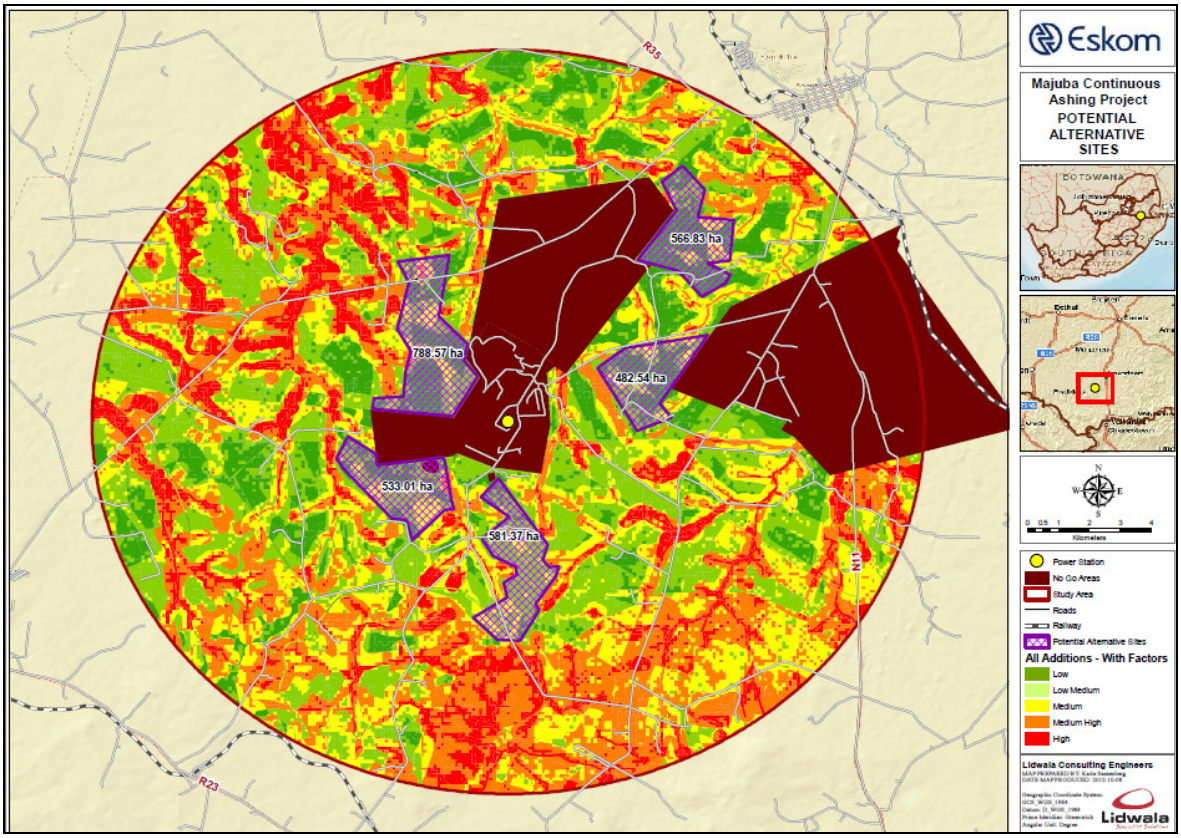

Figure 3: The potential alternative areas, within the study area, large enough to accommodate the required area for the ash disposal facility (overlain on sensitivity map)

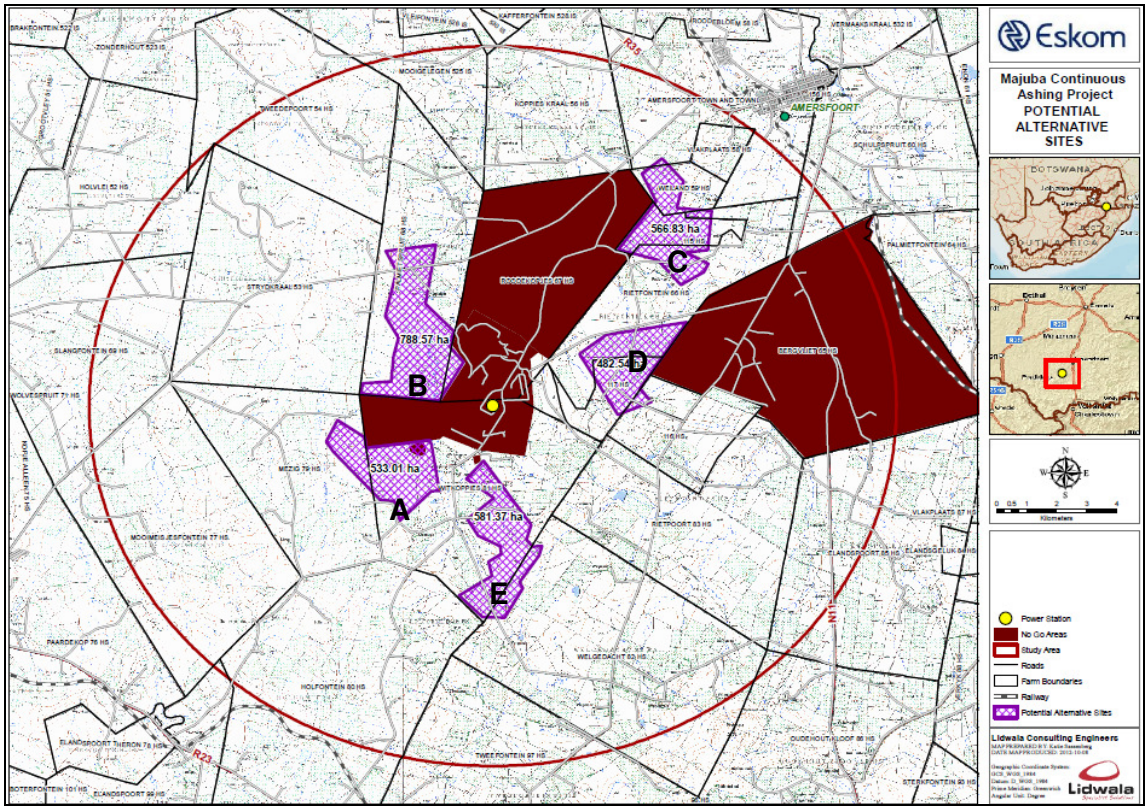

Figure 4: The five potentially suitable areas that can be evaluated and assessed in the EIA studies (overlain on 1 in 50 000 topographic map)

From the above analysis, five areas can be identified as potentially suitable for the continuous ashing activities required at Majuba Power Station at this stage. The area to the south of the existing ash disposal facility incorporates an area already proposed by Eskom for the continuous ashing project. It is still noted that the required ash disposal facility should be placed as close to the existing ashing activities as possible to ensure that existing impacts are kept together and to limit the impact of associated linear infrastructure such as power lines and conveyor belts.

Although these five areas have been identified through this sensitivity analysis, the detailed studies to be undertaken during the EIA phase will ground-truth and confirm any sensitivities within the identified areas. The EIA phase may well refine these areas according to the findings.

6 FINDINGS OF THE IDENTIFICATION OF IMPACTS

The following impacts have been identified for additional study during the EIA phase and are deemed to be issues of potentially **medium to high significance** or those anticipated to require specific mitigation measures:

- **Biophysical Impacts**
  - *Geology*
    - Impacts related to the construction-related earthworks
    - Impacts related to the pollution in case of spillage/leakage of hydrocarbon and other hazardous material from storage facilities
  - *Groundwater*
    - Contamination of ground water due to hydrocarbon spillage and seepage into groundwater reserves, affecting groundwater quality.
    - Further construction of infrastructure and compaction of the area will further contribute to reduced water infiltration rates to replenish groundwater aquifers.
  - *Soil and agricultural potential*
    - Pollution of soil due to handling, use and storage of hazardous substances during construction and operation.
    - The loss of available top soil.
    - Key variables that determine the land capability of the study area such as soil fertility reduced and disturbed due to the potential activities related to the ash disposal facility.
    - The loss of viable agricultural land.
  - *Avifauna*
    - Ash disposal facility
      - Destruction of habitat and disturbance of birds
    - Associated Infrastructure such as powerlines
      - Electrocutions

        - Collisions
        - Habitat destruction
        - Disturbance
    - *Surface Water*
        - Impacts on surface water quality;
        - Impacts on hydrology;
        - Impacts related to erosion and sedimentation;
        - Impacts on aquatic biota; and
        - Impacts on aquatic ecosystem services.
    - *Biodiversity*
        - Direct impacts on threatened flora species;
        - Direct impacts on protected flora species;
        - Direct impacts on threatened faunal taxa;
        - Direct impacts on common fauna species/ faunal assemblages (including migration patterns, corridors, etc.);
        - Human - Animal conflicts;
        - Loss or degradation of natural vegetation/ pristine habitat (including ecosystem functioning);
        - Loss/ degradation of surrounding habitat;
        - Impacts on South Africa's conservation obligations & targets;
        - Increase in local and regional fragmentation/ isolation of habitat; and
        - Increase in environmental degradation, pollution (air, soils, surface water).

- **Social Impacts**
    - *Air Quality*
        - Increase in dust generating activities during construction and operation including exceedances of PM10 concentrations and exceedances of dustfall rates.
    - *Visual*
        - Impact on the current visual landscape.
        - Impact on sensitive receptors,
    - *Heritage*
        - identify the potential heritage sites within the study area
        - identify any impacts (if any) that may occur on these sites as a result of the continuous ashing project
    - *Socio-Economic*
        - Perceptions and fears associated with the proposed power line; and
        - Local, site-specific issues.

The above mentioned impacts will be investigated in more detail during the EIA phase of the project.

7 CONCLUSIONS AND RECOMMENDATIONS

A number of potentially significance environmental impacts have been identified as requiring some more in-depth investigation and the identification of detailed mitigation measures. Although the impacts identified are of a highly significant nature they would not prohibit the project from continuing at this stage of the process

Therefore, a detailed Environmental Impact Assessment is required to be undertaken in order to provide an assessment of these potential impacts and recommend appropriate mitigation measures, where required.

The recommendation of this report is that detailed specialist studies are undertaken on the five potential suitable areas were identified through the use of sensitivity mapping and the no-go alternative.

Eskom Holdings SOC Limited

Environmental Impact Assessment for the Proposed Continuous Ashing at the Majuba Power Station, Mpumalanga Province

Draft Scoping Report

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