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**ESKOM**

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# **Proposed Fuel Oil Storage Tank Grootvlei Power Station**

## **Noise Impact Report for Basic Assessment**

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## EXECUTIVE SUMMARY

M2 Environmental Connections conducted a screening level noise impact report to consider, and identify the potential risk associated with noise impacts that the development of an additional fuel oil storage tank at Grootvlei Power Station may pose to the surrounding potentially noise-sensitive developments (NSDs). This facility is to be developed near the town of Grootvlei, Mpumalanga Province.

The report evaluated the potential noise impact on potential receptor using an administrative questionnaire as recommended in SANS 10328:2008.

Two various proposed locations have been identified at Eskom's existing facility, referred to as *Alternative One* and *Alternative Two*. These two proposed locations are roughly 30 meters from each other.

The result of this administrative review shows that the proposed facility will not have a noise impact on surrounding noise-sensitive developments as the closest identified noise-sensitive development is roughly 880m from the proposed facility.

A further study (an Environmental Noise Impact Assessment) is not required.



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## NOISE IMPACT ASSESSMENT FOR SCOPING PURPOSE

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## GLOSSARY OF ABBREVIATIONS

DEADP	Department of Environmental Affairs and Development Planning
DENC	Department of Environment and Nature Conservation
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act 78 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
ENIA	Environmental Noise Impact Assessment
FEL	Front End Loader
IAPs	Interested and Affected Parties
i.e.	that is
IEM	Integrated Environmental Management
km	kilometers
LHD	Load haul dumper
m	Meters (measurement of distance)
m <sup>2</sup>	Square meter
m <sup>3</sup>	Cubic meter
mamsl	Meters above mean sea level
MENCO	M <sup>2</sup> Environmental Connections cc
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NCR	Noise Control Regulations (under Section 25 of the ECA)
NGO	Non-government Organisation
NIA	Noise Impact Assessment
NSD	Noise-sensitive development
PPE	Personal Protective Equipment
PPP	Public Participation Process
PoS	Plan of Study
SABS	South African Bureau of Standards
SANS	South African National Standards
SHEQ	Safety Health Environment and Quality
WHO	World Health Organisation



## GLOSSARY OF TERMS

1/3-Octave Band	A filter with a bandwidth of one-third of an octave representing four semitones, or notes on the musical scale. This relationship is applied to both the width of the band, and the center frequency of the band. See also definition of octave band.
A – Weighting	An internationally standardised frequency weighting which approximates the frequency response of the human ear and gives an objective reading, which therefore agrees with the subjective human response to that sound.
Air Absorption	The phenomena of attenuation of sound waves with distance propagated in air, due to dissipative interaction within the gas molecules.
Alternatives	A possible course of action, in place of another, that would meet the same purpose and need (of proposal). Alternatives can refer to any of the following but are not limited hereto: alternative sites for development, alternative site layouts, alternative designs, alternative processes and materials. In Integrated Environmental Management the so-called “no go” alternative refers to the option of not allowing the development and may also require investigation in certain circumstances.
Ambient	The conditions surrounding an organism or area.
Ambient Noise	The all-encompassing sound at a point being composed of sounds from many sources both near and far. It includes the noise from the noise source under investigation.
Ambient Sound	The all-encompassing sound at a point being composite of sounds from near and far.
Ambient Sound Level	Means the reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such a meter was put into operation. In this report the term Background Ambient Sound Level will be used.
Amplitude Modulated Sound	A sound which noticeably fluctuates in loudness over time.
Applicant	Any person who applies for an authorisation to undertake a listed activity or to cause such activity in terms of the relevant environmental legislation.
Assessment	The process of collecting, organising, analysing, interpreting and communicating data that is relevant to some decision.
Audible Frequency Range	Generally assumed to be the range from about 20 Hz to 20,000 Hz, the range of frequencies which our ears perceive as sound.
Background Ambient Sound Level	The level of the ambient sound indicated on a sound level meter in the absence of the sound under investigation (e.g. sound from a particular noise source or sound generated for test purposes). Ambient sound level as per Noise Control Regulations.
C-Weighting	This is an international standard filter, which can be applied to a pressure signal or to a SPL or PWL spectrum, and which is essentially a pass-band filter in the frequency range of approximately 63 to 4000 Hz. This filter provides a more constant, flatter, frequency response, providing significantly less adjustment than the A-scale filter for frequencies less than 1000 Hz.
dB(A)	Sound Pressure Level in decibel which has been A-weighted, or filtered, to match the response of the human ear.
Decibel (db)	A logarithmic scale for sound corresponding to a multiple of 10 of the threshold of hearing. Decibels for sound levels in air are referenced to an atmospheric pressure of 20 $\mu$ Pa.
Diffraction	Modification of the progressive wave distribution due to the presence of obstacles in the field. Reflection and refraction are special cases of diffraction.
Direction of	The direction of flow of energy associated with a wave.



Propagation	
Disturbing noise	Means 'n noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group; these circumstances include biophysical, social, economic, historical, cultural and political aspects.
Environmental Control Officer	Independent officer employed by the applicant to ensure the implementation of the Environmental Management Plan (EMP) and manage any further environmental issues that may arise.
Environmental impact	A change resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organisation's activities or may be indirectly caused by them.
Environmental Impact Assessment	An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and which may significantly affect the environment. The EIA includes an evaluation of alternatives, as well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures for enhancing the positive aspects of the proposal, and environmental management and monitoring measures.
Environmental issue	A concern felt by one or more parties about some existing, potential or perceived environmental impact.
Equivalent continuous A-weighted sound exposure level ( $L_{Aeq,T}$ )	The value of the average A-weighted sound pressure level measured continuously within a reference time interval T, which have the same mean-square sound pressure as a sound under consideration whose level varies with time.
Equivalent continuous A-weighted rating level ( $L_{Req,T}$ )	The Equivalent continuous A-weighted sound exposure level ( $L_{Aeq,T}$ ) to which various adjustments has been added. More commonly used as ( $L_{Req,d}$ ) over a time interval 06:00 – 22:00 (T=16 hours) and ( $L_{Req,n}$ ) over a time interval of 22:00 – 06:00 (T=8 hours).
Footprint area	Area to be used for the construction of the proposed development, which does not include the total study area.
Frequency	The rate of oscillation of a sound, measured in units of Hertz (Hz) or kilohertz (kHz). One hundred Hz is a rate of one hundred times per second. The frequency of a sound is the property perceived as pitch: a low-frequency sound (such as a bass note) oscillates at a relatively slow rate, and a high-frequency sound (such as a treble note) oscillates at a relatively high rate.
Green field	A parcel of land not previously developed beyond that of agriculture or forestry use; virgin land. The opposite of Greenfield is brownfield, which is a site previously developed and used by an enterprise, especially for a manufacturing or processing operation. The term brownfield suggests that an investigation should be made to determine if environmental damage exists.
G-Weighting	An International Standard filter used to represent the infrasonic components of a sound spectrum.
Infrasound	Sound with a frequency content below the threshold of hearing, generally held to be about 20 Hz. Infrasonic sound with sufficiently large amplitude can be perceived, and is both heard and felt as vibration. Natural sources of infrasound are waves, thunder and wind.



Integrated Development Plan	A participatory planning process aimed at developing a strategic development plan to guide and inform all planning, budgeting, management and decision-making in a Local Authority, in terms of the requirements of Chapter 5 of the Municipal Systems Act, 2000 (Act 32 of 2000).
Integrated Environmental Management	IEM provides an integrated approach for environmental assessment, management, and decision-making and to promote sustainable development and the equitable use of resources. Principles underlying IEM provide for a democratic, participatory, holistic, sustainable, equitable and accountable approach.
Interested and affected parties	Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.
Key issue	An issue raised during the Scoping process that has not received an adequate response and which requires further investigation before it can be resolved.
Listed activities	Development actions that is likely to result in significant environmental impacts as identified by the delegated authority (formerly the Minister of Environmental Affairs and Tourism) in terms of Section 21 of the Environment Conservation Act.
Loudness	The attribute of an auditory sensation which describes the listener's ranking of sound in terms of its audibility.
Magnitude of impact	Magnitude of impact means the combination of the intensity, duration and extent of an impact occurring.
Masking	The raising of a listener's threshold of hearing for a given sound due to the presence of another sound.
Mitigation	To cause to become less harsh or hostile.
Negative impact	A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, or by causing nuisance).
Noise	a. Sound which a listener does not wish to hear (unwanted sounds). b. Sound from sources other than the one emitting the sound it is desired to receive, measure or record. c. A class of sound of an erratic, intermittent or statistically random nature.
Noise Level	The term used in lieu of sound level when the sound concerned is being measured or ranked for its undesirability in the contextual circumstances.
Octave Band	A filter with a bandwidth of one octave, or twelve semi-tones on the musical scale representing a doubling of frequency.
Positive impact	A change which improves the quality of life of affected people or the quality of the environment.
Property	Any piece of land indicated on a diagram or general plan approved by the Surveyor-General intended for registration as a separate unit in terms of the Deeds Registries Act and shall include an erf, a site and a farm portion as well as the buildings erected thereon
Public Participation Process	A process of involving the public in order to identify needs, address concerns, choose options, plan and monitor in terms of a proposed project, programme or development
Reverberant Sound	The sound in an enclosure excluding that which is received directly from the source.
Reverberation	The persistence, after emission of a sound has stopped, of a sound field within an enclosure.
Significant Impact	An impact can be deemed significant if consultation with the relevant authorities and other interested and affected parties, on the context and intensity of its effects, provide reasonable grounds for mitigating measures to be included in the environmental



	<p>management report. The onus shall be on the applicant to include the relevant authorities and other interested and affected parties in the consultation process. Present and potential future, cumulative and synergistic effects should all be taken into account.</p>
Sound Level	<p>The level of the frequency weighted and time weighted sound pressure as determined by a sound level meter.</p>
Sound Power	<p>Of a source, the total sound energy radiated per unit time.</p>
Sound Pressure Level (SPL)	<p>Of a sound, 20 times the logarithm to the base 10 of the ratio of the RMS sound pressure level to the reference sound pressure level. International values for the reference sound pressure level are 20 micropascals in air and 100 millipascals in water. SPL is reported as <math>L_p</math> in dB (not weighted) or in various other weightings.</p>
Soundscape	<p>Sound or combination of sounds that forms or arises from an immersive environment. The study of soundscape is the subject of acoustic ecology. The idea of soundscape refers to both the natural acoustic environment, consisting of natural sounds, including animal vocalizations and, for instance, the sounds of weather and other natural elements; and environmental sounds created by humans, through musical composition, sound design, and other ordinary human activities including conversation, work, and sounds of mechanical origin resulting from use of industrial technology. The disruption of these acoustic environments results in noise pollution.</p>
Study area	<p>Refers to the entire study area encompassing all the alternative routes as indicated on the study area map.</p>
Sustainable Development	<p>Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs (Brundtland Commission, 1987).</p>
Zone of Potential Influence	<p>The area defined as the radius about an object, or objects beyond which the noise impact will be insignificant.</p>
Zone Sound Level	<p>Means a derived dBA value determined indirectly by means of a series of measurements, calculations or table readings and designated by a local authority for an area. This is similar to the Rating Level as defined in SANS10103:2008.</p>



# 1 INTRODUCTION

M2 Environmental Connections was commissioned to undertake a specialist study to determine the potential noise impact on the surrounding environment due to the establishment of an additional 500m<sup>3</sup> fuel oil storage tank at the existing Grootvlei Power Station near the town of Grootvlei, Mpumalanga Province.

This report is the result of a first phase study (desktop) on the potential noise impact of such a facility on the surrounding sound environment, highlighting methodologies, potential issues to be investigated as well as preliminary findings and recommendations. The information in this document should be sufficient to the regulatory authorities and developer to make an informed decision whether there might be a potential noise impact on the environment and surrounding noise-sensitive developments (NSDs), and whether any additional work in this regard would be required.

This report will report on any potential noise such a facility may create on the surrounding environment during the daytime operations (06:00 to 22:00) relating to the construction phase.

## 1.1 Scope of the Study

SANS 10328:2008 (Edition 3) specifies the methodology to assess the noise impacts on the environment due to a proposed activity that might impact on the environment. The standard also stipulates the minimum requirements to be investigated for screening purposes. These minimum requirements are:

1. identification and description of the noise sources and noise-sensitive developments associated with the development that has to be investigated;
2. identification and description of the noise sources and noise-sensitive developments in the target area that could affect the development (or that could be affected by the development) that has to be investigated;
3. identification, with the assistance of all interested or affected parties, and description of all the noise sources and noise-sensitive developments associated with the development, or located within the target area, that are to be excluded from the investigation. The reason(s) for the exclusion shall be stated; and
4. a reference to this standard regarding the method of investigation.

The purpose of the investigation is to determine, by administrative means, whether the proposed development could have any significant acoustical implications. It is based on an overview of all the information available as well as the review of a questionnaire. If the outcome of the all the questions are negative, the planned development or activity is not likely to present a noise



disturbance. In this case, a scoping investigation and an environmental noise impact investigation could be dispensed and this Screening report may be submitted to the relevant authorities as part of the Environmental Authorization process.

If one or more of the answers to the questions in is affirmative, the acoustical impact could probably be significant and a scoping investigation and, if necessary, an environmental noise impact investigation shall be considered.

In addition, this report should contain sufficient information to allow the Environmental Assessment Practitioner (EAP) to compile the Plan of Study for Environmental Impact Assessment (EIA), including the Noise component.

In this regard the following will be included to assist the EAP in the compilation of the Plan of Study (PoS) for the EIA:

- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact. This will be done by means of a desktop study; and
- A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts.

## **1.2 Assumptions and Limitations**

Increased noise levels are directly linked with the various activities associated with the construction of the facility and related infrastructure. However, the Grootvlei Power Station is an active facility, and there are already a number of activities taking place during the day.

### **1.2.1 Potential Noise Sources - Planning Phase**

Two proposed sites 30 meters from each other on the Eskom Grootvlei property have been identified by the developer. Therefore both these two areas will be investigated. There is no noise source associated with the planning phase.

### **1.2.2 Potential Noise Sources - Construction Phase**

It is anticipated that construction will take place between 06:00 and 18:00 (natural available light).

Construction activities may include the following activities:

- Site establishment (site office, stores/material depot, workshops);
- Excavation operations (foundations for buildings and other infrastructure, compaction of sub soil and surface levels, trenches for cabling and piping etc);



- General construction activities (concrete mixing, building, steel work, concrete vibration); and
- General vehicle movement (on-site movement, delivery of materials and construction equipment).

The equipment likely to be required to complete the above tasks will typically include:

- TLB(s), grader/bulldozer, a vibratory roller, concrete truck(s), mobile crane and various 4WD and service vehicles.

The impact from these construction noises will depend on the type of activities taking place, the number of activities taking place at the same time, type of equipment used.

### Traffic

Traffic relating to this construction project is not considered to be an additional noise source of any significance.

### **1.2.3 Potential Noise Sources - Operational Phase**

An increase of road noise is expected due to delivery of fuel to the fuel oil storage tank. Delivery of fuel will be predominately supplied by Sasol via mobile road tankers trucks from one of their two supply depots namely Sasol refinery and Sasol depot.

The operation of various mechanical components, specifically the pumping of the fuel from the fuel oil storage tank to the burners, could result in a slight increase in noise levels. Currently the fuel oil storage tank will be implemented on the surface and not underground. Furthermore the maintenance and cleaning of such a tank will be required, each activity contributing to the noise levels in the area.

### Operational Phase: Increase in Road Noise

Delivery of fuel oil from Sasol will be done via mobile road tanker trucks. The increase in road noise is dependent on the following:

- the number of vehicles passing in a time period calculated in terms of  $L_{Aeq,T}$ , where  $T$  is 60 minutes time period;
- the route, dependant on the roads the mobile road tanker trucks will take when entering the study area for this;
- the speed that the mobile road tanker trucks travels at;
- the road surface;
- the time the truck travels the route. SANS 10103:2008 allows a 10 dBA penalty to be implemented on the identified daytime ambient sound for the night-time ambient soundscape. (22:00 to 06:00);
- topography and structures that may act as barriers;



- distance between potential noise-sensitive development and the road
- metrological data
- other characteristics of noise associated with trucks including air brakes etc.

However, it is assumed that the fuel will only be used infrequently situations, and the fuel tank is provided as an added precaution to allow for continued power generation. Once filled, it may remain full for a period before a power demand requires the use of this fuel and the tank may require filling. Considering existing traffic in the area, the increased traffic (for a short while during the filling of the fuel tanks) is not considered to be a noise source of any significance.

#### Operational Phase: Mechanical Noise Fuel Oil Storage Tank

In order to pump the fuel from the fuel oil storage tank, it is assumed an industrial pump.

Certain noise characteristics of noise are associated with pumps specifically tonal noise such as whines and whistles. Tones are noises with a narrow sound frequency composition (e.g., the whine of an electrical motor). Annoying tones can be created in numerous ways. Machinery with rotating parts such as motors, gearboxes, fans and pumps often create tones. An imbalance or repeated impacts may cause vibration that, when transmitted through surfaces into the air, can be heard as tones. Pulsating flows of liquids or gases can also create tones, which may be caused by combustion processes or flow restrictions.

However, a pump generally is not a noise source of any significance, and unlikely to change the surrounding ambient noise levels at any detectable levels.

### **1.3 Legislative Context**

#### **1.3.1 Republic of South Africa Constitution Act (“The Constitution”)**

The environmental right contained in section 24 of the Constitution provides that everyone is entitled to an environment that is not harmful to his or her well-being. In the context of noise, this requires a determination of what level of noise is harmful to well-being. The general approach of the common law is to define an acceptable level of noise as that which the reasonable person can be expected to tolerate in the particular circumstances. The subjectivity of this approach can be problematic, however, which has led to the development of noise standards (see **Section 1.3.7**).

“Noise pollution” is specifically included in Part B of Schedule 5 of the Constitution, which means that noise pollution control is a local authority competence, provided that the local authority concerned has the capacity to carry out this function.



### **1.3.2 The Environmental Conservation Act**

The Environment Conservation Act (“ECA”) allows the Minister of Environmental Affairs and Tourism (“now the Ministry of Water and Environmental Affairs”) to make regulations regarding noise, among other concerns. The Minister has made noise control regulations under the ECA (GN R154 in Government Gazette No. 13717, 10 January 1992). Neither the Northern nor Eastern Cape has adopted these Noise Control Regulations as provincial regulations.

### **1.3.3 The National Environmental Management Act**

The National Environmental Management Act (“NEMA”) defines “pollution” to include any change in the environment, including noise. A duty therefore arises under section 28 of NEMA to take reasonable measures while establishing and operating the facility to prevent noise pollution occurring. NEMA sets out measures which can be regarded as reasonable. They include measures:

- To investigate, assess and evaluate the impact on the environment;
- To inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed to avoid causing significant pollution or degradation of the environment;
- To cease, modify or control any act, activity or process causing the pollution or degradation;
- To contain or prevent the movement of pollution or degradation;
- To eliminate any source of the pollution or degradation; or
- To remedy the effects of the pollution or degradation.

### **1.3.4 National Environmental Management: Air Quality Act (“AQA”)**

Section 34 of the National Environmental Management: Air Quality Act (Act 39 of 2004) makes provision for:

- the Minister to prescribe essential national noise standards for:
  - i) The control of noise, either in general or by specified machinery or activities or in specified places or areas, or
  - ii) Determining:
    - A definition of noise; and
    - The maximum levels of noise.
- When controlling noise the provincial and local spheres of government are bound by any prescribed national standards.

This section of the Act is in force, but no such standards have yet been promulgated.

An atmospheric emission license issued in terms of section 22 may contain conditions regarding noise.



### **1.3.5 Noise Control Regulations**

In terms of section 25 of the ECA, the national noise-control regulations (NCRs) (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R.55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996 legislative responsibility for administering the NCR was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in Gauteng, Free State, KwaZulu Natal and the Western Cape Province. The Mpumalanga Province has not yet promulgated their own noise control regulations.

In terms of the National Noise Control Regulations, if the predicted level of noise emanating from a proposed activity is likely to cause the noise levels on surrounding land to exceed 65 dBA (61 dBA for an industrial noise), noise mitigation measures are required to be implemented to ensure that the noise levels on the affected land are reduced so as not to exceed 65 dBA.

In addition, increases above 7 dBA from the background ambient noise levels (impact experienced by a receptor) are considered a "Disturbing noise". Any disturbing noise is prohibited.

### **1.3.6 Draft Model Air Quality Management By-Law for adoption and adaption by Municipalities**

Draft model air quality management by-laws for adoption and adaptation by municipalities was published by the Department of Environmental Affairs in the *Government Gazette* of 15 July 2009 as General Notice (for comments) 964 of 2009. Section 18 specifically focuses on Noise Pollution Management, with sub-section 1 stating:

*"No person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, animal, machine, device or apparatus or any combination thereof."*

The draft regulations differ from the current provincial Noise Control Regulations as they define a disturbing noise as a noise that is measurable or calculable of which the rating level exceeds the equivalent continuous rating level as defined in SANS 10103:2008.

### **1.3.7 Noise Standards**

Four South African Bureau of Standards (SABS) scientific standards are considered relevant to noises from a Solar Thermal facility. They are:

- SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';
- SANS 10210:2004. 'Calculating and predicting road traffic noise';
- SANS 10328:2008. 'Methods for environmental noise impact assessments', and



- SANS 10357:2004. 'The calculation of sound propagation by the Concave method'.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. The recommendations that the standards make are likely to inform decisions by authorities but non-compliance with the standards will not necessarily render an activity unlawful *per se*.

### **1.3.8 International Guidelines**

While there exist a number of international guidelines and standards that could encompass a document in itself, the study below was selected as they are used by different countries in the subject of environmental noise management.

#### Guidelines for Community Noise (WHO, 1999)

The World Health Organization's (WHO) document on the *Guidelines for Community Noise* is the outcome of the WHO- expert task force meeting held in London, United Kingdom, in April 1999. It is based on the document entitled "Community Noise" that was prepared for the World Health Organization and published in 1995 by the Stockholm University and Karolinska Institute.

The scope of WHO's effort to derive guidelines for community noise is to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments.

Guidance on the health effects of noise exposure of the population has already been given in an early publication of the series of Environmental Health Criteria. The health risk to humans from exposure to environmental noise was evaluated and guidelines values derived. The issue of noise control and health protection was briefly addressed.

The document uses the  $L_{Aeq}$  and  $L_{A,max}$  noise descriptors to define noise levels.



## 2 TECHNICAL DETAILS OF THE PROJECT

### 2.1 Site Location and Description

#### 2.1.1 Project Location

The facility is proposed near the town of Grootvlei in the Mpumalanga Province.

A site locality map is presented in **Figure 1** showing the locality of Eskom and the conceptual deliver route for mobile road tanker trucks to the fuel oil storage tank. The area under investigation is roughly 5 km<sup>2</sup> in size.

Two proposed locations 30 meters apart on Eskom's grounds are proposed by the developer, and these locations are illustrated in **Figure 2**.

#### 2.1.2 Topography

Using GoogleEarth® the area can be seen as a brown field's area, with many agricultural cultivated low laying crop areas divided into various crop/farm portions. The area does not seem dense in natural vegetation from topographical maps.

A previous visit to the area done on the 30 September 2011 viewed the area to be relatively flat, with little undulation in the geographic topography. The study area has a downward slope gradient starting at roughly 1,570 mamsl found at the western side of the study area, decreasing to 1,530 mamsl to the western side of the study area.

#### 2.1.3 Roads

R51 highway (a noise source) traverses north to south from the town of Grootvlei roughly 1,700 meters to the north-west of the proposed fuel oil storage tank.

Other smaller unidentified roads connecting farms and other small holdings to secondary and main roads traverse the study area. Many smaller roads traverse the Eskom facility itself.

#### 2.1.4 Land Use

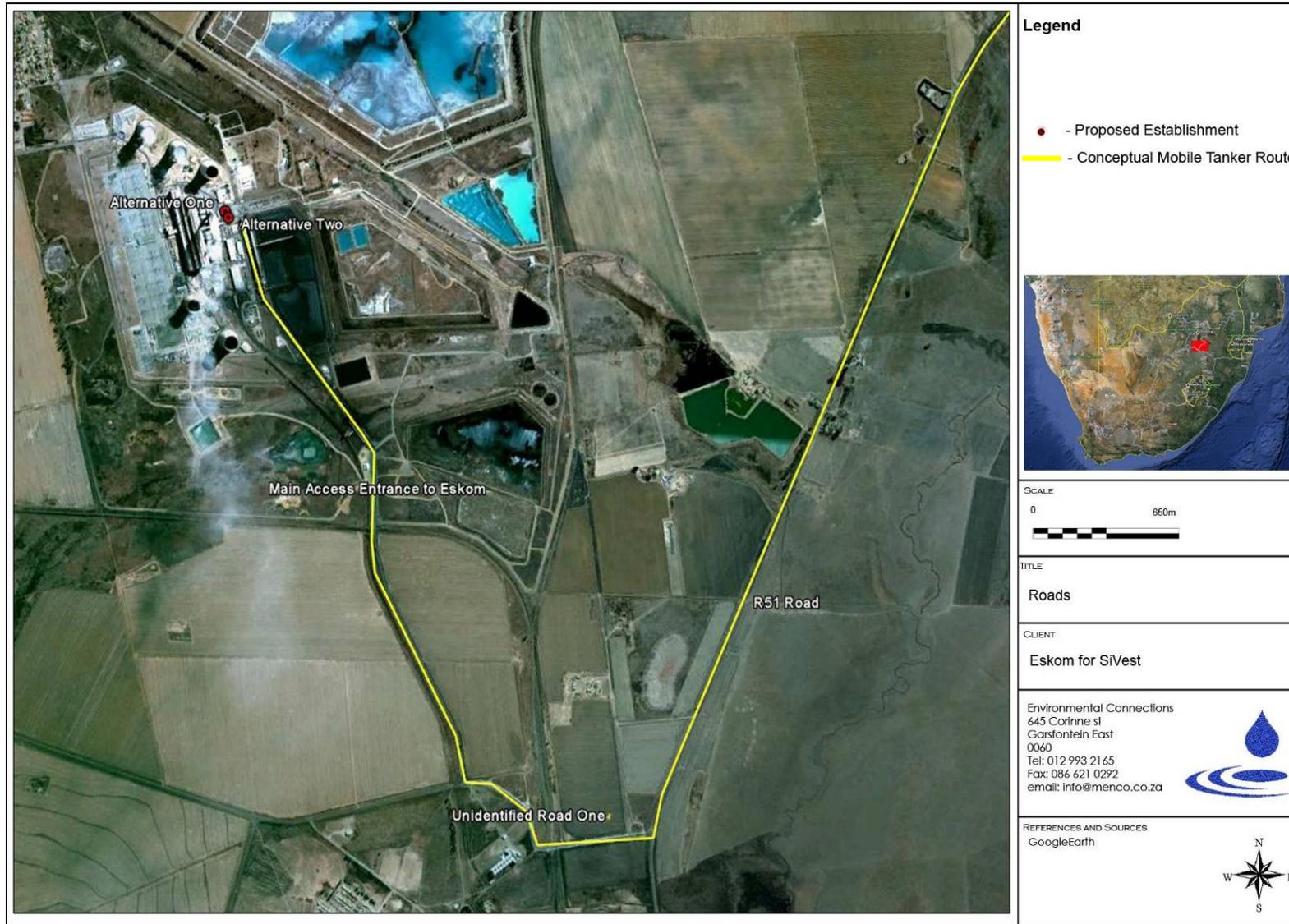
Land use seems mostly agricultural, and as mentioned previously two residential areas are identifiable from GoogleEarth® maps. These are what seems to be an Eskom residential area roughly 900 meters north-westerly from the proposed co-ordinates for the fuel oil tank, and the town of Grootvlei itself.

The Power Station site is considered an industrial area.



### **2.1.5 Ground Conditions and Vegetation**

The area seems to consist mostly of low growing agriculture vegetation with hard ground conditions (as observed during a previous visit to the area on the 30 September 2011). The ground cover would offer little in the way of acoustical absorption.



**Figure 1: Site map indicating two proposed locations for the fuel oil storage tank facility near the town of Grootvlei**

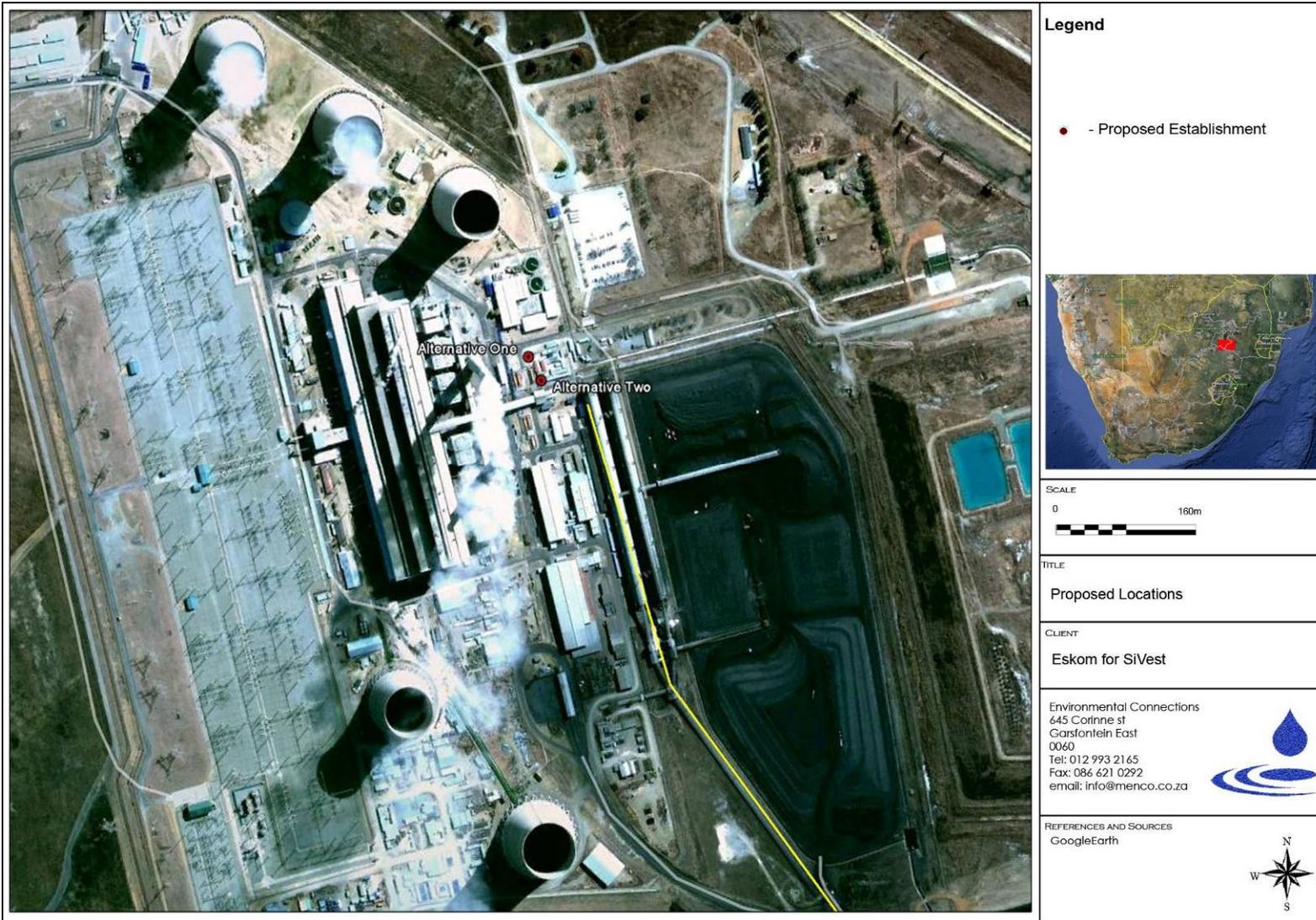


Figure 2: Two proposed locations of the fuel oil storage tank on Eskom's grounds, namely Alternative One and Alternative Two



### 2.1.6 Available Information

No other study could be found regarding the acoustical character or the ambient sound levels in this area besides the previous site visit by the author.

### 2.1.7 Potential Noise-Sensitive Developments

An assessment of the area was done using available topographical maps and GoogleEarth®. A number of Potential noise-sensitive developments (NSDs) were identified, with those within 1,000 meters of the boundary of the proposed facility indicated in **Figure 3** with **Table 1** defining their locations. The town of Grootvlei and the assumed Eskom residential area is represented by **NSD01** and **NSD02** respectively.

The status of the dwellings found in **Figure 3** has not been confirmed and various buildings surrounding the immediate area around Eskom facility are assumed to be part of the facility.

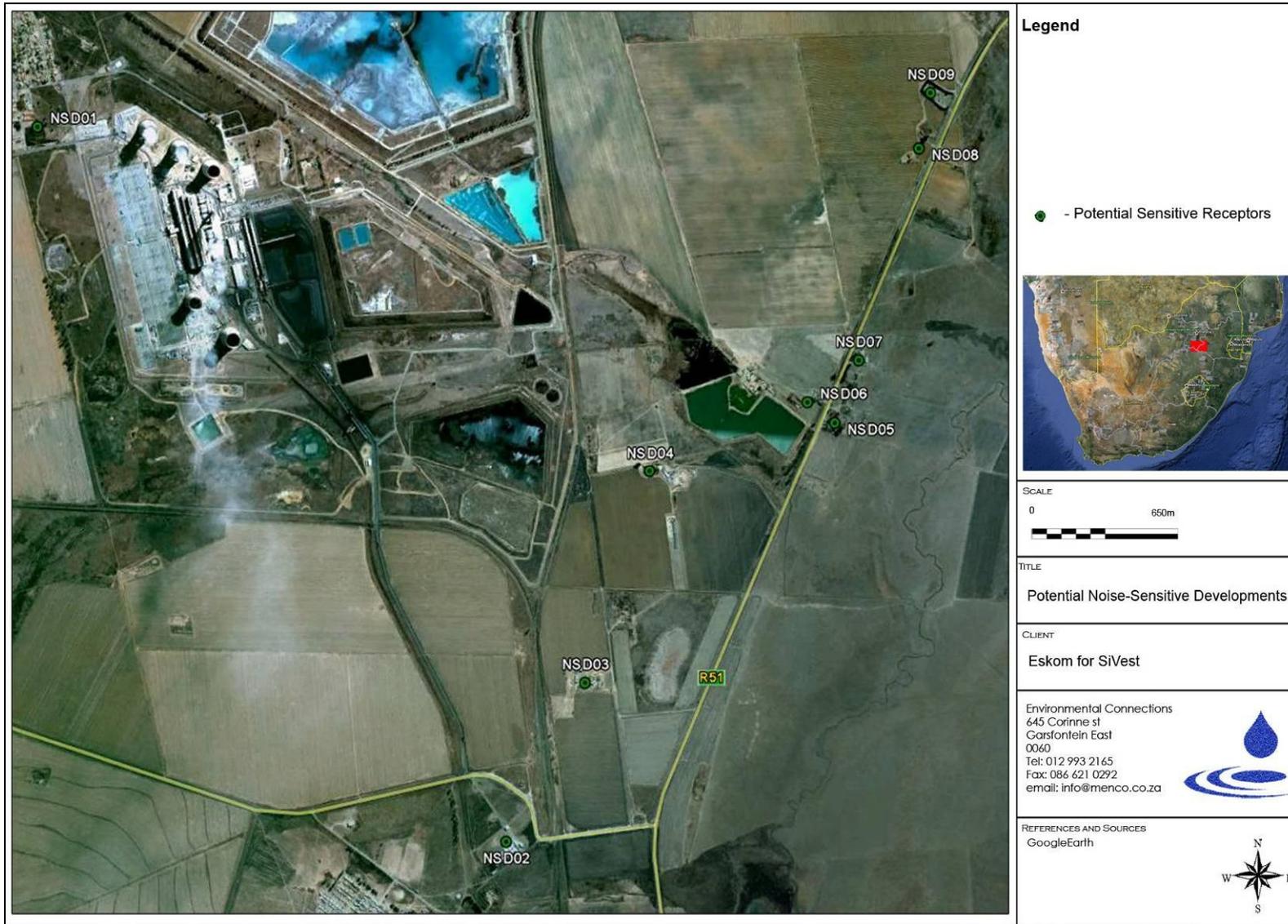
**Table 1: Locations of the identified Noise Sensitive Developments (Datum type: WG84 – Hartbeeshoek)**

Receptor	Location Longitude	Location Latitude	Distance to the proposed facility	L <sub>Req,d</sub> (dBA)
NSD01	-26.765343°	28.489644°	880m	50
NSD02	-26.791303°	28.512075°	2,800m	50
NSD03	-26.785118°	28.515182°	2,500m	45
NSD04	-26.776950°	28.517521°	2,100m	45
NSD05	-26.774672°	28.525614°	2,800m	45
NSD06	-26.773952°	28.524351°	2,600m	45
NSD07	-26.772239°	28.526529°	2,800m	45
NSD08	-26.764085°	28.528639°	3,000m	45
NSD09	-26.761966°	28.529003°	3,100m	45

## 2.2 Technical Project Description

The study area of the proposed fuel storage tank is approximately 5 km<sup>2</sup>. The capacity of the proposed fuel oil storage tank is 500 m<sup>3</sup>. Currently the Eskom facility makes use of six tanks of a capacity of 97m<sup>3</sup> each (one of 75m<sup>3</sup>) supplying six coal fired units with pulverized fuel. The fuel oil is used to start up and shut down these boilers.

The 7<sup>th</sup> proposed tank will be installed on an open space adjacent to the existing six tanks. The proposed tank is intended to be situated about 15 meters from the existing nearest tank. The proposed tank will be linked to the other six existing tanks and will make use of the current four inch supply pipe, and a five inch return pipe from the coal fired units.



**Figure 3: Noise Sensitive Developments (as green dots) identified using GoogleEarth®**

**ESKOM**  
 Proposed Fuel Oil Tank Grootvlei Power Station  
 Revision No.0  
 16 January 2012

**Prepared for: SiVEST**



### 3 ASSESSMENT METHODOLOGY

SANS 10328:2008 (Edition 3) specifies the methodology to assess the noise impacts on the environment due to a proposed activity that might impact on the environment. The standard also stipulates the minimum requirements to be investigated for screening purposes. These minimum requirements are:

1. identification and description of the noise sources and noise-sensitive developments associated with the development that has to be investigated;
2. identification and description of the noise sources and noise-sensitive developments in the target area that could affect the development (or that could be affected by the development) that has to be investigated;
3. identification, with the assistance of all interested or affected parties, and description of all the noise sources and noise-sensitive developments associated with the development, or located within the target area, that are to be excluded from the investigation. The reason(s) for the exclusion shall be stated; and
4. a reference to this standard regarding the method of investigation.

The purpose of the investigation is to determine, by administrative means, whether the proposed development could have any significant acoustical implications.

It is based on an overview of all the information available as well as the review of a questionnaire. If the outcome of the all the questions are negative, the planned development or activity is not likely to present a noise disturbance. In this case further investigation could be dispensed with.

## 4 FINDINGS OF ASSESSMENT

This administrative evaluation would be relevant for both the construction and operational phases, and only considered the potential noise impact of the proposed facility. It does not consider the fact that the facility are industrial, and that there are a number of existing activities that already would impact on the ambient sound environment.

**Table Error! No text of specified style in document..2: Questions for Noise Screening (SANS 10328:2008)**

<b>Question</b>	<b>Answer</b>	<b>Comment</b>
Does the planned linear source (arterial road, planned arterial road reserve, or a main line railway line) at any position along the route pass within 1 000 m from an area which is developed or zoned for residential purposes?	No	<b>Not relevant</b>
Does the planned linear source (suburban road, planned suburban road reserve where only two lanes of traffic will be present at an average speed limit not exceeding 60 km/h, or a suburban electric traction railway line) at any position along the route pass within 500 m from an area which is developed or zoned for residential purposes?	No	<b>Not relevant</b>
Does the planned development of a residential area or a piece of land zoned for residential purposes fall within 1 000 m from a planned linear source (arterial road, planned arterial road reserve, or a main line railway line)?	No	<b>Not relevant</b>
Does the planned development of a residential area or a piece of land zoned for residential purposes fall within 500 m from a planned linear source (suburban road, planned suburban road reserve where only two lanes of traffic will be present at an average speed limit not exceeding 60 km/h, or a suburban electric traction railway line)?	No	<b>Not relevant</b>
Does a planned industrial development or a building housing plant fall within a distance of 1 000 m from an already developed residential area or land zoned for residential purposes?	No	<b>Not relevant</b>
Does a piece of land to be developed for residential purposes or land to be zoned for residential purposes fall within 1 000 m from an already developed industrial area or a building housing plant?	No	<b>Not relevant</b>
Does planned light industrial development or a building(s) housing workshops fall within a distance of 500 m from an already developed residential area or land zoned for residential purposes?	No	<b>Closest NSD more than 500 m</b>
Does a piece of land to be developed for residential purposes or land to be zoned for residential purposes fall within 500 m from an already developed light industrial development or a building(s) housing workshops?	No	<b>Not relevant</b>
Does a piece of land to be developed for residential purposes or land to be zoned for residential purposes fall within 2 000 m from an existing wind generator farm?	No	<b>Not relevant</b>
Does a piece of land to be developed as a wind generator farm fall within 2 000 m from a piece of land to be developed for residential purposes or land to be zoned for residential purposes?	No	<b>Not relevant</b>
Does a piece of land to be developed for residential purposes or land to be zoned for residential purposes fall within 2 000 m from a low frequency source (e.g. low speed ventilation fans or low speed diesel engines)?	No	<b>Not relevant</b>
Does an activity containing a low frequency source (e.g. low speed ventilation fans or low speed diesel engines) to be developed fall within 2 000 m from a piece of land to be developed for residential purposes or land use to be zoned for residential purposes?	No	<b>Not relevant</b>
Will the planned repaving of a suburban street be provided with a normal, non-sound absorptive bitumen or cement concrete paving?	No	<b>Not relevant</b>
Where an aircraft landing strip, heliport, hoverport or airport is planned, or is to be altered, will this planned activity be such that the calculated appropriate limit noise contour for the full planned use of the activity fall inside the boundaries of any residential area or any piece of land zoned for residential purposes?	No	<b>Not relevant</b>
Where a residential area is planned or a piece of land is to be zoned for residential purposes, will the evaluated appropriate limit noise contour for the full planned use of an aircraft landing strip, heliport, hoverport or airport fall inside the boundaries of the residential area or the piece of land zoned for residential purposes?	No	<b>Not relevant</b>

## **5 CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

This report is a Screening assessment of the predicted noise environment due to the development of the proposed fuel oil storage at the existing Grootvlei Power Station near the town of Grootvlei, Mpumalanga Province. It is based on an administrative assessment as recommended in SANS 10328:2008.

This screening assessment indicated that the proposed project could have a noise impact of low significance (low probability to have an impact) on the noise climate in the surrounding area due to the distance between the proposed development and the closest noise-sensitive receptors.

### **5.2 Recommendations**

This screening noise impact assessment is sufficient to identify and define any risks in terms of potential noise impacts on the surrounding environment and receptors.

Because the proposed facility is further than 500 meters from the closest noise-sensitive development it is unlikely to have a noise impact.

No further noise impact assessment is required, and this screening noise report would be sufficient for the Environmental Authorization Process.

## 6 REFERENCES

In this report reference was made to the following documentation:

- Norton, M.P. and Karczub, D.G.: *Fundamentals of Noise and Vibration Analysis for Engineers*, Second Edition, 2003
- SANS 10103:2008. *'The measurement and rating of environmental noise with respect to annoyance and to speech communication'*;
- SANS 10210:2004. *'Calculating and predicting road traffic noise'*;
- SANS 10328:2008. *'Methods for environmental noise impact assessments'*;
- SANS 10357:2004 *'The calculation of sound propagation by the Concave method'*;
- World Health Organization, 1999: *Protection of the Human Environment; Guidelines for Community Noise*

End of Report.