

15. NOISE IMPACT EVALUATION

15.1. Approach

A noise impact evaluation was undertaken in order to investigate the potential impact of noise as a result of the proposed construction of the proposed new power station. The approach to this evaluation was as follows:

- A sufficiently detailed quantitative (by measurement) and qualitative evaluation within the area of influence of the proposed Matimba B Power Station was to be undertaken in order to enable a full appreciation of the nature, magnitude, extent and implications of the potential noise impact of all aspects of the project.
- The level of investigation was to be that of a Scoping Study.
- The four alternative power station sites were to be evaluated and compared for the nomination of a preferred site.
- The eight alternative ancillary infrastructure sites were to be evaluated and compared for the nomination of a preferred site.
- All aspects of the investigation were to conform to the requirements of relevant environmental legislation and noise standards.
- The potential impacts at the pre-construction, construction and operational phases of the project were to be evaluated.

Refer to Appendix Q for a comprehensive glossary of terms.

15.2. Details of the Study Area

The study area is defined as that area which is influenced by the noise generated by the operations of and traffic generated by the proposed Matimba B Power Station. The areas of influence of the eight alternative sites (taking the respective cumulative effect of the existing power station) were considered.

15.2.1. Topography

The general terrain of the area is flat, falling gently to the north-east.

15.2.2. Roads

The main roads influencing the study area are:

- The main road from Lephalale to Matimba Power Station and Grootegeluk Colliery. This road continues north-westwards to Stockpoort (border post). For convenience in the report this road has been divided into three sections:

- * Section 1: Nelson Mandela Drive - through Lephalale.
- * Section 2: Nelson Mandela Drive Extension - west of Lephalale (Onverwacht Township) to the Steenbokpan Road intersection.
- * Section 3: Stockpoort Road - west of the Steenbokpan Road intersection.
- The Steenbokpan Road. This east-west aligned road intersects with Nelson Mandela Drive Extension approximately 5 km west of Onverwacht.
- The Afguns Road, which links to the Steenbokpan Road 3 km west of the latter's intersection with Nelson Mandela Drive Extension.

15.2.3. Railway Lines

The only railway line in the area is the one linking from the Grootegeluk Colliery southwards to Thabazimbi. Its main use is the export of coal from the colliery. There are usually two trains per day.

15.2.4. Land Use

- *Existing Situation*

The existing land uses in the area are:

- * Residential:
 - Town of Lephalale (Ellisras). The nearest section of the town to the study area namely Onverwacht Township lies approximately 5 km to the south-east of Matimba Power Station.
 - Marapong Township lies just to the north-east of Matimba Power Station.
 - There are several farmhouses and farm labourer houses spread out through the study area.
- * Educational: There are schools in Lephalale but these are too far away from the proposed development site to be affected by the noise generated by the proposed new power station.
- * Industrial:
 - Matimba Power Station.
 - There is a small industrial area just to the north of Onverwacht Township.
- * Mining. The Grootegeluk Colliery, which provides Matimba with coal is located just to the west of the existing power station.
- * Agriculture. The main land use in the study area and its environs is cattle and game farming.

It is only the existing residential areas in the study area that may be defined as noise sensitive land uses.

- *Planned Land Use*

There are presently no known developments in the study area that could be adversely affected by new power station.

15.2.5. Aspects of Acoustical Significance

The terrain across the study area is flat falling gently to the north-east. There are no natural features that will assist in the attenuation of noise.

The main meteorological aspect that will affect the transmission (propagation) of the noise is the wind. The wind can result in periodic enhancement downwind or reduction upwind of noise levels. Analysis of the wind records for the area indicates that overall (day and night average) the main prevailing winds blow from the northeast (44%). Approximately 30% *still* periods are experienced annually.

15.3. Methodology

15.3.1. General

The evaluation of the noise impact was guided by the requirements of the Code of Practice SANS 10328:2003: *Methods for Environmental Noise Impact Assessments*. The level of investigation was the equivalent of a Scoping of the situation. A comprehensive evaluation of all noise impact descriptors (standards) has been undertaken. The noise impact criteria used specifically take into account those as specified in the South African National Standard SANS 10103:2003, *The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication* as well as those in the National Noise Control Regulations. The investigation comprised the following:

- Determination of the existing situation (prior to the proposed development).
- Determination of the situation during and after development.
- Evaluation of the change in noise climate and impact.
- Comparison of alternative sites and the nomination of a preferred site.

The specific land use (type of farming activity) and position of the farmhouses, labourers' houses and other habitations have not been confirmed through ground-truthing. For this scoping study, the position of houses/dwellings on the farms was taken off the following 1:50 000 topographical cadastral maps. Even though the latest editions were used, the mapping is 15 to 25 years out of date.

- South Africa 1:50 000 Sheet 2327CB Steenbokpan Second Edition, 1980.
- South Africa 1:50 000 Sheet 2327CD Rooipan Second Edition, 1980.

- South Africa 1:50 000 Sheet 2327DA Ellisras Second Edition, 1980. This map has note that it was partially revised from aerial photography In 1990.
- South Africa 1:50 000 Sheet 2327DC Afguns Second Edition, 1980.

15.3.2. Determination of the Existing Conditions

The sound pressure level (SPL) (noise) measurements were taken in accordance with the requirements of the South African National Standard (SANS) 10103:2003, *The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication*. Two Type 1 Integrating Sound Level Meters, a Bruël and Kjaer Model 2230 meter and a Larson Davis 824 were used for the noise measurements. The former was used to provide supplementary data, where relevant, to that from the Larson Davis meter and thus the readings taken on the latter are the primary data recorded in this report. Both meters were calibrated at the CSIR Acoustical Laboratory within the last 12 months. The calibration status of the meters was also checked before and after completion of the total measurement period of the day. A calibrated signal with a sound pressure level of 94,0 dB at 1 kHz and 114,0 dB at 1 kHz were applied to the Bruël and Kjaer meter and the Larson Davis meter respectively. A Larson Davis Model CAL200 was used. A comparative calibration measurement between the two metres was also taken at the start of each measurement session.

For all measurements taken to establish the ambient noise levels, the equivalent noise level (L_{Aeq}), the maximum sound pressure level (L_{Amax}) and the minimum sound pressure level (L_{Amin}) during that measurement period were recorded. The frequency weighting setting was set on "A" and the time weighting setting of the meters were set on *Impulse* (I). Measurement periods of a minimum of 10 minutes were used where ambient conditions were to be established. Where the power station component was to be isolated, the variation in instantaneous sound pressure level (SPL) over a short period was measured when the power station could be heard to predominate. For these latter measurements the time weighting setting of the meter was also set on *Impulse* (I).

At all the measurement sites, the meters were set up with the microphone height at 1,3 m above ground level and well clear of any reflecting surfaces (a minimum of 3 m clearance). For all measurements, a standard windshield cover (as supplied by the manufacturers) was placed on the microphone of each meter.

At the same time as each individual measurement was being taken, the qualitative nature of the *noise climate* in the area of the measurement site was assessed and recorded. This comprised an appraisal of the general prevailing acoustic conditions based on the subjective response to the sounds as perceived by the listener (i.e. *auditory observation* by the surveyor), as well as identifying

those noise incidents, which influenced the noise meter readings during that measurement period. This procedure is essential in order to ensure that there is a *human* correlation between the noise as perceived by the human ear and the noise, which is measured by the meter, as well as to establish any anomalies in the general ambient noise conditions.

This phase comprised the following:

- The relevant technical details of the existing and the proposed power stations, the existing traffic patterns and the existing and planned land use in the study area were reviewed in order to establish a comprehensive understanding of all aspects of the project that will influence the future noise climate in the study area.
- Using these data, the limits of the study area for each alternative development site were determined and the potential noise sensitive areas, other major noise sources and potential problems in these areas were identified.
- Applicable noise standards were established. The National Noise Control Regulations, and the SANS 10103:2003 standards were applied.
- The existing *noise climate* of the study area was determined by means of a field inspection and a noise measurement survey. The measurement survey appropriately covered the whole of the study area, focussing specifically on the identified noise sensitive/problem areas. Measurements were taken at 13 monitoring sites in the study area. Both the daytime and night-time conditions were measured. The sound pressure level (SPL) (noise) measurements were taken in accordance with the requirements of the Code of Practice SANS 10103:2003, *The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication*. Type 1 Integrating Sound Level meters were used for the noise measurements. All measurements were taken under dry weather and normal traffic (that is mid-week/school term) conditions.
- On the general field inspection and at the same time as each individual measurement was being taken, the qualitative nature of the *noise climate* in the area of the measurement site was assessed and recorded. This comprised an appraisal of the general prevailing acoustic conditions based on the subjective response to the sounds as perceived by the listener (i.e. *auditory observation* by the surveyor), as well as identifying those noise incidents, which influenced the noise meter readings during that measurement period. This procedure is essential in order to ensure that there is a *human* correlation between the noise as perceived by the human ear and that, which is measured by the meter, as well as to establish any anomalies in the general ambient noise conditions.
- The existing noise climates along the main roads as related to the current traffic volumes and patterns were established. These traffic noise levels were

calculated using the South African National Standard SANS 10210 (SABS 0210) *Calculating and Predicting Road Traffic Noise* for Route. The Year 2005 traffic was used as the baseline reference.

- The calculated 24-hour period noise indicators, as well as those for the daytime period and night-time period provided the main data for the impact assessment. The measured data provided a field check of the acoustic conditions.

15.3.3. Evaluation of Planning/Design Phase and Construction Phase Impacts

Aspects of the pre-design field surveys and construction activities that potentially will have a noise impact were identified and, where appropriate, mitigating measures have been recommended.

15.3.4. Evaluation of Operational Phase Impacts

The main focus of the operational phase evaluation was to establish the nature, magnitude and extent of the potential change in *noise climate* in the study area directly related to and within the area of influence of each of the four alternative development sites. This was done as follows:

- The impact of the new power station with its ancillary operations (including traffic) was established, and then its cumulative effects with Matimba Power Station were determined.
- In order to determine the most appropriate site, the four alternative power station sites were compared by rating 15 noise impact aspects related to the development infrastructure and site characteristics. A separate rating analysis was also carried out for the eight sites to check which were suitable for the ash dumps.
- Based on the findings, appropriate noise mitigating measures (site scale) have been investigated and recommendations made. These are conceptual and not detailed to final design level.

15.4. Details of the Noise Measurement Survey and Existing Noise Climate Condition Evaluation

The following conditions were observed in the study area and the following aspects were determined from the surveys, calculations of noise indicators and the predictive modelling undertaken for the evaluation of the noise impact of the proposed power station.

15.4.1. General Details

General aspects of note were as follows:

- The weather conditions on the survey days were such that the measurements to establish the ambient noise levels were not adversely affected and no specific corrective adjustments needed to be made.
- The main sources of noise (or potential sources of noise) which presently affect the residual *noise climate* in the Study Area were found to be the following:
 - * Matimba Power Station.
 - * Grootgeluk Colliery.
 - * Traffic on Nelson Mandela Drive/Stockpoort Road.
 - * Conveyor belt systems.
 - * Operations at the ash dump.
 - * Trains on the coal haul railway line.
 - * Operations at the power station sewage works.
- The existing noise sensitive areas, which are likely or could possibly be impacted by Matimba B are:
 - * The western sector of Onverwacht Township.
 - * Marapong Township.
 - * Various farmhouses and farm labourer houses.
 - * Certain operations on game farms.
- The specific land use (type of farming activity) and position of the farmhouses, labourers' houses and other habitations have not been confirmed through ground-truthing. For this study the position of houses/dwellings on the farms was taken off 1:50 000 scale topographical-cadastral maps.

15.4.2. The Existing Ambient Noise Climate

- *Measurement Sites*

Measurements and *auditory observations* were taken at five main sites in order to establish the ambient noise conditions of the study area. Measurements were taken at another eight (8) sites where it was attempted to isolate the noise from the existing Matimba Power Station. These were taken at appropriate sites at varying distances from the power station. The five general sites in the study area where the ambient noise condition was established were:

- * Site G1: In Onverwacht (North), on the northern sidewalk of Bergsig Street, 30 m from the intersection with Ngoako Ramathlodi Road. The site is approximately 7 700 m east of the power station.
- * Site G2: In Onverwacht (South), on the northern sidewalk of Waterlelie Road at the western extremity of the block from Zebra Street. The site is

at the south-eastern extremity of the township and is approximately 5 700 m south-east the power station.

- * Site G3: In Marapong Township on eastern sidewalk of the road just south of the Marapong Private Hospital. The site is approximately 700 metres northeast of the power station.
- * Site G4: On the southern side and 10 metres from the centreline of the Steenbokpan Road at approximately the boundary between the farms Naaumontkomen 509-LQ and Eenzaamheid 512-LQ. The site is approximately 8 500 m southwest of the power station.
- * Site G5: On the access road to the Farm Peerboom 466-LQ (on the boundary with the farm Welgelegen 469-LQ). The site is approximately 6 300 m east of the power station.

The eight sites where the existing Matimba Power Station noise was isolated were:

- * Site M1: On the southern fence line of Matimba Power Station in line with the centreline of the bank of cooling fans. The site is approximately 300 m south of the power station.
- * Site M2: On the eastern fence line of Matimba Power Station in line with the centreline of the power station building (centreline of the bank of cooling fans). The site is approximately 430 m east of the power station.
- * Site MMR3: On the southern side of Nelson Mandela Drive Extension (main road to power station) just west of Onverwacht Township. The site is approximately 4600 m south-east of the power station.
- * Site MMR4: On the southern side of Nelson Mandela Drive Extension at the intersection with the entrance road to the ash dump (on the boundary between the farms Hanglip 508-LQ and Zwartwater 507-LQ). The site is approximately 2 800 m south of the power station.
- * Site MMR5: On the southern side of Nelson Mandela Drive Extension at the intersection with the Steenbokpan Road. The site is approximately 1 900 m south of the power station.
- * Site MSR6: On the northern side of the Steenbokpan Road at the level crossing with the railway line. The site is approximately 4 600 m south-west of the power station.
- * Site MMR7: On the northern side of Nelson Mandela Drive Extension at the intersection with the main entrance road to Matimba Power Station. The site is approximately 1 300 m south-west of the power station.
- * Site MMR8: On the southern side of Nelson Mandela Drive Extension at the intersection with the entrance road to Grootgeluk Colliery and the road to Marapong Township. The site is approximately 2 600 m west of the power station.

- *Measurement Dates/Times*

General observation of the noise conditions in the areas around the development site as well as the site specific sound pressure level (noise) measurements and observations were taken on Monday 4 April, Tuesday 5 April and Wednesday 6 April 2005 during the daytime period from 09h30 to 17h00 and during the evening period from 19h30 to 22h30. Further measurements were taken on Tuesday 24 May 2005.

- *Noise Measurement Details*

- * Summary of Ambient Sound Pressure Level Measurements

The results of the ambient noise condition measurement survey are summarised in Table 15.1. The equivalent sound pressure (noise) level (L_{Aeq}), the maximum sound pressure level (L_{Amax}) and the minimum sound pressure level (L_{Amin}) are indicated. Note that the equivalent sound pressure (noise) level may, in layman's terms, be taken to be the average noise level over the given period. This "average" is also referred to as the residual noise level (excluding the impacting noise under investigation) or the ambient noise level (if the impacting noise under investigation is included).

The weather conditions on all the survey days were such that the measurements to establish the ambient noise levels were not adversely affected and no specific corrective adjustments needed to be made.

Table 15.1: Existing (year 2005) noise levels in the areas of the alternative sites for the proposed Matimba B Power Station

Measurement Site	Measured Sound Pressure Level (dBA)					
	Daytime Period			Evening Period		
	L_{Aeq}	L_{max}	L_{min}	L_{Aeq}	L_{max}	L_{min}
SITE G1	51.9	66.7	39.2	53.5	72.5	36.1
SITE G2	43.8	57.6	36.6	45.4	51.6	31.0
SITE G3	50.2	68.2	42.5	53.2	61.1	51.6
SITE G4	45.1	57.1	37.3	39.6	42.3	33.3
SITE G5	44.3	58.4	23.6	-	-	-

- * Noise from Matimba Power Station

Short duration sound pressure level measurements, which isolated the noise from Matimba Power Station were taken at eight sites. These data,

which give an indication of the noise component from the power station at varying distances from Matimba are summarised in Table 15.2.

Table 15.2: Noise component from Matimba Power Station

Site	Distance form Matimba (m)	Noise Level (dBA)	Comment
M1	300	58	Noise from cooling fans the main component.
M2	430	54	Noise from cooling fans the main component.
MMR3	4600	41	Night conditions/ still wind condition.
MMR4	2800	48	Night conditions/ still wind condition.
MMR5	1900	56	Night conditions/ still wind condition.
MSR6	4600	38	Night conditions/ still wind condition.
MMR7	1300	47	Quieter side of Power Station.
MMR8	2600	48	Infiltration of colliery noise. Matimba hardly audible.

* Measurements at Other Main Noise Generators

Measurements were also taken at the following other main noise generators related to the Matimba Power Station operation:

- Conveyor belt system for the coal supply to the Power Station and for ash disposal to ash dump. Noise levels were recorded as follows:
 - i) Under elevated section at live stockpile (at power station)
 - 79,6 dBA.
 - ii) 5 m from elevated section at live stockpile (at power station)
 - 75,8 dBA.
 - iii) 10 m from conveyor belt at ash dump
 - 64,3 dBA.
 - iv) 10 m from conveyor belt at crossing of Steenbokpan Road
 - 64,3 dBA.
- Drive house for conveyor belt system. The noise level at approximately 3 m from drive house was measured at 91,4 dBA.
- Ash dump ash spreading operation. The ambient noise level of 66.7 dBA was measured at a distance of 50 m from the ash dumper and the spreading operation by means of a front end loader. The conveyor belt was operating 50 m away.
- Sewage works. Noise levels were recorded as follows:
 - i) 1 m from aeration rotor motor - 81,6 dBA.
 - ii) 5,5 m from aeration rotors - 75,9 dBA.
 - iii) General ambient 30 m from sewage ponds - 59,7 dBA.

Note that the aeration ponds are generally sunken into the ground or are in the form of concrete tanks. Within a short distance of the ponds noise levels are attenuated significantly due to the shielding effect of the pond walls.

* Noise Climate Related to the 24-hour Road Traffic

In order to complement the short-term noise measurements in the study area, the existing 24-hour residual noise levels related to the average daily traffic (ADT) flows on Nelson Mandela Drive Extension and Steenbokpan Road were also calculated. These data provide an accurate base for the SANS 10103 descriptors. The noise levels generated from the traffic on these roads were calculated using the South African National Standard SANS 10210 (SABS 0210), *Calculating and Predicting Road Traffic Noise*. Typical situations were used for the calculation sites. The Year 2005 traffic was used as the baseline for the calculations. The traffic data were obtained from the consulting engineers Goba (Pty) Ltd.

The noise levels at various offsets from the centreline of Nelson Mandela Drive and Steenbokpan Road are summarised in Table 15.3. The noise descriptors used are those prescribed in SANS 10103:2003, namely:

- Daytime equivalent continuous rating (noise) level ($L_{Req,d}$) (L_d used in Table), namely for the period from 06h00 to 22h00).
- Night-time equivalent continuous rating (noise) level ($L_{Req,n}$) (L_n used in Table), namely for the period from 22h00 to 06h00).
- Day-night equivalent continuous rating (noise) level ($L_{R,dn}$) (L_{dn} used in Table), namely for the 24 hour period from 06h00 to 06h00).

The noise levels given are the unmitigated values. A conservative approach has been taken in that a hard intervening ground condition has been modeled to simulate winter conditions (burnt veld). The thick vegetation in the area will generally result in greater attenuation with distance than shown. There will also be greater attenuation with distance than shown where there are houses, other buildings and terrain restraints in the intervening ground between the source and the receiver point.

Table 15.3: Existing noise climate adjacent to main roads (Year 2005)

Road	Noise Levels Alongside Roads at Given Offset from Centreline (SANS 10103 Indicator) (dBA)											
	50m Offset			100m Offset			200m Offset			500m Offset		
	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}
N Mandela Dr Ext	58.4	47.5	58.1	55.4	44.5	55.1	52.4	41.5	52.1	48.4	37.5	48.1
Sterkpoort Road	58.4	47.5	58.1	55.4	44.5	55.1	52.4	41.5	52.1	48.4	37.5	48.1
Steenbokpan Rd	47.7	34.7	46.9	44.7	31.7	43.9	41.7	28.7	40.9	37.7	24.7	36.9

* Prevailing Noise Climate

In overview, the existing situation with respect to the *noise climates* in the study area was found to be as follows:

- The areas relatively far from the main roads and Matimba Power Station are generally very quiet. Most of the area has a typical rural *noise climate*.
- The main sources of noise in the area are from traffic on the main roads, Matimba Power Station, power station infrastructure remote from the facility, and Grootgeluk Colliery.
- With regard to Nelson Mandela Drive, existing residences in the residential areas of Lephalale (Ellisras) and Onverwacht up to approximately a 250 m offset from the road impacted. In these areas the noise levels exceed acceptable suburban residential living conditions as specified in SANS 10103:2003. Ideally the ambient noise level should not exceed 50 dBA during the daytime period (06h00 to 22h00) and 40 dBA during the night-time period (22h00 to 06h00).
- Ambient noise levels due to traffic in the areas along Steenbokpan Road are not high and impact is insignificant.
- Noise levels from Matimba Power Station adversely affect the daytime noise climate at any residences in the surrounding area for up to a distance of 3 000 m around the facility base on the rural standards that need to be applied for this area. At night the radius of impact increases to approximately 6 000 m.
- There are also noise sources from power station equipment at locations remote from the power station as well as other isolated (or infrequent) noise sources such as:
 - i) Coal conveyor belt from the colliery to the power station and the conveyor belt transporting the ash residue from the power station to the ash dump.
 - ii) Operations at the ash dump that include the dumping and spreading of the ash, and the rehabilitation of the dump.

- iii) The sewage works serving the power station, which is located 3 km to the north of the power station.
- iv) Coal haul trains on the railway line from the colliery to Thabazimbi.

15.5. Evaluation of Noise Impact

15.5.1. Evaluation of the Pre-Construction Phase

Activities during the planning and design stages that have possible impact implications in the study area are related to field surveys (such as seismic testing and geological test borehole drilling for large building foundation investigations). As these survey activities will be of short duration and take place during the day, they are unlikely to cause any noise impact and are therefore not considered significant.

15.5.2. Evaluation of the Construction Phase

- *General*

The potential noise climate was established in general for the construction of the new power station inclusive of appurtenant works such as the conveyor belt systems, internal road system, new sewage works and the construction of new access roads.

Although many of the details of the proposed Development's buildings have not yet been finalised, general concepts have been used in the noise impact evaluation and these are adequate to provide a sound basis for the analysis of typical noise conditions and impacts that are likely to prevail on the project.

- *Construction Noise Conditions*

Construction will likely be carried out during the daytime only (07h00 to 18h00 or 20h00). It should however be noted that certain activities may occasionally extend into the late evening period, while others may need to take place over a 24-hour period. Some of the activities such as the construction of the chimney stacks could take place continuously (24-hours a day) over a number of weeks if a continuous sliding shutter concreting operation is used. It is estimated that the development of the project will take place over a period of 3 to 4 years.

- * Sources of Noise

The following are likely to be the main construction related sources of noise for the power station and its infrastructure:

- Construction camp establishment. This will be for the site offices, workshops and possibly the accommodation camp for the workers on site.

- Activities related to the relocation of services.
- Excavation of building basements and service trenches. Blasting may be required in places but in general pneumatic breakers will be used where rock is encountered.
- Piling operations for large buildings.
- Erection of shuttering for concrete.
- Fixing of steel reinforcing.
- Placing and vibration of concrete. Poker vibrators will be used.
- Stripping of shuttering after concrete pour.
- Erection of structural steelwork.
- Finishing operations on buildings. Cladding, services installation, etc.
- Installation of generating plant and ancillary plant.
- General movement of heavy vehicles such as concrete delivery vehicles, mobile cranes, mechanical dumpers and water trucks (dust suppression) around the site.
- De-watering pumps. A 24-hour operation may sometimes be necessary.
- Road construction equipment. Scrapers, dozers, compactors, etc. (Construction of the internal road system, access roads and possibly the re-alignment/reconstruction the Steenbokpan Road and/or the Kuipersbult/Afguns Road).
- Construction site fabrication workshops and plant maintenance workshops.
- Construction material and equipment delivery vehicles.
- Concrete batching plant and asphalt batching plant on site.

The level and character of the construction noise will be highly variable as different activities with different plant/equipment take place at different times, over different periods, in different combinations, in different sequences and on different parts of the construction site. Typical noise levels generated by various construction equipment are given in Table 15.4.

Table 15.4: Typical noise levels generated by construction equipment

Plant/Equipment	Typical Operational Noise Level at Given Offset (dBA)							
	5m	10m	25m	50m	100m	250m	500m	1000m
Air compressor	91	85	77	71	65	57	51	46
Compactor	92	86	78	72	66	58	52	46
Concrete mixer	95	89	81	75	69	61	55	49
Concrete vibrator	86	80	72	66	60	52	46	40
Conveyor belt	77	71	63	57	51	43	37	32
Crusher (aggregate)	90	84	76	70	64	56	50	44
Crane (mobile)	93	87	79	73	67	59	53	47
Dozer	95	89	81	75	69	61	55	49
Loader	95	89	81	75	69	61	55	49
Mechanical shovel	98	92	84	78	72	64	58	52
Pile driver	110	104	97	91	85	77	71	65
Pump	86	80	72	66	60	52	46	40
Pneumatic breaker	98	92	84	78	72	64	58	52
Rock drill	108	102	94	88	82	74	68	62
Roller	84	78	70	64	58	50	44	38
Trucks	-	81	73	67	64	60	57	54

These noise levels assume that the equipment is maintained in good order. Conservative attenuation conditions (related to intervening ground conditions and screening) have been applied.

* *Noise Impact*

The nature of the noise impact from the large building construction sites is likely to be as follows:

- Source noise levels from many of the construction activities will be high. Noise levels from all work areas will vary constantly and in many instances significantly over short periods during any day working period.
- Exact daytime period and night-time period continuous equivalent sound pressure levels are not possible to calculate with certainty at this stage as the final construction site layout, work programme, work *modus operandi* and type of equipment have not been finalised. Working on a worst case scenario basis, it is estimated that the

maximum noise levels from general construction operations should not exceed 62 dBA at a distance of 1 500 m from the activity site.

- There are likely to be noise disturbance and noise nuisance effects on people living in the area of the construction site. Dependant on the site chosen for the new power station, Marapong Township and/or several farmhouses and farm labourer houses could be affected.
- Ideally the daytime outdoor ambient noise levels (as specified in SANS 10103) should not exceed 50 dBA.
- For all construction work, the construction workers working with or in close proximity to equipment will be exposed to high levels of noise as can be seen from Table 15.4 (refer to the 5 m offset noise levels).

The nature of the noise impact from the road construction activities (internal roads and access roads) is likely to be as follows:

- The level and character of the construction noise will be highly variable as different activities with different plant/equipment take place at different times, over different periods, in different combinations, in different sequences and on different parts of the construction site.
- As no specific construction details or possible locations of major ancillary activity sites are available at this stage, the anticipated noise from various types of construction activities cannot be calculated accurately. In general at this stage, it can be said that the typical noise levels of construction equipment at a distance of 15 metres lie in the range of 75 decibels (dBA) to 100 dBA. Refer also to Table 15.4. Based on data from similar "linear" construction sites, a one-hour equivalent noise level of between 75 dBA and 78dBA at a point 50 m from the construction would be typical for the earthmoving phase.

From the details presently available, it appears that the worst construction noise impact would potentially be from the development of the power station on the farm Nelsonskop, due to the site's proximity to Marapong.

15.5.3. Evaluation of the Operational Phase

- *General*

The four alternative sites for the new power station were evaluated on the following basis:

- * Noise impact from proposed Matimba B Power Station.
- * Cumulative noise impact effects of both power stations.
- * Noise impact from ancillary works.
- * Noise impact from traffic generated by the new Power Station.
- * Features of acoustical significance.

- *General Noise Conditions Related to the Existing and New Power Stations*

The existing Matimba Power Station has a generating capacity of about 3 900 MW from six generator units. The intended installed capacity of Matimba B Power Station will be 4 800 MW. The main noise source from the power stations is the cooling fans, which are installed on one side only of the Power Stations. There are 48 fans per generating unit at the existing facility (a total of $6 \times 48 = 288$). It is estimated by Eskom that the proposed new Power Station would require 54 fans per generating unit (a total of $6 \times 54 = 324$). This is an increase of 12,5%. From a noise generation perspective this increase in the number of fans will not significantly increase the total noise level generated by the whole bank of fans. Conservatively this increase has been taken to be 1 dBA. Note that it would take a doubling of the number of fans to produce an increase in noise level of 3 dBA. The condenser fan platform at fan level is 45 m above ground level. This configuration of fans is likely to result in approximately the following ambient noise conditions around the proposed Matimba B Power Station (from power station source only):

- * 57 dBA at 1 000 m.
- * 51 dBA at 2 000 m.
- * 45 dBA at 3 000 m.
- * 41 dBA at 4 000 m.
- * 37 dBA at 5 000 m.
- * 33 dBA at 6 000 m.

Noise levels on the far side of the power station building to the fans will be slightly quieter due to shielding from the building.

The noise levels given are the unmitigated values. A conservative approach has been taken in that a hard intervening ground condition has been modelled. The thick vegetation in the area will generally result in greater attenuation with distance than shown. There will also be greater attenuation than shown with distance where there are houses, other buildings and terrain restraints in the intervening ground between the source and the receiver point.

- *General Noise Conditions Related to Ancillary Works*

- * Conveyor Belt Systems

For the details of the noise levels from a conveyor belt system at various offset distances refer to Table 15.4. The noise levels from an intermediate drive house for a conveyor belt will be of the order of:

- 51 dBA at a 500 m offset.
- 46 dBA at a 1 000 m offset.
- 41 dBA at a 2 000 m offset.

* Ash Dump Spreader Operations

The maximum noise levels from the ash spreading operations at an ash dump will be of the order of:

- 55 dBA at a 500 m offset.
- 49 dBA at a 1 000 m offset.
- 43 dBA at a 2 000 m offset.

* Sewage Works Operation

When the aeration rotors are working the ambient noise level will be 40 dBA at a 300 m offset.

• *Traffic Operational Conditions*

The predicted traffic data for the operational conditions once the new Power Station is commissioned were supplied by the consulting engineers Goba (Pty) Ltd. It has been estimated that the proposed new power station will generate about 800 additional trips daily.

The future ambient noise situations along Nelson Mandela Drive Extension/Stockpoort Road and Steenbokpan Road were calculated using the South African National Standard SANS 10210 (SABS 0210), *Calculating and Predicting Road Traffic Noise*. The noise levels at various offsets from the centreline of these roads were established for the four development site alternatives and these data are summarised in Table 15.5 and Table 15.6. The noise descriptors used are those prescribed in SANS 10103:2003, namely:

- * Daytime equivalent continuous rating (noise) level ($L_{Req,d}$) (L_d used in Table), namely for the period from 06h00 to 22h00).
- * Night-time equivalent continuous rating (noise) level ($L_{Req,n}$) (L_n used in Table), namely for the period from 22h00 to 06h00).
- * Day-night equivalent continuous rating (noise) level ($L_{R,dn}$) (L_{dn} used in Table), namely for the 24-hour period from 06h00 to 06h00).

The noise levels given are the unmitigated values. A conservative approach has been taken in that a hard intervening ground condition has been modelled to simulate winter conditions (burnt veld). The thick vegetation in the area will generally result in greater attenuation with distance than shown. There will also be greater attenuation with distance than shown where there are houses, other buildings and terrain restraints in the intervening ground between the source and the receiver point.

The following traffic and traffic noise conditions are anticipated:

- * Farm Nelsonskop 464 LQ and Farm Appelvlakte 448 LQ: Access to the proposed new power station would be from the Stockpoort Road. All the traffic generated by the new facility will route along Nelson Mandela

Drive/Stockpoort Road. None of this traffic will route along the Steenbokpan Road. The ambient noise levels due to this additional traffic will increase present residual levels along Nelson Mandela Drive Extension/Stockpoort Road (east of the Grootgeluk Colliery/Marapong Township intersection) by about 1 dBA. Refer to Table 15.5 and compare with Table 15.3.

Table 15.5: Farm Nelsonskop 464 LQ and Farm Appelvlakte 448 LQ: Predicted noise climate adjacent to main roads after commissioning of the proposed Matimba B Power Station

Road	Noise Levels Alongside Roads at Given Offset from Centreline (SANS 10103 Indicator) (dBA)											
	50 m Offset			100 m Offset			200 m Offset			500 m Offset		
	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}
N Mandela Dr Ext	59.3	48.4	59.0	56.3	45.4	56.0	53.3	42.4	53.0	49.3	38.4	49.0
Stockpoort Road	59.3	48.4	59.0	56.3	45.4	56.0	53.3	42.4	53.0	49.3	38.4	49.0
Steenbokpan Rd	47.7	34.7	46.9	44.7	31.7	43.9	41.7	28.7	40.9	37.7	24.7	36.9

- * Farm Naauwontkomen 509 LQ and Farm Eenzaamheid 510 LQ: Access to the proposed new power station will be from the Steenbokpan Road, while the access to the ash dumps would be from the Kuipersbult/Afguns Road. All the traffic generated by the new facility will route from Lephalale along Nelson Mandela Drive and Steenbokpan Road. A small percentage will use the Kuipersbult/Afguns Road. The ambient noise levels due to this additional traffic will increase present residual levels along Nelson Mandela Drive Extension by about 1 dBA. Refer to Table 15.5 and compare with Table 15.3. The noise levels along Stockpoort Road will remain unaltered. Refer to Table 15.6 and compare with Table 15.3. Residual noise levels will however be increased significantly by about 5 dBA during the day and 8 dBA during the night along Steenbokpan Road. Refer to Table 15.6 and compare with Table 15.3.

Table 15.6: Farm Naauwontkomen 509 LQ and Farm Eenzaamheid 510 LQ: Predicted noise climate adjacent to main roads after commissioning of Matimba B Power Station

Road	Noise Levels Alongside Roads at Given Offset from Centreline (SANS 10103 Indicator) (dBA)											
	50 m Offset			100 m Offset			200 m Offset			500 m Offset		
	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}
N Mandela Dr Ext	59.3	48.4	59.0	56.3	45.4	56.0	53.3	42.4	53.0	49.3	38.4	49.0
Stockpoort Road	58.4	47.5	58.1	55.4	44.5	55.1	52.4	41.5	52.1	48.4	37.5	48.1
Steenbokpan Rd	53.3	42.4	53.0	50.3	39.4	50.0	47.3	36.4	47.0	43.7	32.4	43.0

Note that there are no noise sensitive sites close to Nelson Mandela Drive Extension and Stockpoort Road along the section west of Onverwacht Township to the possible access road to the new Power Station for Farm Appelvlakte 448 LQ. Two possible noise sensitive sites have been identified next to the Steenbokpan Road.

- *Features of Acoustical Significance*
 - * Wind

The wind blows mainly from the north-east (44% of the time) with a large percentage still time (30%).
 - * Topography

The terrain in the study area is relatively flat with a gentle fall to the north-east.
 - * Vegetation

The vegetation in the area is thick bush and trees.

15.6. Evaluation of the Alternative Sites

The analysis has been made with the following assumptions:

- The orientation of the new power station will be similar to Matimba Power Station, that is with the condenser fans on the eastern side of the generator building.
- It is anticipated that there may be ash dumps on the adjacent farm to the respective potential development sites.

The following noise related issues were ascertained for the four alternative sites proposed for the construction of the Matimba B Power Station:

- *Farm Appelvlakte 448 LQ*
 - * There will be a noise increase over a 170 degree sector ranging from the north-west to the south-east of the site.
 - * The site lies within 4 300 m of the existing power station.
 - * The site is 3 800 m from Marapong Township.
 - * The site is 9 000 m from Lephalale (Onverwacht Township).
 - * There are 8 (7) farmhouses/dwellings within 6 000 m of the site.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive (in Lephalale) only marginally. Houses close to the road are already significantly impacted particularly at night.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive Extension only marginally. There are no noise sensitive sites close to this section of road.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along the Stockpoort Road only marginally. North-west of the Marapong/Grootgeluk Colliery intersection noise levels will increase significantly. There are no noise sensitive sites close to this section of road. If the access road to the new site is along the northern boundary of Appelvlakte, the farmhouse on the farm Vooruit 449-LQ will be impacted.
 - * The additional traffic generated by Matimba B will not raise the present ambient noise levels along the Steenbokpan Road.
 - * The additional traffic generated by Matimba B will not raise the present ambient noise levels along the Afguns Road.
 - * Noise impact from the ash dump operations on Marapong will be fairly low.
 - * There will be no noise impact from the ash dump operations on Lephalale.
 - * Noise impact from the ash dump operations on some farmhouses/dwellings could be significant at times.
 - * There will be no noise impact from the conveyor belt system.
 - * The general noise climate of the site is slightly degraded from the noise from the existing power station.
 - * The prevailing wind will reduce the noise in the farming area to the north-east.
 - * The cumulative effects from the existing power station will be minimal in noise sensitive areas affected by the new facility.

- *Farm Nelsonskop 464 LQ*
 - * There will be a noise increase over a 90 degree sector to the north-east of the site.
 - * The site lies within 2 000 m of the existing power station.
 - * The site is 1 200 m from Marapong Township.
 - * The site is 7 000 m from Lephalale (Onverwacht Township).
 - * There are 6 (3) farmhouses/dwellings within 6 000 m of the site.

- * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive (in Lephalale) only marginally. Houses close to the road are already significantly impacted particularly at night.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive Extension only marginally. There are no noise sensitive sites close to this section of road.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along the Stockpoort Road only marginally. North-west of the Marapong/Grootgeluk Colliery intersection noise levels will increase significantly. There are no noise sensitive sites close to this section of road.
 - * The additional traffic generated by Matimba B will not raise the present ambient noise levels along the Steenbokpan Road.
 - * The additional traffic generated by Matimba B will not raise the present ambient noise levels along the Afguns Road.
 - * Noise impact from the ash dump operations on Marapong is expected to be low in general but could be reasonably significant at times.
 - * Noise impact from the ash dump operations on Lephalale is expected to be very low.
 - * Noise impact from the ash dump operations on farmhouses/dwellings could be significant at times.
 - * The noise from conveyor belt operations will affect Marapong slightly.
 - * The general noise climate of the site is already fairly degraded from the noise from the existing power station.
 - * The prevailing wind will reduce the noise in the farming area to the north-east but will enhance the impact on Marapong Township.
 - * The cumulative effects from the existing power station will be fairly significant on noise sensitive sites to the east of Matimba B (but within 5 000 m).
- *Farm Naauwontkomen 509 LQ*
 - * There will be a noise increase over a 220 degree sector ranging from the north-east to the west of the site.
 - * The site lies within 4 000 m of the existing power station.
 - * The site is 5 200 m from Marapong Township. Marapong is partially shielded from the new site by the existing power station.
 - * The site is 8 500 m from Lephalale (Onverwacht Township).
 - * There are 4 (3) farmhouses/dwellings within 6 000 m of the site.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive (in Lephalale) only marginally. Houses close to the road are already significantly impacted particularly at night.

- * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive Extension only marginally. There are no noise sensitive sites close to this section of road.
- * Most of the additional traffic generated by Matimba B will not route along the Stockpoort Road.
- * The additional traffic generated by Matimba B will raise the present ambient noise levels significantly along the Steenbokpan Road up to the entrance to the new facility. There are at present no noise sensitive sites close to this section of road.
- * The additional traffic generated by Matimba B will raise the present ambient noise levels significantly along the Afguns Road. The existing noise sensitive sites along this section of road will become part of the power station property and are likely to be demolished.
- * There will be no noise impact from the ash dump operations on Marapong.
- * There will be no noise impact from the ash dump operations on Lephalale.
- * Noise impact from the ash dump operations on some farmhouses/dwellings could be significant at times.
- * There will be no impact from the conveyor belt system.
- * The general noise climate of the site is only marginally affected from the noise from the existing power station.
- * The prevailing wind will increase the noise in the farming area to the south-east.
- * The cumulative effects from the existing power station will be marginal.

- *Farm Eenzaamheid 510 LQ*
 - * There will be a noise increase over a 180 degree sector ranging from the north-west to the south-east of the site.
 - * The site lies within 11 000 m of the existing power station.
 - * The site is 12 000 m from Marapong Township.
 - * The site is 15 000 m from Lephalale (Onverwacht Township).
 - * There are 9 (7) farmhouses/dwellings within 6 000 m of the site.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive (in Lephalale) only marginally. Houses close to the road are already significantly impacted particularly at night.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels along Nelson Mandela Drive Extension only marginally. There are no noise sensitive sites close to this section of road.
 - * Most of the additional traffic generated by Matimba B will not route along the Stockpoort Road.
 - * The additional traffic generated by Matimba B will raise the present ambient noise levels significantly along the Steenbokpan Road up to the entrance to the new facility. There are a few noise sensitive sites close to this section of road.

- * The additional traffic generated by Matimba B will raise the present ambient noise levels significantly along the Afguns Road. There are a few noise sensitive sites close to this section of road.
- * There will be no noise impact from the ash dump operations on Marapong.
- * There will be no noise impact from the ash dump operations on Lephhalale.
- * Noise impact from the ash dump operations on some farmhouses/dwellings could be significant at times.
- * There will be no noise impact from the conveyor belt system.
- * The general noise climate of the site is very quiet and is not affected from the noise from the existing power station.
- * The prevailing wind will increase the noise in the farming area to the south-west.
- * The cumulative effects from the existing power station will be insignificant.

The following noise related issues were ascertained for the four additional sites proposed for the establishment of ancillary infrastructure for the proposed Matimba B Power Station

- *Farm Drooghehevel 447 LQ*
 - * Noise impact from the ash dump operations on Marapong will be fairly low.
 - * There will be no noise impact from the ash dump operations on Lephhalale.
 - * Noise impact from the ash dump operations on some farmhouses/dwellings could be significant at times.
 - * There will be no noise impact from the conveyor belt system.
 - * The general noise climate of the site is slightly degraded from the noise from the existing power station.
 - * The prevailing wind will reduce the noise in the farming area to the north-east.
 - * The cumulative effects from the existing power station will be minimal in noise sensitive areas affected by the new facility.
- *Farm Zongezien 467 LQ*
 - * Noise impact from the ash dump operations on Marapong is expected to be low in general but could be reasonably significant at times.
 - * Noise impact from the ash dump operations on Lephhalale is expected to be very low.
 - * Noise impact from the ash dump operations on farmhouses/dwellings could be significant at times.
 - * The noise from conveyor belt operations will affect Marapong slightly.
 - * The general noise climate of the site is already fairly degraded from the noise from the existing power station.
 - * The prevailing wind will reduce the noise in the farming area to the north-east but will enhance the impact on Marapong Township.

- *Farm Kuipersbult 511 LQ*
 - * There will be no noise impact from the ash dump operations on Marapong.
 - * There will be no noise impact from the ash dump operations on Lephhalale.
 - * Noise impact from the ash dump operations on some farmhouses/dwellings could be significant at times.
 - * There will be no impact from the conveyor belt system.
 - * The general noise climate of the site is only marginally affected from the noise from the existing power station.
 - * The prevailing wind will increase the noise in the farming area to the south-east.

- *Farm Kromdraai 690 LQ*
 - * There will be no noise impact from the ash dump operations on Marapong.
 - * There will be no noise impact from the ash dump operations on Lephhalale.
 - * Noise impact from the ash dump operations on some farmhouses/dwellings could be significant at times.
 - * There will be no noise impact from the conveyor belt system.
 - * The general noise climate of the site is very quiet and is not affected from the noise from the existing power station.
 - * The prevailing wind will increase the noise in the farming area to the south-west.

15.7. Conclusions

15.7.1. Comparison of the Alternative Sites

The rating analysis for the four alternative power station sites not taking into consideration their adjacent infrastructure sites is given in Table 15.7. The rating analysis of all the eight alternative sites to evaluate their acceptability for the power station infrastructure is given in Table 15.8.

Table 15.7: Rating comparison of the four alternative sites for the proposed Matimba B Power Station only with no evaluation of ancillary infrastructure

Aspect for Rating	Rating for Alternative			
	Appelvlakte 448 LQ	Nelsonskop 464 LQ	Naauwontkome 509 LQ	Eenzaamheid 510 LQ
Impact of Matimba B on Marapong Township	3	1	4	4
Impact of Matimba B on Lephalale (Onverwacht Township)	4	5	4	4
Impact of Matimba B on farmhouses/other rural residences	4	3	5	5
Impact of Matimba B traffic on Nelson Mandela Drive area	3	3	3	3
Impact of Matimba B traffic on Nelson Mandela Dr Ext area	4	4	4	4
Impact of Matimba B traffic on Stockpoort Road area	4	4	5	5
Impact of Matimba B traffic on Steenbokpan Road area	5	5	3	3
Impact of Matimba B traffic on Afguns Road area	5	5	4	4
Impact of conveyor belt systems	5	3	5	4
Site location related to already degraded noise condition	3	5	4	3
Wind mitigating factor	5	3	4	3
Cumulative effect of existing Matimba Power Station	3	3	4	5
Total	48	44	49	47
Summary rating of Acceptability of Site	3	2	4	3

Table 15.8: Rating comparison of the eight alternative sites to determine the suitability for the support infrastructure only for the proposed Matimba B Power Station

Aspect for Rating	Rating for Alternative							
	Appel- vlakte 448 LQ	Nelsons- kop 464 LQ	Naauw- ontkomen 509 LQ	Eenzaam- heid 510 LQ	Droog- heuvel 447 LQ	Zon- gesien 467 LQ	Kuipers- bult 511 LQ	Krom- draai 690 LQ
Impact of ash dump on Marapong	4	3	5	5	4	3	5	5
Impact of ash dump on Lephalale (Onverwacht Township)	5	4	5	5	5	4	5	5
Impact of ash dump on farmhouses/other rural residences	3	4	4	3	3	4	4	3
Impact of conveyor belt systems	5	3	5	4	5	3	5	4
Site location related to already degraded noise condition	3	5	4	3	3	5	4	3
Wind mitigating factor	5	3	4	3	5	3	4	3
Cumulative effect of existing Matimba Power Station	3	3	4	5	3	3	4	5
Total	28	25	31	28	28	25	31	28
Summary Rating of Acceptability of Site	3	2	4	3	3	2	4	3

15.7.2. Site Preference Rating

The site preference rating for the sites in terms of noise impact is outlined in Table 15.9 and Table 15.10.

Table 15.9: The Site Preference Rating of the alternative Sites for the power station with regards to noise impact

Farm name	Site Preference Rating
Farm Appelvlakte 448 LQ	3 (acceptable)
Farm Nelsonskop 464 LQ	2 (not preferred)
Farm Naauwontkomen 509 LQ	4 (preferred)
Farm Eenzaamheid 687 LQ	3 (acceptable)

In terms of noise impact the farm Naauwontkomen 509 LQ is considered the preferred site for the construction of the power station.

Table 15.10: The Site Preference Rating of the alternative sites for the ancillary infrastructure with regards to noise impact

Farm name	Site Preference Rating
Farm Appelvlakte 448 LQ	3 (acceptable)
Farm Nelsonskop 464 LQ	2 (not preferred)
Farm Naauwontkomen 509 LQ	4 (preferred)
Farm Eenzaamheid 687 LQ	3 (acceptable)
Farm Droogeheuvel 447 LQ	3 (acceptable)
Farm Zongezien 467 LQ	2 (not preferred)
Farm Kuipersbult 511 LQ	4 (preferred)
Farm Kromdraai 690 LQ	3 (acceptable)

In terms of noise impact the farms Naauwontkomen 509 LQ and Kuipersbult 690 LQ are considered the preferred site for the establishment of ancillary infrastructure.

15.7.3. General

The following conclusions may be drawn from the foregoing evaluation:

- Although some of the base data required was not available for the analysis, the assumptions made are considered adequate to give a meaningful analysis of the noise impact situation, taking into account the fact that the exercise was broad based to evaluate alternatives and that all alternatives were evaluated on the same basis.
- The area of serious impact around the new power station will be fairly small (contained within a radius of about 6 km).

- All the sites being considered have advantages and disadvantages and each one of the four sites could be used.
- There would be advantages to containing the general noise from both power stations by locating Matimba B close to the existing power station, that is there would be a smaller "noise footprint".
- Any of the four alternative sites could be selected for the construction, but, in terms of noise impact, preference should be given to the Naauwontkomen site. This site is close to the existing power station, thereby containing the noise to an already degraded area.

15.8. Recommendations

The following are recommended:

- Noise impacts associated with the preferred site will be assessed and appropriate mitigation measures recommended where required. This assessment will be undertaken in accordance with the relevant SANS guidelines.
- The National Noise Control Regulations and SANS 10103:2003 should be used as the main guidelines for addressing the potential noise impact on this project.
- Once more information on the land use details is available, a check should be undertaken of the assumptions made in this analysis.