Ben van Zyl MSc (Eng) PhD T/A Acusolv
ACOUSTIC CONSULTING ENGINEER

P O Box 70596
Die Wilgers
0041

Tel: 012 807 4924 ▸ Cell: 083 469 3888
Fax: 086 508 1122
ben@acusolv.co.za
542 Verkenner Ave ▸ Die Wilgers ▸ Pretoria

Report G1518	Issued: 25-Nov-2021
Midvaal Brick Manufacturing Facility	
Noise Impact Assessment	
For: SA Block (Pty) Ltd	

Executive Summary

Scope

Acusolv was appointed to undertake a study to investigate the noise implications of the proposed Midvaal Brick Manufacturing Facility for residents in the surrounding area and to consider the requirements and options for mitigation.

Existing State of the Environment

The district where the Midvaal Brick Project will be located may be described as Urban Residential interspersed with mining, industrial and commercial activities. The immediate surroundings of the Project site are exposed to noise from the R59 main road and local roads, noise from the railway line to the west, and noise from Glen Douglas Dolomite Mine to the south. In Daleside (Witkopdorp), the residential area bordering on the Midvaal Brick site, previous surveys indicated that the daytime and night-time levels were in the order if 50 dBA and 45 dBA, respectively.

Midvaal Brick Project Noise Impacts

The study finds that the noise impact of the proposed Midvaal Brick Manufacturing operations at the nearest houses in the Daleside residential area is expected to be negligible (the nearest houses are outside the 3 dB impact footprint). Noise from operations on the Project site will therefore not be disturbing in the residential surroundings. The two main factors which effectively mitigate the extent of operation noise impacts are:

(a) Restriction of operations to daytime hours (06:00 – 22:00);

(b) The placement of the brick manufacturing machines inside brick plant buildings oriented with the access doorways facing south, away from the Daleside residential area.

There is however a risk that reverse alarm noises, although having a negligible effect on the overall noise levels, may cause a noise nuisance. This is because of the sensitivity of human hearing to noises with a tonal character, such as produced by reverse alarms. Reverse alarm noises on the Brick Manufacturing site may be audible and cause a nuisance, even if the level is below that of the general background noise.

Mitigation

General operation noise at the Midvaal Brick Manufacturing facility is not expected to have any significant impacts in the residential surroundings. No mitigation is required.

The risk of noise nuisance caused by reverse alarm noise identified in the assessment can be effectively mitigated by construction of a noise barrier along the northern and along part of the eastern site boundaries. Guidelines are provided for the construction of such a noise berm.

Authorisation

Based on noise considerations, it is recommended that the project be authorised for the proposed location and layout.

Dr B G van Zyl MSc (Eng) PhD
Acoustical Engineer

Index

Definitions and Acronyms

Acoustic terminology

Term	Label	Unit	Definition
A-weighting			Frequency-dependent weighting applied to band-filtered or spectral sound levels, corresponding to the frequency characteristics of human hearing
A-weighted level	L_A	dBA	A-weighted sound pressure or sound power level
dBA			A-weighted unit of magnitude on a logarithmic scale
Decibel		dB	Unit of sound magnitude on a logarithmic scale defined as 10 log ($f\{W\}/W_o$) $f\{W\}$ is proportional to the acoustic power or intensity of the sound or noise W_o is a power or intensity reference
Sound or Noise Level	L, LP	dB	Pressure Level representing the magnitude of the sound or noise on the decibel scale
Sound Power Level	LW	dB	Sound Power Level [dB] defined as 10 log (W/W_0) where W is the sound power [W], P_0 = 10 pW, the international standard reference of sound power
Sound Pressure Level	LP	dB	Magnitude of sound or noise [dB] defined as 10 log (P^2/P_0^2) where P is the sound pressure [Pa], P_0 = 20 μPa, the international standard reference of sound pressure
Equivalent continuous level	$L_{eq,T}$	dB	The average level of a sound or noise determined by integrating and averaging the acoustic energy over a measurement period T The level of a sound with constant amplitude which would have the same average over time T
A-weighted equivalent continuous sound level	L_{Aeq}	dBA	Average level of a sound or noise determined by integrating and averaging the A-weighted acoustic energy over a measurement period T

2014 EIA Regulations Appendix 6
Requirements for Specialist Reports

2014 EIA Regulations Appendix 6		Cross Reference to
Clause	**Requirement**	**Noise Report Section**
1 (a)	Specialist details	Section 1.3.2
	Specialist qualifications and expertise	Section 1.3.2; CV
(b)	Declaration of independence	Section 1.3.2
(c)	Scope and purpose of report	Section 1.3.1
(d)	Date and season of investigation	Section 3.2
	Relevance of season to outcome	Section 6.2.2
(e)	Methodology	Section 3
(f)	Sensitivity related to activities	Section 6
(g)	Avoidance and buffer requirements	N/A
(h)	Map showing activities and sensitivities	Section 6.2.4; Noise Map 6-1.
(i)	Assumptions, uncertainties and gaps	Section 3.4
(j)	Findings, potential implications and impact	Section 6
(k)	Mitigation measures for inclusion in EMPR	Section 7
(l)	Conditions for inclusion in authorisation	N/A
(m)	Monitoring requirements for inclusion in EMPR	Section 7.3
(n)	Reasoned opinion	Section 6
(o)	Consultation process	N/A
(p)	Copies of comments received	N/A
(q)	Other information requested by authority	N/A
2	Pre-assessment conducted	N/A

1 Introduction

1.1 Project Background

SA Block (Pty) Ltd, a subsidiary of Afrimat Limited, intends to expand its brick production capacity on premises closer to its customer base. SA Block is a brick making plant which mainly focuses on the production of clinker bricks. Clinker is a product derived from the burning of coal and the bricks made of clinker are considered to be light in weight when compared to regular cement bricks. SA Block produces SABS approved bricks that are mainly used for the building of housing (residential and commercial) developments.

SA Block has received permission from Glen Douglas mine, another subsidiary of Afrimat Limited located on the Remaining Extent of Portion 3 of the farm Witkoppie 373 IR, to erect a brick making plant on their property, outside their mining area. SA Block will erect an automated brick manufacturing plant under a 1 500 m^2 roof with a small storage yard outside and temporary building structures as offices.

1.2 Project Location

The proposed Midvaal Block Manufacturing plant will be located on the Remaining Extent of Portion 3 of the farm Witkoppie 373 IR, as shown on the location map in Figure 1-1. The site is situated along Bokmakiere Road, approximately 0,6 km southwest of Daleside, and approximately 2,5 km northeast of Highbury. It is located approximately 1 km east of the R59 Provincial Route and 0,8 km southwest of the R557 Regional Route. The area neighbours the northern section of the Glen Douglas Dolomite Mine.

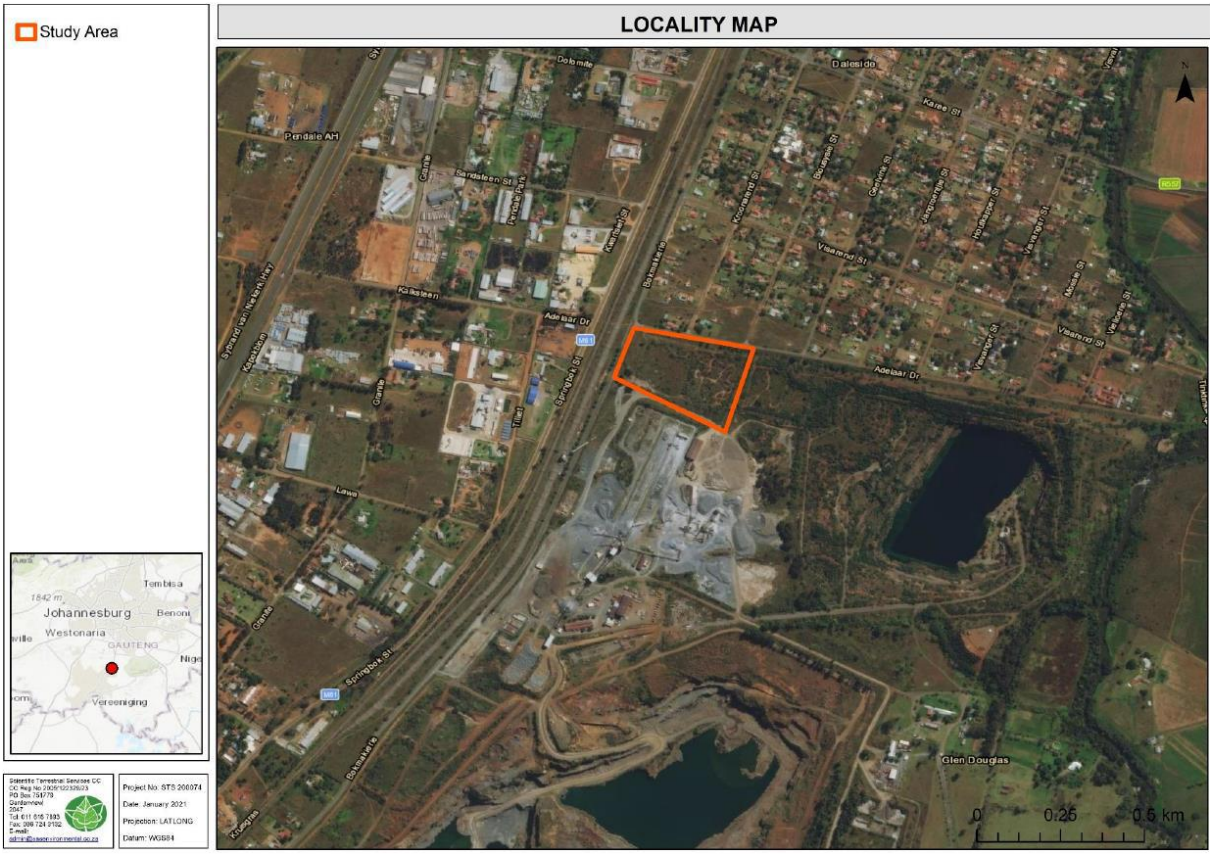


Figure 1-1 Arial view of the proposed project site

1.3 Noise Study

1.3.1 Terms of Reference and Scope of Work

Acusolv was appointed to undertake a noise study to investigate the noise implications of the proposed Midvaal Brick Project for communities in the surrounds outside the project site boundary and to consider the requirements and options for mitigation. This entailed the following scope of work:

A Baseline Assessment

Baseline sound levels for the area were obtained from the results of several investigative and routine noise monitoring surveys previously undertaken in the area for Glen Douglas Mine.

B **Predictive Noise Impact Study**

A predictive noise impact assessment was carried out. Estimation of noise levels and of noise impacts was based on modelling of the emission and atmospheric propagation of noise generated by brick manufacturing and associated activities. Noise impacts are referenced to existing ambient noise ratings derived in the baseline assessment.

This report describes the methodology and presents the findings of the noise study.

1.3.2 Noise Specialist

Specialist Details

Name of practitioner:	Ben van Zyl Acoustical Engineer
Tel No:	012 807 4924
Fax No:	086 508 1122
Postal Address:	P O Box 70596, Die Wilgers, 0041
E-mail address:	ben@acusolv.co.za

Qualifications

Ben van Zyl is a noise specialist in private practice based in Pretoria, South Africa. He holds masters and PhD degrees in acoustical engineering and has more than 40 years' experience in environmental acoustics, noise monitoring; noise impact assessment, noise problem solving and design for noise reduction in the mining and other industries. A CV is provided in Appendix B.

Declaration of Independence

As a sole proprietor and noise specialist, Ben van Zyl has no vested interest in the proposed Midvaal Brick Project or in SA Block (Pty) Ltd and hereby declares his independence, as required in terms of the 2014 EIA Regulations.

1.3.3 Noise Study Area

The noise study modelled sources of noise and considered potential impacts in an area of approximately 700 by 1 000 m as shown in Figure 1-2. This area includes the Project and noise receptors potentially located within estimated reach of audible Project activity noises.

Figure 1-2 Midvaal Brick Project Noise Study Area

2 Legal Framework

2.1 South African Noise Regulations

Noise Regulations for the Province of Gauteng [1] were promulgated in 1999 by the Department of Agriculture, Conservation and Environment under Section 25 of the Environment Conservation Act (Act 73 of 1989). In regard to Land-use, these regulations prohibit any changes to existing facilities, or uses of land, or buildings or the erection of new buildings, if these will house activities that will cause a disturbing noise, unless precautionary measures to prevent such disturbing noises have been taken to the satisfaction of the local authority. Erect also means alter, convert, extend or re-erect.

A disturbing noise means a noise that causes the ambient noise level to rise above the designated zone level, or if no zone level has been designated, the typical rating levels for ambient noise in districts, as defined in SANS 10103 [2]. A local authority may, before any changes or new erections take place, require that noise impact assessments or tests be conducted by the developer. The owner may be requested to furnish proof to the local authority's satisfaction that no disturbing noise shall be caused by or on the premises.

2.2 Prohibitions

2.2.1 Prohibition of Disturbing Noise

In accordance with international and South African standard practice, noise impact assessments are made with respect to outdoor noise levels. Noise is deemed to be disturbing if it exceeds certain limits. Depending on the type of data available, SANS 10103 allows for different formulations of excessive noise.

If the actual residual ambient level is known: The excess is taken to be the difference between the noise under investigation and the residual noise measured in the absence of the specific noise under investigation. This definition, based on the noise emergence criterion, finds application in both predictive and noise monitoring assessments, if baseline noise levels can be determined by measurement.

If the actual residual ambient level is unknown: Alternatively, the excess may also be defined as the difference between the ambient noise under investigation and the acceptable ambient rating for the district class under consideration in accordance with SANS 10103. In this case, a table value is used as reference. This definition, based on the acceptable level criterion, is employed in predictive noise studies and in noise monitoring assessments, if for practical reasons, the actual residual (baseline) levels cannot be determined by measurement.

2.2.2 Prohibition of a Noise Nuisance

Noise regulations also prohibit the creation of a noise nuisance, defined as any sound which disturbs, or impairs the convenience or peace of any person. The intent of this clause is to make provision for the control of types of noise not satisfactorily covered by measurement and assessment criteria applicable to disturbing noises. These are noises which are either difficult to capture, or noises for which the readings on a sound level meter and assessed against standard criteria, do not satisfactorily correlate with the annoyance caused. Noise regulations list examples of activities which are prohibited if exercised in a manner to cause a noise nuisance, i.e.:

- The playing of musical instruments and amplified music;
- Allowing an animal to cause a noise nuisance;
- Discharging fireworks;
- Discharge of explosive devices, firearms or similar devices which emit impulsive sound, except with the prior consent in writing of the local authority concerned and subject to conditions as the local authority may deem necessary;
- Load, unload, open, shut or in any other way handle a crate, box, container, building material, rubbish container or any other article, or allow it to be loaded, unloaded, opened, shut or handled, (if this may cause a noise nuisance).
- Drive a vehicle on a public road in such a manner that it may cause a noise nuisance.
- Use any power tool or power equipment used for construction work, drilling or demolition work in or near a residential area, (if this may cause a noise nuisance).
- And:
- Except in an emergency, emit a sound, or allow a sound to be emitted, by means of a bell, carillon, siren, hooter, static alarm, whistle, loudspeaker or similar device (if it may cause a noise nuisance).

2.2.3 The difference between Noise Disturbance and Noise Nuisance

The essential differences between a disturbing noise and a noise nuisance are follows:

Noise Disturbance – Is quantifiable and its assessment is based on estimated or measured sound levels, expressed in decibel (dBA). Investigation and assessment of existing noise disturbance problems involve the measurement of ambient levels in the presence of a specific source under investigation and comparison of this level with either the level measured in the absence of the source, or a table value deemed to be an acceptable level for the district class under consideration.

Noise Nuisance – Is difficult to quantify and is not satisfactorily confirmed or assessed by measurement. Judging whether a noise qualifies as a nuisance is based purely on its character and audibility, in conjunction with subjective considerations such as the perceived intent of the noise maker and connotations attributable to the source of noise. Noise nuisance criteria are normally employed when measurements and noise disturbance criteria fail to make an appropriate assessment.

Whenever possible and meaningful, however, measurements should be carried out to obtain supplementary information in the assessment of annoyance. In practice, depending on the regularity of occurrence, and on the continuity and uniformity of the levels, it is sometimes feasible and meaningful to assess noise in terms of both disturbance and annoyance criteria. The decision is left to the discretion of the specialist conducting the investigation.

Noise nuisance is defined and addressed in the regulations only. SANS 10103 only deals with quantifiable noise (noise disturbance), without any guidelines for, or reference to noise nuisance.

2.3 SANS 10103 - Acceptable ambient levels

Noise regulations require the rating level of the ambient noise to be compared with the rating level of the residual noise (where this can be measured), or alternatively (where the noise source cannot be switched off or interrupted), with the appropriate rating level given in SANS 10103. SANS 10103 provides guidelines and criteria in respect of acceptable ambient noise levels applicable in land use planning and noise impact assessment. These criteria, which are in line with longstanding international norms and which have been adopted in Provincial Noise Regulations, specify acceptable ambient sound levels for various districts, ranging from rural to industrial. In principle, the acceptable or characteristic level in any area increases with the level of road infrastructure, as well as the density of commercial, retail and industrial development. Table 2-1 summarises SANS 10103 criteria for acceptable ambient levels in various districts. Ratings increase in steps of 5 dB from one to the next higher category. In general, regardless of the type of district, ambient noise levels tend to decline by typically 10 dB from daytime to night-time.

Table 2-1 Typical outdoor ambient noise levels in various districts (SANS 10103)

District		Daytime	Night-time
(a)	Rural	45	35
(b)	Suburban – With little road traffic	50	40
(c)	Urban	55	45
(d)	Urban - With workshops, business premises & main roads	60	50
(e)	Central business districts	65	55
(f)	Industrial districts	70	60

A 24-hour cycle is divided into the following periods:

Daytime (06:00 – 22:00)

Night-time (22:00 – 06:00)

SANS 10103 also gives guidelines in respect of expected community response to different levels of noise impact (increase in noise level), as summarized in Table 2-2.

Table 2-2 Expected community response to an increase in ambient noise level (SANS 10103)

Increase in Ambient Level [dB]	**Expected Community Reaction**
0 - 10	Sporadic complaints
5 - 15	Widespread complaints
10 - 20	Threats of community action
More than 15	Vigorous community action

A significant (Moderate) impact is deemed to occur if noise produced by the activity under assessment elevates the ambient level at the property boundary (or nearest noise receptor) by 5 dB or more. The reference level is determined from the guidelines in Table 2-1 in conjunction with measurements taken in the absence of the activities under assessment.

3 Methodology

3.1 Approach

The Midvaal Brick Project noise study comprised of a baseline assessment and a noise impact assessment. The study was carried out in accordance with SANS 10328 [3] which gives guidelines on procedures for conducting noise assessments. The baseline assessment evaluated current ambient noise conditions, prior to commencement of any Project construction or operation activities. Baseline ratings derived from field evaluations and surveys were used as reference in modelling for the estimation of the Project's noise impacts.

3.2 Baseline Noise Assessment

Several investigative and routine noise monitoring surveys have previously been undertaken by Acusolv in the residential surroundings of Glen Douglas Mine. The results of these surveys provide sufficient information and were used for determination of baseline ratings in the Midvaal Brick noise study area.

3.3 Predictive Noise Impact Assessment

3.3.1 Noise Modelling

The expected noise footprints of brick manufacturing and associated operations were estimated in the predictive impact assessment by means of noise modelling. Noise contour maps derived from the model facilitated assessment of the Project's noise impact on any property or noise receptor within the study area. Since the Brick Manufacturing facility will operate during daytime hours (06:00 – 22:00) only, the assessment of Project noise impacts is made for daytime conditions.

The noise model and computation of expected noise levels were based on the model developed by CONCAWE (Conservation of Clear air and water in Europe), an organisation established by a group of oil companies in 1963. The Concawe model [4] has been validated and is widely used in the simulation of small and large sources of noise and for prediction of noise levels in environmental noise assessments [5], [6]. This method has been adopted in South African Standard SANS 10357:2000 [7].

3.3.2 Definition of Noise Impacts

Noise impact in general is defined as the change in ambient level caused by the operations of a proposed development under assessment. In predictive impact assessment the incremental impact is the change expected to occur relative to conditions which prevailed immediately prior to commencement of the proposed construction and operation activities.

3.3.3 Baseline Reference

The reference for the incremental impacts determined in the predictive assessment is the rating for existing ambient noise levels derived in the baseline assessment.

3.3.4 Impact Rating Criteria

In line with SANS 10103 as well as international (e.g. World Bank) guidelines, an impact of 3 dB or less, by implication, is deemed insignificant. It becomes significant if intrusive noise elevates the ambient level by more than 3 dB. The magnitude and severity of impacts are

rated as follows:

- By its statistical nature, noise assessment significance criteria cannot be defined in discrete steps with exact limits between zones. This is why SANS 10103 noise criteria are defined with overlapping ranges of significance. Against this background, noise impact assessment criteria applied in this noise study are as follows:
- Below and up to 3 dB an impact is rated as insignificant and negligible. The magnitude (severity) is rated from zero, up to minor.
- Above 3 dB the impact becomes notable. Between 3 dB and 5 dB the magnitude is rated from minor, up to moderate.
- At and above 5 dB the impact is significant. From 5 dB up to 10 dB the magnitude of impact is rated from moderate, up to major.
- At or above 10 dB the magnitude of impact is rated as very high; likely to invoke vigorous community action (See Table 2-2).

3.4 Assumptions

Computations assume that operations on the brick manufacturing site will be restricted to daytime hours (06:00 – 22:00).

4 Project Description

4.1 Project Components and Site Layout

The main components and site layout of the brick manufacturing facility modelled for the predictive noise assessment, are shown in Figure 4-1. The Asphalt Plant indicated on the map, has been omitted from the Project plan.

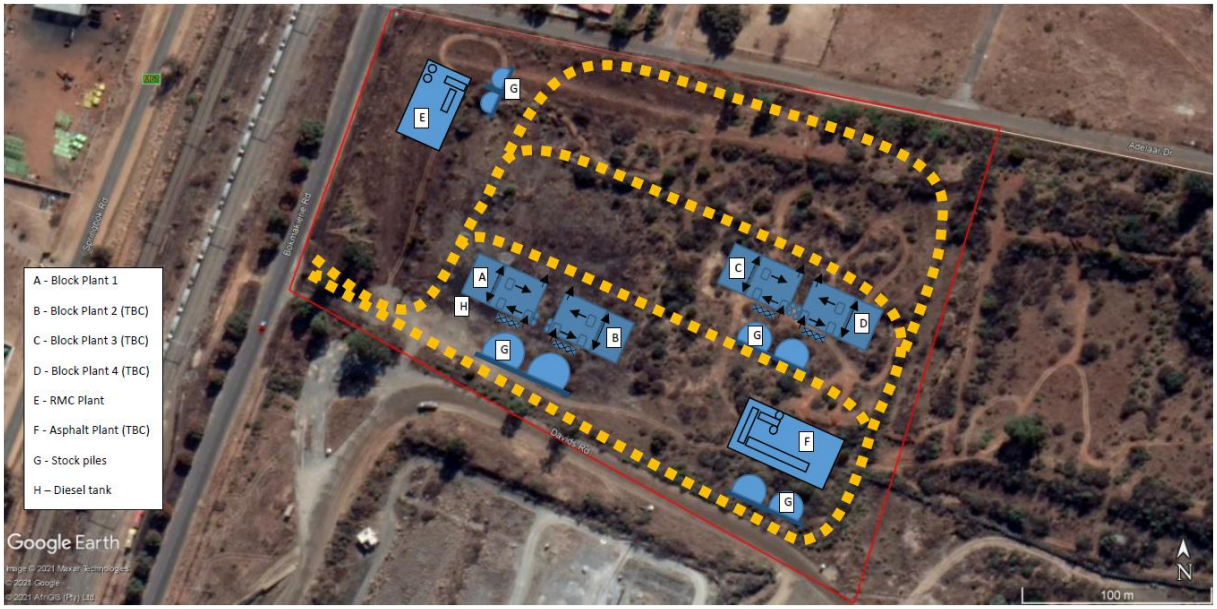


Figure 4-1 Main components and site layout of the Midvaal Brick Manufacturing Facility

4.2 Sources of Noise

The main sources of noise on the site will be the following:

- Block Plants 1 – 4. Although the Block Plants will be the primary sources of noise on the site, the machines will be installed inside buildings with brick walls and steel roofs. The screening provided by the plant buildings will significantly reduce the levels of outdoor noise emission. Data used in noise modelling of the brick manufacturing machines was obtained from the results of tests previously conducted at similar plants.
- Outdoor material handling, mixing and loading activities at the RMC Plant.
- Stockpiling and stockpile maintenance.
- Vehicle movements, estimated at approximately 20 vehicles per 24 hours, of which 15 vehicles per hour will be heavy vehicles. Transport vehicles will arrive and depart in a southerly direction on Bokmakierie road.
- Engine and reverse alarm noises of material handling vehicles, such as forklifts.

5 Baseline Description

5.1 State of the Environment

The district where the Midvaal Brick Project will be located may be described as Urban Residential interspersed with mining, industrial and commercial activities. The immediate surroundings of the Project site are exposed to noise from the R59 main road and local roads, noise from the railway line, and noise from Glen Douglas Dolomite Mine.

5.2 Existing Ambient Noise Levels

Daytime and night-time background noise levels measured in a survey conducted in 2018, are shown in Figure 5-1. In Daleside, the residential area bordering on the Midvaal Brick site, the daytime and night-time levels were 48 dBA and 44 dBA, respectively. This corresponds to nominal SANS 10103 Table values of 50 dBA and 45 dBA, respectively. These levels were used as reference ratings in the modelling and assessment of Project noise impacts.

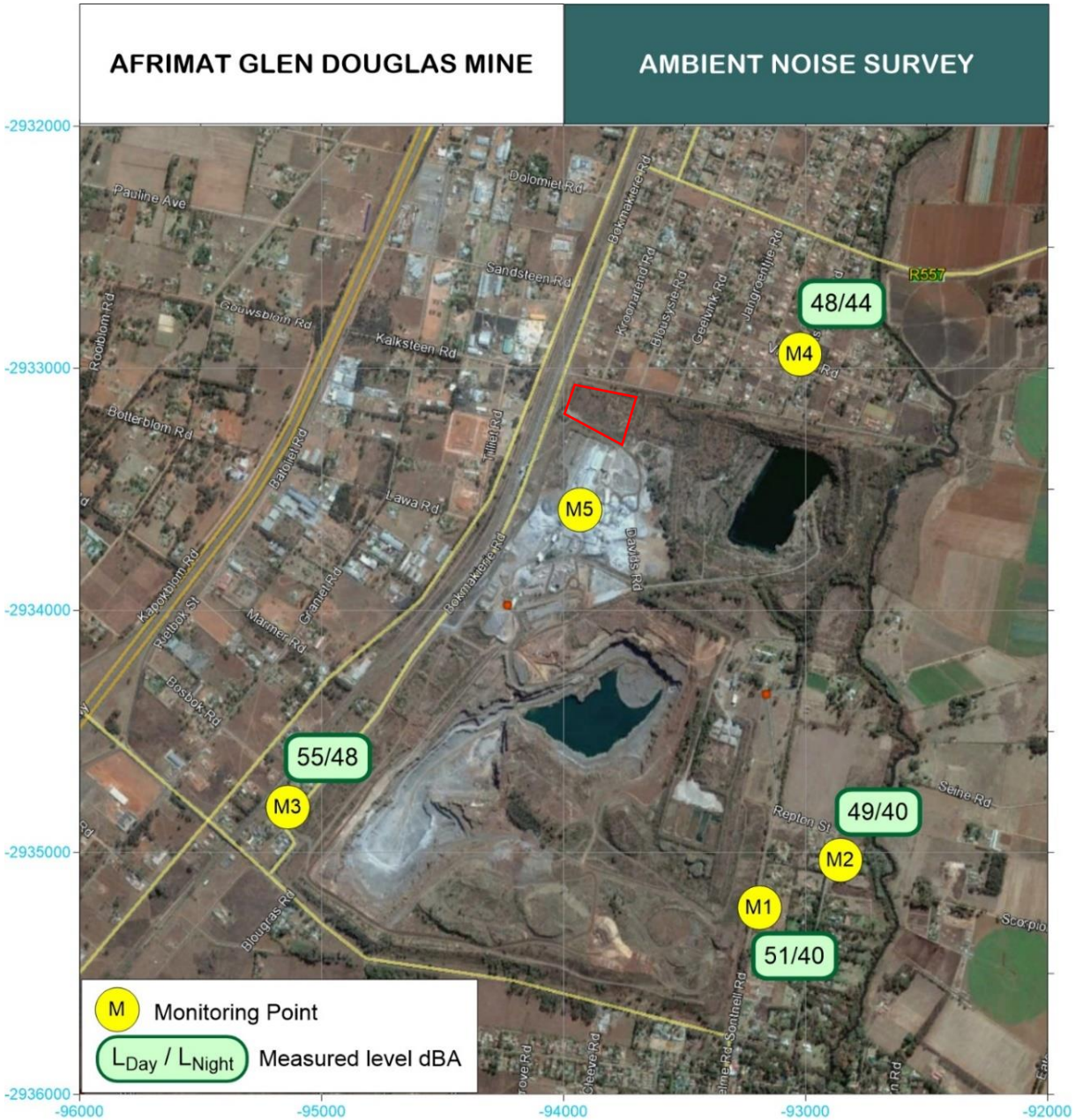


Figure 5-1 Ambient noise levels measured in the surroundings of Glen Douglas Mine.

6 Noise and Vibration Impacts

6.1 Construction Noise Impacts

Construction will involve site clearance, excavation and digging of foundations, the erection of steel frames, roofing and general building construction activities. In all these activities the primary source of noise will be the operation of diesel engines (trucks, front-end loaders, cranes, generator sets). Assuming most of this work will occur during daytime, the levels are not expected to be disturbing or notable at the nearest houses in the external environment.

6.2 Operation Noise Impacts

6.2.1 Presentation of Results

As previously pointed out (see Section 3.3.1), the prediction and assessment of Midvaal Brick Project noise impacts were made for daytime conditions. The results of the predictive noise modelling and analysis are presented on a noise contour map computed with the assumption that the Manufacturing Facility is fully operational. Noise contours on the maps show 3 dB and 5 dB noise impact footprints, delineating the distances at which Project operations elevate the daytime ambient level by 3 dB (Low impact; recommended planning limit) and the 5 dB (Moderate impact) contours.

If the specific level of intrusive noise at any location rises to the point where it equals the background level, the ambient level will rise by 3 dB above its initial level. This represents a noise impact of 3 dB, which is still acceptable in terms of the Noise Regulations and SANS 10103 criteria. Inside the 3 dB footprint, moving towards the centre of noise generating activities, the impact gradually becomes more significant. The 5 dB contour delineates the extent of a Moderate impact.

The 1 dB contour is shown for context only. Along the 1 dB contour the impact is entirely insignificant, bearing in mind that the intrusive Project noise level for an impact of 1 dB is already 6 dB below the background ambient level.

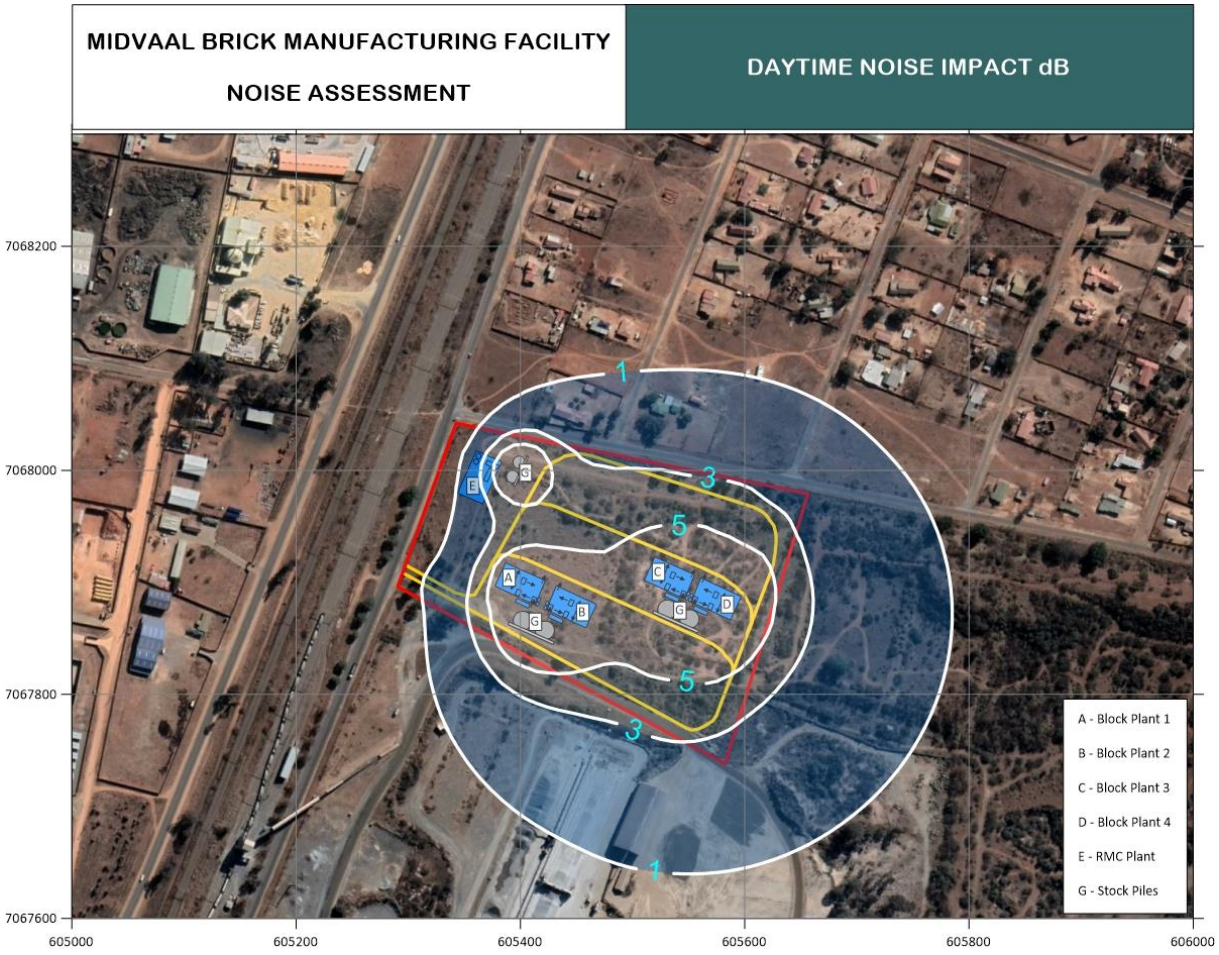
6.2.2 Findings

Noise Map 6-1 depicts the estimated daytime outdoor noise impact of the Midvaal Brick Project. The contours signify the increase in the ambient noise level expected as a result of the proposed Project operations, relative to the existing daytime ambient level determined in the 2018 survey [8]. The directional pattern of the noise footprint is determined by the radiation characteristics of the various Project components, in conjunction with the reference background ambient noise profile in the area. The flat topography in the study area does not influence the profile. The nominal daytime reference level for the area was taken as 48 dBA, to which were added the local effects of nearby roads and rail traffic.

The impacts on the map are quantified in dB. The contours serve to assess the extent (distance) of significant influence and the extent to which general operation noise will be disturbing. In terms of noise regulations, a significant impact of more than 3 dB will be deemed a disturbing noise. The noise map shows that the noise impact of the proposed Midvaal Brick Manufacturing operations at the nearest houses in the Daleside residential area is expected to be negligible (the nearest houses are outside the 3 dB impact zone). Noise from the operations will therefore not be disturbing in the residential surroundings.

There is however a risk that reverse alarm noises, although having a negligible effect on the overall noise levels, may cause a noise nuisance. This is because of the sensitivity of human hearing to noises with a tonal character, such as produced by reverse alarms. Reverse alarm noises on the Brick Manufacturing site may be audible and cause a nuisance, even if the level is below that of the general background noise.

Season has no effect on the levels predicted and on the findings of this investigation.



Noise Map 6-1 Unmitigated Daytime noise impact [dB] of Midvaal Brick operations.

The 3 dB contour delineates a Low impact and the 5 dB contour a Moderate impact.

The 1 dB (negligible impact) contour is shown for context only.

6.3 Vibration Impacts

Machinery and earthwork vibrations are of no material consequence to people in the surroundings of the Brick Manufacturing Plant. Even in mining operations, the only source of potentially significant vibration is seismic vibration caused by blasting. What is often perceived to be vibration, and incorrectly referred to as vibration, is low-frequency airborne sound. Actual structural vibrations caused by heavy machinery, excavation, dozing, or by any other earth-moving equipment operations, are generally only significant on the equipment itself and in a localised area on the site or inside plant buildings (in the workplace). As per standard practice, vibrating machinery such as the Brick Manufacturing machines, are mounted on vibration isolators. This is for the protection of the machines, but at the same time this also reduces the amplitude of vibrations induced into the ground.

Moreover, vibration induced into the ground and propagated through the earth (ground-borne machine vibration), is rapidly attenuated to negligible levels even before it reaches the site boundaries. Consequently, compared to airborne noise, the vibration footprint of Brick Plant operations will be negligible. For all practical purposes, the scope of the noise and vibration assessment and the risk of vibration impacts are covered by the results and findings of the air-borne noise impact assessment concluded in this study.

7 Mitigation and Management

7.1 General Noise

The levels of general operation noises are expected to be within acceptable limits. No mitigation is required.

7.2 Reverse Alarm Noise

7.2.1 Noise Screening by Construction of a Barrier

Reverse alarm noise can be mitigated by construction of a noise barrier on the northern boundary, as indicated in Figure 7-1.

.

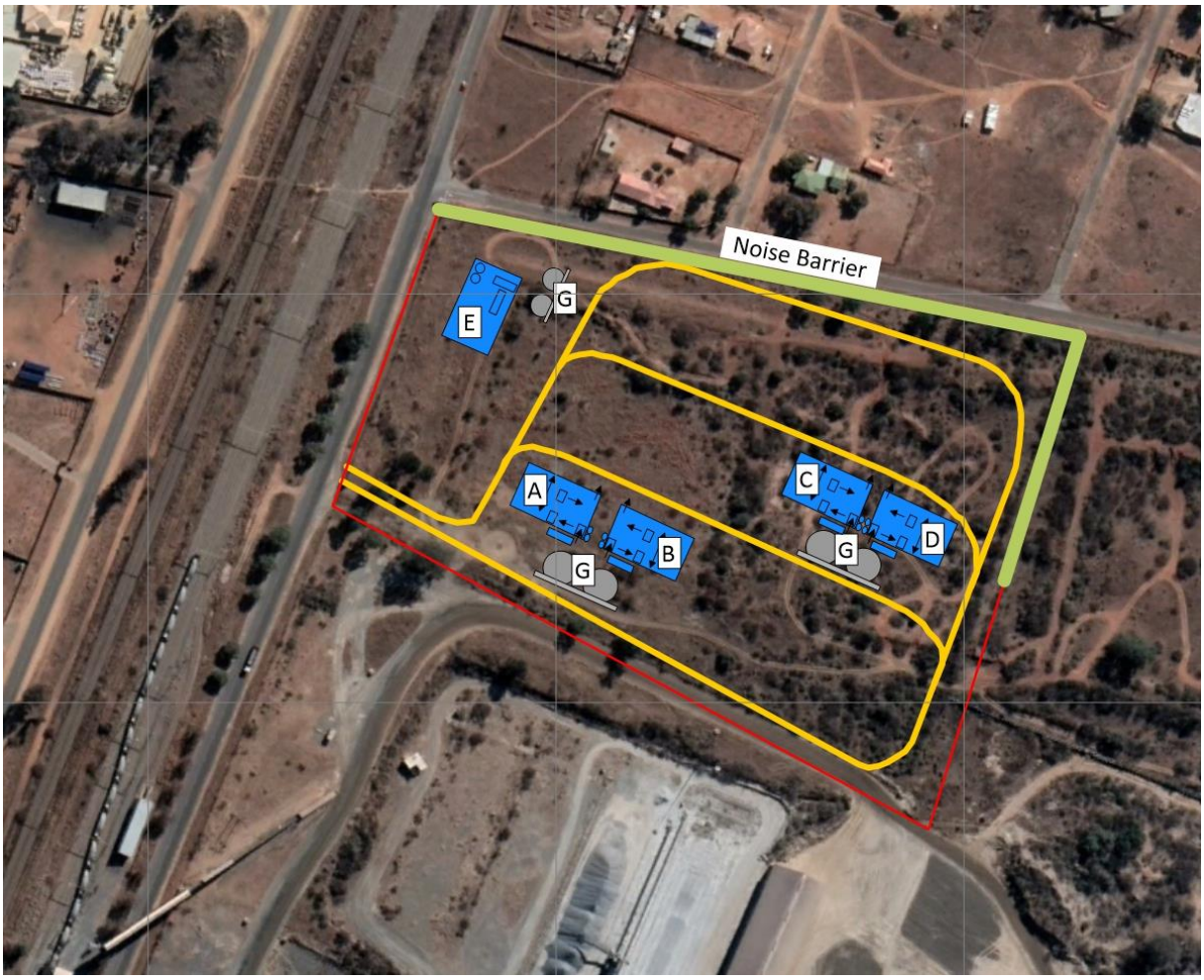


Figure 7-1 Position and alignment of a noise barrier for acoustic screening of reverse alarm noise

7.2.2 Noise Barrier Requirements

The noise barrier comprises of a berm, or a wall, or a combination of a berm and a wall as illustrated in Figure 7-2. The minimum height of the barrier in this case is 3,5 m.

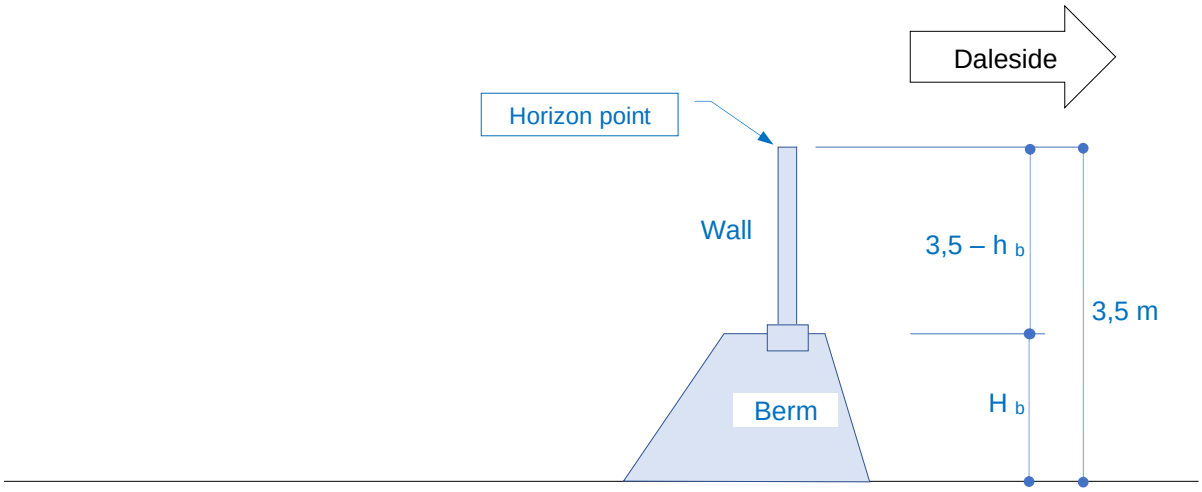


Figure 7-2 Construction of a noise barrier comprising of an earthen berm or a brick wall, or a combination of it.

Construction Guidelines

- The required total height of the barrier is at least 3,5 m. If a combination of a berm and a wall is used, the heights of the individual components are unimportant, as long as the overall height of the barrier is at least 3,5 m.
- The barrier must be long enough to break the line-of-sight between any source of reverse alarm noise on the site and any of the noise receptors of concern (houses in Daleside).
- The width of the berm is unimportant, any practical structure will be more than thick enough for acoustical purposes.
- Although the use of a berm as part of the barrier is not a precondition, a berm does have certain advantages over a vertical wall in that firstly, it provides a small degree of absorption. More importantly, the sloped face reflects noise skywards, rather than horizontally.
- For a brick wall the thickness will be determined by structural, safety and security, rather than acoustical considerations. For acoustical purposes, a single (110 mm) solid brick wall would be more than adequate.
- The barrier must have no gaps and all joints must be airtight.
- Prefabricated concrete walls are not suitable for noise screening. This is because of poor sealing at joints and poor long-term stability.

7.3 Noise Monitoring

7.3.1 The Need for Noise Monitoring

In view of the risk of reverse alarm nuisance identified in this noise study , it is recommended that a noise monitoring program be implemented.

7.3.2 Monitoring Localities and Procedure

Noise monitoring should focus on the Daleside residential area. The need for continued monitoring and the monitoring plan must be revised prior to and after each survey. Revision will be based on factors such as complaints from residents in the area and the outcomes of previous surveys.

7.3.3 Noise Complaint Register

Community complaints about Midvaal Brick Plant operation noise must be logged in a Complaint Register administered by the Environmental Officer or the relevant person identified and assigned the responsibility by Management. Feedback on new entries and on actions in response to complaints must be a fixed item on weekly or monthly management meeting agendas.

8 Reasoned Opinion - Environmental Impact Statement

Extent of Impact

General operation noise at the Midvaal Brick Manufacturing facility is not expected to have any significant impacts in the residential surroundings. The two main factors which effectively mitigate the extent of operation noise impacts are:

(a) Restriction of operations to daytime hours (06:00 – 22:00);

(b) The placement of the brick manufacturing machines inside brick plant buildings oriented with the access doorways facing south, away from the Daleside residential area.

The risk of noise nuisance caused by reverse alarm noise identified in the assessment can be effectively mitigated by construction of a noise barrier along the northern and part of the eastern site boundaries.

Authorisation

Based on noise considerations, it is recommended that the project be authorised for the proposed location and layout.

9 References

[1] Gauteng Province, Department of Agriculture, Conservation and Environment: Environment Conservation Act, 1989 (Act 73 of 1989), Noise Control Regulations, 1999, Provincial Gazette Extraordinary, 20 August 1999.

[2] SANS 10103: *The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.*

[3] SANS 10328: *Methods for environmental noise impact assessments.*

[4] Concawe Report 4/81, Manning et al, The propagation of noise from petroleum and petrochemical complexes to neighbouring communities, Den Haag, May 1981.

[5] International Standards Organisation, ISO 9613-1: Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere.

[6] International Standards Organisation, ISO 9613-2: Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

[7] South African National Standards, SANS 10357:2000: The calculation of sound propagation by the Concawe method.

[8] Van Zyl BG, *Glen Douglas Dolomite Mine 2018 Annual Noise Survey*, Acusolv Report G1383, August 2018.

Ben van Zyl MSc (Eng) PhD
Acoustical Engineer

Appendix B

Curriculum Vitae

Curriculum Vitae

Barend Gideon van Zyl
542 Verkenner Ave, Die Wilgers, Pretoria

Qualifications		**Institution**	**Year Completed**
(1)	BSc (Eng) Elec	University of Pretoria	1970
(2)	BSc (Eng) Hon Elec	University of Pretoria	1972
(3)	MSc (Eng) (Cum Laude)	University of Pretoria	1974
(4)	PhD	University of Natal	1986

MSc thesis: Sound intensity vector measurement
PhD thesis: Sound transmission analysis by measurement of sound intensity vector

Professional registration and membership

- Southern African Acoustics Institute (Fellow) Member since 1974

Career

CSIR 1971 – 1989	Join the Acoustics Division of the Council for Scientific and Industrial Research (CSIR) in 1971; Chief Specialist Research Engineer 1981 - 1989. • Undertake basic and applied acoustic research & development projects; • Pioneer technique and instrumentation for measurement of sound intensity vector, leading to sponsored research & consulting work in the Netherlands (TNO 1978) and Denmark (Brüel & Kjaer 1981). • Acoustic consulting engineering services rendered in the fields of building acoustics, industrial noise control, acoustic materials development & environmental acoustics.
Advena 1989 – 1990	• SA Space Programme: Manager Systems Integration & Environmental Test Laboratories; • Design and commissioning of ultra-high noise simulation facilities for endurance testing of launch vehicles, spacecraft, satellites, instrumentation and payload.
SABS 1991 – 1994	• Acoustic consulting engineering services rendered to industry • Building acoustics, industrial noise control and environmental acoustics.
Acusolv Private Practice Since 1995	Private practice - Sole proprietor - Acoustic consulting engineering • EIA noise studies, noise modelling and noise surveys • Acoustical engineering design & problem solving: Industrial & Machinery noise, Vehicle noise (road, rail & air) • Theatre Acoustics, Building Acoustics • Specialised services: Theoretical analysis & design of multi-layered acoustic panels. • Laboratory & Field testing: Building systems and materials, Equipment & machinery noise

---

Papers and publications

- Several papers presented at international congresses and symposia.
- Several papers published in international acoustic journals, such as

  Journal of the Acoustical Society of America; Applied Acoustics; Noise Control Engineering Journal.

- Several papers published in Southern African journals.

Ben van Zyl PhD MSc (Eng)
ACOUSTIC CONSULTING ENGINEER T/A Acusolv
ben@acusolv.co.za
Tel: 012 807 4924 ▸ Fax: 086 508 1122
P O Box 70596 ▸ Die Wilgers ▸ 0041
542 Verkenner Ave ▸ Die Wilgers ▸ Pretoria

Practice Profile

Based in Pretoria South Africa, Ben van Zyl T/A Acusolv is an independent sole proprietor acoustic consulting engineering practice with in-house expertise and experience in various acoustic disciplines, including:

- Environmental noise: EIA studies; noise modelling, noise monitoring surveys
- Building acoustics: Theatre design, offices, Green Star Rating design and assessment
- Blast and gunshot noise monitoring and assessment
- Industrial noise: Testing, problem investigation and problem solving
- Engineering design for noise reduction
- Test and evaluation
- Acoustic materials development.

Acusolv is equipped with state-of-the-art acoustic measuring instruments employed in noise monitoring surveys, measurement of blast noise, laboratory and field testing of systems and materials and as diagnostic aid in the investigation and solving of noise problems.

Ben van Zyl PhD MSc (Eng)
ACOUSTIC CONSULTING ENGINEER T/A Acusolv
ben@acusolv.co.za
Tel: 012 807 4924 ▸ Fax: 086 508 1122
P O Box 70596 ▸ Die Wilgers ▸ 0041
542 Verkenner Ave ▸ Die Wilgers ▸ Pretoria

Examples of projects

Acoustic Field: Environmental Noise & EIA

Project	For	Aspects
• Gauteng Waste Plant	S E Solutions	Impact study: New waste plant
• Swartland	Centurus	Residential and commercial development - traffic
• Mapoch II	Marlin Granite	Quarry Impact study: Blasting, open cast mining
• Delmas Extension: mining dev	Ingwe Coal Corp	Noise EIA – Plant, conveyors, trains, roads
• Twistdraai new access roads	Sasol Coal	Noise EIA – Roads, conveyors
• Bosjesspruit shaft ventilation fans	Sasol Coal	Noise EIA; shaft & ventilation fan noise rural area
• Hillendale new mining development	Iscor Heavy Minerals	Noise EIA – Plant, road transport
• Empangeni Central Processing Plant	Iscor Heavy Minerals	Noise EIA – Large processing plant
• Rooiwater mining development	Iscor Mining	Noise EIA – Plants, road & rail transport
• Sigma overland conveyor	Sasol Mining	Conveyors: Analyse sources of conveyor noise
• Sigma overland conveyor	Sasol Mining	Noise EIA – Conveyors measurement survey
• Maputo steel project	Gibb Africa	Noise EIA peer review: trains, slurry pipe
• Pump station noise	Transvaal Suiker Bpk	Noise EIA & Design for noise reduction
• GPMC Environmental Resources Plan	GPMC	Noise policy & resources plan
• Damelin College Randburg	Titan Construction	Assess impact of traffic noise on college + design
• Atterbury Value Mart	Parkdev	Land use planning - City Council requirements noise
• Holmes Place HAC London	V Z de Villiers	Land use planning - City Council requirements noise
• Elmar College Pretoria	Iscor Pension Fund	Assess impact of traffic noise on college + design
• Sanae 4 Base Antarctica	Dept Public Works	Noise impact design for control - Plant rooms
• New truck fuel & service station	Bulktrans	Noise EIA & Design for noise control
• Country Lane	Country Lane Dev	Land use planning – Road traffic noise impact
• Randburg Water Front	Randburg City	Advisor & specialist court witness
• Syferfontein overland conveyor	Sasol Coal	Noise impact as function of idler properties
• Twistdraai East mining noise	Sasol Coal	Mitigation of noise impact on neighbouring farm
• Little Loftus – The Rest Nelspruit	TAP de Beer	Sports bar - Impact study
• Blast noise	Somchem	Blast noise impact assess & design noise control
• Syferfontein overland conveyor	Sasol Coal	Noise impact as function of conveyor design
• Leeuwpan Mine Delmas district	Iscor/Ticor	Noise EIA – Plant noise, loading
• Fairbreeze open cast mine KwaZulu	Iscor/Ticor	Noise EIA – Open cast mining; plant, transport
• Brandspruit mine	Sasol	Noise EIA - Ventilation fan noise rural area
• Irene Ext 47	Irene Land Dev Corp	Noise EIA - Mixed development; road traffic noise
• Irene Ext 55	Irene Land Dev Corp	Noise EIA - Residential; road traffic noise
• Lynnwood filling station & car wash	Town Planning Hub	Noise EIA: Filling station & car wash in residential
• Lyttleton 190	Ferero	Noise EIA: Residential next to N1 highway
• Twistdraai N-East Mine shaft	Sasol Mining	Noise EIA; shaft & ventilation fan noise rural area

Acoustic Field: Environmental Noise & EIA (Continued)

Project	For	Aspects
• Wesput open cast mine	Petmin	Noise EIA: Blasting, excavation & transport
• Gedex open cast mine	Petmin	Noise EIA: Open cast excavation & transport
• Kensington college	Centurus	Noise EIA: Sport grounds, roads
• Spandow mine shaft	Sasol Mining	Noise EIA; shaft & ventilation fan noise rural area
• Twistdraai Central Mine Shaft	Sasol Mining	Noise EIA; shaft & ventilation fan noise rural area
• Addington Hospital	Delen Oudkerk	Equipment outdoor noise impact & mitigation
• Fourways Gardens Country Club	Fourways Gardens	Music noise impact assess & design for mitigation
• Irene Ext 29	Irene Land Dev Corp	Noise EIA: New township & highway noise
• Pick 'n Pay Warehouse Meadowbrook	Pick 'n Pay	Truck movement & loading: Assessment
• Irene Sports Academy	Centurus	Impact assessment: Sports grounds & road traffic
• Jameson substation transformer	EThekwini Municipal	Transformer noise: Assess & design mitigation
• Eugene Marais Hospital	Eugene Marais Hosp	Plantroom & outdoor equipment impact & mitigate
• Klipspruit mine wash plant	Billiton & DRA	Coal wash plant infra-sound: design for mitigation
• Eagle Quarry	Mapochs Action	Quarry new application: peer review
• Blast Test Facility Somchem	Denel	Blast noise impact: assess & design for mitigation
• Virgin Active Sandton Gym	Virgin Active	Aerobics, squash & equipment: assess & mitigate
• Conveyor noise study	Bateman	Overland conveyor noise: Causes & parameters
• Zuid Afrikaans Hospital	Z A Hospital	Chiller outdoor noise: design for mitigation
• K54 Road	Tshwane	Noise Study: Future road through residential
• PWV6 Road	Gautrans	Noise Study: Future highway noise contours
• Zandfontein mine shaft	Sasol Mining	Noise Study: Mine shaft & fan noise outdoor impact
• Pierre van Ryneveld Ext 24	Van Vuuren Dev	Noise EIA: New township & highway noise
• PFG Glass new float plant	PFG Glass	Noise EIA: Future plant noise in residential area
• Sterkfontein residential development	M&T	Noise EIA: Road noise impact mitigation
• Sasol future Irenedale mine	Sasol	Noise EIA: Prediction of shaft & conveyor noise
• Ammunition demolition	SA Army	Noise EIA: Long distance noise impact assess
• Rietvlei Ridge residential development	M&T	Noise EIA: Road noise impact mitigation
• Mooiplaats / Hoekplaats	Chieftain	Noise EIA: Road noise impact mitigation
• Sasol Syferfontein conveyor	Bateman	Noise EIA: Noise complaints from farmers
• Madagascar Toliara Sands	Exxaro	Noise EIA: Future mining, plant, transport
• Rooipoort Mine	Sasol Mining	Noise EIA: Mining and conveyor noise
• Vlakplaats	Quantum	Noise EIA: Residential development
• Polokwane 2010 Soccer stadium	Africon	Noise EIA: Stadium noise in residential area
• New Clydesdale colliery	Exxaro	Noise EIA: Open cast mining, blasting and plant
• Grootfontein ventilation shaft	Sasol Mining	Noise EIA: Ventilation shaft & surface fan
• Cicada Pycna mating call study	Anglo Platinum	Cicada mating call – Mining noise interference
• Weltevreden ventilation shaft	Sasol Mining	Noise EIA: Ventilation shaft & surface fan
• Leandra North new colliery	Ingwe	Noise EIA: Mining development
• PTM new platinum mine	PTM Platinum	Noise EIA: Mining development
• Lyttleton X191	Pro-Direct	Noise EIA, new residential development
• Barking noise nuisance	Vd Merwe	Barking noise measurements, specialist report

Acoustic Field: Environmental Noise & EIA (Continued)

Project	For	Aspects
• Vanggatfontein	Exxaro/Metago	Noise EIA: Open-cast mine
• Forfar clay mining extension	Forfar/Zimbiwe	Noise EIA: Open-cast clay mining operations
• Luhfereng Doringkop development	Bigen	Noise EIA: Mixed development, train noise
• K113 Road noise study	Heartland/Bokamoso	Noise EIA: Road, mixed development
• Eland Mine	Exstrata/Metago	Noise EIA: New access road for product transport
• Sheraton Hotel	Pan Pacific Property	Noise EIA: Hotel impact on residential area
• Sishen Infrastructure Relocation	Kumba/Synergistics	Noise EIA: Railway route options evaluation
• Tharisa Mine noise monitoring	Tharisa/Metago	Baseline noise monitoring surveys
• Sishen Mine baseline monitoring	Kumba/Synergistics	Baseline noise monitoring surveys
• Sishen Mine Protea discard dump	Kumba/Synergistics	Discard dump location - Noise screening assess
• Eastplats	Barplats/Metago	Noise EIA: New vertical shaft
• Inyanda Mine noise disturbance	Exxaro	Noise surveys: Noise complaints investigation
• Irenedale Mine commissioning	Sasol Mining	Noise Monitoring: New shaft operational phase
• Honey Ridge indoor shooting range	Insul-Coustic	Design for noise reduction
• Sishen Mine expansion project 2	Kumba/Synergistics	Noise EIA: New processing plant Sishen mine
• Sishen Mine noise monitoring	Kumba Iron Ore	Peer review: Baseline survey
• Sishen Mine new 10 MTon plant	Kumba/AGES	Noise EIA: New 10 MTon processing plant
• Khameni Kalkfontein/Tamboti Mine	Khameni/Metago	Noise EIA: New opencast mine and plant
• Exxaro Kalbasfontein rail load-out	Exxaro	Noise survey: Assess impact of railway loud-out
• Sishen Mine Lylyveld development	Kumba/EGES	Noise EIA: New opencast mine & transport
• Haasfontein new opencast mine	Exxaro/Synergistics	Noise EIA: New underground mine + conveyor
• Westlake mixed development	Heartland/SEF	Noise EIA: New urban mixed development
• Marlboro road M60	Heartland/SEF	Noise EIA: New road traffic noise modelling
• Driefontein Mine	Goldfields	Noise scoping assessment and recommendations
• Bokfontein Chrome Mine	Hernic/Metago	Noise EIA: New furnaces and beneficiation plant
• Eland opencast mine extensions	Exstrata/Metago	Noise EIA: Opencast mine extensions
• Tharisa Mine EMP noise monitoring	Tharisa/Metago	EMP noise monitoring survey 1
• Dragline noise reduction Kriel	Anglo Coal	Dragline noise – Design for noise reduction
• Ivory Coast noise studies	Metago	Peer review
• Eskom Grootvlei Power Station	Insul-Coustic	Design for noise reduction - internal
• Inyanda Mine	Exxaro	Design for plant noise reduction - enviromental
• Swakkop Uranium Husab Project	Swakkop Uranium	Noise EIA: New open-cast operation & plant
• Sasol Shondoni Shaft	Sasol Mining	Noise EIA: New shaft and overland conveyor
• Vanggatfontein EMP	Keaton	EMP annual noise surveys
• Doornpoort Plaza Service Station	Petroland	Noise EIA: New service station on N4 highway
• Hawerklip railway load facility	Exxaro	Noise EIA: New railway coal loading facility
• Lusthof Coal Mine	Black Gold	Noise EIA: New open-cast coal mine
• Conveyor noise parameters	Melco	Research investigation: Conveyor noise
• Sishen discard dumps	Kumba	Noise EIA: New discard dumps at Sishen
• Impala Shafts 18 & 19	Impala Platinum	Noise EIA: New shafts & infrastructure
• Tharisa noise complaint investigation	Tharisa Minerals	Noise complaint investigation, survey & assessment
• Moonlight Iron Ore Project	Turquoise Moon	Noise EIA: New Open-cast mine and plant
• New Largo	Anglo Coal	Noise EIA: New Open-cast mine

Acoustic Field: Environmental Noise & EIA (Continued)

Project	For	Aspects
• Phola-Kusile conveyor	Anglo Coal	Noise EIA: New conveyor to Kusile Power Station
• Leeuw Colliery	Leeuw Mine	Noise EIA: Leeuw Utrecht Colliery
• Letaba Crushers	F Kruger	Noise complaint investigation, survey & assessment
• Sasol Shondoni Conveyor	Sasol	Design measures for conveyor noise reduction
• Aquarius Everest Mine	SLR Metago	Noise EIA: New shafts and infrastructure
• Anglo Kriel Beneficiation Plant	SRK	Noise EIA: New coal beneficiation plant
• Tharisa Mine expansions	SLR Metago	Noise EIA: Plant and opencast mine expansion
• NN Metals processing plant	Bokamoso	Noise EIA and certification Tshwane
• Magazynskraal Mine	SLR Metago	Noise EIA: Future opencast mine
• Anglo Kriel Block F	AACT	Noise EIA: Future underground mine & shafts
• Wallmannsthal Fluor Spar	AGES	Noise EIA: Future Opencast mine & Plant
• Thubelisha Conveyor	Sasol Mining	Conveyor noise tests & impact assessment
• SANDF Bethlehem Demolition Range	Rheinmetall	Blast noise: Tests & impact assessment
• SANDF Kroonstad Demolition Range	Rheinmetall	Blast noise: Tests & impact assessment
• Tharisa West Mine	Tharisa Minerals	Noise monitoring & assessment
• Impala Platinum Shaft 18	SLR Metago	Noise EIA: Future Shaft development
• Kitumba Copper Mine Zambia	AGES	Noise EIA: Future mine and Plant
• Anglo New Denmark Destoning Plant	SRK	Noise EIA: New Destoning Plant
• Nyumba Gold & Copper Mine (DRC)	SRK	Noise EIA: Cement Plant and Quarry
• Kamoto (DRC)	SRK	Noise EIA: Copper opencast mine and plant
• Exxaro Inyanda Mine	Exxaro	Noise complaints investigation, monitoring
• Exxaro Inyanda Mine	Exxaro	Develop Plant Noise Reduction Strategy
• Frontier Saldanha Plant	AGES	Noise EIA: Separation Plant
• Sedex REE Mine Zandkopsdrift	AGES	Noise EIA: Mine and Processing Plant
• Anglo Alexander Project	Synergistics	Noise EIA: New coal mine with conveyors
• TFM DRC Acid Plant	SRK	Noise EIA Acid Plant extension DRC
• TFM DRC Haul Road	SRK	Noise EIA New Haul Roads DRC
• Anglo noise reduction programme	Anglo	Noise reduction design – Underground vehicles
• PPC Barnett DRC	SRK	Noise EIA new cement mine and plant DRC
• A-Cap Lethlakane Botswana	SLR	Noise EIA new Uranium mine Botswana
• FNB Faerie Glen Data Centre	ARUP	Data Centre Plant noise study & NR design
• FNB Randburg Data Centre	ARUP	Data Centre Plant noise study & NR design
• Mkhombi Cascade Mining Project	Ethical Exchange	Noise EIA screening assessment
• Glen Douglas Mine expansion	Warburton	EIA peer review
• Mc Donald's Generator	Tshwane Municipality	Generator noise compliance certification
• Southern Implants Generator	Southern Implants	Generator noise compliance certification
• Tharisa Mine Annual noise survey	Tharisa Minerals	EMPR 2015 Annual noise survey
• Eastway Centre Plants & machines	City Property	Tshwane noise compliance tests & certification
• PwC Building Waterfall Midrand	Atterbury	Construction noise monitor
• Sishen Far South Project	Kumba Iron Ore	Baseline surveys + EIA noise study
• Sishen Mine	Kumba Iron Ore	2015 Annual noise survey
• Eskom Substation Mall of Africa	Attacq	Power Substation noise impact assessment
• Tharisa Mine Buffelspoort	Tharisa Minerals	2016 Annual Noise Monitoring
• Bidvest Protea Coin Shooting Range	Bidvest	Shooting Range impact assessment

Acoustic Field: Environmental Noise & EIA (Continued)

Project	For	Aspects
• Eskom Substation Riverside	Lebohang	Noise EIA: New electrical substation
• Glen Douglas Mine	Afrimat	4 -Day noise survey
• Black Mountain Chrome Mine	Umnotho	Noise EIA: Chrome mine extensions
• Sishen Expansion Project	Kumba Iron Ore	Noise EIA: Mine expansion programme
• Glen Douglas Mine	Afrimat	Diagnostic surveys, noise source identification
• Glen Douglas Mine	Afrimat	Sinter Plant noise reduction design
• Eskom Substation Riverside View	Lebohang	Substation: Design for noise reduction
• UMK Mine Hotazel	UMK	UMK Manganese Mine EIA operation changes
• Lepalale LCPP Project	Dedicoal	Noise EIA: LCPP Coal Mine and Power Station
• Kruidfontein Shaft	PPM	Noise EIA: new Shaft Complex and Roads
• Tharisa Mine	Tharisa Minerals	EMPR 2017 Annual noise survey
• Sierra Rutile Area 1 Sierra Leone	SRL	Noise EIA: Wet and dry mining, plants & haul roads
• Sasol Shondoni Shaft and Conveyor	Sasol Mining	Post-mitigation noise compliance audit
• Glen Douglas Mine	Afrimat	2018 Annual Survey
• Tenke Fungurume Copper Mine DRC	TFM	ESIA Noise Study
• The Waterberg Project	Waterberg JV	SEIA Noise Study
• Tharisa Chrome Mine	Tharisa minerals	EIA Amendment Noise Study
• SACE Lifex PFS-A	Anglo Coal	Prefeasibility Noise Study
• Clydesdale Coal Mine Project	Anglo Coal	Prefeasibility Noise Study
• Klipkraal Upcast Ventilation Shaft	Sasol Mining	Modelling, design specification for Noise Reduction
• SRL Sembehun Project Sierra Leone	SRL	EIA Noise Study
• Polofields Indoor Shooting Range	Waterfall Arms	Acoustic & soundproofing design and testing
• Sasol Shondoni Project	Sasol Mining	EIA Amendment noise study
• JHB 1.5 Data Centre	Arup	Noise study and design input for noise reduction
• Rivonia indoor shooting range	Safari Outdoor	Acoustic & soundproofing design and testing
• ADC CPT Data Centre	Zutari	Design office acoustics and machine noise control
• QK Cold Room Plant Noise	QK Group	Diagnostic survey, locate and identify noise sources
• Petra Diamond Mine Cullinan	Petra Mine	Infra-sound investigation; locate infra-sound sources
• Bostu Boerboels Barking Noise	Bostu Boerboels	Barking noise assessment and mitigation
• Sasol Upcast Shaft	Sasol Mining	New upcast shaft noise audit
• Mopani Nkana Mine Zambia	Mopani Mine	ESHIA noise baseline and impact assessment
• Mopani Mufulira Mine Zambia	Mopani Mine	ESHIA noise baseline and impact assessment

Acoustic Field: Industrial, machinery & equipment noise control

Project	For	**Aspects**
• Iscor New Compressor House	Voest Alpine	Design for noise reduction, inspection & testing
• Botswana TV centre Air-con system	Atlantic Tech	Design for control of plantroom & ducted noise
• Granulation plant	DOW Plastics	Design for noise reduction, inspection & testing
• CS2 Xantate plant	DOW Chemicals	Design for noise reduction, inspection & testing
• Alkylate chemical plant	DOW Chemicals	Design for noise reduction, inspection & testing
• SAP 4 Acid plant	Sasol Agri Palaborwa	Design for noise reduction, inspection & testing
• Motor pump enclosures	Sulzer	Design of noise hoods for large motor-pump units
• Rite Value Refrigeration Plant	Rite Value	Problem solving & design for noise reduction
• Sugar mills pump station	TSB	Design for noise reduction – noise impact control
• Pferd factory noise reduction	Pferd SA	Problem solving & design factory noise reduction
• Alusaf Bayside compressor plant	Alusaf	Problem solving & design for noise reduction
• Alusaf Bayside blower plant	Alusaf	Problem solving & design for noise reduction
• Alusaf Bayside cold rolling mill	Alusaf	Problem solving & design for noise reduction
• Sinter plant Van der Bijl Park	Iscor	Noise reduction strategy & requirements
• Blast furnace fan noise	Universal Fans	Design for fan noise reduction
• Aircraft Engine test facility	Kentron	Design for noise control – environmental impact
• Sulphuric acid plant noise	Fedmis	Design for noise reduction, inspection & testing
• Automotive assembly line	Nissan	Design & commissioning noise reduction canopies
• Scrubber fan noise	RBM	Design for noise reduction
• Ship unloader machine room noise	Algroup Alusuisse	Design for noise reduction
• Paint plant noise	Daimler Chrysler	Design for noise reduction on skid cleaner
• Mail sorting centre plantroom noise	Telkom Sapos	Design for plantroom noise control
• Scrubber system and fan noise	Aquachlor	Design for noise reduction
• Power station turbine hall noise	Eskom	Design for noise reduction
• Mill noise	PPC	Design for noise reduction in control rooms & offices
• Plantroom noise	Vodacom	Design for noise control in offices
• G6 armoured veh power plant noise	SME	Design enclosure for noise control
• Carltonville hospital boiler plant noise	Gauteng Health Dept	Design for noise reduction
• Refinery noise	Rand Refineries	Diagnostic investigation & strategy for noise reduct
• Engine test facility ultra-high noise	Sasol	Design for sound proofing engine test facility
• Chiller plant noise	Dep Public Works	Design for noise reduction
• New Chipper Plant	Sappi Tugela	Plant building design for external noise control
• Transformers	Hawker Siddeley	Acoustic test and evaluation
• Sappi Enstra Paper Mill	Sappi SA	Noise reduction programme and design
• Blast noise	Somchem	Blast noise eval; test facility design for noise control
• Mill noise	Anglo Platinum	Bond mill & sieve shaker design for noise reduction
• Vibration screen infra-sound problem	Billiton	Problem analysis and design for infra-sound control
• Bucket repair workshop	S A Coal Estates	Design enclosures & screens for noise reduction
• LoadHallDump vehicle noise reduction	Anglo-Coal	Design ventilated hood for noise reduction
• PMR Precious metal refinery	Anglo Platinum	Excessive ventilation noise: design to reduce
• Pebble bed ball impact test facility	Necsa	Noise control booth design

Acoustic Field: Industrial, machinery & equipment noise control (Continued)

Project	For	**Aspects**
• Sasol Syferfontein conveyor	Sasol Mining	Design: Overland conveyor noise reduction
• SARS Alberton new building	SARS	Plantroom design for noise impact control
• Sulzer large flow bend	Insul-Coustic	Design bend treatment for flow noise control
• BMW wax & seal test facility	Insul-Coustic	Test facility soundproofing design - Metal cutting
• Kumba induction panel test facility	Kumba	Test facility soundproofing
• KZN P Maritz B new legislative offices	KZN Dept P Works	Plantrooms and machinery design for noise control
• Alstom 32 MVA Power transformer	Alstom	Power transformer noise output tests
• Waterfall Boven	Nkalanga Municipal	New water purification design for noise control
• Conveyor noise study	Bateman	Overland conveyor noise: Causes & parameters
• Harvest House Pretoria	Desmo Eng	Chiller & cooler plant design noise screening meas
• Ventilation fan noise problem	Anglo Coal	Surface ventilation fan - Design noise reduction
• Sasol Syferfontein conveyor	Sasol Mining	Diagnostic analysis: noise generating mechanisms
• Sasol Syferfontein conveyor	Sasol Mining	Design: Overland conveyor noise reduction
• Metal press noise	TRW	Design enclosures & screens for noise reduction
• Stone Duster Vehicle	Bird Machines	New vehicle – Design & achieve noise spec
• Gautrain	Insul-Coustic	Construction sites – Design noise enclosures
• Exxaro High-frequency generator	Insul-Coustic	Noise enclosure and soundproofing design
• Unisa new registration building	Unisa	Plantroom noise predictions and design inputs
• Columbus Steel	Insul-Coustic	Control room and pulpit soundproofing design
• Sesane TV studios	Insul-Coustic	Plantroom and machinery noise reduction design
• Safour air plant noise reduction	Insul-Coustic	Compressor enclosure and soundproofing design
• Rustenburg Mine Laboratories	Rustenburg Mine	Design for machine noise reduction
• Anglo Research Lab Mills	Anglo American	Research lab mills, design for noise reduction
• Safripol Blowers	Safripol	Blower noise, design for noise reduction
• Eskom Grootvlei Power Station	Insul-Coustic	Design NR, boardrooms, offices
• Exxaro Inyanda Mine	Exxaro	Noise Reduction Strategy
• Locomotive air-conditioning system	Booyco	Design to meet Alstom noise spec
• Gecko Rapid Deployment Vehicle	LMT	Noise Reduction – Strategy and Design
• Sasol Wright 356 & Toro 350 LHD	Sasol Mining	LHD Vehicles design for noise reduction
• Denel B43 Chiller Plant	Denel	Chiller Plant design for noise reduction
• Eskom substation Fourways	Insul-Coustic	Design for noise reduction
• Grain Building Chiller Plant	Grain Building	Design for noise reduction
• In-Shere Shopping Centre Plant	Golden Properties	Design for noise reduction

Acoustic Field: Specialised services

Project	For	Aspects
• Specialist advisor to SABS LVA	SABS	Specialist advisor for SABS Acoustics Laboratory
• Pakistan Airforce: Missile assessment	Dep Trade & Industry	Assessments non-proliferation treaty
• Taiwan push-pull loco bullet train	Union Carriage	Driver's cabin speech intelligibility & noise control
• NRZ rail coaches	Union Carriage	Acoustic design for noise reduction
• Locomotive Class 9E Electrical Sishen	Alstom	Design upgrade - Noise reduction for hearing safety
• Theoretical analysis sound insulation	CSIR & several other	Predict/analyse acoustical properties of materials
• Overland coal conveyor noise	Sasol	Diagnostic analysis: noise generating mechanisms
• G6 artillery vehicle – Gun shot noise	LIW	Acoustic measurements & assessment hearing risk
• Locomotive Class 11E Electrical	Spoornet	Design upgrade - Noise reduction for hearing safety
• Dakota aircraft upgrade	Aerosud	Design for noise reduction
• Hearing damage gunshot noise	SA Police	Hearing conservation programme
• New drywall product development	BPB Gypsum	Theoretical analysis of acoustical properties
• Power generators outside broadcast	Ontrack	Noise reduction and field tests
• Ermelo – Richards Bay Locomotive	Transwerk	Design upgrade speech intelligibility & noise control
• Indoor artillery test facility	Somchem	Design for environmental noise control
• MUF building systems	Chipboard Industries	System acoustic evaluation and development
• Locomotive Class 34GM Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Locomotive Class 35GM Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Locomotive Class 36GM Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Locomotive Class 37GM Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Locomotive Class 34GE Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Locomotive Class 35GE Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Locomotive Class 36GE Diesel-elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• SABS acoustic test lab validation	SABS	Assess & validate SABS test laboratory & method
• Mobile partitioning system	L J Doors	Design input to improve insulation performance
• Locomotive Class 7E Elec	Spoornet	Design upgrade - Noise reduction for hearing safety
• Weapons and ammunition demolition	SA Navy	Measurement of hi-explosives detonation noise
• Locomotive Class 19E Elec	UCW	New Coal-link locomotive – Low noise design
• Locomotive Class 15E Elec	UCW	New Sishen iron ore loco - Low noise design
• Soshalowa power car	Transnet	Train set power car sound-proofing design
• Locomotive hooters	Transnet	Study hooter audibility at level crossings
• Aluglass building systems	Aluglass	Acoustic panel theoretical evaluation