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Transnet's Proposed New Lephalale Railway Yard, Steenbokpan, Lephalale Local Municipality, Waterberg District, Limpopo Province

Submitted by: Barend van der Merwe
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DISCLAIMER

The findings, results, observations, conclusions and recommendations given in this scoping report are based on the author's best scientific and professional knowledge as well as available information. The report will be based on survey and assessment techniques which are prescribed by Noise Control Regulations and/or SANS 10103 of 2008.

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0.0 EXECUTIVE SUMMARY

The Lephalale rail yard project will be situated on the Farms Geelhoutkloof 359LQ, Enkeldraai 314LQ, Kringgatspruit 318LQ. The study area is some 30km west of Lephalale town. There are some individual farmsteads in the vicinity of the proposed project and the noise impact assessment will be done at all the identified noise receptors. Current Impacts from Existing Mining Activities

The following noise sources prevail in the vicinity of the project area:

- Mine activities and processing plant – in the vicinity of the complex;
- Traffic – hauling vehicles, busses and motor-vehicles along the abutting feeder roads;
- Madupe power station;
- Game farm activities;

0.1 Legislative Requirements

The following Legislation and Standards will be used during the noise and vibration impact assessment:

- Department of Environment Affairs: Noise Control Regulations promulgated under the Environment Conservation Act**,** (Act No. 73 of 1989), Government Gazette No. 15423, 14 January 1994;
- SANS 10328: 2008 - Methods for environmental noise impact assessments.
- SANS 10103: 2008 - The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.
- SANS 10357:2000 The calculation of sound propagation by the Concawe method.
- SANS 10210 of 2004 – The determination of road traffic noise.
- Environmental, Health and Safety Guidelines for Community Noise and Mining, World Health Organisation, Geneva, 1999.

0.2 Impact Identification

The preparation and provision of infra-structure for the proposed rail yard will be the main noise sources during the construction phase which may have a cumulative impact

on the environment. During the operational phase it will be shunting, train activities, hooting which may have a cumulative impact on the abutting noise receptors. The rehabilitation activities during the decommissioning phase may have a temporarily impact on the environment.

0.3 Terms of Reference for Environmental Impact Assessment

0.3.1 Environmental Noise Study

The environmental noise study will be done to determine the prevailing environmental ambient noise levels within and adjacent to the proposed rail yard area and this information will be used to determine the possible noise intrusion at the different noise receptors.

0.3.2 Area of Influence

All residential properties in the vicinity of the proposed project study area.

0.3.3 Methodology

A site visit was carried out to determine the prevailing ambient environmental noise levels by means of a qualitative evaluation and a quantative evaluation will be carried out on the findings of the site visit. Calibrated instruments will be used to do the environmental noise survey. The impact assessment methodology will be used to identify the area likely to be affected.

In terms of the International Finance Corporation Performance Standards the area of influence is defined as:

- the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project;
- impacts from unplanned but predictable developments caused by the project that may occur later or at a different location;
- indirect project impacts on biodiversity or on ecosystem services upon which affected communities' livelihoods are dependent;
- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

0.5 Conclusion

The environmental noise survey will be done during the day and the night time periods so as to determine the baseline noise levels which will be used to identify possible noise intrusion levels at the abutting noise receptors. This will assist in the management of the project in terms of noise mitigatory measures and management principles for implementation during the construction and operational phases of the project.

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List of Abbreviations and Acronyms

Abbreviation	Description
dBAcoustics	dBAcoustics
dBA	Decibel in the A-weighted scale
m/s	Meters per second
m	Meters
RSA	Republic of South Africa
SA	South Africa
SANS	South African National Standards
ToR	Terms of Reference

1.0 INTRODUCTION

The proposed project area will be along an existing rail road between Lephalale and Thabazimbi which runs through game farms. The locations of the open cast pits are illustrated in Figure 1.1.

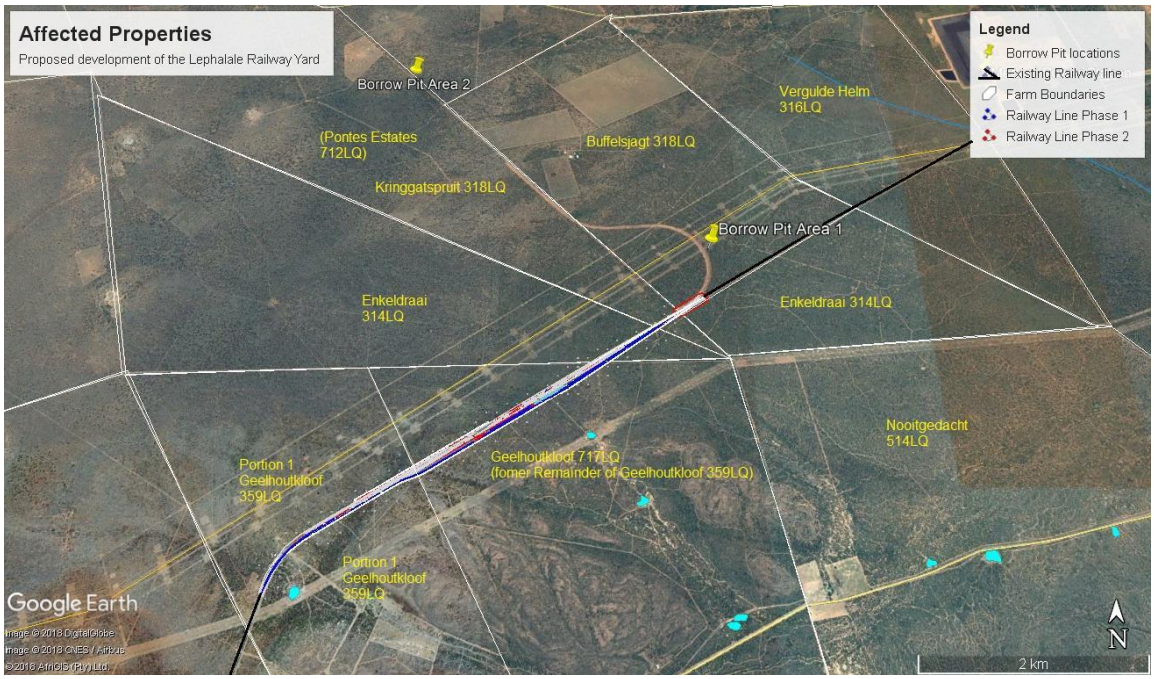


Figure 1-1: Location of the proposed railyard expansion

The key environmental sensitivities of the area in terms of noise will be at the shunting yard.

1.1 Specialist Expertise

I, Barend JB van der Merwe of 43th Street, Linden Johannesburg am an environmental noise and ground vibration specialist for the last 16 years. I have been instrumental in the pre-feasibility studies of proposed projects which may have an impact on the environment and noise sensitive areas. I am also involved with the noise and ground vibration impact assessments and the environmental management plans compilation of large projects such as wind farms, mining, roads, trains (primarily the Gautrain) and various point noise sources. As a post-graduate student in Environmental Management at the University of Johannesburg, I researched the impact of noise and ground vibration on a village close to a new underground mine. I have played a major role in the identification, evaluation and control of physical factors such as noise and ground vibration in the following projects – wind farms, various platinum and coal mines and the quarterly noise evaluation of the Gautrain, the rehabilitation of the N11 near Mokopane, construction of the P166 near Mbombela, design of the Musina by-pass, noise mitigatory measures at the N17 road near Trichardt, establishment of the weigh

bridge along the N3 near Pietermaritzburg, George Western by-pass. The following large environmental companies are amongst my clients: Amec Foster Wheeler, Gibb, Royal Haskoning DHV, Coffey Environmental, Golder Associates Africa (Pty) Ltd, GCS Environmental (Pty) Ltd, Knight Piesold Environmental (Pty) Ltd and SRK Engineering (Pty) Ltd.

Qualifications

- MSc Environmental Management – University of Johannesburg;
- BSc Honours in Geography and Environmental Management – University of Johannesburg;
- National Higher Diploma in Environmental Health - Witwatersrand Technikon;
- National Diploma in Public Health - Cape Town Technikon;
- National Certificate in Noise Pollution - Technikon SA;
- National Certificate in Air Pollution - Technikon SA;
- National Certificate in Water Pollution - Technikon SA;
- Management Development Diploma - Damelin Management School; and
- Advanced Business Management Diploma - Rand Afrikaans University.

1.1.1 Declaration of Independence:

I, Barend Jacobus Barnardt van der Merwe act as the independent specialist/s in the environmental authorisation and EMP amendment processes for the establishment of the Lephalale rail yard. I will perform the work relating to the environmental authorisation applications in an objective manner, even if this results in views and findings that are not favourable to the applicant.

I declare that there are no circumstances that may compromise my objectivity in performing such work. I have expertise in conducting the noise and vibration specialist study and report relevant to the environmental authorisation applications. I confirm that I have knowledge of the relevant Environmental Acts, Regulations and Guidelines that have relevance to the proposed activity and my field of expertise and will comply with the requirements therein.

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

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

- the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

1.2 Scope of Work

The following needs to be undertaken:

- Initial baseline noise measurement surveys to determine existing ambient noise

levels at the proposed site boundaries and affected parties;

- The prediction of the future noise regime outside the proposed boundaries of the site;
- Recommendation of mitigation methods should these be necessary or appropriate;
- Noise modelling.

It is proposed to make use of the following six-stage process approach to assessment and mitigation:

Step 1- Define the project requirements and noise problem – gather technical support information
Step 2 – Agree on the assessment criteria, establish baseline noise environment and determine extent of the noise impact of initial proposal
Step 3 – Identify and agree on noise mitigations options
Step 4 – Assess noise impact against criteria of Step 2 and evaluate key considerations and significance for each mitigation option
Step 5 – Determine optimal noise control solution
Step 6 – Review, implement, monitor and audit.

Objectives of the environmental noise specialist study:

- Update and gain a detailed understanding of the baseline environment in the vicinity of the proposed rail yard;
- Identify areas that should be avoided due to irreplaceable sensitivity or irreversible environmental impact or by identifying mitigation measures to overcome these impacts;
- Determine and assess the impacts to noise receptors in the vicinity of the proposed development;
- Development of environmental management measures so that the possible negative impacts may be mitigated and positive benefits enhanced;
- Assist in the feedback to stakeholders; and
- Provide guidance with regard to any further legal requirements in terms of environmental noise issues.

1.2.1 Zone of Influence

The abutting residential areas in the vicinity of the proposed rail yard.

1.3 Scoping Process

The proposed assessment will include the following:

- Desktop review of existing noise data;
- Site visit will be carried out to identify key strategic noise sources, to avail the assessor with the study area and to determine possible noise monitoring points;

- Noise survey of the study area at all the key noise sources and noise receptors during the day and night time periods;
- The survey will be conducted in terms of the requirements as provided by the Noise Regulations and SANS 10103 of 2008;
- All collected data will be analysed for flaws so as to do a follow-up noise survey.

1.4 Report Structure

The noise impact assessment following should be included in your specialist report:

- Title page including names of authors and contact details;
- Executive summary detailing the major findings and actions to be taken;
- Table of Contents;
- Introduction, including a project description;
- Scope of work (as per your proposal, attached)
- Overview of the relevant legislation to your specific field of study;
- Methodology;
- Baseline information in terms of your respective specialist field. Baseline information from existing specialist studies and EMPs should be utilised to assist in the baseline environment definition, and existing baseline information should be updated if necessary;
- Objectives for each environmental aspect (specialist specific);
- Environmental impact assessment per activity for pre-construction, construction phase, operational phase, decommissioning phase and closure and post closure phases as per the methodology detailed in section 5 below;
- Any cumulative impacts identified;
- Address comments from authorities and stakeholders (if required);
- Proposed management and mitigation measures per activity;
- Concurrent and ongoing monitoring measures;
- Concurrent and ongoing management measures for rehabilitation;
- Assumptions and knowledge gaps;
- Conclusion;
- References; and
- Any other information as you deem necessary and appropriate to the assessment and mitigation measures.

2.0 DESKTOP REVIEW AND STATUS QUO

2.1 Background

The environmental noise and vibration study area will include the abutting noise receptors, boundaries of the study area and any other areas which may be influenced by the additional train activities.

2.2 Project Context

The study area is illustrated in the following aerial imagery of the existing rail line and the proposed rail yard in Figure 1.1.

2.3 Desktop Study

There was no noise data of the study area and the assessor made use of the existing noise reports for previous noise studies done in the vicinity of the study area.

The results of the noise survey were:

- In the vicinity of Thabametsi mine – 40.0dBA during the day and 35.0dBA during the night;

2.4 Status Quo

There is an existing power station and existing mining operations in the vicinity of the proposed rail yard which will contribute to the prevailing ambient noise levels of the study area.

2.5 Management and Monitoring Programmes

No environmental noise monitoring programmes are in place and a monitoring programme will be designed to conform with the proposed noise management plan for the proposed rail yard activities.

2.6 Introduction

This section contains the national and international requirements related to noise requirements and recommended levels.

2.7 South African Legal Framework

Provincial Noise Control Regulations

These noise control regulations are applicable in the study area and the main aspect of these noise control regulations is that you may exceed the prevailing ambient noise levels by 7.0dBA before a noise disturbance is created.

SANS 10103 of 2008

The South African National Standards provide the guidelines for the different recommended prevailing ambient noise levels and how to evaluate when a specific operation or activity is creating a noise disturbance and what reaction can be expected if a noise disturbance is created.

SANS 10210 of 2004

This national standard is applied to determine or project road traffic noise which is associated with a new development.

SANS 10357:2000

The calculation of sound propagation by the Concawe method.

2.8 International Standards, Guidelines and Requirements

The recommended noise level for a noise sensitive area is 55.0dBA during the day and 45.0dBA during the night (World Bank, 2005).

3.0 IMPACT IDENTIFICATION

Potential noise impacts which may be associated with the project and which have to be further investigated as part of the specialist investigations and environmental noise and vibration impact assessment phase:

Construction phase

- Civil construction;
- Removal of topsoil;
- Construction of waste/overburden/rock dump sites;
- Infra-structure construction;
- Increased traffic.

Operational phase

- Rai road activities;
- Shunting activities;
- Hooting;
- Workshop activity noises.

It is important that interactions that could lead to potential impacts which may be result from the project aspects, or interactions that could lead to potential impacts which may be intensified as a result of the project aspects, during the construction, operational and

closure phases (including potential areas of impact) to assist in focusing the specialist investigations.

3.1 Methodology

An aspect and impact matrix will be used to assist in identifying potential interactions between environmental and social receptors and project activities. Where interactions are deemed likely, the interaction is further rated to determine if impacts could potentially be created which should be further investigated. The matrix makes provision for the identification of potential interactions for all phases of the project (either positive or negative).

The impact assessment methodology that will be utilised when assessing the impacts of the proposed project activities is as follows:

Generally, the impact assessment is divided into three parts:

- **Issue identification** - evaluate the 'aspects' arising from the project description and ensure that all issues in your area of expertise have been identified;

- **Impact definition** - positive and negative impacts associated with these issues (and any others not included) need to be defined. The definition should include the activity (source of impact), aspect and receptor as well as whether the impact is direct, indirect or cumulative. Fatal flaws should also be identified at this stage; and

- **Impact evaluation** – this is not a purely objective and quantitative exercise. It has a subjective element, often using judgement and values as much as science-based criteria and standards. The need therefore exists to clearly explain how impacts have been interpreted so that others can see the weight attached to different factors and can understand the rationale of the assessment.

3.1.1 Impact significance rating

The impact significance rating system is presented in and involves three parts as detailed in **Table 3-1**:

- **Part A:** Define impact consequence using the three primary impact characteristics of magnitude, spatial scale/population and duration;
- **Part B:** Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and
- **Part C:** Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence.

The significance of the impacts associated with the identified impacts will be done in terms of the method provided in Table 2 and the example of Impact rating of the ToR (Page 8 & 9).

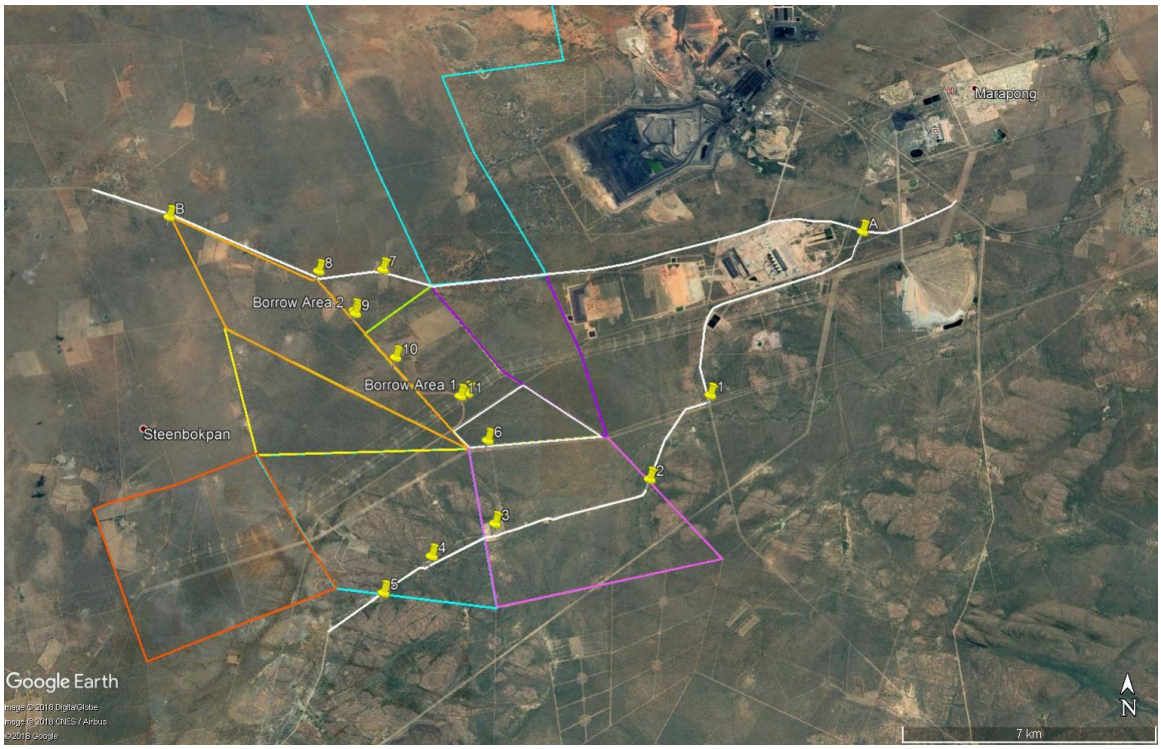
3.1.2 Activities to be rated

The proposed project will be evaluated for the activities which may generate high vibration and/or noise levels during the preconstruction & construction, operational, decommissioning/closure and the post-closure phases.

4.0 GAP ANALYSIS

A noise survey will be done at the following measuring points as given in Figure 4.1.

Figure 4-1: Proposed measuring points



5.0 BASELINE INFORMATION

The study area is some 30km west of Lephalale town..

The railway yard would be developed on the existing single railway line between Thabazimbi to Lephalale. The existing line is within Transnet servitude.

- Two new tracks are being constructed north of the existing railway line by Boikarabelo Mine that would tie into the proposed Lephalale Railway Yard. The two tracks are within Transnet servitude.
- There is an existing Eskom power line, presumably 11-33kV distribution line, approximately 6m south of the existing railway line. The power line runs alongside the railway line service road. The proposed railway line is not electrified and diesel locomotives are used. The powerline would therefore need to be relocated to make way for the facility.
- There is also an existing 132kV Eskom distribution power line running from Thabazimbi/Lephalale 350m north of the existing railway line. The new railyard would not impact on the existing 132kV power line yet the location of borrow area 1 in relation to the power line is not feasible and should be reconsidered.

The following properties may be affected by the proposed railway yard:

- Portion 1 (re) of the farm Geelhoutkloof 359LQ (Koedoe Nature Reserve)
- Remainder of Geelhoutkloof 359LQ
- Enkeldraai 314LQ
- Kringgatspruit 318LQ (now Pontes Estates 712LQ)

The following formula will be used to determine the noise impact at the different noise sensitive areas during the rail yard activities.

Noise intrusion levels

$$Lp = Lw - 20\log R - 5dB$$

Where, Lp is the sound level at a distance from the source in dBA;

Lw is the sound level at the source in dBA;

R is the distance from the source.

The categorization of the intrusion levels during the construction and operational phases are as follows.

Table 5-1: Noise intrusion levels and how it is perceived

Different noise level increases	How the noise increase is perceived	Colour code
Sound level change of 1.0dB	Barely be detected by humans	
Change of 2.0dB to 3.0dBA	Barely noticeable	
Change of 5.0dB	Readily noticeable	
Change of 10.0dB	Perceived as a doubling in loudness	
Change of 20.0dB	Represents a dramatic change	

6.0 SAMPLING METHODOLOGY

Measuring equipment

Integrating sound level meter configuration, that complies at least with the accuracy requirements specified for a class 1 instrument in SANS 656, SANS 658 and SANS 61672-1. A windscreen of a type specified by the manufacturer as being suitable for the particular microphone, and that does not detectably influence the accuracy of the meter under the ambient conditions of the test, shall be used.

Sound calibrator which complies with the requirements prescribed for a class 1 calibrator in SANS 60942.

Calibration of equipment

Calibration

All items of the sound measuring equipment used should be calibrated against the requirements of SANS 656, SANS 658, SANS 60942 and SANS 61672-1 (by an accredited laboratory), at intervals not exceeding one year for the sound calibrator, and two years for the rest of the equipment, that they comply with the requirements for accuracy.

Discrete measurement positions

Measuring points that are representative of the noise climate should be selected. At each measuring point, the microphone should be placed at a height of between 1, 2 m and 1, 5 m for general investigations, and, if practicable, at least 3, 5 m away from walls, buildings and other large flat vertical surfaces.

6.1 Analyses

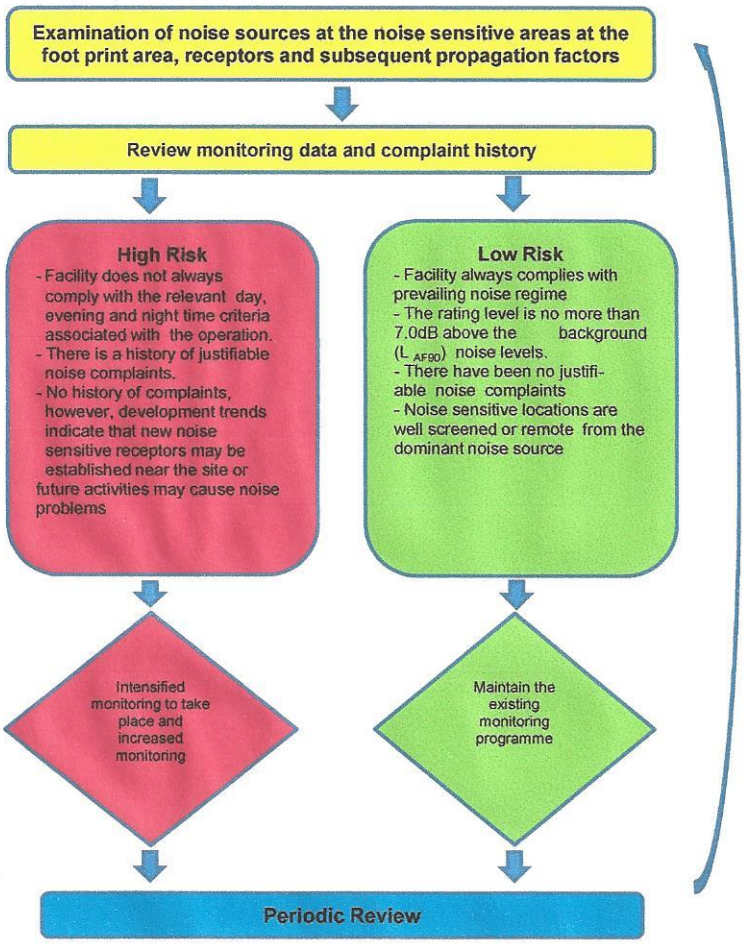
The noise information acquired from the calibrated data collection instruments will be used to determine the impact at the abutting noise receptors to the proposed project area.

6.2 Management and Monitoring Programme

A detailed description of the activity of the elements of the proposed rail yard activities will have to be compiled and a map of the study area will illustrate the infra-structure and environmental sensitivity areas. The following aspects will be dealt with:

- Management objectives, identify impacts and risks, mitigation measures and monitoring programme;
- Monitoring of the different processes during the construction, operational and decommissioning phases;
- Method and frequency of monitoring will be provided;
- Management monitoring plan as given in Figure 5-1.

Figure 5-1: Noise management plan (Source: EPA, 2012).



7.0 CONCLUSION

The environmental noise and vibration impact assessment will be done by means of approved scientific methods and the expertise of the specialist will ensure that the impact assessment will be done with utmost sensitivity towards the receptors of the proposed rail yard establishment and associated infra-structure.

Barend van der Merwe – MSc UJ
Environmental Noise Specialist

8.0 REFERENCES

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