

Terms of Reference

Visual Impact Assessment - MetroGIS

The visual impact assessment will be undertaken by Lourens du Plessis and Dawie van Vuuren from MetroGIS (Pty) Ltd. in their capacity as a visual assessment and Geographic Information Systems specialists.

MetroGIS is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilise the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape province of South Africa, their core elements are more widely applicable (i.e. to other provinces within South Africa).

The scoping study is the process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision-making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process will be included in a specialist report that will include issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

- Create a detailed DTM for the potentially affected environment. This would constitute the study area and area of analysis for the subsequent VIA.
- Source relevant spatial data. This would include cadastral features, land use categories, natural and topographical features, site placement, design, etc.
- Identify sensitive environments or areas upon which the proposed new ash dam could have a potential visual impact. Critical areas will be highlighted during this phase. These would be identified through, mainly (but not restricted to), the inputs from interested and affected parties.
- Undertake a viewshed analysis from each of the site placement alternatives (if applicable) in order to determine the visual exposure. The viewshed analyses will take into account the dimensions of the relevant structures/features.
- Compare the results of the individual viewshed analyses in terms of the overall visual exposure of each potential alternative and in terms of the specifically affected areas. Apply criteria that might further mitigate or aggravate the results of each alternative.
- Weigh the resultant envisaged impacts of each alternative and create an alternative-ranking table, stipulating the potential impacts of each alternative.
- Create maps to display the results of the analyses and to supplement the motivation for the preferred alternative.
- Stipulate the potential visual impacts of the project and identify issues related to the visual impact that should be addressed during the visual impact assessment phase.

Terms of Reference

Air Quality Assessment – Airshed Planning Professionals

The Air Quality Impact Assessment will be undertaken by Lucian Burger and colleagues at Airshed Planning Professionals. The Air quality professional opinion will be compiled in the EIA phase.

It is proposed that the assessment needs to contain the following aspects:

- A description of the existing air quality conditions (if available); and
- A prediction of the impact of the proposed development upon sensitive receptors in the area

These aspects can conveniently be grouped into (a) the establishment of an air quality Baseline and (b) the Predicted Impact of the proposed operation. Based on the basic scope of study outlined, we are confident that we possess the necessary expertise to complete the task at hand successfully.

The study terms of reference, methodology, scope of work, deliverables, timeframe and budget, are outlined in subsequent sections.

- **Air Quality Methodology and Terms of Reference**

The baseline air quality characterisation will include the assessment of:

- The regional climate and site-specific atmospheric dispersion potential;
- Preparation of hourly average meteorological data for the wind field model;
- The legislative and regulatory context, including emission limits and national ambient air quality standards and dustfall classifications.

The impact prediction study will include the following:

- Dispersion simulations of particulate concentrations from the operational activities using stack emissions and parameters as supplied by the proponent and calculated windblown dust from the ash dump and coal stockpile.
- Analysis of dispersion modelling results from operations, including:
 - Assessment of the predicted incremental ground level concentrations (stack emissions only);
 - Assessment of the predicted cumulative ground level concentrations (stack emissions and windblown dust from the coal and ash dump facilities onsite only);
 - Evaluation of potential for human health and environmental impacts.

- **Scope of Work**

- Baseline Assessment

A general description of the climate for the greater region would be determined from the existing monitoring data and historical records. Meteorological mechanisms govern the dispersion, transformation, and eventual removal of pollutants from the atmosphere. All available local meteorological data will be analysed and where necessary, missing data inter- and extrapolated. For the

purposes of establishing the local climatology, it is a necessity to analyse at least one year's data, however, a normal requirement is for a five-year database. An analysis of the data would serve to:

- Provide a general description of the local climate;
- Calculate fugitive airborne dust emissions; and,
- Be used in the dispersion simulations.

Hourly average meteorological data would be utilised, including wind speed, wind direction and temperature. Mixing heights would be estimated for each hour, based on prognostic equations, while night-time boundary layers will be calculated from various diagnostic approaches. Wind speed and solar radiation are used to calculate hourly stability classes. The analysis of the meteorological data will include diurnal temperature profiles, wind roses, atmospheric stability classifications and inversion height estimations.

Air quality data would be analysed in comparison to National Ambient Air Quality Standards.

- *Impact Prediction Study*

The modelling scope includes the dispersion of air pollutants arising from the stack emissions from the power station and windblown dust from the coal and ash dump facility onsite. The stack emissions and parameters (current and proposed) will be supplied by the proponent for dispersion modelling purposes.

The emissions from the windblown dust from the coal and ash dump facility will be calculated using emission factors and particle size distribution as provided by the proponent (or from similar activities if not available).

Ground level concentrations of pollutants for stack sources of emissions and windblown dust sources will be performed. Dispersion models compute ambient concentrations as a function of source configurations, emission strengths and meteorological characteristics, thus providing a useful tool to ascertain the spatial and temporal patterns in the ground level concentrations arising from the emissions of various sources.

All emission scenarios would be simulated using one of the following models:

- (a) ADMS 4 (UK); or,
- (b) USA Environmental Protection Agency's (US EPA) AERMET/AERMOD model.
- (c) CALPUFF/CALMET model

The model selection would be based on the complexity of the terrain and the availability of detailed meteorological data.

Terms of Reference

Noise Impact (Professional Opinion) – Francois Malherbe Acoustic Consulting

At this stage it is assumed that a detailed noise study will not be required, however, provision has been made for a professional opinion regarding this issue. This professional opinion will be compiled by Francois Malherbe of Francois Malherbe Acoustic Consulting and will be undertaken during the EIA phase of the project. The following methodology has been proposed:

- A site visit will be conducted in order to familiarise the consultant with the environment of the proposed development. Possible noise issues and the nearest noise sensitive receptors will be identified.
- Although major environmental noise measurements are not expected to be necessary, samples of the noise emission levels of existing noise sources, such as pumping stations, will help during the assessment of possible noise issues.
- In order to illustrate the reasoning behind the assessment of noise related issues, sample calculations will be made. Please note that no in-depth modelling will be made.
- The results of the observations and calculations will be assessed in terms of the applicable Mpumalanga noise regulations and the guidelines provided in SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'.
- A professional opinion will be written describing methodology, results and findings of the noise study.