

# Review of the 2009 Gauteng Air Quality Management Plan



**GT/GDARD/154/2016**

**INCEPTION REPORT/  
PROCESS PLAN**



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## **1. INTRODUCTION**

Gauteng is one of South Africa's nine provinces. It is the smallest province, but comprises three metropolitan municipalities namely, City of Johannesburg (CoJ), City of Tshwane (CoT) and Ekurhuleni Metropolitan Municipality (EMM). The two district municipalities that also form part of the province include Sedibeng District Municipality and West Rand District Municipality (Figure 1-1).



**Figure 1-1: Location map showing Gauteng and the respective municipalities**

In accordance with Section 15(2) of the National Environmental Management: Air Quality Act (NEM: AQA) (Act No. 39 on 2004), the Gauteng Department of Agriculture, Conservation and Environment (GDACE) developed the first provincial Air Quality Management Plan (AQMP) in South Africa in 2009 (GDACE, 2009). The AQMP described the status of air quality in Gauteng at the time and identified seven problems regarding air quality management. To address each of these in a structured manner, the AQMP defined objectives and intervention strategies.

With the ongoing implementation of various air quality management tools, and changes in the physical environment, the Gauteng Department of Agriculture and Rural Development (GDARD) recognised the need to review the 2009 AQMP in 2017. GDARD issued a call for tender, GT/GDARD/154/2016, and following due process the project to review the 2009 Gauteng AQMP was awarded to uMoya-NILU Consulting (Pty) Ltd.

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The overall objective of the project for the review of the GDARD AQMP is to establish the current status of air quality within Gauteng province and to develop a revised AQMP with objectives that will ensure prevention and improvement in air quality in the Gauteng province, so as to fulfill Government's Constitutional mandate to ensure an environment that is not harmful to the health and well-being of all South Africans. There are nine sub-objectives:

OBJECTIVE 1:	Planning
OBJECTIVE 2:	Establish stakeholder groups and baseline assessment report
OBJECTIVE 3:	Gap and problem analysis
OBJECTIVE 4:	Threat assessment
OBJECTIVE 5:	Air quality management goals
OBJECTIVE 6:	Development of an implementation plan (intervention strategies)
OBJECTIVE 7:	Draft Air Quality Management Plan
OBJECTIVE 8:	Final Air Quality Management Plan
OBJECTIVE 9:	Public Participation

Objective 1, the *Planning Objective*, is the purpose of this report, resulting in a Process Plan. The Process Plan describes the steps to be undertaken in the review of the AQMP. It includes information on methodology, resources and timelines. It will provide the schedule for the execution of tasks and reporting as well as a capacity building strategy for GDARD personnel.

## **2. OBJECTIVE 2: ESTABLISH STAKEHOLDER GROUPS AND BASELINE ASSESSMENT REPORT**

### **2.1 Establish stakeholder groups**

An inclusive and participative stakeholder engagement process is fundamentally important to gaining buy-in into the AQMP review process, and to the successful implementation of the revised AQMP. The process that uMoya-NILU will undertake to establish a database of stakeholders for the AQMP review is described here:

- i. Publish a notice in one regional and three local newspapers advertising GDARD's intention to revise the 2009 AQMP, inviting interested and affected parties to register on the Stakeholder Database;
- ii. Develop a Background Information Document (BID) for the project;
- iii. Establish a project web page as a platform for registration on the stakeholder database, communication with stakeholders, to distribute documents and to record and maintain information.
- iv. uMoya-NILU will work with the PSC to identify stakeholders that that have fundamental input and involvement in the development and implementation of interventions to meet the goals of the AQMP.

Existing GDARD databases will be used to initially populate the stakeholder database. Furthermore, key stakeholders will be identified together with the PSC. The initial

stakeholder database will be continually updated, based on input from the PSC, responses to the newspaper notices and from other sources.

The Excel database will be maintained throughout the project and made available to GDARD on completion of the project.

## **2.2 Air quality baseline report**

A comprehensive understanding of the current air quality status quo is necessary for the subsequent phase of the project. The air quality status was described in the 2009 AQMP and will serve as a departure point for the 2017 baseline report and will provide input on changes in aspects of air quality over the past six years in Gauteng. The baseline assessment report will include different sections pertaining to air quality, namely:

*i. Physical characterisation*

The physical characterisation of Gauteng province will include a description of the climate, topography, land use, transportation modes and routes, demographics, the socio-economic status of communities and their relative levels of vulnerability. Information will be drawn from the Gauteng 2012 Spatial Development Framework, the 2030 Gauteng Spatial Development Perspective, the South African Weather Service (SAWS), StatsSA Census 2011, GDARD GIS department, amongst others. Graphs, maps and overlays will be used to describe and illustrate the physical variables that characterise Gauteng.

In achieving this objective, it will be necessary for GDARD to facilitate the access of information from associated departments.

*ii. Ambient air quality*

The current state of ambient air quality in Gauteng will be described using available monitoring data from SAWS, GDARD and the municipalities in the province. All available data will be included in the assessment so that temporal trends can be identified, changes since 2009 can be assessed, as well as the spatial variation in ambient concentrations of pollutants. Compliance with the NAAQS will be assessed and areas of exceedance or potential exceedance will be highlighted.

In achieving this objective, it will be necessary for GDARD to facilitate the access to ambient monitoring data from the respective data holders.

*iii. Significant sources of air pollution*

Significant sources of air pollutants in the province will be identified in the emission inventory task and addressed in the baseline assessment.

*iv. Cause effect relationships*

The description of the cause and effect relationships that give rise to the significant sources of air pollution will consider the nature of the source, the pollutants being emitted, land use, demographics, energy demands, etc.

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- v. *State of environmental health*

The description of the overall health, environmental impacts, social and economic impacts of poor air quality in Gauteng will be based on available information. The Medical Research Council, CSIR and other appropriate institutions will be consulted to source relevant information. This will be summarised in the baseline assessment report.
  
- vi. *Emission reduction potential*

The description of the relative difficulty, or otherwise, of reducing emissions from various sources will consider the nature of the sources and the availability, feasibility and cost of alternatives.
  
- vii. *Threat assessment*

The assessment of threats to future air pollution is conducted in Objective 4. This includes identifying future scenarios, developing future emission inventories and dispersion modelling to predict future ambient concentrations. The threat assessment will be included as a chapter in the baseline report.  
In achieving this objective, it will be necessary to engage with GRARD and other stakeholders to define plausible future scenarios.
  
- viii. *Air quality management capacity*

The requirements regarding the air quality management function of provinces is well described in the National Framework for Air Quality Management. The current capacity in GDARD and municipalities to execute the air quality management function will be assessed through interviews with provincial and municipal staff. Capacity refers to strategy, structure, skills, systems and incentives. The outcomes of the process will be used to assess the capacity gaps to inform the skills development requirements of the project. The status of air quality management capacity will be documented as a chapter in the baseline assessment.

### **2.3 Emission inventory**

uMoya-NILU will work closely with GDARD in the development of the provincial emission inventory and will make available all documentation and calculations used in the development of the inventory. The starting point will be the review of emission inventories that have been developed by municipalities in Gauteng and for the province. The emission inventory will be in the form of a spreadsheet, with a worksheet for each source category. The emission inventory will also be documented as a chapter in the baseline assessment and will include sections on the emission inventory design, methodology and calculated emissions. The proposed methodology for the different source categories is:

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*a) Industrial operations (point and fugitive emissions)*

Existing municipal emission inventories and the 2015 submissions to the National Atmospheric Emission Inventory System (NAEIS) will be used. It will be necessary for GDARD to provide appropriate access rights on the NAEIS. The Listed Activity emissions data will be presented for all reported air pollutants in table form for categories and sub-categories.

For Controlled Emitters, municipal registers will be used. Where necessary, questionnaires will be used to obtain information on fuel-burning devices, fuels used, fuel consumption and emission factors, which will be used to estimate emissions using a Tier 1 methodology. It will be necessary for GDARD to provide a letter to support the request for data.

*b) Mining and quarry activities*

Data on operational mines in Gauteng will be obtained from the Council for Geoscience, including mine location, type of mining operation and the minerals mined. uMoya-NILU will use the data submitted to the NAEIS in 2015 to quantify emissions from mining in Gauteng. It will be necessary for GDARD to provide appropriate access rights on the NAEIS. Reporting gaps will also be identified. The mining emissions will be presented for all reported air pollutants in table form for categories and sub-categories for different resolutions.

*c) Domestic fuel burning*

Emissions resulting from domestic fuel burning will be estimated at a resolution of municipal wards. Each ward will be treated as an area source. StatsSA Census 2011 data on fuel type and fuel consumption will be used with relevant emission factors from the NAEIS. Annual average emissions will be calculated, i.e. there will be no daily or seasonal variation in the estimates.

*d) Vehicle emissions*

Gauteng vehicle count data and default emission factors for vehicle class and fuel type will be used to estimate emissions from motor vehicles. Information on fuel types and fuel sold in each municipal area and information on vehicle class will be sourced from the Department of Energy. Estimated emissions, road networks and vehicle density, will highlight potential areas of concern.

*e) Fugitive dust sources*

Fugitive sources of dust in Gauteng will focus on wind entrained dust from mine tailings. Existing data on emissions will be verified where necessary with USEPA methodologies for wind entrainment and will be applied to estimate the emissions of dust from these facilities.

*f) Biomass burning*

Biomass burning refers to both controlled fires (man-made for land management) and uncontrolled fires. Emissions from biomass burning (fires) will be estimated using burnt area data from the Advanced Fire Information System (AFIS), vegetation data and emission factors. Annual average emissions will be presented, i.e. there will be no daily or seasonal variation in the estimates. It will be necessary for GDARD to facilitate the acquisition of AFIS data.

*g) Waste treatment and disposal*

Waste management refers to registered and managed landfill sites and wastewater treatment works (WWTW). Available data will be used to quantify emissions from these two source types. Questionnaires will be used to source the necessary information from the plant managers.

## **2.4 Dispersion modelling**

uMoya-NILU will develop a modelling plan of study in accordance with the requirements of the Regulations Regarding Air Dispersion Modelling (DEA; 2014). The plan will describe the modelling approach and demonstrate its applicability. It will be discussed with the PSC so that a final decision on the modelling approach can be made and approved by the PSC prior to any work commencement. Following approval of the Model Plan of Study, the dispersion model will be set-up and parameterised. The dispersion model will be used to augment monitored ambient concentrations of criteria pollutants in Gauteng. It will be used to identify areas of concern or potential concern in the province, i.e. where the NAAQS are exceeded or may be exceeded.

The results of the dispersion modelling will be documented as a chapter in the baseline assessment.

On completion of the project, uMoya-NILU will provide GDARD with copies of all input data, model parameterization and post-processing files.

### **3. OBJECTIVE 3: GAP AND PROBLEM ANALYSIS**

Following the finalisation of the Baseline Assessment Report, uMoya-NILU will work with the PSC to undertake a gap and problem analysis of the status of air quality management in Gauteng. This will be done via two tasks, the first to identify gaps and the second to assess the problems and effects associated with the gaps.

The gap analysis will be used to categorise the gaps, issues and air quality management problems in a workshop. The key inputs to the process will be the Baseline Assessment report and the 2009 Gauteng AQMP.

For the problem analysis, a Logical Framework Assessment (LFA) workshop will be conducted with the PSC to:

- i. Develop 'Problem Trees' for the gaps, issues and challenges identified in the gap analysis;
- ii. Transform the Problem Trees into 'Objective Trees' by defining goals for each of objectives; and
- iii. Describing possible interventions that could achieve each of the objectives.

A problem assessment report will be provided as the output defining the gaps, problem trees, objective trees and possible interventions.

### **4. OBJECTIVE 4: THREAT ASSESSMENT**

To identify future development scenarios that may impact on air quality, uMoya-NILU will review the 2012 Gauteng Spatial Development Framework and the 2030 Gauteng Spatial Development Perspective and engage with GDARD.

Three future scenarios will be discussed and agreed on with the PSC for the Threat Assessment. The assessment of these scenarios will firstly involve the development of a hypothetical emission inventory for each. Secondly, dispersion modelling will be undertaken to predict the additive effect of the development on ambient concentrations, considering the current baseline emissions and concentrations.

An assessment of the potential impacts (or threats) of the three development scenarios in Gauteng on future ambient air quality will be included as a chapter in the air quality baseline assessment report.

### **5. OBJECTIVE 5: AIR QUALITY MANAGEMENT GOALS**

Based on the air quality baseline report, the gap analysis and the problem analysis, uMoya-NILU and the PSC will work together to develop a vision, mission and goals for the revised

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AQMP. The vision, mission and goals of the 2009 Gauteng AQMP will be reviewed with an evaluation of progress since 2009. Reasons for not achieving goals set in 2009 will be considered as gaps and will be taken forward into the revised AQMP.

The output of this objective will be a clearly defined vision, mission and goals for the revised Gauteng AQMP.

**6. OBJECTIVE 6: DEVELOPMENT OF AN IMPLEMENTATION PLAN  
(INTERVENTION STRATEGIES)**

uMoya-NILU will work with the PSC and key stakeholders to develop interventions to meet the goals of the AQMP. With the assistance of GDARD, uMoya-NILU will then describe each intervention and will include:

- i. The intervention objective with details of timing and expected impact/improvement on quality impacts, e.g. the emission reduction potential;
- ii. The intervention outputs, activities, and input requirements including financial, human and technological resources;
- iii. The assumptions and risks associated with the implementation of the intervention;
- iv. The intervention implementation plan that clearly describes timing and responsibilities; and
- v. An indicative cost of the implementation of each intervention, i.e. a cost benefit analysis will not be undertaken.

The output of this objective will be a clearly articulated intervention plan detailing objectives, activities required, responsibilities, timeframes and indicators to assess implementation progress.

**7. OBJECTIVE 7: DRAFT AIR QUALITY MANAGEMENT PLAN**

The draft revised AQMP will draw on the outputs of the preceding objectives. It will include the following:

- i. A summary of the baseline assessment, highlighting key aspects;
- ii. The strategy analysis including gaps, problems and air quality management challenges;
- iii. A description of the interventions;
- iv. The coordination, cooperation, participation and implementation arrangements (including organisational structures, monitoring and reporting, etc.);
- v. The identification of any regulations necessary for implementing and enforcing the AQMP and achieving its objectives;
- vi. An indicative cost for the implementation of the interventions; and
- vii. An implementation plan.

The draft plan will be presented to the PSC and stakeholders for comments before it is finalised and made available for public comments.

uMoya-NILU will compile an executive summary of the revised draft AQMP and a Power Point presentation that summarises the key elements and interventions contained in the draft plan to facilitate approval by senior provincial management.

## **8. OBJECTIVE 8: FINAL AIR QUALITY MANAGEMENT PLAN**

uMoya-NILU will compile a database of all comments received during the public comments process of the draft revised AQMP. uMoya-NILU will work closely with GDARD and propose amendments to the draft revised AQMP based on public comments received. Proposed changes will be presented to the PSC. Once approved, uMoya-NILU will amend the draft revised AQMP in consultation with GDARD. uMoya-NILU will submit the final AQMP to GDARD, together with all processed data.

uMoya-NILU will produce 200 copies of the final AQMP and 200 DVDs of the report in the latest MS Word version that is compatible with the GDARD IT systems.

The resultant output will be an accessible, implementable and widely accepted AQMP for Gauteng that strives to address all identified gaps, issues and problems in a structured, consistent and measured manner.

## **9. OBJECTIVE 9: PUBLIC PARTICIPATION**

An inclusive and participative stakeholder engagement process is fundamentally important to the success of the project and to obtain acceptance into the AQMP development process, and ultimately to successful implementation. The stakeholder engagement process that uMoya-NILU will facilitate follows on from establishing the stakeholder groups in Objective 2 and is described here:

- i. Two rounds of public meetings will be held, consisting of three workshops each, i.e. six public workshops will be held during the course of the project;
- ii. The first round of meetings will coincide with the drafting of the air quality baseline report. Three meetings will be held at central locations in Johannesburg, Tshwane and Ekurhuleni to allow broad public participation;
- iii. The second round of meetings will coincide with the drafting of the AQMP report. Again, three workshops will be held at central locations in Johannesburg, Tshwane and Ekurhuleni to allow broad public participation;
- iv. For both set of meetings, uMoya-NILU will publish invitations, circulate the agenda, note and minute-taking, and meeting facilitation.

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- v. For both sets of meetings, uMoya-NILU will be responsible for the hiring of venues, equipment and catering according to appropriate and acceptable standards, as agreed to by GDARD;
- vi. uMoya-NILU will record minutes and distribute these after the meetings in the most appropriate manner;
- vii. All comments received will be recorded in a comments/response data base;
- viii. All comments will be discussed with the PSC and responses will be formulated and added to the comments/response database for consideration in revising the respective reports.

## **10. SKILLS TRANSFER**

Opportunities for the skills to be transferred to GDARD personnel depend on the current level of competence and on staff career development plans. uMoya-NILU's proposed approach to transferring skills is to:

- i. Conduct the capacity status quo assessment (see Section 2.2. section viii) with GDARD and municipalities to determine the current skills levels in GDARD staff and the competency gaps;
- ii. Develop a skills transfer plan and present to the PSC;
- iii. Implement the skills transfer plan accordingly.

The skills transfer plan may address air quality management topics such as emission estimation techniques and emission inventory development, evaluating and presenting ambient monitoring data, and dispersion modelling.

The method of skills transfer will be discussed and agreed on with the PSC.

## **11. PROJECT MANAGEMENT**

The project manager, Mr Benton Pillay, will form a direct link between the project team and the GDARD Project Manager. Mr Pillay will be supported by Ms Sarisha Perumal. uMoya-NILU's approach to project management will include the following:

- i. Attendance on an inception meeting within 10 days of award of the project at the GDARD offices to sign the Service Level Agreement;
- ii. Attendance of fortnightly project management meetings, or otherwise if required, at the GDARD offices or a venue to be agreed upon by both parties;
- iii. Attendance of bi-monthly (every second month) PSC meetings for discussion and adoption of final draft documents related to project deliverables at the GDARD offices;
- iv. Responsibility for all logistical arrangement and administration of all meetings;

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- v. Responsibility for minutes of all meetings and circulated within 5 work days of the meeting to all relevant parties; and
- vi. Preparation of monthly Progress Reports and submission to the Project Manager.

**12. SCHEDULE OF ACTIVITIES**

The project will start on 1 February 2017 and the final revised AQMP will be submitted by 09<sup>th</sup> March 2018. A schedule of tasks during the 13 month project cycle is shown in the Gantt Chart in Figure 12-1.

Proposed dates for the fortnightly project management meetings and the bi-monthly PSC meetings are listed in Table 12-1.



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**Table 12-1: Proposed meeting dates**

Proposed date	Project management	PSC	Key stakeholder	Public
21-Feb-17	✓			
7-Mar-17	✓			
22-Mar-17	✓	✓		
4-Apr-17	✓			
18-Apr-17	✓			
2-May-17	✓			
16-May-17	✓			
30-May-17	✓	✓		
13-Jun-17	✓			
27-May-17	✓			
11-Jul-17	✓			
25-Jul-17	✓	✓		
25-27 Jul-17				✓
1-4 Aug-17			✓	
8-Aug-17	✓			
22-Aug-17	✓			
5-Sep-17	✓			
19-Sep-17	✓			
3-Oct-17	✓	✓		
17-Oct-17	✓			
31-Oct-17	✓			
14-Nov-17	✓			
28-Nov-17	✓	✓		
28-30 Nov-17				✓
12-Dec-17	✓			
16-Jan-18	✓			
30-Jan-18	✓			
13-Feb-18	✓			
27-Feb-18	✓	✓		
13-Mar-18	✓			

**13. INVOICING SCHEDULE**

Invoicing will be monthly for milestones achieved or work completed. Invoices will be submitted to the GDARD Project Manager in the first week of each month together with the monthly progress report. The proposed invoicing schedule is shown in Figure 13-1.

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**Figure 13-1: Proposed invoicing schedule**

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Invoice date	28-Mar-17	28-Apr-17	28-May-17	28-Jun-17	28-Jul-17	28-Aug-17	28-Sep-17	28-Oct-17	28-Nov-17	28-Dec-17	28-Jan-18	28-Feb-18	28-Mar-18	Task tota
Invoice number	Inv 1	Inv 2	Inv 3	Inv 4	Inv 5	Inv 6	Inv 7	Inv 8	Inv 9	Inv 10	Inv 11	Inv 12	Inv 13	
Inception meeting	R18,046.20													R 18,046.20
Fortnightly project management meetings		R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R5,790.25	R 69,483.00
Bi-monthly PSC meetings		R22,809.50		R22,809.50		R22,809.50		R22,809.50		R22,809.50		R22,809.50		R 136,857.00
Monthly reporting		R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R2,223.00	R 26,676.00
Objective 1: Planning	R22,344.00													R 22,344.00
Objective 2: Task 1 - Establish stakeholders		R45,600.00												R 45,600.00
Objective 2: Task 2 - Baseline report			R33,299.40	R33,299.40	R33,299.40	R33,299.40								R 133,197.60
Objective 2: Task 3 - Emission inventory				R203,376.00										R 203,376.00
Objective 2: Task 4 - Dispersion modelling						R81,168.00								R 81,168.00
Objective 3: Gap and problem analysis						R41,849.40								R 41,849.40
Objective 4: Threat assessment							R50,616.00							R 50,616.00
Objective 5: Air quality management goals						R28,625.40								R 28,625.40
Objective 6: Intervention strategies							R69,768.00							R 69,768.00
Objective 7: Draft AQMP								R75,057.60	R75,057.60					R 150,115.20
Objective 8: Final AQMP													R113,259.00	R 113,259.00
Objective 9: Public participation meetings		R43,703.04			R87,406.08				R87,406.08					R 218,515.20
Skills transfer		R21,272.40	R21,272.40	R21,272.40	R21,272.40	R21,272.40	R21,272.40	R21,272.40	R21,272.40					R 170,179.20
<b>INVOICE TOTAL</b>	<b>R40,390.20</b>	<b>R141,398.19</b>	<b>R62,585.05</b>	<b>R288,770.55</b>	<b>R149,991.13</b>	<b>R237,037.35</b>	<b>R149,669.65</b>	<b>R127,152.75</b>	<b>R191,749.33</b>	<b>R30,822.75</b>	<b>R8,013.25</b>	<b>R30,822.75</b>	<b>R121,272.25</b>	<b>R 1,579,675.20</b>