
**AMAJUBA DISTRICT MUNICIPALITY
AIR QUALITY MANAGEMENT PLAN**

DRAFT AIR QUALITY MANAGEMENT PLAN

2018



COMPILED BY



GONDWANA

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EXECUTIVE SUMMARY

Air quality in South Africa is governed under the National Environmental Management Air Quality Act, (NEM: AQA) (Act No. 39, 2005) and related legislation such as the National Ambient Air Quality Standards (NAAQS) (Government Notice No. 1210, 2009). The NEM: AQA (Section 15(2)) requires Municipalities to introduce Air Quality Management Plans (AQMPs) that seek to improve air quality, identify and address emissions that have a negative effect on human health. Municipalities are required to include an AQMP as part of their Integrated Development Plans (IDP).

The NEM: AQA (Act No. 39, 2005) aims to provide reasonable measures to prevent air pollution and give effect to Section 24 of the Constitution (South Africa, 1996). The NEM: AQA of 2004 states that local authorities are required to develop AQMPs which should be in their Integrated Development Plans (Act No. 39, 2005). Section 15(2) of the Air Quality Act requires each Municipality to include an AQMP in its Integrated Development Plan (IDP) as required in terms of Chapter 5 of the Municipal Systems Act (Act No. 32, 2000). The Amajuba District Municipality (Amajuba DM), in fulfilment of these legislative requirements has developed an AQMP which is presented in this report.

Located in the north-western region of KwaZulu-Natal, Amajuba DM comprises three local municipalities (LM): Dannhauser LM; eMadlangeni LM and Newcastle LM covering an area of approximately 7 102 km². This makes Amajuba one of the smallest districts in KwaZulu Natal in terms of surface area, comprising only 8% of the provincial geographical area (Municipalities SA, 2017). The Amajuba DM is located in the north western corner of KZN and borders the Free State (West) and Mpumalanga (North), uThukela DM and uMzinyathi DM to the south and Zululand district to the East. Key economic activities include manufacturing, community services, financial and business services and trade (Municipalities SA, 2017).

The Amajuba DM had a total population of 500 615 in 2011 and 531 327 was captured by the Community Survey conducted in 2016 (StatsSA, 2016). The number of households increased from 111 103 (2011) to 117 256 (2016) which is a 5.5% increase. Newcastle LM holds more than 70% of the total population in Amajuba DM and is also the most industrialised with the larger proportion of licensed emitters located in this municipality.



Approach followed in developing the AQMP for Amajuba DM

The AQMP developed for the Amajuba DM is in line with the guidelines outlined in the 2007 National Framework for Air Quality Management in the Republic of South Africa (NFAQM) (Government Notice No. 1138, 2007), the 2012 reviewed National Framework for Air Quality Management in the Republic of South Africa (Government Notice No. 919, 2013) and the Air Quality Management Plan Guideline Documents (DEA, 2012) provided by the Department of Environmental Affairs (DEA). The process of developing an AQMP followed a series of steps which included:

Status Quo Assessment

This phase included a detailed baseline assessment of the meteorological conditions and the ambient air quality situation in Amajuba DM. An emissions inventory was compiled for air pollution sources, with specific focus on quantifiable sources such as industries, vehicles, agriculture, waste, mining, biomass burning and domestic fuel burning.

Gap and Capacity Analysis

An evaluation of the current capacity of Government (Local, District and Province) for air quality management and control in terms of personnel, skills, resources and tools.

Air Quality Management Plan

Findings from the Status Quo Assessment and the Gap and Capacity Analysis were incorporated to develop the Air Quality Management Plan which articulated emission control and management strategies for Amajuba DM.

Stakeholder Engagement

Stakeholders were engaged through PSC meetings and invitation for comments from interested and affected parties throughout the process of developing the AQMP for Amajuba DM.

The following reports were generated as part of this project and can be found attached to this final AQMP as appendices;

1. Draft Status Quo Report (Appendix A);
2. Draft Gap and Capacity Analysis Report (Appendix B).

The contents of these reports have been summarised as part of this executive summary.



Emissions Inventory by Sector

- Listed Activities and Boilers

Data from listed activities was obtained from the DEA NAEISystem. The results showed that most of the industrial activities are concentrated in the Newcastle Local Municipality. Industrial emissions contributed the highest pollutant levels for PM₁₀, SO₂ and NO_x.

- Vehicle Emissions

Emissions from fuel (diesel and petrol) were calculated for towns within the Amajuba DM based on the 2016 magisterial fuel sales volumes (DoE, 2016). NO_x emissions are the highest of the criteria pollutant emissions from vehicles in Amajuba DM by mass. Over 95% of the total emissions in Amajuba DM are within the Newcastle LM. NO_x and CO are the main criteria pollutants resulting from the combustion of petrol and diesel in the Amajuba DM.

- Domestic Fuel Burning

Emissions from domestic burning of paraffin, wood and coal (for cooking, heating and lighting) were calculated at municipal level. Coal burning, followed by wood burning are the biggest polluters by mass of the fuel burnt, in terms of SO₂, NO and PM₁₀. There is a relatively large number of households using wood and coal for domestic fuel burning leading to the high emissions per kilogram of coal and wood burnt (compared to paraffin). Coal burning is the largest source of air pollution within the Amajuba DM in terms of domestic fuel burning. In total, by mass emitted, PM₁₀ is the largest criteria pollutant emitted from domestic fuel burning in the Amajuba DM.

- Biomass Burning

The total area burned between 2013 and 2017 in the Amajuba DM was 550 212.57 ha. This equates to an annual average of 110 043 ha burned. Approximately 94% of all burned area occurred during the mid-late dry season. Emissions due to biomass burning were highest in CO and PM₁₀.

- Crop farming

Crops identified in the Amajuba DM include maize, wheat, and soya beans. Emissions were calculated for the land preparation and harvesting of these crops. A calculated total of approximately 550 thousand kilograms of nitrogen fertilizer is applied for agricultural activities per annum in Amajuba DM. This amount of fertilizer applied



equates to over 17 thousand kilograms of PM₁₀ emissions per annum. Maize contributes the highest PM₁₀ and PM_{2.5} emissions from agricultural processes, which include land preparation and harvesting. The largest area planted is under maize cultivation mostly in the eMadlangeni local municipality. The highest PM_{2.5} and PM₁₀ emissions are found in the eMadlangeni Local Municipality.

- **Livestock Farming**

The largest contributions to PM emissions from livestock in Amajuba DM are from the Dannhauser followed by the eMadlangeni Local Municipalities. This is due to the high number of commercial livestock farmed in these municipalities.

- **Denuded land**

Denuded land in Amajuba DM contributes approximately 29 metric tons of PM₁₀ emissions and 4 metric tons of PM_{2.5} emissions. eMadlangeni has the greatest area of denuded land (46km²) followed by Dannhauser LM (23km²) and Newcastle LM (10km²).

- **Mining**

Mining activities in Amajuba DM cover an area of approximately 21 km² (Table 27). These mining activities contribute about 3.7 thousand metric tons of PM₁₀ emissions. The largest mining areas can be found in Newcastle LM (37%) followed by Dannhauser (35%).

- **Landfills**

Based on the three landfills in Amajuba DM PM₁₀ emissions amount to over 700 kg/year while benzene emissions are close to 2000 kg/year.

- **Wastewater Treatment Plants**

According to the DWS Green drop report of 2013 (DWS, 2013), there are 7 wastewater collection and treatment systems in Amajuba DM. These 7 WWTPs treat approximately 7 592 110 m³/year and produce approximately 7.6 thousand kg of VOC emissions per year. Of the wastewater treated in Amajuba DM, the bulk of it is treated in the Newcastle LM and consequently most of the VOCs are emitted in Newcastle Local Municipality as well.

Emissions inventory summary of findings



- By mass, PM is the largest contributing criteria pollutant emitted within the Amajuba DM followed by SO_2 and NO_x ;
- Particulate matter as PM_{10} is largely emitted from listed activities (74%) followed by agriculture (15%) and domestic fuel burning (11%);
- SO_2 and NO_x are mostly emitted from listed activities; while
- Vehicle emissions contribute the most to CO emissions.

Gap and Capacity Analysis

- The Amajuba DM did not have an emissions inventory prior to the one developed for this project.
- The human resources capacity in the Amajuba DM is lacking with one officer in the District conducting air quality management related duties in addition to broader environmental issues.
- Local municipalities do not have dedicated staff for air quality related tasks
- There is one ambient monitoring station in the district located in the Newcastle LM.

Proposed interventions

Interventions for the various emission sources were proposed for implementation. The two main sources of emissions were identified as industrial emissions and biomass burning. The key interventions proposed for these sources are;

Industrial emissions

- Periodic site inspections and emissions measurements should be undertaken by the Amajuba DM.
- Continuous monitoring of unlicensed activities should be conducted in order to register listed activities and controlled emitters.
- Enforcement and compliance monitoring according to license conditions should continue on a scheduled basis.
- Regular tracking of the recordings at the Newcastle LM monitoring station to detect any exceedances (and to take take action on such incidences) that have a direct impact of the communities of Madadeni and Osizweni.
- Miantenance of a systematic complaints and register linked to the offender and subsequent corrective action taken.

Biomass burning



- Emissions from biomass burning need to be accurately quantified through recording of fire incidences and areas affected.
- The role of the fire services in air pollution control needs to be identified in the Local Municipalities.
- Each local Fire Department should maintain and update a database of the locations of veld fires and the extent of the areas burnt. This will assist with the quantification of biomass burning emissions.

Implementation plan

Short medium and long term targets where drawn up for the Amajuba District based on the mission, vision and goals of the Amajuba DM for air quality management.

Actions that needs to be implemented in the immediate to short term period are;

- to communicate the contents of the AQMP to the key/ responsible persons;
- to officially appoint a dedicated Air Quality Officer(s) with clear functions as recommended in the gap analysis;
- to conduct a workshop or capacity gap analysis that provides an assessment of functions and workloads that Air Quality Units / Divisions are required to undertake;
- to establish a complete complaints system, based on the complaint type such as smoke, odours, dust etc. Records should be kept of responses, letters, notices and feedback to the complainant;
- to submit an annual report on the implementation of the AQMP to measure progress and to keep stakeholders informed.



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ACRONYMS

ADM	Amajuba District Municipality
AEL	Atmospheric Emissions Licence
AQMP	Air Quality Management Plan
AQO	Air Quality Officer
CO	Carbon Monoxide
DEA	Department of Environmental Affairs
DM	District Municipality
IDP	Integrated Development Plans
LM	Local Municipality
NAAQS	National Ambient Air Quality Standards
NAEIS	National Atmospheric Emission Inventory System
NDCR	National Dust Control Regulations
NEM: AQA	National Environmental Air Quality Act
NFAQM	National Framework for Air Quality Management
NH ₃	Ammonia
NMVOC	Non-Methane Volatile Organic Compound
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
O ₃	Ozone
PM ₁₀	particulate matter with an aerodynamic diameter of less than 10 µm
PM _{2.5}	particulate matter with an aerodynamic diameter of less than 2.5 µm
SAAQIS	South African Air Quality Information System
SO ₂	Sulphur Dioxide
VOC	Volatile Organic Compound
WHO	World Health Association
WWTW	Wastewater Treatment Works



1. INTRODUCTION

The Amajuba District Municipality (Amajuba DM) is located within the north-western region of KwaZulu-Natal. Amajuba DM comprises three local municipalities (LM): Dannhauser LM; eMadlangeni LM; and Newcastle LM. It is the smallest district in the Kwazulu Natal Province Manufacturing, community services, financial and business services and trade are the main economic sectors in the Amajuba DM (Municipalities SA, 2017).

Air quality in South Africa is governed under the National Environmental Management Air Quality Act, (NEM: AQA) (Act No. 39, 2005) and related legislation such as the National Ambient Air Quality Standards (NAAQS) (Government Notice No. 1210, 2009). The NEM: AQA (Section 15(2)) requires Municipalities to introduce Air Quality Management Plans (AQMPs) that seek to improve air quality, identify and address emissions that have a negative effect on human health. Municipalities are required to include an AQMP as part of their Integrated Development Plans (IDP). The main objective of this project is to develop an AQMP for the Amajuba DM, as per the requirements of the NEM: AQA 2004.

The main aims of the Amajuba DM AQMP are;

- to ensure sustainable implementation of air quality standards within the Amajuba DM;
- to comply with the Bill of Rights as enshrined in the Constitution of South Africa (South Africa, 1996) of every citizen having the right to live in an environment that is free of pollution;
- to recommend the methodology and processes for the monitoring of pollution parameters consistent with national, provincial and local norms and standards;
- to evaluate the existing air quality monitoring system in the Municipality and make recommendations for an effective air quality monitoring programme;
- to review the protocol for data collection, processing, quality control and assurance;
- to review the protocol for interpretation and archiving of reports;
- to establish an emission inventory of the study area by identifying sources, quantifying pollution and capturing these in geographic information systems (GIS);
- to initiate an air pollution dispersion modelling system; and



- to ensure the provision of sustainable air quality management support and services to all stakeholders within the Amajuba DM.

In order to meet these aims, the immediate objectives were to;

- conduct a Status Quo Assessment to determine pollution sources, ambient concentrations and the potential for human health effects within the Amajuba DM
- conduct an intervention study to outline the strategies to address the current air quality situation and provide recommendations for air quality monitoring
- compile an AQMP for the Amajuba DM.



2. EMISSION REDUCTION INTERVENTIONS

In view of the identified pollution sources in the Amajuba DM, emissions reduction interventions have been proposed for the major sources of pollution. This section will highlight each of the identified sources and propose interventions for the Amajuba DM.

2.1. Listed Activities (Industries)

The emissions inventory results showed that industrial emissions contributed the most to all the criteria pollutants except for CO emissions in the Amajuba DM. The following interventions are proposed for the Amajuba DM for industries;

- Periodic site inspections and emissions measurements should be undertaken by the Amajuba DM.
- Continuous monitoring of unlicensed activities should be conducted in order to register listed activities.
- Enforcement and compliance monitoring according to license conditions should continue on a scheduled basis.
- Regular tracking of the recordings at the Newcastle LM ambient air quality monitoring station to detect any exceedances (and to take action on such incidences) that have a direct impact of the communities of Madadeni and Osizweni.
- Maintenance of a systematic complaints register linked to the offender and subsequent corrective action taken, with feedback provided to the complainant.

2.2. Domestic fuel burning

Domestic fuel burning accounts for 11% of total PM₁₀ emissions in Amajuba DM. Measures should be put in place to ensure that this level does not continue to rise.

- The domestic fuel burning emissions inventory should be reviewed with updated population statistics as these become available.
- Awareness raising programmes through media campaigns and community forums should be developed to educate the public around the negative health impacts of domestic fuel burning.
- The Amajuba DM should encourage the distribution of alternative forms of energy such as low smoke fuels (by replacing coal with cheaper low smoke char briquettes) and liquid petroleum gas (LPG);
- The roll-out of safer illuminating paraffin stoves should be initiated by the relevant departments.



- Energy efficiency measures should be integrated into low-cost houses such as housing insulation, solar panels and stove maintenance and replacement.
- Replacing traditional household solid fuel with lower-emission cookstoves and/or cleaner fuels;
- shifting away from kerosene to solar powered energy;
- Improving the energy efficiency of homes and commercial buildings through insulation and passive design principles such as natural ventilation and lighting.

2.3. Vehicle Emissions

Vehicle emissions were found to contribute the most to CO emissions in the Amajuba DM. The following interventions have been put forward to address vehicle tailpipe emissions.

- The vehicle emissions database should be reviewed with updated traffic count data as these become available.
- Updated fleet data (vehicle type, age, fuel usage etc.) should be collected in order to improve the vehicle emissions inventory
- Awareness raising and promotion of the use of cleaner fuels and modes of transport such as cycling, walking and rail.
- shifting to cleaner heavy duty diesel vehicles and low-emissions vehicles and fuels, including fuels with reduced sulfur content for the Amajuba District and its local municipalities fleet.
- Traffic light synchronisation.

2.4. Agriculture

Emissions from agricultural activities such as crop spraying, crop burning, harvesting and N-fertilizer application are potentially significant sources of air pollution. Information on the quantity of pesticides sold in the local municipalities should be obtained as a first step in quantifying the potential impact of crop spraying. Impacts associated with crop spraying can be minimised by ensuring that crops are sprayed during periods of favourable meteorological conditions such as when wind speeds are low to reduce spray drift.

Interventions proposed for agriculture in Amajuba DM are listed as follows;

- Improve on the emissions inventory by collecting updated data on
 - Crops cultivated in Amajuba District;
 - Areas under cultivation (hectarage);



- Proportion of commercial and subsistence farming;
- Fertiliser usage;
- Total herd count for animal farming.
- Obtain information on the quantity of pesticides and fertilizers consumed in the Amajuba DM;
- Ensure that crop spraying takes place under favourable atmospheric conditions that reduce spray drift, i.e. when wind speeds and temperatures are low;
- Improving the management of agricultural waste and livestock manure;
- Promoting good farming practices to limit the use of inorganic fertilisers;
- Reducing the burning of agricultural fields or alternatively agricultural burning should only be allowed under favourable dispersion conditions which occur in the middle of the day.

2.5. Waste Management

Emissions from waste treatment and disposal facilities (with the exception of incinerators) are an important contributor to air quality due to the type of pollutants released and the increase in these pollutants released if they are poorly maintained.

Landfill sites within the Amajuba DM need to be permitted to ensure that these landfills are effectively managed and controlled to reduce illegal dumping and waste burning.

Several Municipalities within South Africa, including the eThekweni Municipality in KZN, have initiated a waste-to-energy programme. Three projects at La Mercy, Mariannhill and Bisasar landfill sites were initiated and are believed to be producing 7,5 MW of electricity (Gumbo, 2013). Similar to the waste to energy from landfills, wastewater treatment works have the ability to run the plants off the electricity generated from the conversion of waste (methane) to energy. A feasibility study of the potential for selected WWTPs to produce energy was conducted in 2012 and Newcastle LM was part of this study. The results showed that the Newcastle WWTP assessed in the feasibility study had limited potential for electricity production due to the settling ponds retaining sludge, which could otherwise feed the digesters that produce biogas (SALGA, 2015). Similar studies can be conducted at other WWTPs which do not use settling ponds and assess the energy production potential.

Raising awareness campaigns around the environmental benefits of recycling should be accelerated. These campaigns should focus on schools with recycling bins and



depots installed at each school in the region. Proper refuse collection in all areas within the Amajuba DM will also minimise illegal waste dumping and domestic waste burning in human settlements.

The proposed interventions for waste treatment and disposal are listed as follows;

- Maintain a current database of permitted and non-permitted landfill sites;
- Introduce awareness programmes and public education of waste minimization and recycling initiatives;
- Reduce illegal dumping and the creation of informal landfills through efficient service delivery in residential areas;
- Undertake landfill gas monitoring and management schemes;
- Initiate a waste-to-energy project to reduce waste at Landfill sites and produce energy;
- Explore opportunities for waste to energy in WWTWs and aerator control mechanisms.

2.6. Biomass burning

Veldfires are common in Amajuba DM during the cooler months of June to September according to data collected for the period 2003 to 2013 putting communities at risk of dangerous CO rich emissions (Strydom & Savage, 2016). Over 100 million kg of CO were emitted due to biomass burning during the 2013-2017 period with an annual average of slightly over 23 million kg of CO emitted. The dangers posed by fires require intervention measures be put in place to minimise their occurrence and to shorten the length of time fires are left unattended. The following interventions are proposed for Amajuba DM;

- Emissions from biomass burning need to be accurately quantified by refining the scale of biomass burning.
- The role of the fire services in air pollution control needs to be identified in the Local Municipalities.
- Each local Fire Department should maintain and update a database of the locations of veld fires and the extent of the areas burnt. This will assist with the quantification of biomass burning emissions.



3. IMPLEMENTATION PLAN

Implementation of the AQMP follows the guidelines of the Amajuba District vision, mission and goals for air quality as articulated below.

3.1. Vision

To attain and maintain of good air quality for the benefit of all inhabitants and natural ecosystems within the Amajuba DM.

3.2. Mission

- To ensure the maintenance of good air quality, through proactive and effective management principles that take into account the need for future sustainable development.
- To work in partnership with communities and stakeholders to ensure that air is healthy to breathe and is not detrimental to the well-being of the residents of Amajuba DM.
- To ensure that future developments (transportation, housing etc.) incorporate air quality impacts.
- To reduce the potential for damage to sensitive natural environmental systems from air pollution both in the short and long-term.
- To facilitate intergovernmental communication at the Local, Provincial and National levels to ensure effective air quality management and control in the Amajuba DM.

3.3. Goals

- Implementing the Air Quality Management Plan within the Amajuba DM.
- Assigning clear responsibilities and functions for air quality management.
- Air quality training of current and future air quality personnel at the local levels.
- Obtaining the necessary resources and funding for air quality management.
- Compliance monitoring and enforcement air quality legislation, policies and regulations.
- Assessing the contribution of various activities/ sources to ambient air quality and establishing measures to control emissions from these sources.

Section 3.4 will outline the prioritised implementation plan broken down into actionable tasks.



3.4. AQMP Implementation Plan

The Implementation Plan for the Amajuba DM is presented in the following tables. For each of the six Strategic Goals and Objectives identified for the municipality, appropriate objectives are set. Intervention strategies are re-stated as actions with responsible parties and expected outputs identified. The indicators can be used to assess progress with implementation of the AQMP. Priority actions ranging from immediate (0 – 6 months), short term (1 – 2 years), medium term (3 – 5 years) and long term (5 – 10 years) were assigned. Where outcomes are repeated at regular intervals, ongoing was assigned as the timeframe. The start and end date will be filled in by the Amajuba DM to indicate progress in achieving the targets.

Table 1: Goal 1 - Implementing the Air Quality Management Plan within the Amajuba DM.

Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
Implement the Air Quality Management Plan.	1.1.1 Communicate the contents of the AQMP to the key/responsible persons.	Amajuba DM	Immediate			Records of communication, responses and acknowledgment of assigned tasks.
	1.1.2 Submit an annual report on the implementation of the AQMP.	Amajuba DM	Short term, ongoing			Annual report on the implementation of the AQMP.
	1.1.3 Obtain the necessary resources and funding for air quality management.	Amajuba DM	Short term			Funding made available for identified air quality management priorities.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	1.1.4 Include the AQMP in the IDP	Amajuba DM	Medium term, ongoing			IDP reflecting air quality considerations.
	1.1.5 Review the AQMP		Long term (5 years)			Reviewed and updated AQMP.

Table 2: Goal 2 - Assigning clear responsibilities and functions for air quality management.

Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
2.1. Effectively manage air quality within Amajuba DM	2.1.1. Workshop or capacity gap analysis that provides an assessment of functions and workloads that Air Quality Units / Divisions are required to undertake.	Amajuba DM	Immediate			Report on the human resources, infrastructure and the financial resources required by the Amajuba DM to implement the AQMP.
	2.1.2. Officially appoint a dedicated Air Quality Officer(s) with clear functions as recommended in the gap analysis.	Amajuba DM	Short term (ongoing)			Letter designating air quality function or appointment letter of a new, dedicated Air Quality Officer(s).



Table 3: Goal 3 - Air quality training of current and future air quality personnel at local level.

Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
3.1. Competent and skilled personnel	3.1.1. Training on calibration and maintenance of analysers in the ambient monitoring stations.	Amajuba DM	Ongoing			Amajuba DM monitoring of ambient air quality and maintenance of air quality monitoring stations as per their mandate as air quality authorities. Alternatively, this function needs to be outsourced. Amajuba DM should provide support and QA/QC when monitoring by the Province, District, Industry and Academia is conducted.
	3.1.2. Training on data acquisition and analysis.	Amajuba DM	Ongoing			Amajuba DM data analysis and reporting on ambient air quality as per their mandate as air quality authorities. Alternatively, this function needs to be outsourced. Amajuba DM should provide support and QA/QC when monitoring by the Province, District, Industry and Academia is conducted.
	3.1.3. Training on dispersion modelling.	Amajuba DM	Ongoing			Attendance at courses, and subsequent certification.
	3.1.4. Training on emission inventories.	Amajuba DM	Ongoing			Attendance at courses. Update or QA/QC information uploaded to SAAQIS by industry.
	3.1.5. Training on air quality management.	Amajuba DM	Ongoing			New knowledge is shared at air quality officers' forums and the annual Governance Lekgotla,



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
						through presentations or publication.

Table 4: Goal 4 - Assessing the contribution of various activities / sources to ambient air quality.

Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
4.1. Compiling an emissions inventory for the Amajuba DM of industrial sources.	4.1.1. An electronic database of all listed activities operating within Amajuba DM should be developed and updated regularly. Those currently operating without emissions licences need to be identified. This information should be included in the NAEIS.	Amajuba DM	Short term, ongoing			Up-to-date electronic database of listed activities. Updated NAEIS.
	4.1.2. An electronic database of small industries in the Amajuba DM should be updated regularly. This information should be included in the NAEIS.	Amajuba DM	Short term, ongoing			Up-to-date electronic database of small industries. Updated NAEIS.
	4.1.3. An electronic database of all controlled emitters needs to be developed and updated by Amajuba DM This	Amajuba DM	Medium term, ongoing			Up-to-date electronic database of controlled activities. Updated NAEIS.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	information should be included in the NAEIS.					
4.2. Compiling an emissions inventory for the Amajuba DM of transport sources.	4.2.1. Update the vehicle emissions database with the latest traffic count data as it becomes available.	Amajuba DM	Short term / ongoing			Up-to-date electronic database of traffic count data.
	4.2.2. Compile a detailed assessment of the vehicle fleet in the Municipality including information on vehicle numbers, type, age and fuel usage.	Amajuba DM	Medium term			Up-to-date electronic database of vehicle fleet in the Amajuba DM.
4.3. Compiling an emissions inventory for the Amajuba DM of domestic fuel burning sources.	4.3.1. Update the domestic fuel burning emissions inventory as population statistics become available.	Amajuba DM	Medium term			Up-to-date domestic fuel burning emissions inventory.
	4.3.2. Conduct a count of all illegal settlements and establish an estimate of the number of residents within these settlements.	Amajuba DM	Medium to long term			Up-to-date inventory of illegal settlements.
4.4. Compiling an emissions inventory for the Amajuba DM of biomass burning sources.	4.4.1. Identify and quantify areas affected by biomass burning, including controlled burning by farmers.	Amajuba DM	Short to medium term (initiation) and ongoing			Up-to-date biomass burning inventory.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	4.4.2. Each local Fire Department should maintain and update a database of the locations of veld fires and the extent of the areas burnt.	Amajuba DM	Short to medium term (initiation) and ongoing			Up-to-date electronic database of locations of veld fires and the extent of the areas burnt.
4.5. Compiling an emissions inventory for the Amajuba DM of agricultural sources.	4.5.1. Updated information regarding agricultural activities within the municipality should be collected.	Amajuba DM	Short to medium term			Up-to-date electronic database of location and extent of different types of agriculture in the Amajuba DM.
4.6. Compiling an emissions inventory for the Amajuba DM of landfill sites.	4.6.1. Maintain a current database of landfill sites, including those with permits and those without.	Amajuba DM	Ongoing			Up-to-date electronic database of landfill sites.

Table 5: Goal 5 - Maintaining good air quality within the Amajuba DM boundaries, with specific emphasis on PM₁₀, PM_{2.5}, NO_x and SO₂ concentrations, by focusing on reducing emissions from large emitters.

Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
5.1. Manage emissions from industrial sources.	5.1.1. Prepare an industrial emission reduction plan.	Amajuba DM, Industries	Short to medium term			Industrial emission reduction plan.
	5.1.2. Implement the industrial emission reduction plan.	Amajuba DM, Industries	Medium term, ongoing			Implementation plan for industrial emission reduction.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	5.1.3. Listed Activity owners (especially those of smaller companies) should be encouraged to be more active in quantifying and mitigating their emissions.	Amajuba DM, industries	Immediate to short term			Licenses issued to smaller listed activities.
	5.1.4. Identify and register all controlled emitters.	Amajuba DM	Immediate to short term, ongoing			All controlled emitters registered.
5.2. Manage emissions from transportation sources.	5.2.1. Synchronise traffic lights.	Amajuba DM	Ongoing			Synchronised traffic lights.
	5.2.2. Construct public transport infrastructure.	Amajuba DM	Long Term			Public transport infrastructure.
	5.2.3. Encourage the use of public transport through information campaigns.	Amajuba DM	Short Term/ Ongoing			Public transport information campaign.
5.3. Manage emissions from domestic fuel burning sources.	5.3.1. Identify and prioritise the residential areas using fossil fuels that require installation of air quality monitoring equipment.	Amajuba DM	Medium Term			Prioritised list of residential areas requiring air quality monitoring. Air quality monitoring stations established in identified residential areas.
	5.3.2. Develop a domestic fuel burning strategy.	Amajuba DM	Medium Term			Report on Amajuba DM fuel burning strategy.
	5.3.3. Create awareness campaigns	Amajuba DM	Short Term			Public awareness campaign.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	around the negative health impacts of domestic fuel burning.					
	5.3.4. Encourage the distribution of alternative forms of domestic energy such as LPG, LSF, gas, methanol, etc.	Amajuba DM	Medium Term			Public awareness campaign.
	5.3.5. Implement electrification in rural areas	Amajuba DM	Medium to Long Term			Electrification schedule.
5.4. Manage emissions from biomass burning sources.	5.4.1. Plan and develop fire early warning systems.	Amajuba DM	Short Term			Early warning system for fires.
	5.4.2. Plan and provide for a buffer zone between residential and vegetation areas.	Amajuba DM	Short Term			Buffer zones planned for and instituted.
	5.4.3. Plan and provide fire breaks in high risk vegetation areas.	Amajuba DM	Ongoing			Fire breaks managed annually.
	5.4.4. Ensure compliance with fire regulations and by-laws.	Amajuba DM	Ongoing			Random inspections conducted.
	5.4.5. Highlight the role of fire services in assisting in air pollution control.	Amajuba DM	Short term			Awareness campaign on the role of fire services in air pollution control.
	5.4.6. Strengthen biomass burning advisory duties which will help people to burn	Amajuba DM	Medium Term			Number of training and awareness campaigns



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	firebreaks on days that are not hazardous to air quality and when weather conditions are not likely to cause runaway fires.					
	5.4.7. A complaints line should be set up for reports regarding negligent fire starters.	Amajuba DM	Short Term			Complaints line.
5.5. Manage emissions from agriculture.	5.5.1. Obtain information on the quantity of pesticides and fertilizers consumed in the Amajuba DM..	Amajuba DM	Ongoing			Up-to-date electronic database of the quantity of pesticides and fertilizers consumed in the Amajuba DM.
	5.5.2. Ensure farmers use best farming practices regarding fertilizer and pesticide use through information campaigns.	Amajuba DM	Ongoing			Information campaign on best farming practices regarding fertilizer and pesticide use.
	5.5.3. Adopt environmentally sound pest control techniques.	Amajuba DM	Ongoing			Information campaign on environmentally sound pest control techniques.
	5.5.4. Ensure that crop spraying takes place under favourable atmospheric conditions that reduce spray drift, i.e. when wind speeds	Amajuba DM	Ongoing			Crop spraying training sessions.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	and humidity levels are low.					
	5.5.5. Allow agricultural burning only under favourable dispersion conditions which occur in the middle of the day.	Amajuba DM	Ongoing			Agricultural burning training sessions.
5.6. Manage emissions from waste treatment and disposal.	5.6.1. Ensure all landfill sites, are issued with permits and are operating within their permit requirements	Amajuba DM	Ongoing			Up-to-date complete incinerator permitting system.
	5.6.2. Introduce awareness programmes and public education of waste minimization and recycling initiatives.	Amajuba DM	Medium term			Awareness programmes and public education of waste minimization and recycling initiatives
	5.6.3. Establish recycling bins at schools in the Municipality.	Amajuba DM	Medium term			Recycling bins installed at schools
	5.6.4. Reduce illegal dumping and the creation of informal landfills through efficient waste removal service delivery in residential areas.	Amajuba DM	Medium term			Efficient waste removal service delivery in residential areas.
	5.6.5. Undertake landfill gas monitoring and management schemes.	Amajuba DM	Ongoing			Established landfill gas monitoring and management schemes.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
	5.6.6. Initiate a waste-to-energy project to reduce waste at landfill sites and produce energy.	Amajuba DM	Long term			Waste-to-energy projects established at landfill sites.
	5.6.7. Initiate waste to energy mechanisms in WWTW.	Amajuba DM	Long term			Waste-to-energy projects established at WWTW.

Table 6: Goal 6 - Compliance monitoring and enforcement of air quality legislation, policies and regulations.

Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
6.1. Compliance monitoring of industrial sources.	6.1.1 Monitoring and random inspections should be conducted in order to evaluate industry and controlled emitter's compliance to the standards.	Amajuba DM	Ongoing			Random inspections conducted.
6.2. Complaints system.	6.2.1 A complete complaints system, should be established, based on the complaint type such as smoke, odours, dust etc. Records should be kept of responses, letters, notices and feedback to the complainant	Amajuba DM	Immediate			Up-to-date complaints and response record system.



Objective	Action	Parties Responsible	Priority	Start date	End date	Indicator / Output
6.3. Enforcement	6.3.1 An objective system of enforcement should be developed, based on the type and level of offence.	Amajuba DM	Short term to medium term			System of enforcement in place with, for example, verbal warnings generally issued and written notices served for more serious offences. Up-to-date offence and enforcement record system.



4. RECOMMENDATIONS AND CONCLUSION

This AQMP should be reviewed within 5 years and as such the implementation plan has included time lines for attainment of goals which can be measured through the indicators and reviewed in the next AQMP. Annual reporting of the AQMP will ensure that targets are reviewed and met on an interval basis.

4.1. Pollutants and sources

The main pollutants identified to be of concern in the Amajuba DM are PM and SO₂. The main sources influencing the air quality in the Amajuba DM have been identified to be:

- Industries – Industrial sources emit the majority of the SO₂ emissions in the District, as well as contributing the most towards PM_{2.5} concentrations.
- Domestic fuel burning – mainly coal, wood and paraffin burning in rural settlements.
- Agricultural activities – agricultural activities are considered to be a substantial source of ambient particulate concentrations with the second highest PM₁₀ contribution in the Amajuba DM.
- Biomass burning – data obtained for the burning of biomass in the Amajuba DM shows that that considerable emissions (CO, NO_x, PM_{2.5}) emanate from this source. The relevant interventions proposed in this report should therefore be considered and be implemented.
- Industrial emissions and biomass burning emissions are the main contributing sources of criteria pollutants in Amajuba DM.

4.2. Capacity Building

The current capacity for effective and co-ordinated air quality management in Amajuba DM is limited by the shortage of personnel, skills and tools.

4.2.1 Human Resources

It is recommended that the Amajuba DM increase the staff complement of the Environmental Management Directorate to include two (2) Air Quality Officers, for the dedicated functions of licensing and compliance monitoring. For the local municipalities, a dedicated Air Quality Officer can be appointed in each of the LMs. However, given the resources and finances required for these appointments, it is recommended that the current support provided to the Local Municipalities by the



Amajuba DM should be defined according to the specific air quality management needs and sufficient training of officers provided.

The DEA published a Business Case Report (e-tool) in 2015 (DEA, 2015) that provides an assessment of functions and workloads that Air Quality Units / Divisions are required to undertake. It was developed to assist authorities in understanding capacity requirements for implementing the requirements of the NEM:AQA. The Business Case Report and Tool could be used as a reference source to identify the quality and number of human resources, the infrastructure and the financial resources required to effectively manage air quality at both Local and District Municipality levels.

4.2.2. Air Quality Management Tools

Air quality management tools are required in the Amajuba DM to effectively fulfil their air quality management functions. Such tools include emissions inventory software (Microsoft Excel will be sufficient), dispersion modelling software and air quality monitoring hardware. The first step in compiling an emissions inventory for the Amajuba DM has been achieved as part of this AQMP. The Amajuba DM should complete and regularly update this emissions inventory. As and when dispersion modelling skills are available, a range of models are available either as freeware or for purchase.

4.2.3. Knowledge and Information Management

Actions that should be implemented by the Amajuba DM include;

- Develop and implement an Air Quality Management Plan (AQMP) and ensure that it is included in the IDP.
- Develop and implement an awareness strategy to improve the understanding of air quality and its impacts in the Amajuba DM. This includes providing input on the communication mechanism, the level of information required and the language of communication.
- Conducting training for air quality officers across the Amajuba DM and local municipalities.
- Continually update the emissions inventory.

This AQMP should be considered to be a living document that requires periodic evaluation and amendment as necessary.



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APPENDIX A – STATUS QUO REPORT

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APPENDIX B – GAP AND CAPACITY ANALYSIS REPORT

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