



**RICHARDS BAY CLEAN AIR
ASSOCIATION
DUST DEPOSITION MONITORING
JANUARY 2009**

**Sampling period: 15 December 2008 – 15 January 2009
Final Monthly Progress Report**

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1. METHODOLOGY

This project commenced operation in June 2006. Windblown settleable dust (fall-out) is monitored based on the American Society of Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739), with certain modifications. This method employs a simple device consisting of a cylindrical 5l container half-filled with de-ionised water exposed for one calendar month (30 ± 3 days). The water is treated with an inorganic biocide to prevent algal growth in the buckets. The most common reagent used for this is a 5% copper sulphate solution (approximately 1 ml per 3 litre of water bucket).

The bucket stand comprises a ring that is raised above the rim of the bucket to prevent contamination from perching birds (Fig 1). The bucket holder is connected to a 2.1 m galvanized steel pole, which is either directly attached to a fence post or can be attached to a galvanized steel base plate, which is buried to a depth of 500 mm. This allows for a variety of placement options for the fallout samplers. Exposed buckets, when returned to the AER laboratories, are rinsed with deionised water to remove residue from the sides of the bucket, and the bucket contents filtered through a coarse ($>1\text{mm}$) filter to remove insects and other coarse organic detritus. The sample is then filtered through a pre-weighed paper filter to remove the insoluble fraction, or dust fallout. This residue and filter are dried, and gravimetrically analysed to determine the insoluble fraction (dust fallout).

1.1 Operational Aspects

The sampling period was from 15 December 2008 to 15 January 2009 and samples were exposed for 31 days. The period complies with the standard exposure period of 30 ± 3 days. It was reported in the reporting month of April 2008 that there is fabrication, construction and general engineering closer to Site 3 (Alton South West) which is still going on. Also there is Construction still going on closer to Site 4 (Harbour West) and Site 5 (CBD (Municipal Offices)). There is grass cutting closer to Site 8 (Nseleni Municipal Offices). No other operational problems were encountered and a valid sample return of 100% was achieved.

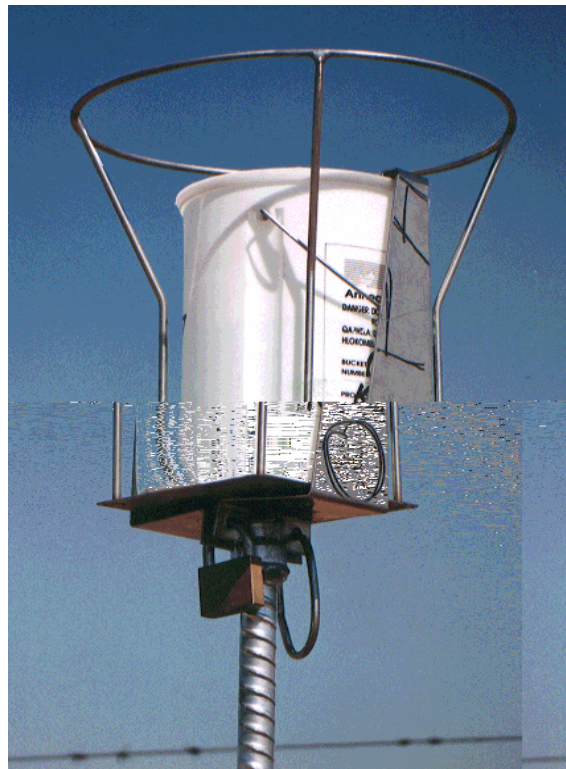


Figure 1: Single bucket monitoring unit, showing sampling bucket with bird ring and security clamp.

2. STANDARDS FOR DUST DEPOSITION

The Standards South Africa has published a new set of dustfall standards (SANS 1929:2005). These standards have been used to evaluate the level of dust deposition and are stated in Table 1 and Table 2 below.

2.1 Evaluation criteria for dust deposition

Dust deposition rates shall be expressed in units of $\text{mg}/\text{m}^2/\text{day}$ over a 30-day averaging period. Dust deposition is evaluated against a four band scale as presented in Table 1. The target, action and alert thresholds for ambient dust deposition are indicated in Table 2. Permissible margins of tolerance are outlined in 2.2, and exceptions noted in 2.3.

Table 1: Four-band scale evaluation criteria for dust deposition (SANS 1929:2005).

Band Number	Band Description Label	Dustfall rate (D) ($\text{mg}/\text{m}^2/\text{day}$, 30-day average)	Comment
1	Residential	$D < 600$	Permissible for residential and light commercial
2	Industrial	$600 < D < 1\ 200$	Permissible for heavy commercial and industrial
3	Action	$1\ 200 < D < 2\ 400$	Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year.
4	Alert	$2\ 400 < D$	Immediate action and remediation required following the first incidence of dustfall rate being exceeded. Incident report to be submitted to relevant authority.

Table 2. Dustfall standards, target, action and alert thresholds for dust deposition (SANS 1929:2005).

Level	Dustfall Rate ($\text{mg}/\text{m}^2/\text{day}$)	Permitted Frequency of Exceedances
Target	300	
Action residential	600	Three within any year, no two sequential months.
Action industrial	1 200	Three within any year not sequential months.
Alert threshold	2 400	None. First exceedance requires remediation and compulsory report to authorities.

2.2 Margin of tolerance

An enterprise may submit a request to the authorities to operate within band 3 (action band), as specified in Table 1, for a limited period, provided that this is essential in terms of the practical operation of the enterprise (for example the final removal of a tailings deposit) and provided that an appropriate control technology is applied for the duration. No margin of tolerance will be granted for operations that result in dustfall rates which fall within band 4 (alert band) as specified in Table 1.

2.3 Exceptions

Dustfalls that exceed the specified rates but that can be shown to be the result of some extreme weather or geological event shall be discounted for the purpose of enforcement and control. Such event might typically result in excessive dustfall rates across an entire metropolitan region, and not be localized to a particular operation. Natural seasonal variations, for example, the naturally windy months each year, will not be considered extreme events for this definition.

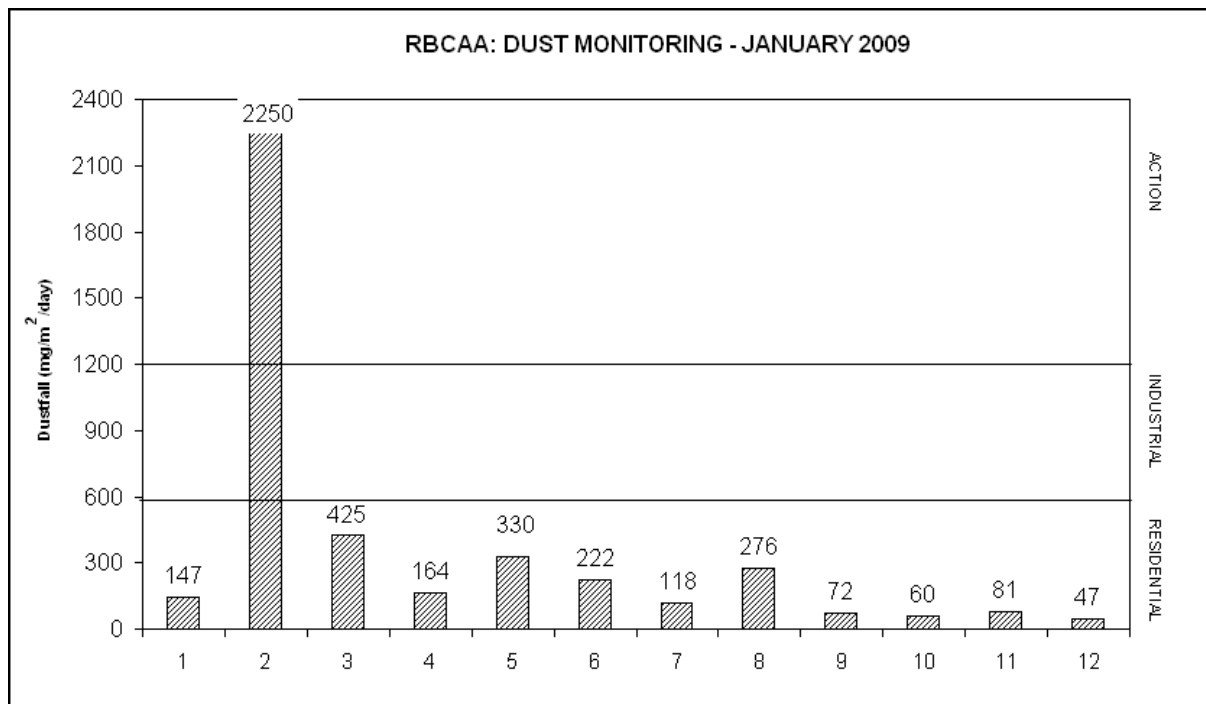
2.4 Application of standards

Dust deposition rates recorded at RBCAA are appraised according to the standards published by the Standards South Africa (SANS 1929:2005). Dustfall rates within the RESIDENTIAL and INDUSTRIAL ranges do not result in complaints from the public. ACTION and ALERT ranges, generally result in complaints from the public, and therefore considered to be action levels, at which sources of excessive dust must be investigated (if not known) and suitable mitigation measures instituted.

3. RESULTS

Site 2 (SAPS Garage) recorded ACTION dustfall rate with **2250** mg/m²/day. The remaining monitoring sites recorded dustfall rates within the RESIDENTIAL threshold. Trends of the dust fallout results per site are presented in Appendix A of this report.

4.

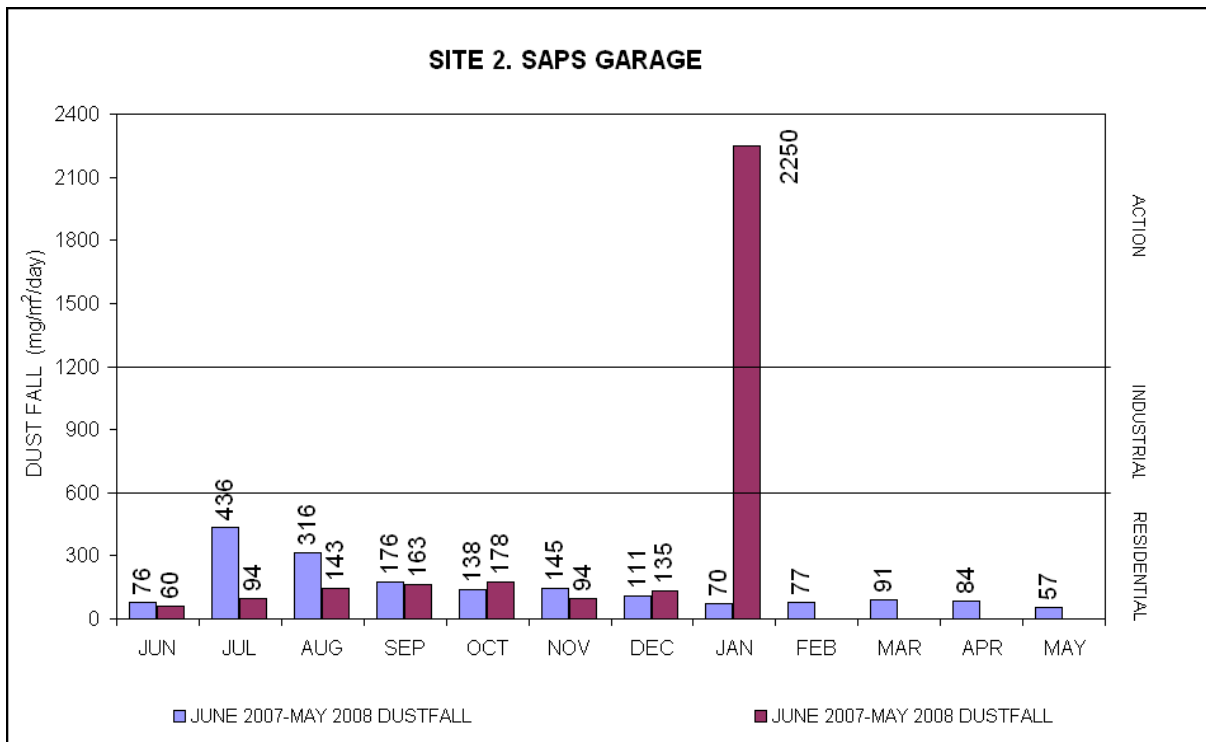
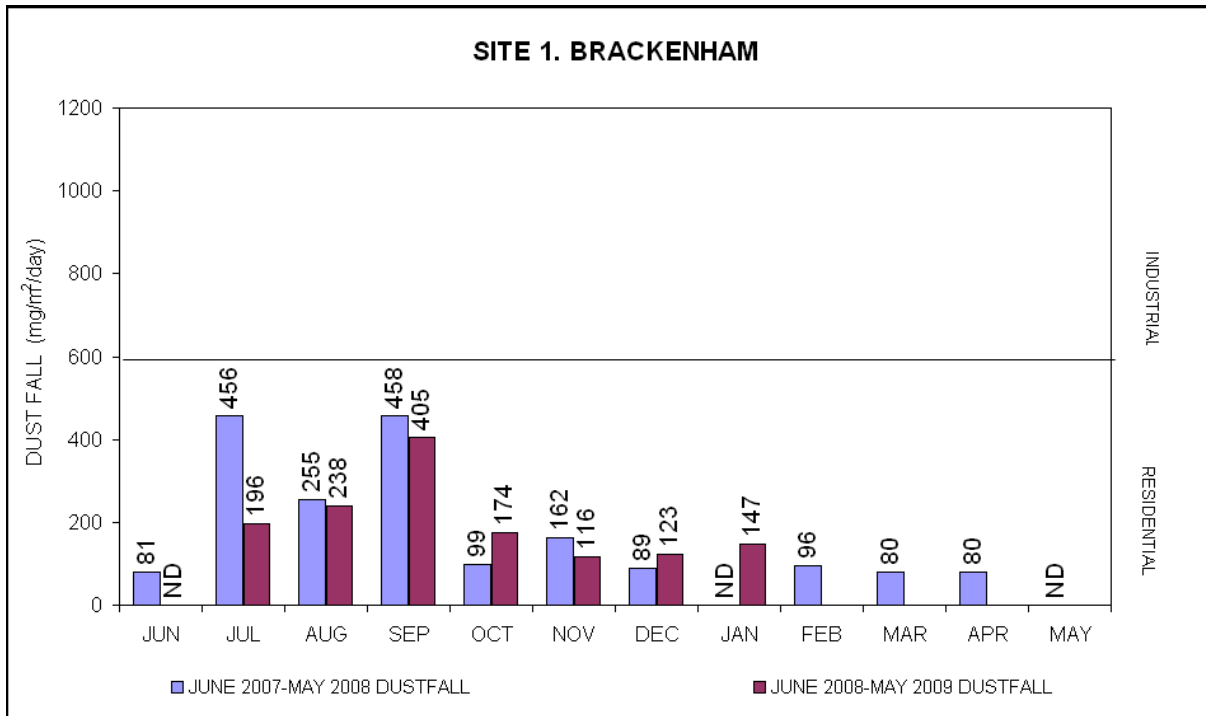
Figure 1: Graph showing results from all sites: January 2009

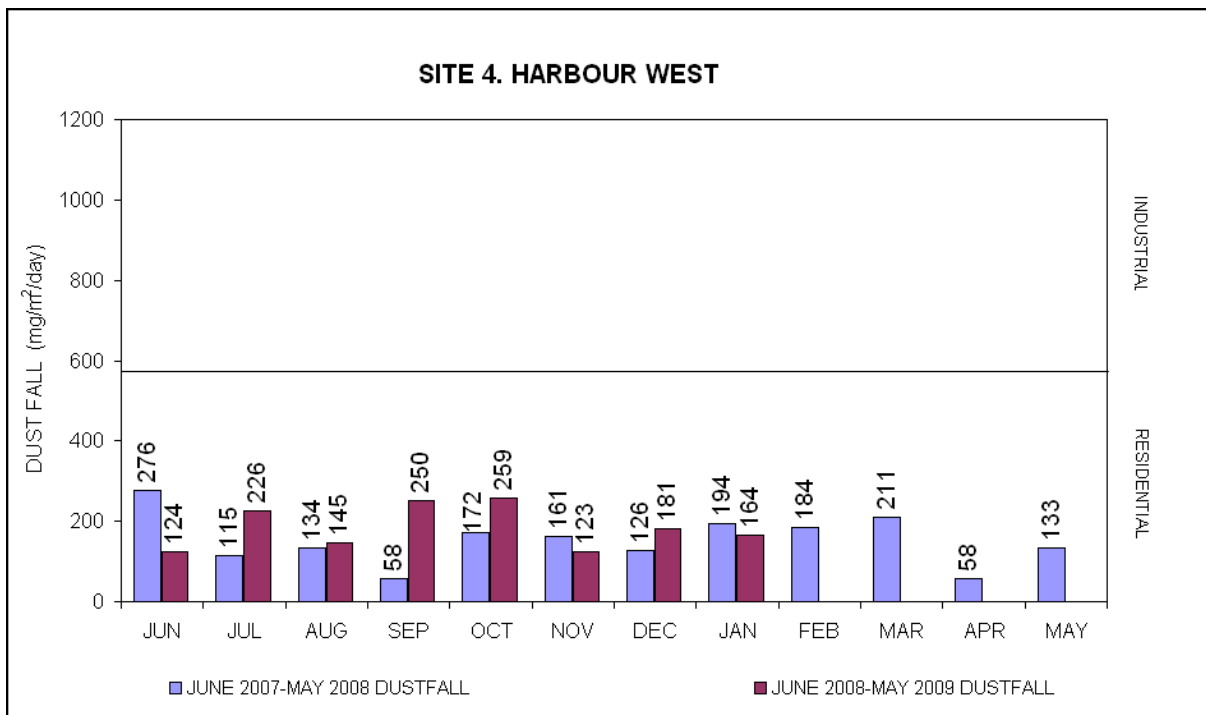
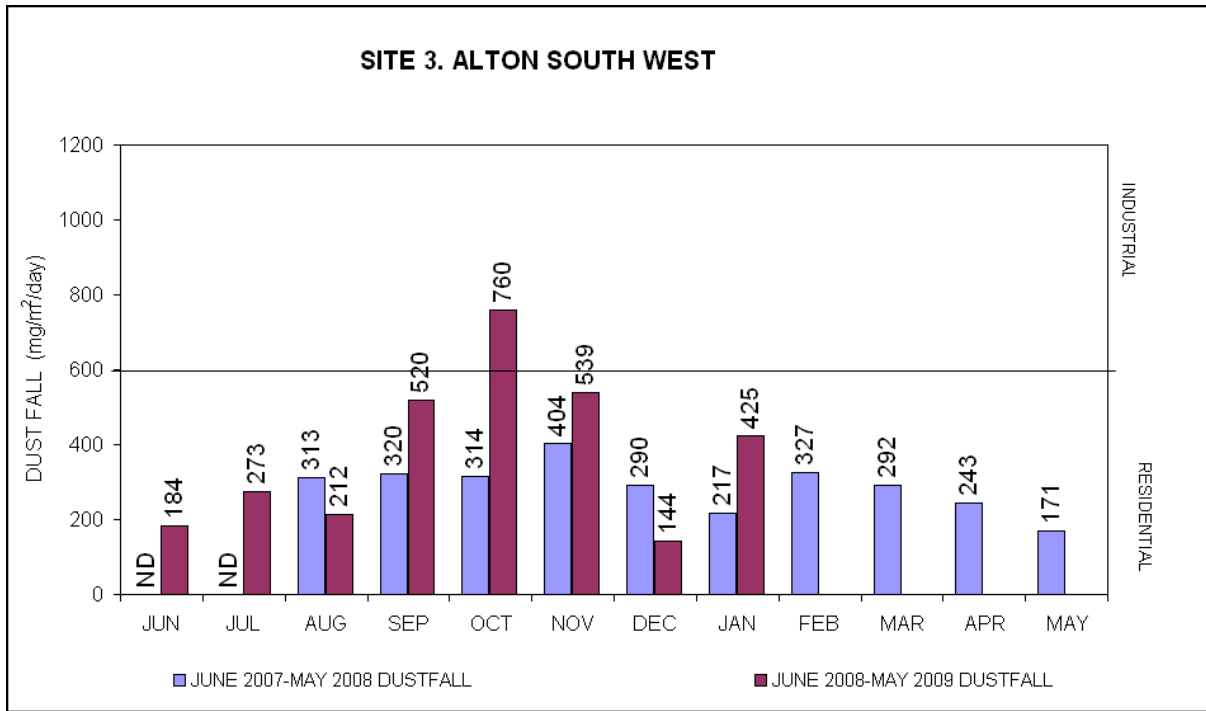
RBCAA DUSTFALL MONITORING			Month: JANUARY 2009 Sampling period: 15 December 2008 – 15 January 2009			
SITE DESCRIPTION	SITE CLASSIFICATION	SITE No.	FILTER CODE	NETT MASS (mg)	No. DAYS	DUST FALLOUT (mg/m ² /day)
Brackenham	RESIDENTIAL	1	RBCAA 09/217	104	31	147
SAPS Garage	RESIDENTIAL	2	RBCAA 09/218	1593	31	2250
Alton South West	INDUSTRIAL	3	RBCAA 09/219	301	31	425
Harbour West	INDUSTRIAL	4	RBCAA 09/220	117	31	164
CBD(Municipal office)	RESIDENTIAL	5	RBCAA 09/221	234	31	330
Scorpio	INDUSTRIAL	6	RBCAA 09/222	157	31	222
Alton fire station	RESIDENTIAL	7	RBCAA 09/223	83	31	118
Nseleni Municipal office	RESIDENTIAL	8	RBCAA 09/224	193	31	276
Empangeni police station	RESIDENTIAL	9	RBCAA 09/225	51	31	72
Felixton Village	RESIDENTIAL	10	RBCAA 09/226	42	31	60
Arboretum	INDUSTRIAL	11	RBCAA 09/227	57	31	81
Meerensee School	RESIDENTIAL	12	RBCAA 09/228	33	31	47

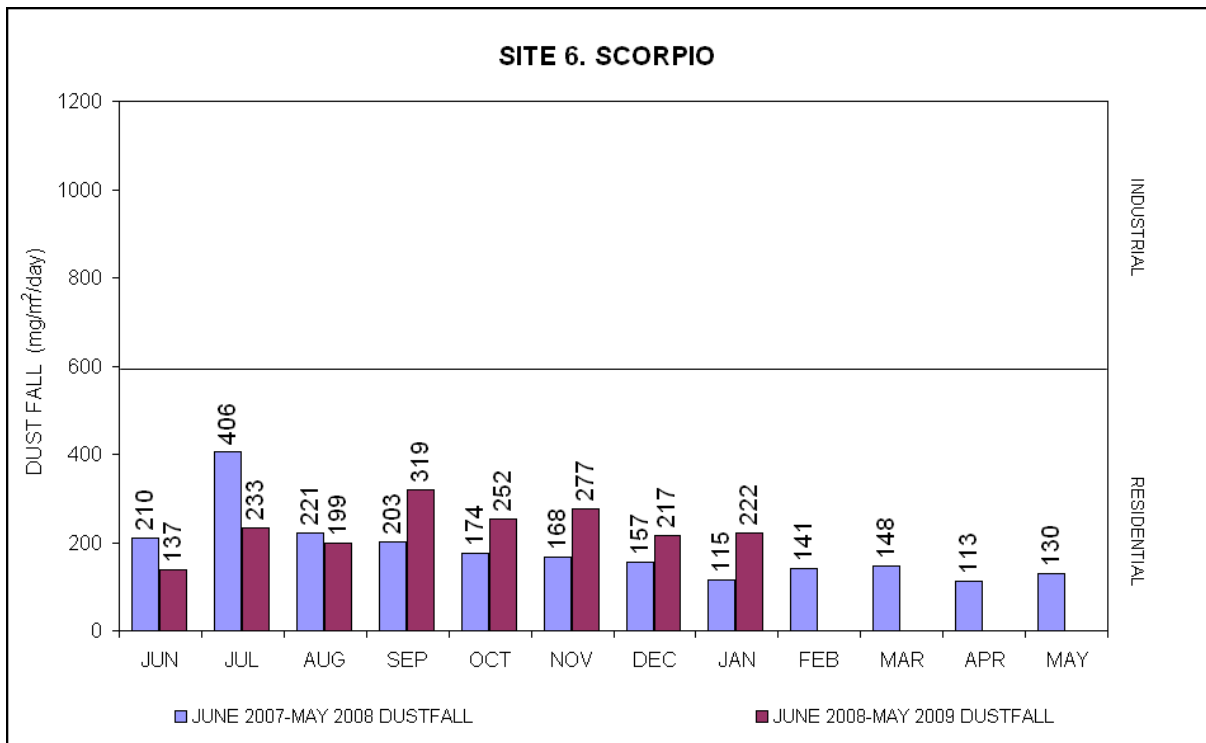
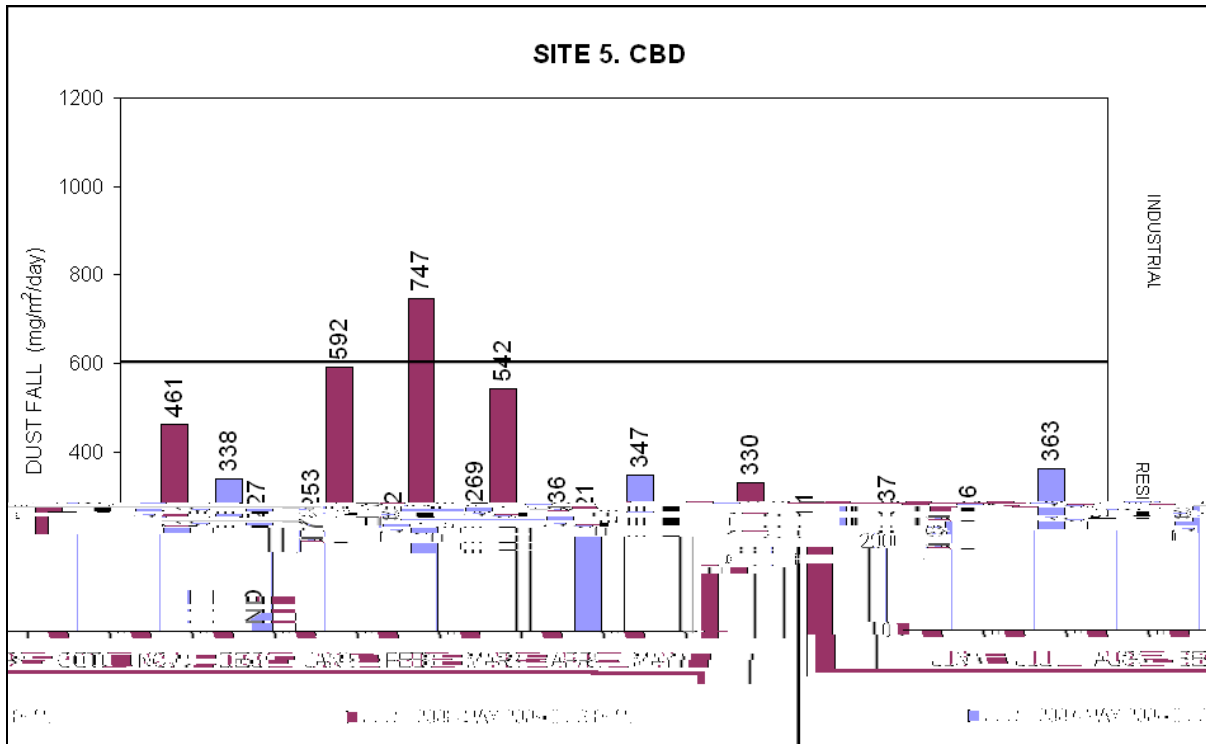
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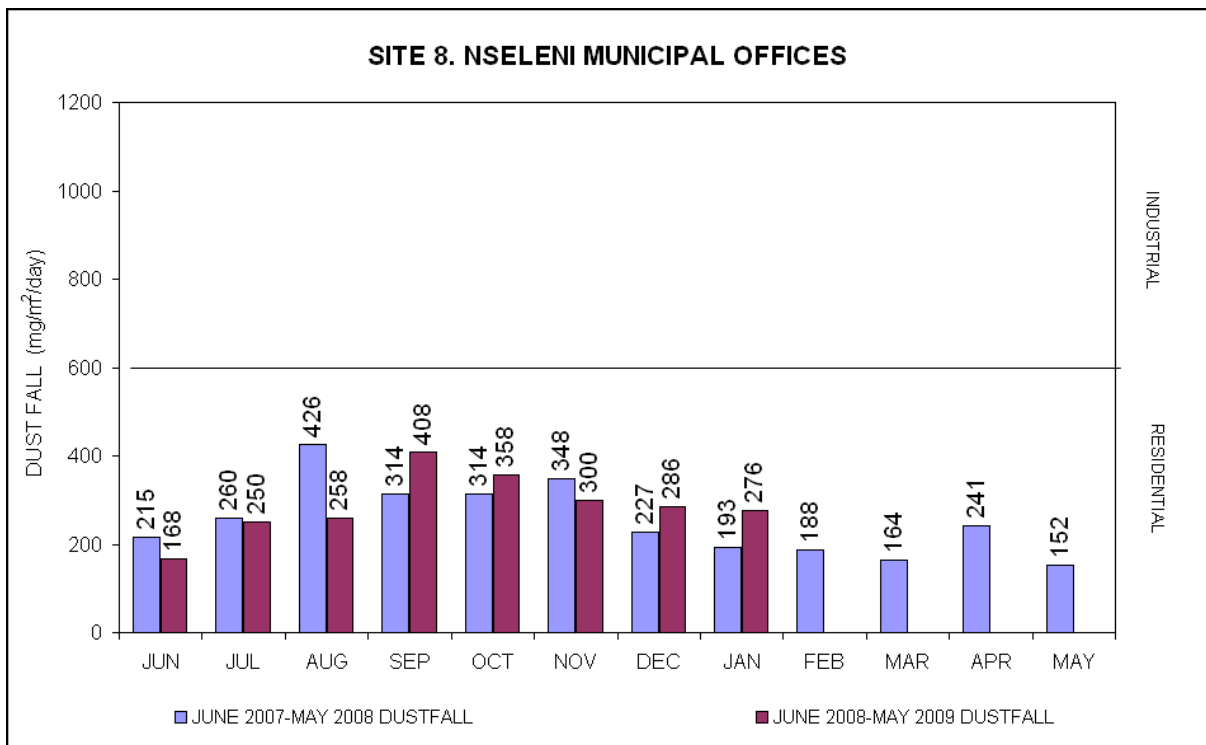
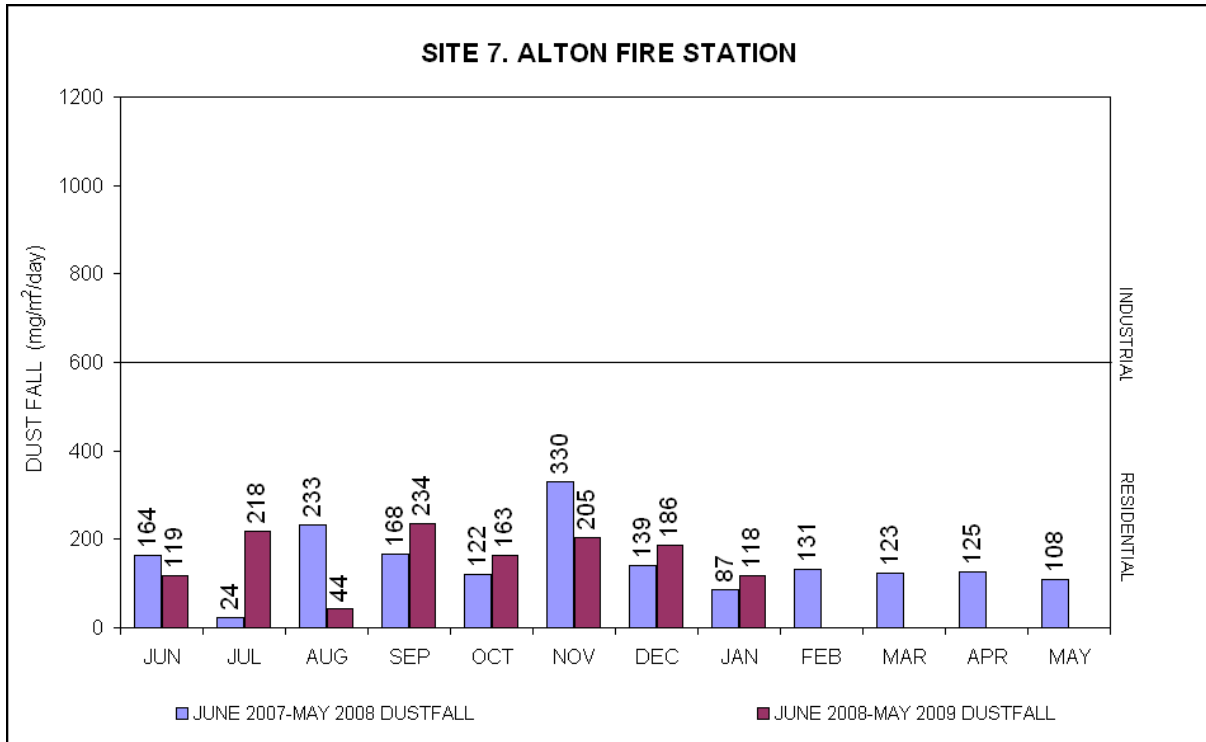
Specific Test Conditions	Samples stored at room temperature prior to analysis. Filters weighed at constant mass
Deviations From Method	None.
Measurement Uncertainty	± 5%

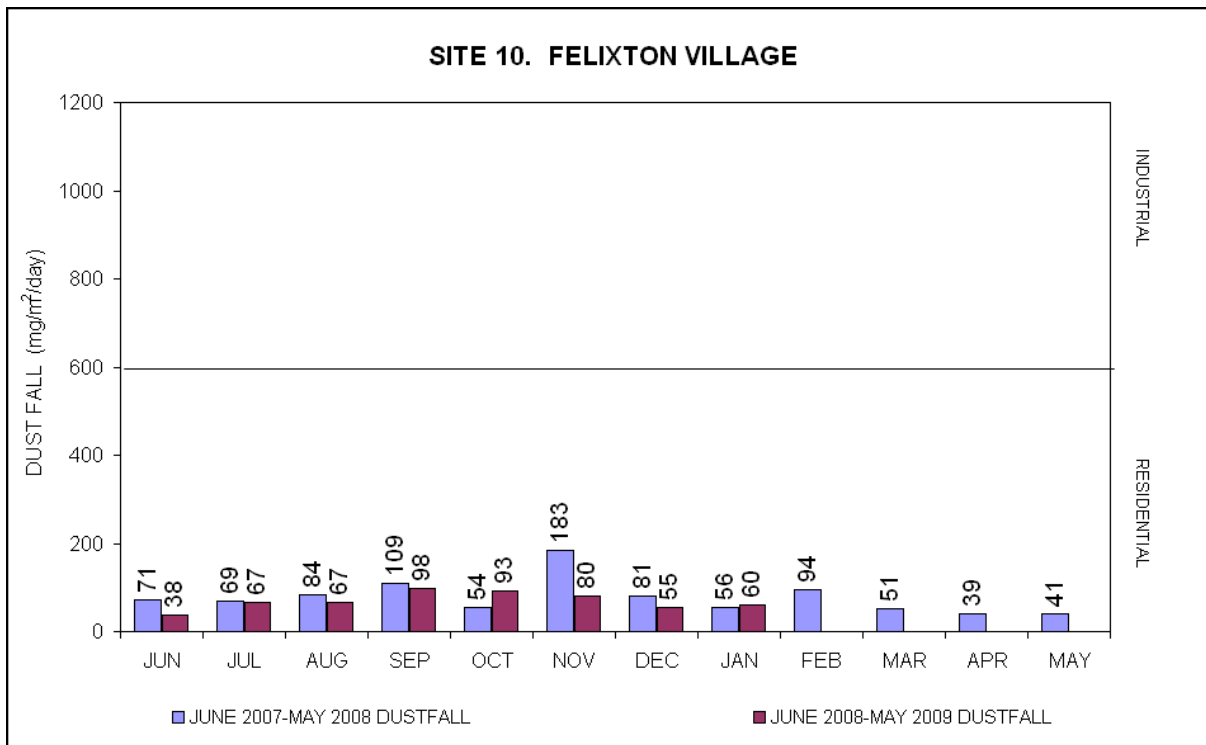
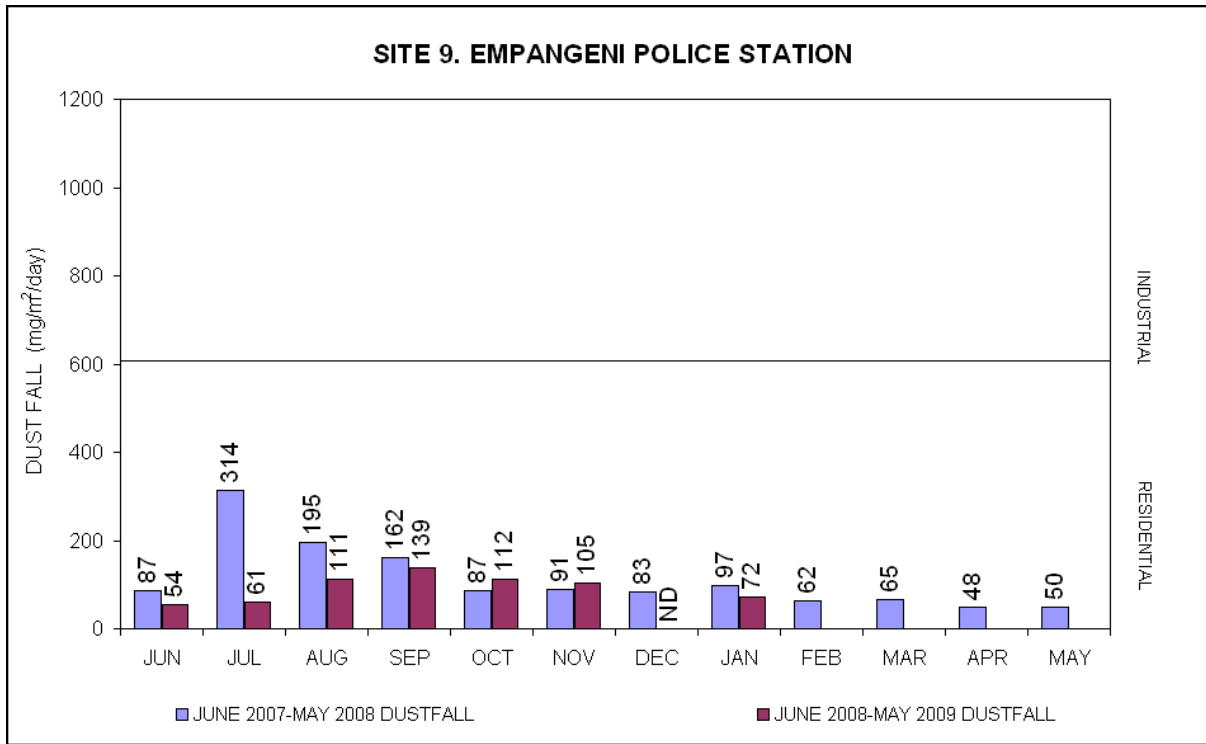
APPENDIX A RBCAA DUST FALLOUT MONTHLY TIMEPLOTS 2007 – 2009

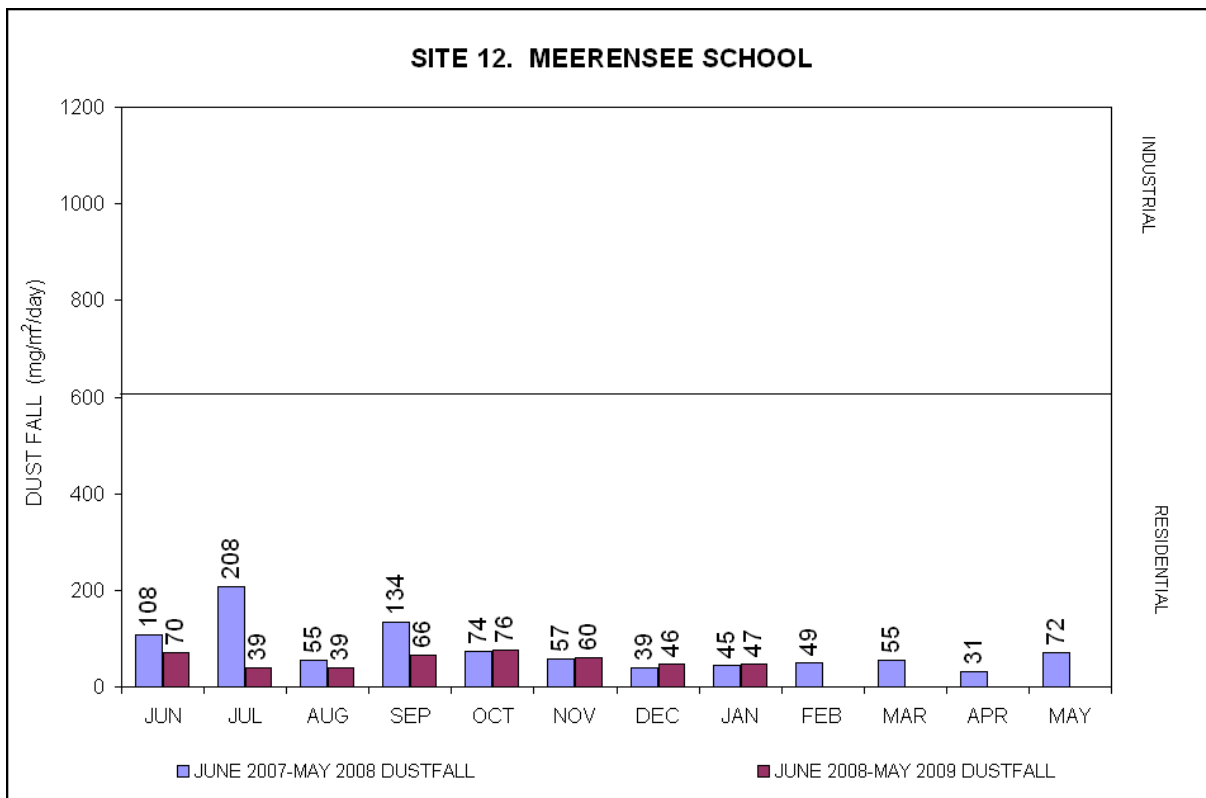
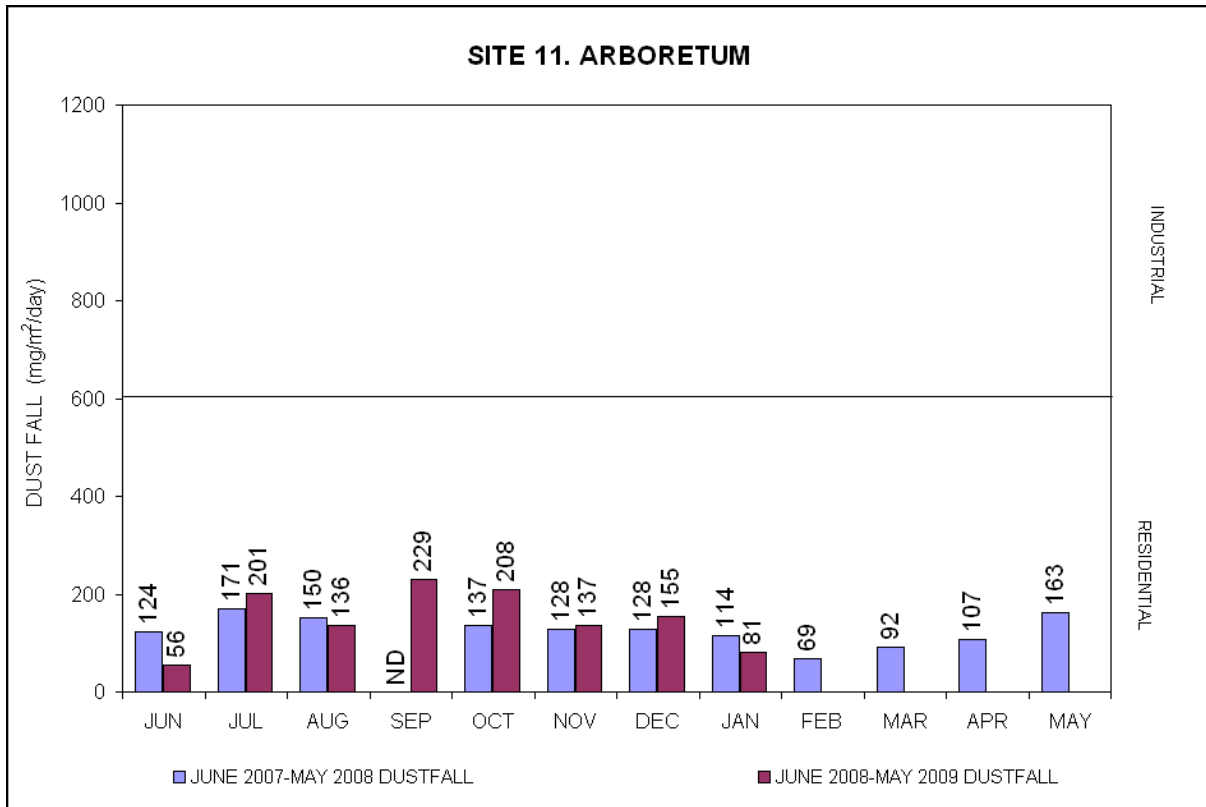












APPENDIX B: Sample Locations of all sites

