



**RICHARDS BAY CLEAN AIR
ASSOCIATION
DUST DEPOSITION MONITORING
APRIL 2009
Sampling period: 16 March - 17 April 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 16 March – 17 April 2009 and samples were exposed for 32 days. The period complies with the standard exposure period of 30 ± 3 days. There is construction and general engineering closer to Site 3 (Alton South West) and Site 4 (Harbour West). Site 5 (CBD), Site 6 (Scorpio) and Site 9 (Empangeni Police Station) recorded that grass cutting was done close to the monitoring sites.. No other operational problems were encountered and a valid sample return of 100% was achieved.

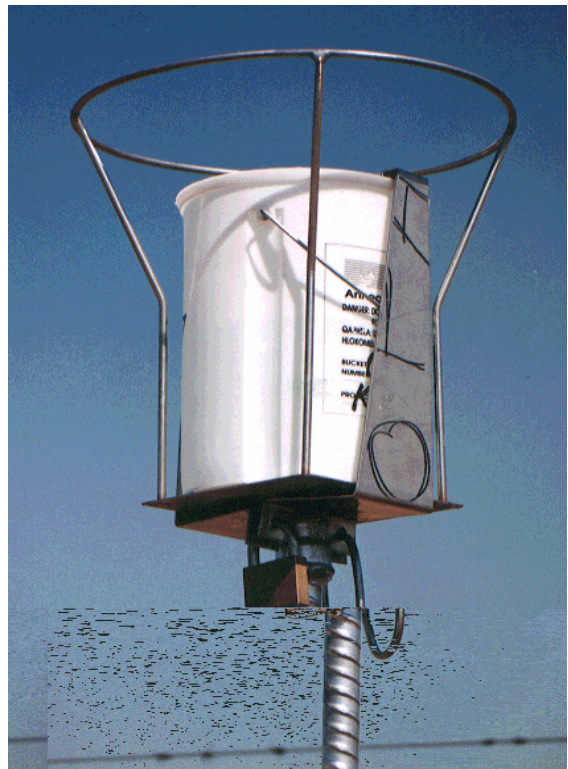


Figure 1: Single bucket monitoring unit, showing sampling bucket with bird ring and security clamp.

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

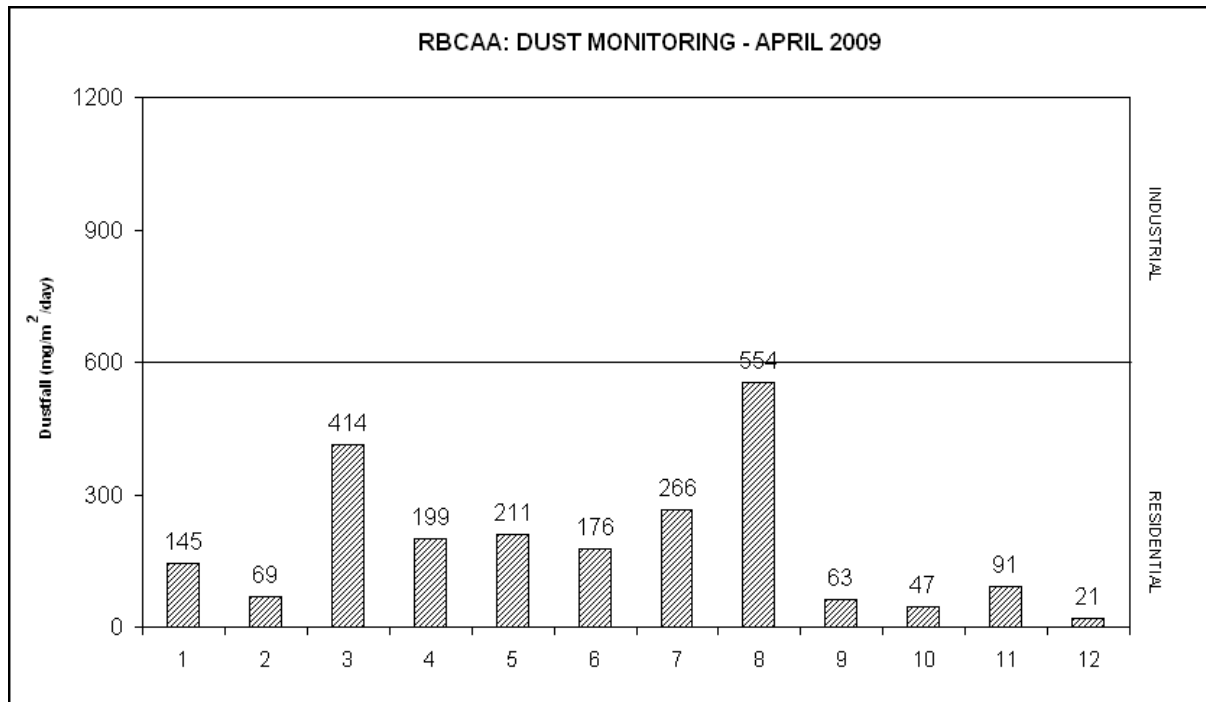
Dustfalls that exceed the specified rates but that can be shown to be the result of some extreme weather or geological event shall be discounted for the purpose of enforcement and control. Such event might typically result in excessive dustfall rates across an entire metropolitan region, and not be localized 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

All the 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.

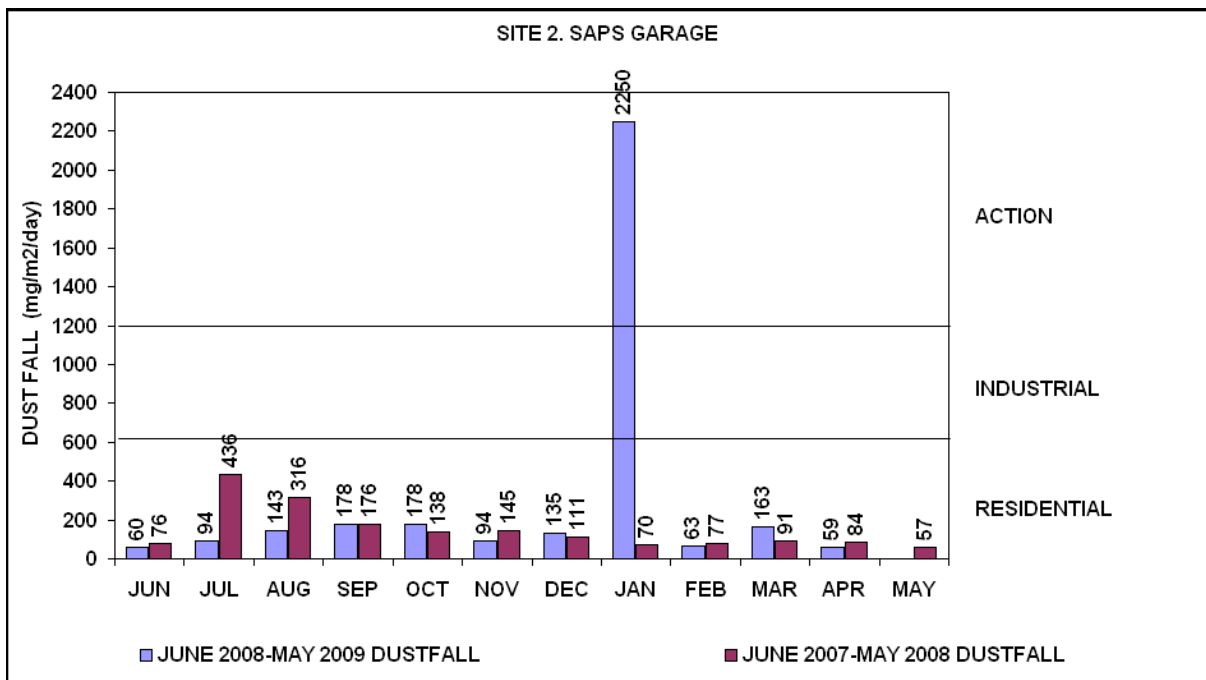
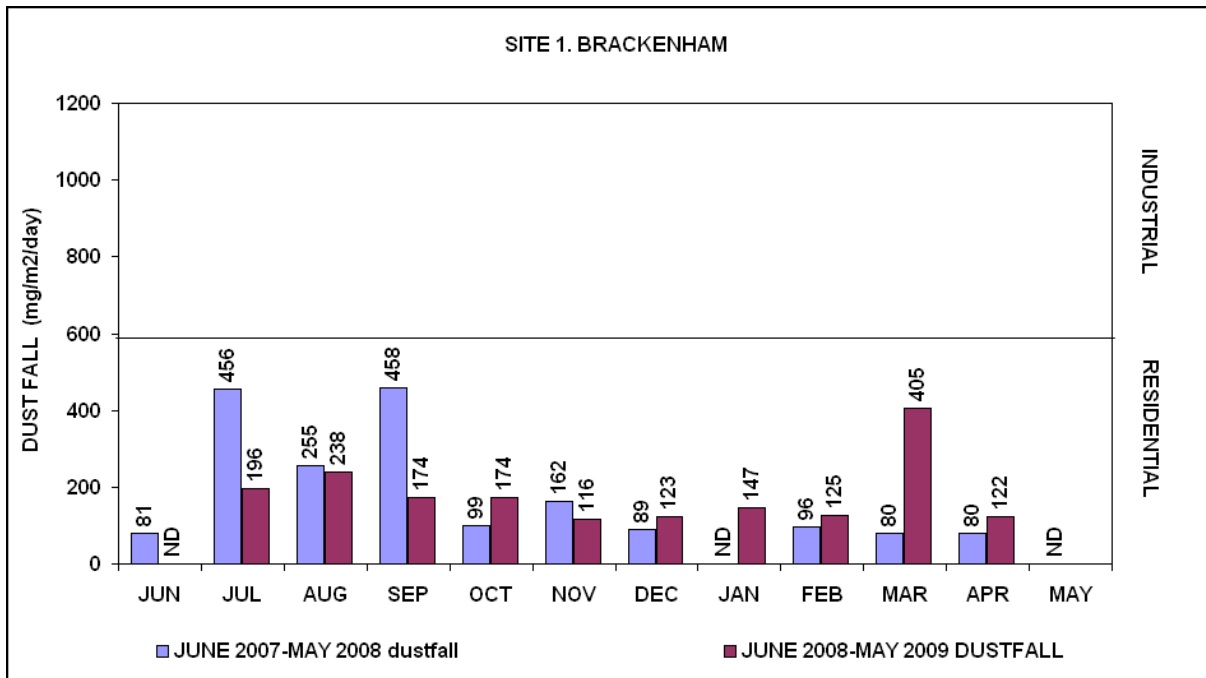
Figure 1: Graph showing results from all sites: April 2009

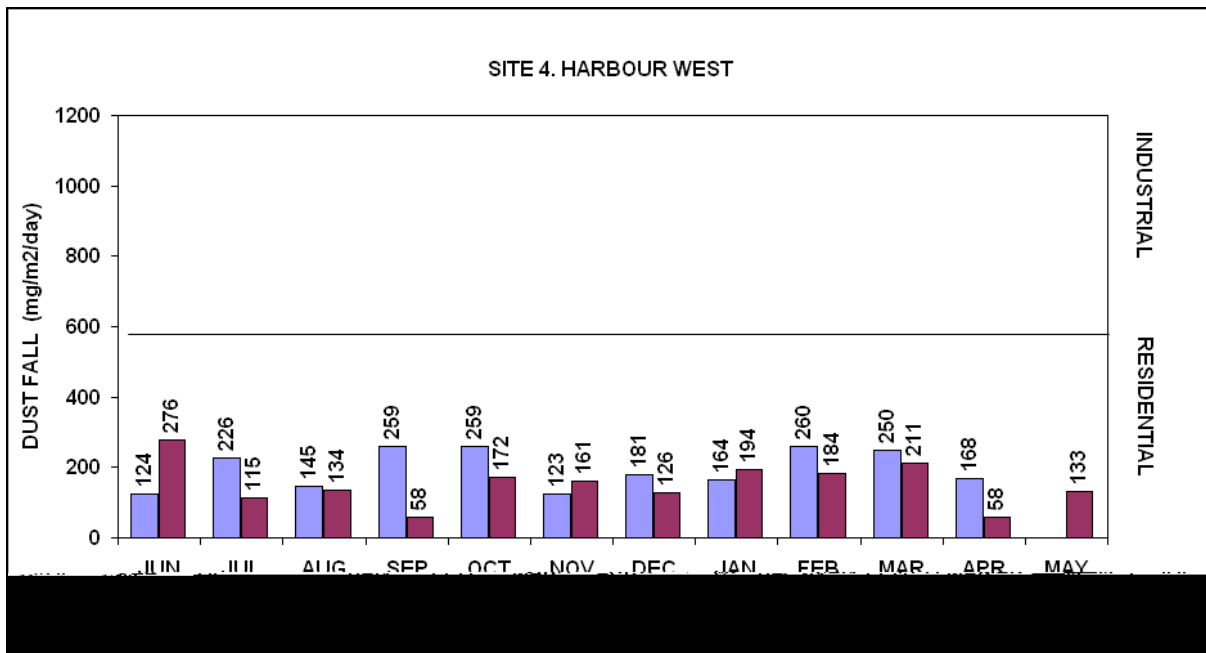
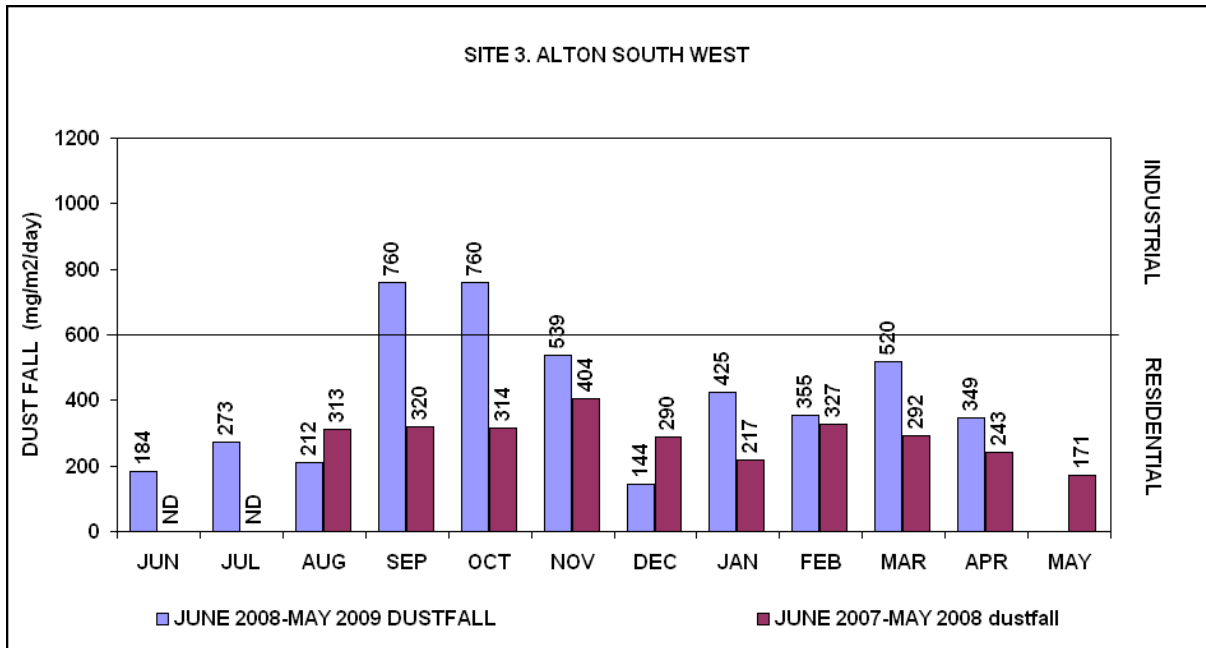
RBCAA DUSTFALL MONITORING			Month: APRIL 2009 Sampling period: 16 March – 17 April 2009			
SITE DESCRIPTION	SITE CLASSIFICATION	SITE No.	FILTER CODE	NETT MASS (mg)	No. DAYS	DUST FALLOUT (mg/m ² /day)
Brackenham	RESIDENTIAL	1	RBCAA 09/253	89	32	122
SAPS Garage	RESIDENTIAL	2	RBCAA 09/254	43	32	59
Alton South West	INDUSTRIAL	3	RBCAA 09/255	252	32	349
Harbour West	INDUSTRIAL	4	RBCAA 09/256	121	32	168
CBD(Municipal office)	RESIDENTIAL	5	RBCAA 09/257	130	32	178
Scorpio	INDUSTRIAL	6	RBCAA 09/258	107	32	148
Alton fire station	RESIDENTIAL	7	RBCAA 09/259	162	32	224
Nseleni Municipal office	RESIDENTIAL	8	RBCAA 09/260	338	32	467
Empangeni police station	RESIDENTIAL	9	RBCAA 09/261	39	32	53
Felixton Village	RESIDENTIAL	10	RBCAA 09/262	29	32	40
Arboretum	INDUSTRIAL	11	RBCAA 09/263	56	32	76
Meerensee School	RESIDENTIAL	12	RBCAA 09/264	12	32	17

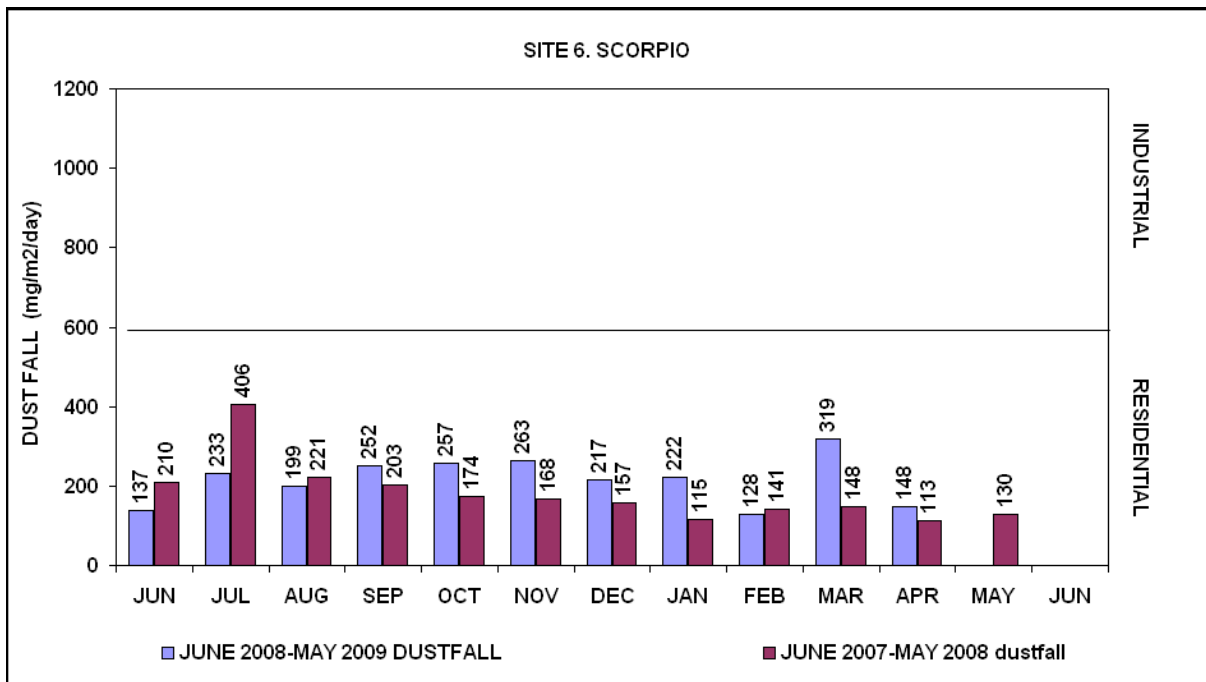
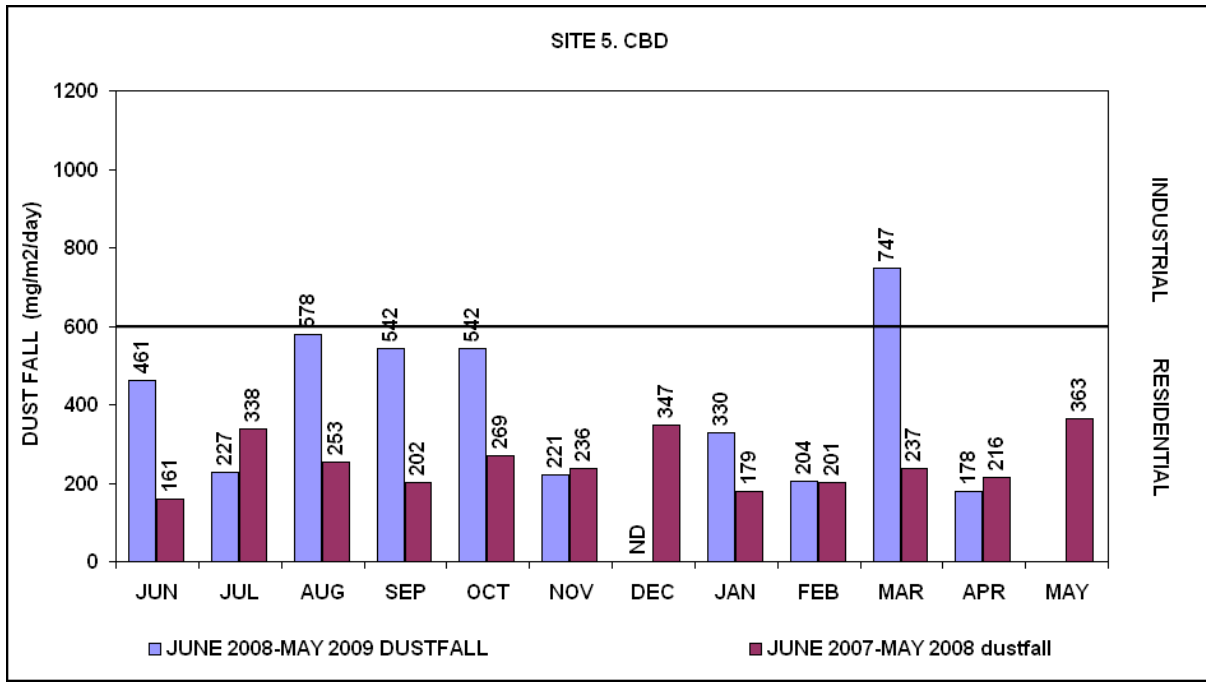
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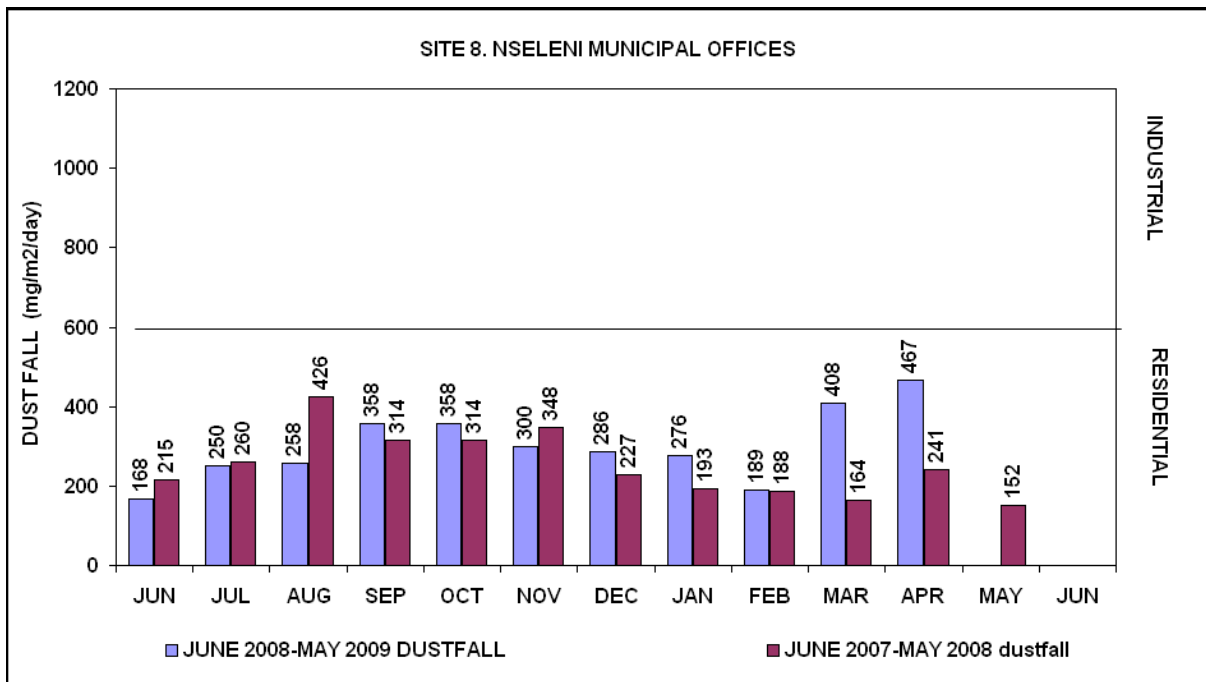
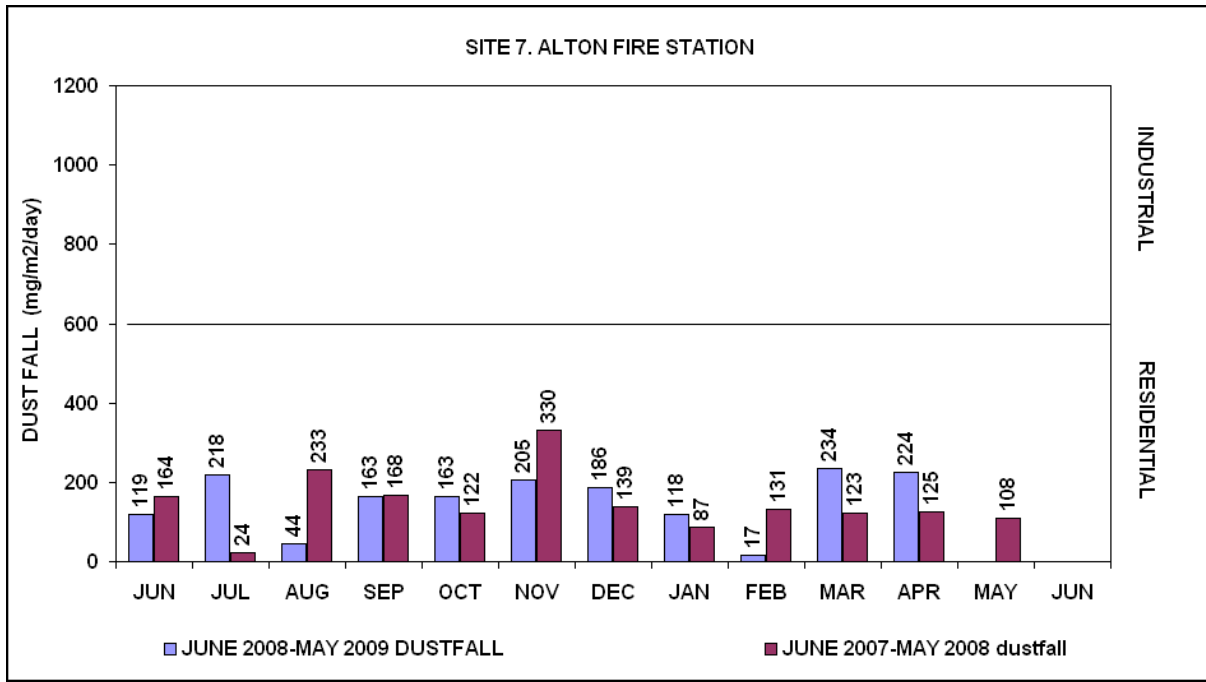
Specific Test Conditions	Samples stored at room temperature prior to analysis. Filters weighed at constant mass
Deviations From Method	None.
Measurement Uncertainty	± 5%

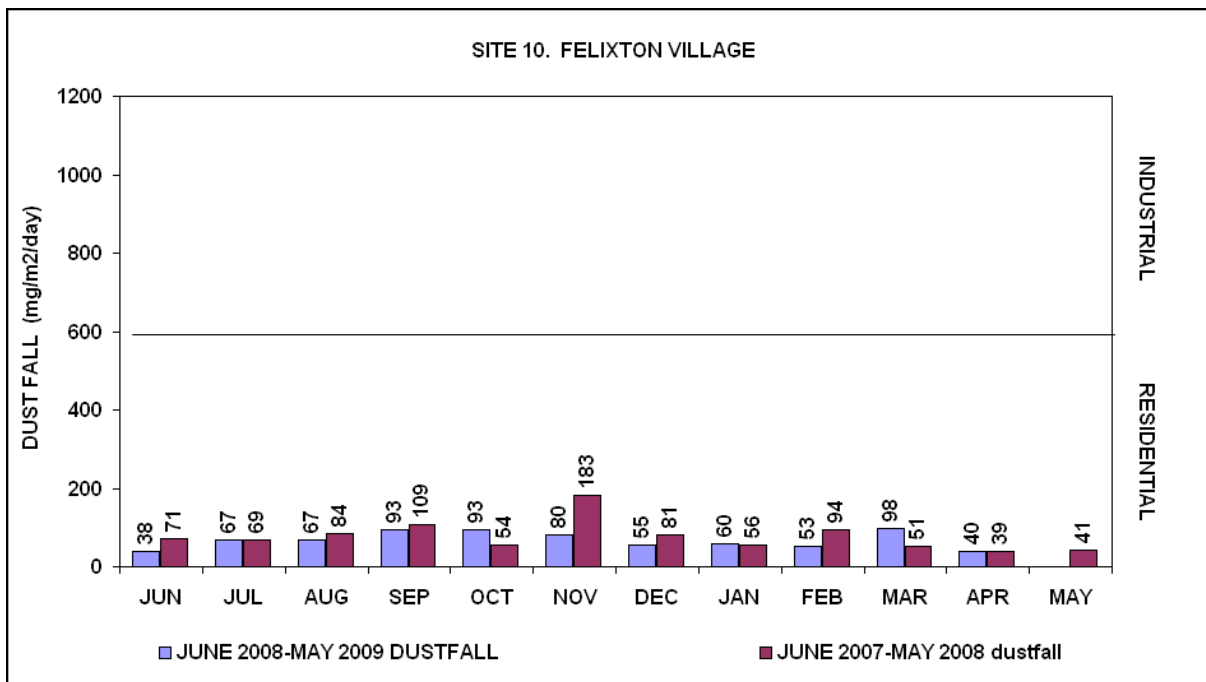
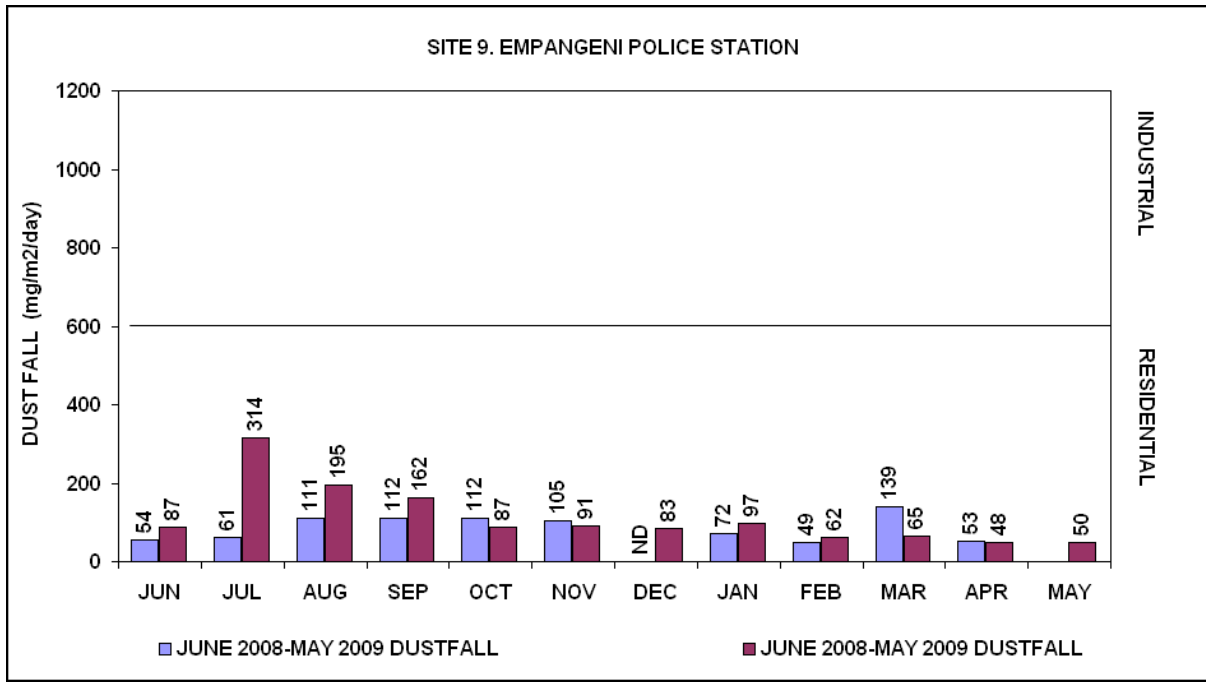
APPENDIX A RBCAA DUST FALLOUT MONTHLY TIMEPLOTS 2007 – 2009

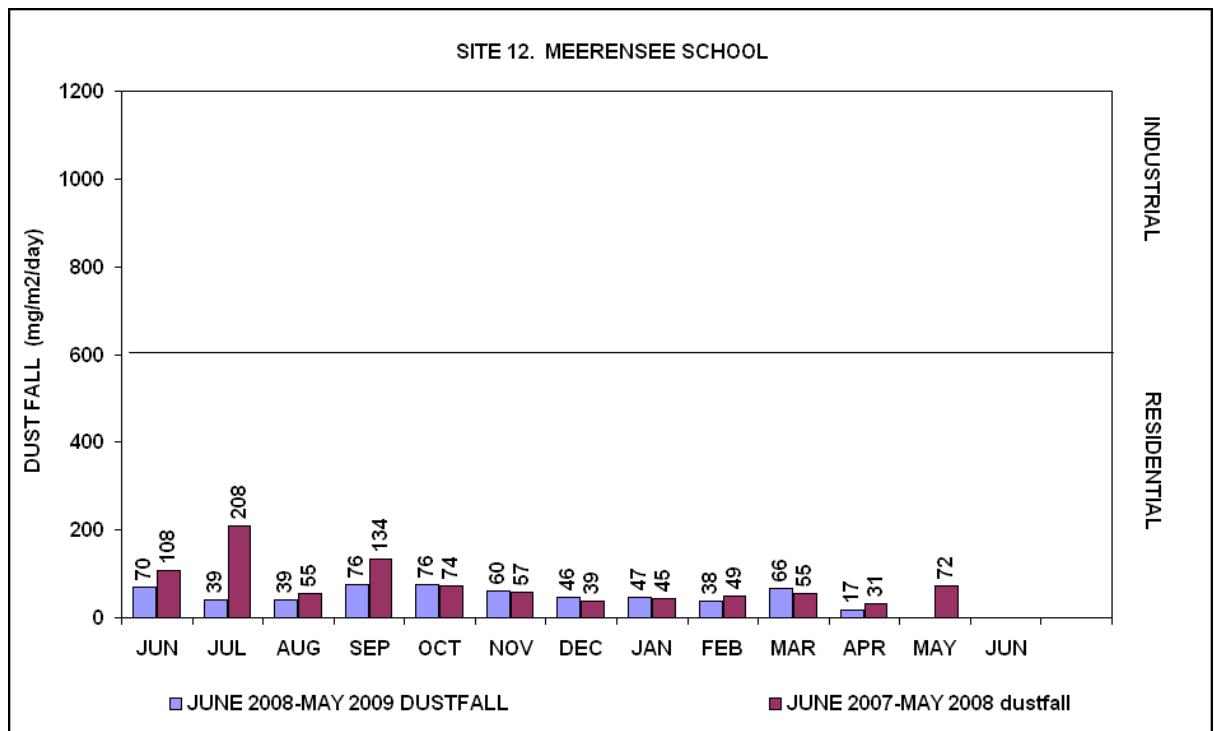
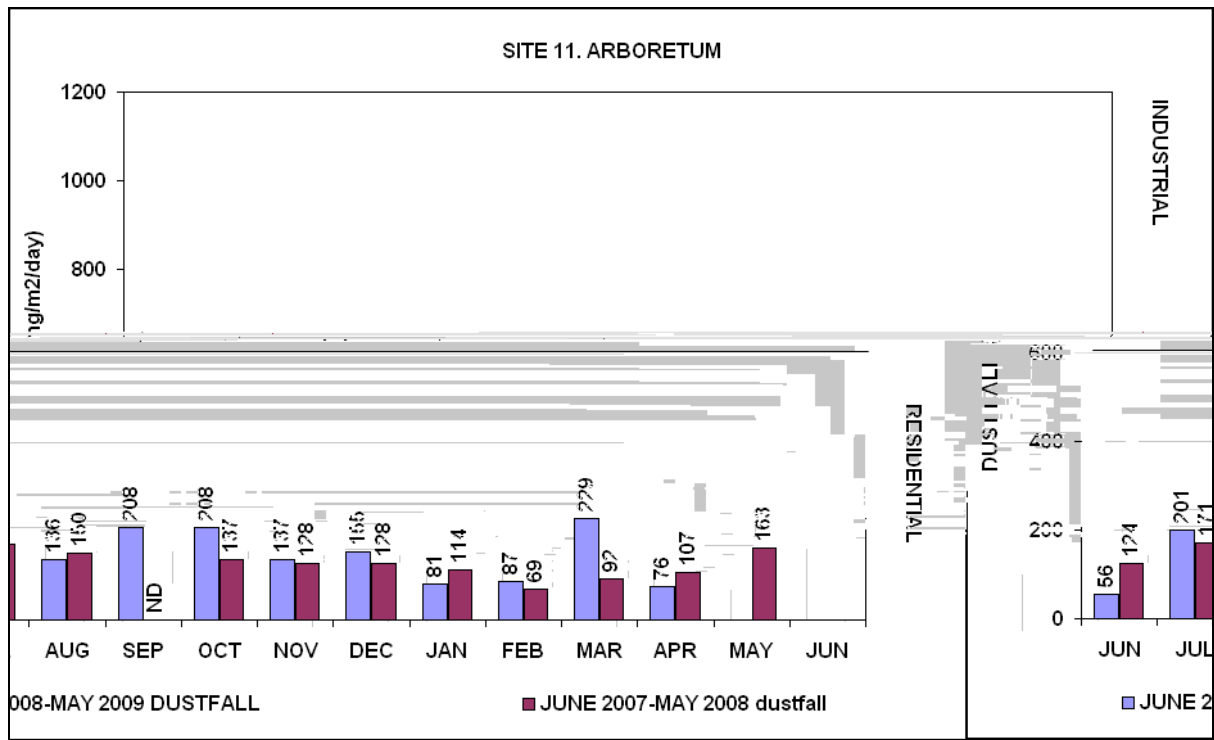












APPENDIX B: Sample Locations of all sites

