



**RICHARDS BAY CLEAN AIR
ASSOCIATION
DUST DEPOSITION MONITORING
DECEMBER 2008**

**Sampling period: 14 November – 15 December 2008
Final Monthly Progress Report**

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Date of Report: 21 January 2008
Report Number: AER 28.752 M_RBCAA

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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 14 November to 15 December 2008 and samples were exposed for 31 days. The period complies with the standard exposure period of 30 ± 3 days. Site 5 (CDB Municipal Offices) recorded no data as the site was relocated to a new sampling point, while Site 9 (Empangeni Police Station) recorded no data as the sample was contaminated. No other operational problems were encountered during the December monitoring month and a valid sample return of 92% was achieved. 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)

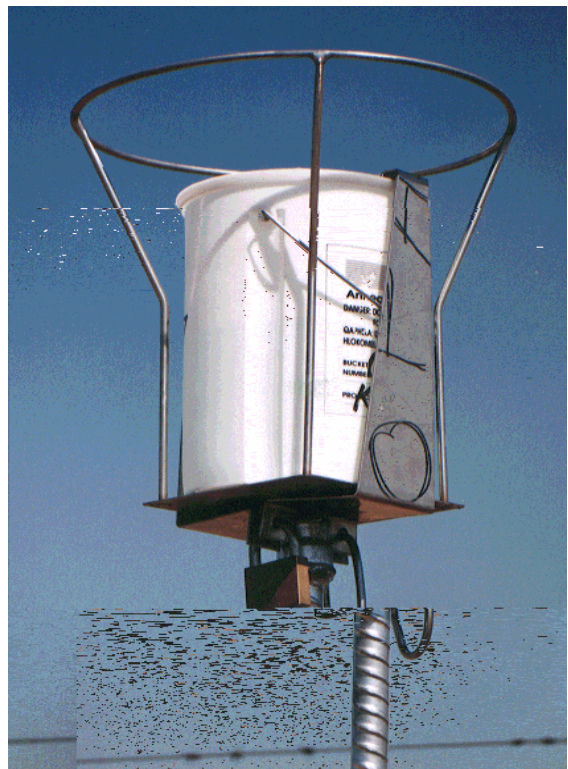


Figure 1: Single bucket monitoring unit, showing sampling bucket with bird ring and security clamp.

which is still going on. Also there is Construction still going on closer to Site 4 (Harbour West) and Site 5 (CBD (Municipal Offices)).

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

Ten monitoring sites recorded dustfall rates within the RESIDENTIAL threshold. Two sites recorded no data due to site relocation and sample contamination respectively. Trends of the dust fallout results per site are presented in Appendix A of this report.

4. Recommendations and Actions

- Ten out of twelve monitoring sites recorded RESIDENTIAL threshold levels during the reporting month in review.
- The results are considered satisfactory as they will not result in community complaints or nuisance.
- Ten sites complied with the SANS targets as laid out in section 2.

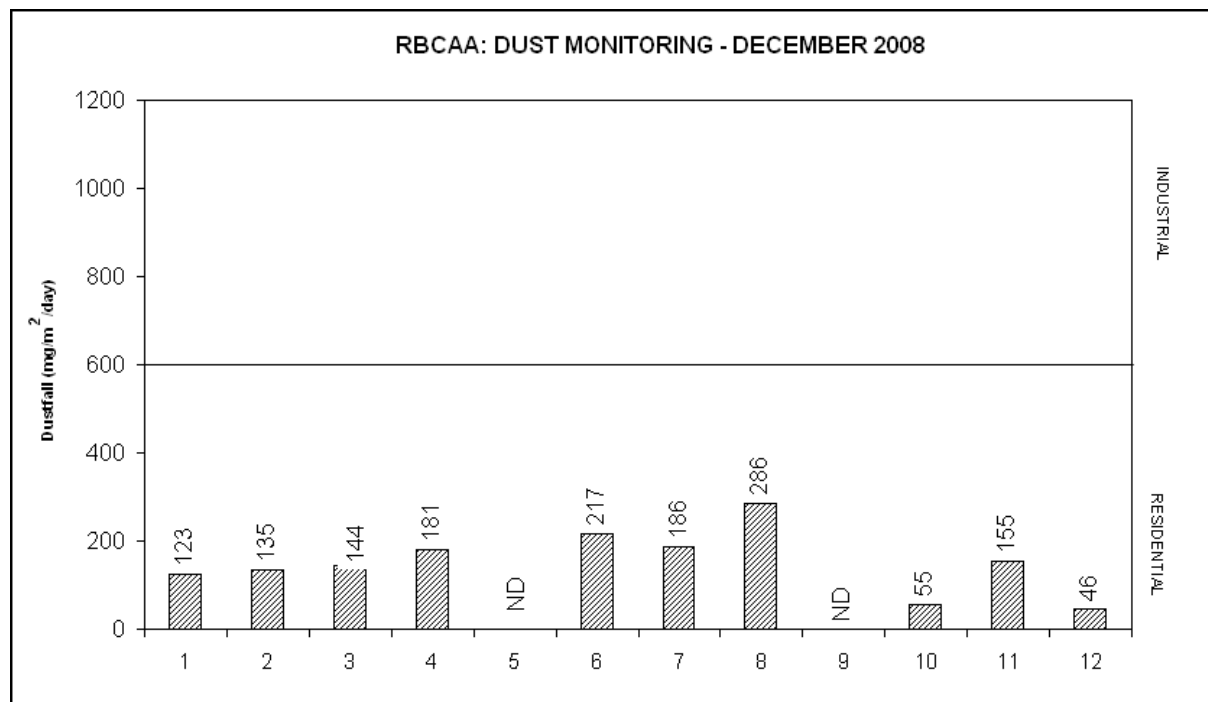
Regards

J Smith

AER Team leader and Quality Manager

For AER (Pty) Ltd

Report compiled by H.Nuwarinda

Figure 1: Graph showing results from all sites: December 2008

RBCAA DUSTFALL MONITORING			Month: December 2008 Sampling period: 14 November - 15 December 2008			
SITE DESCRIPTION	SITE CLASSIFICATION	SITE No.	FILTER CODE	NETT MASS (mg)	No. DAYS	DUST FALLOUT (mg/m ² /day)
Brackenham	RESIDENTIAL	1	RBCAA 08/205	86	31	123
SAPS Garage	RESIDENTIAL	2	RBCAA 08/206	94	31	135
Alton South West	INDUSTRIAL	3	RBCAA 08/207	101	31	144
Harbour West	INDUSTRIAL	4	RBCAA 08/208	126	31	181
CBD(Municipal office)	RESIDENTIAL	5	RBCAA 08/209	ND	ND	ND
Scorpio	INDUSTRIAL	6	RBCAA 08/210	152	31	217
Alton fire station	RESIDENTIAL	7	RBCAA 08/211	130	31	186
Nseleni Municipal office	RESIDENTIAL	8	RBCAA 08/212	203	31	286
Empangeni police station	RESIDENTIAL	9	RBCAA 08/213	ND	ND	ND
Felixton Village	RESIDENTIAL	10	RBCAA 08/214	38	31	55
Arboretum	INDUSTRIAL	11	RBCAA 08/215	108	31	155
Meerensee School	RESIDENTIAL	12	RBCAA 08/216	32	31	46

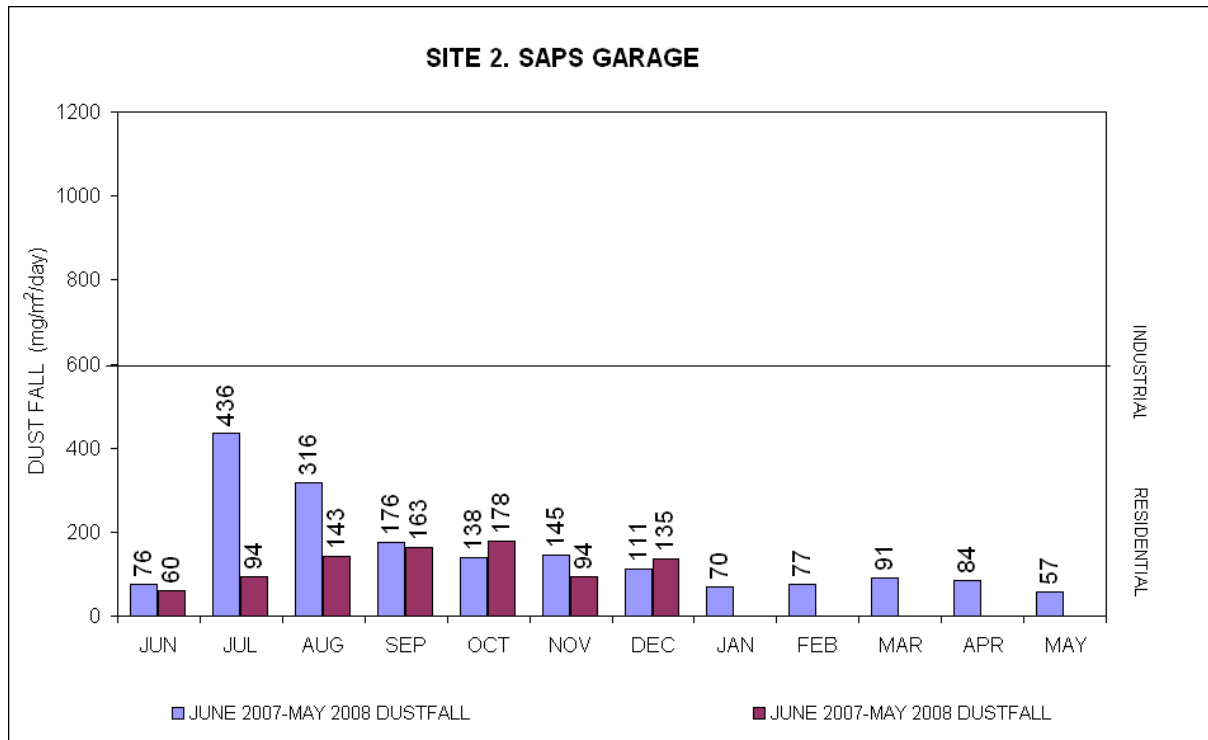
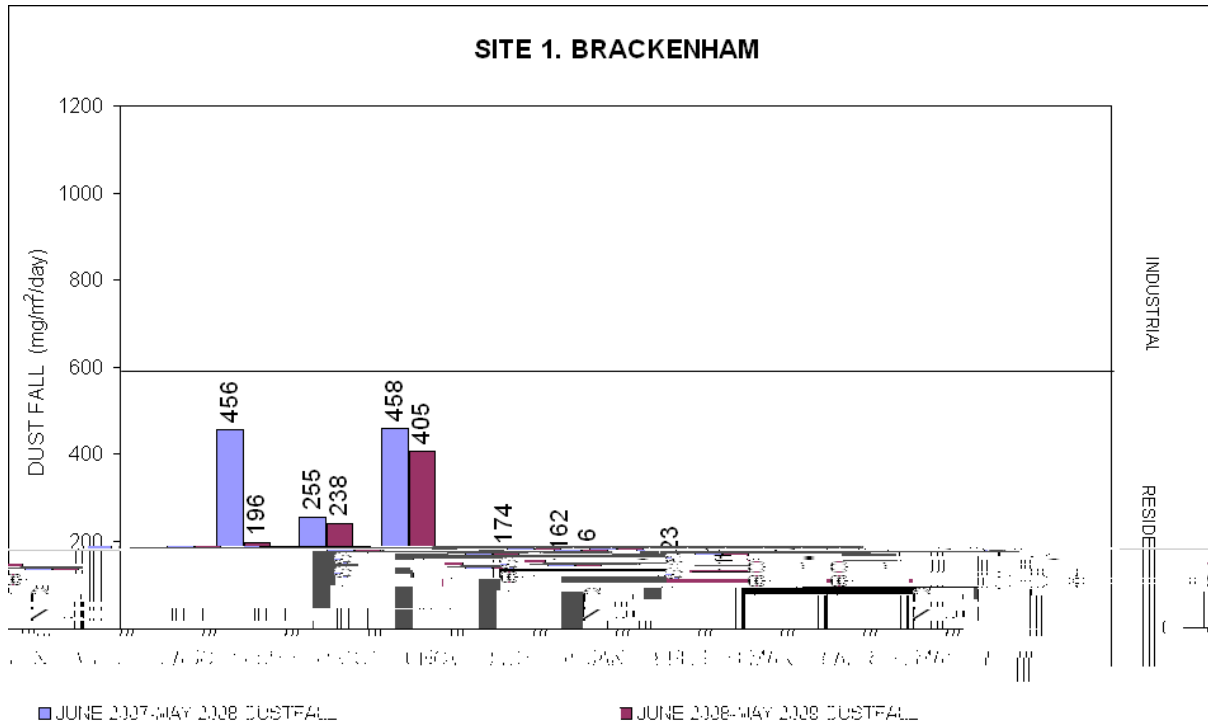
Comment: ND: No data site was relocated to a new site

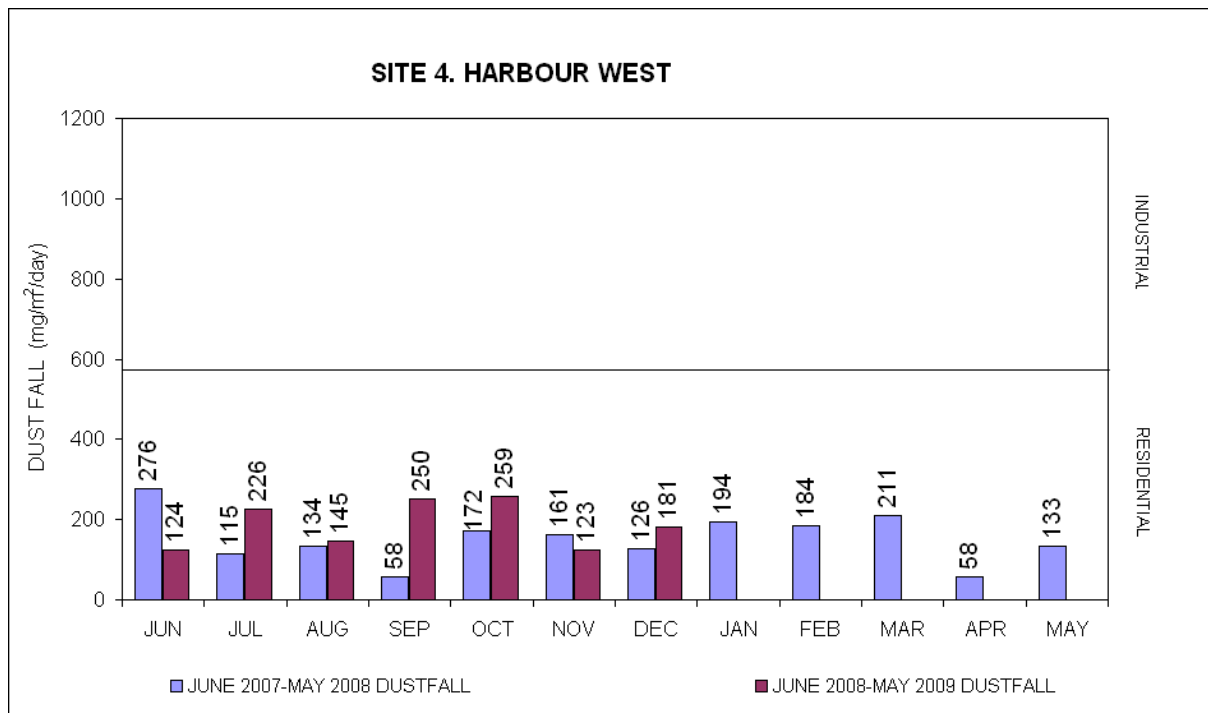
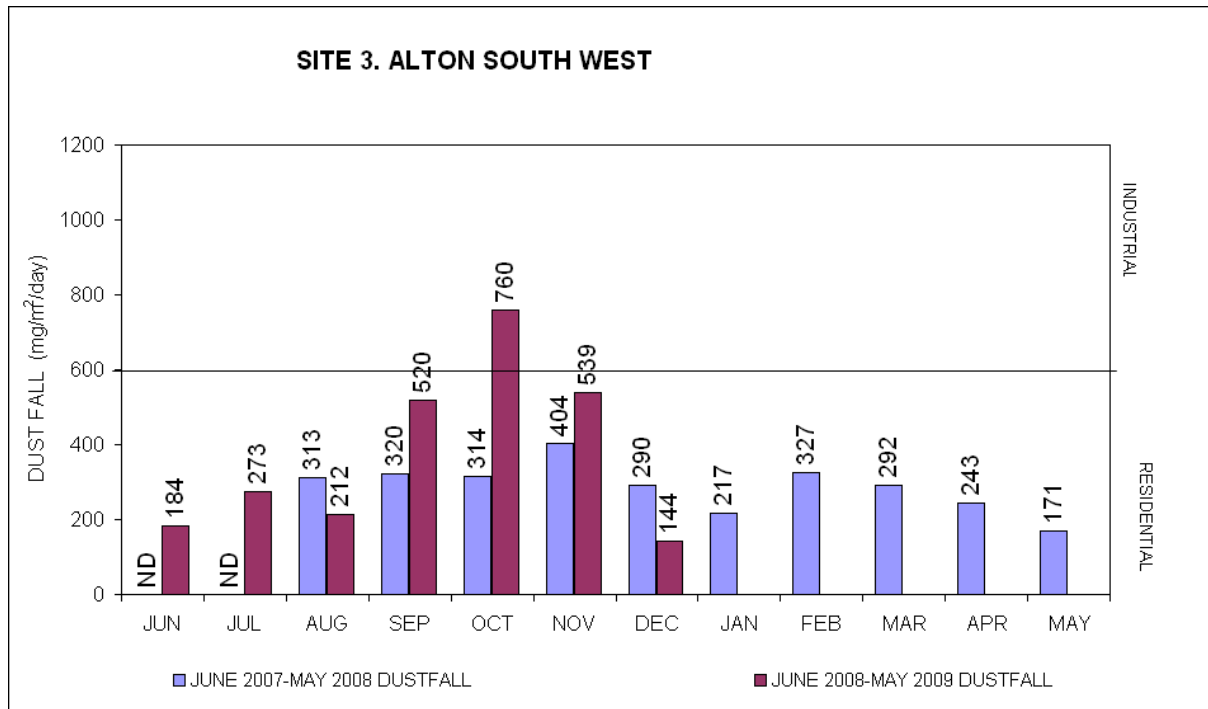
ND: No data due to sample contamination

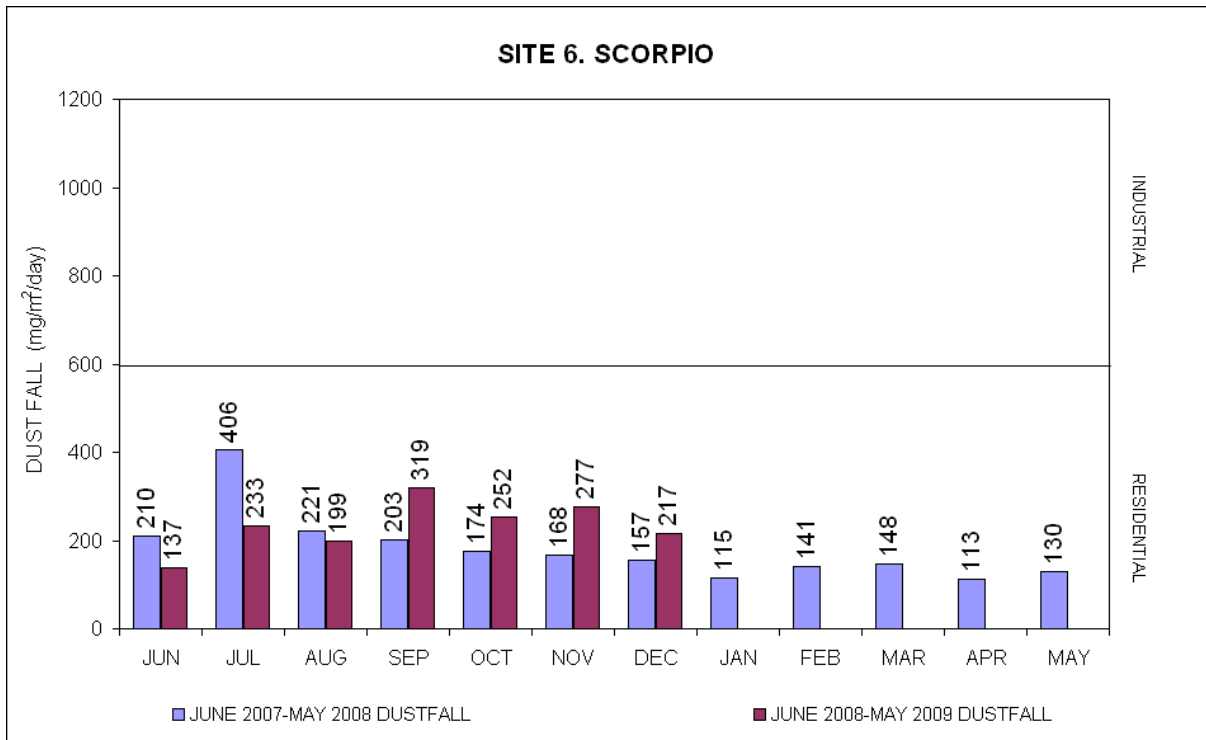
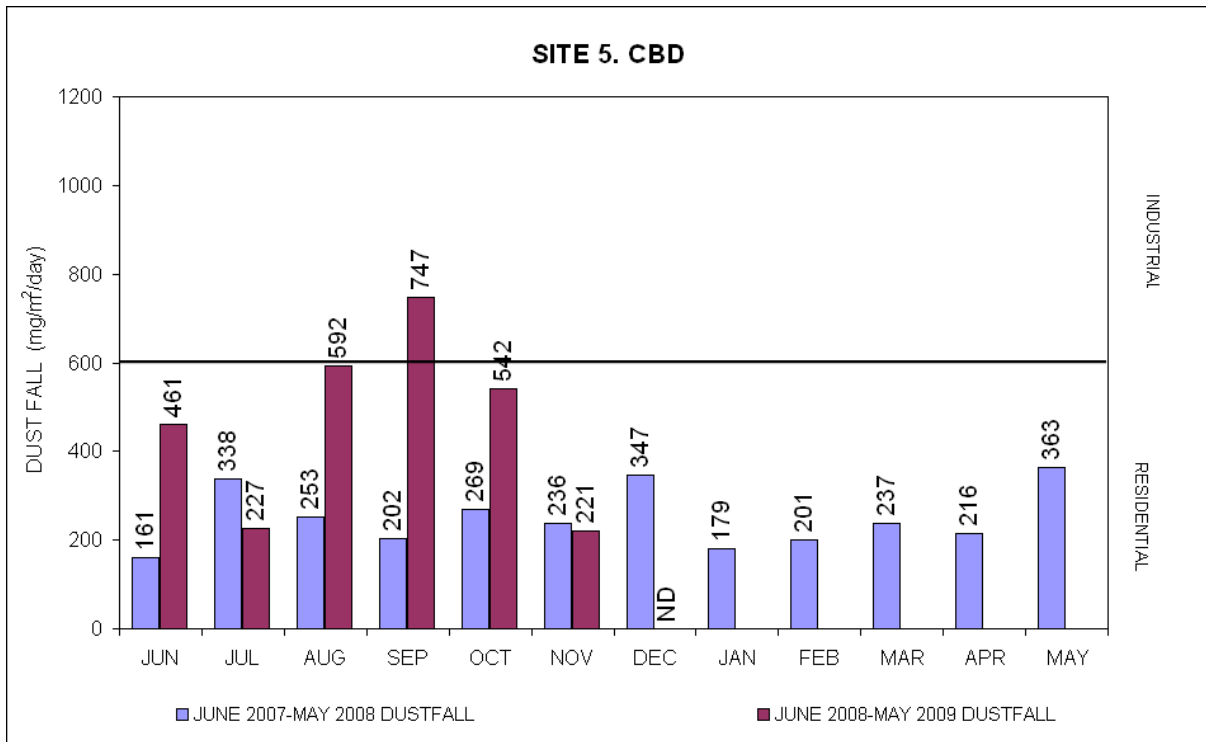
Specific Test Conditions	Samples stored at room temperature prior to analysis. Filters weighed at constant mass
Deviations From Method	None.

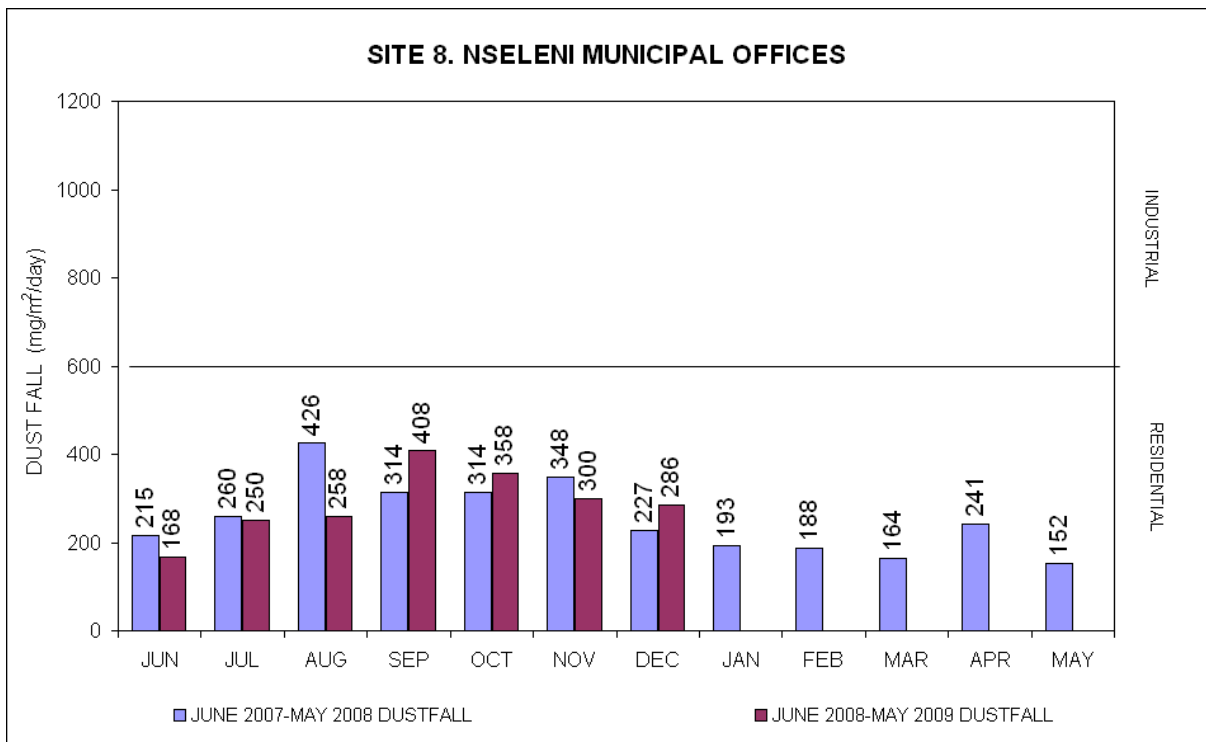
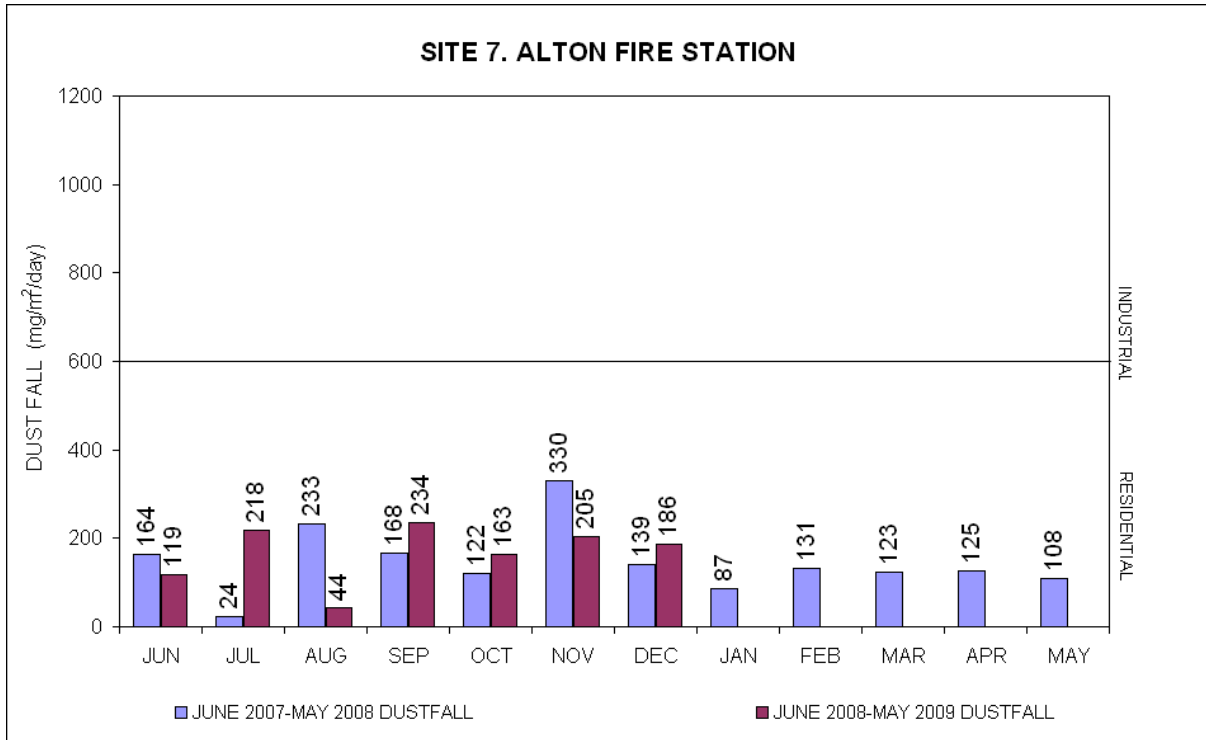
Measurement Uncertainty	$\pm 5\%$
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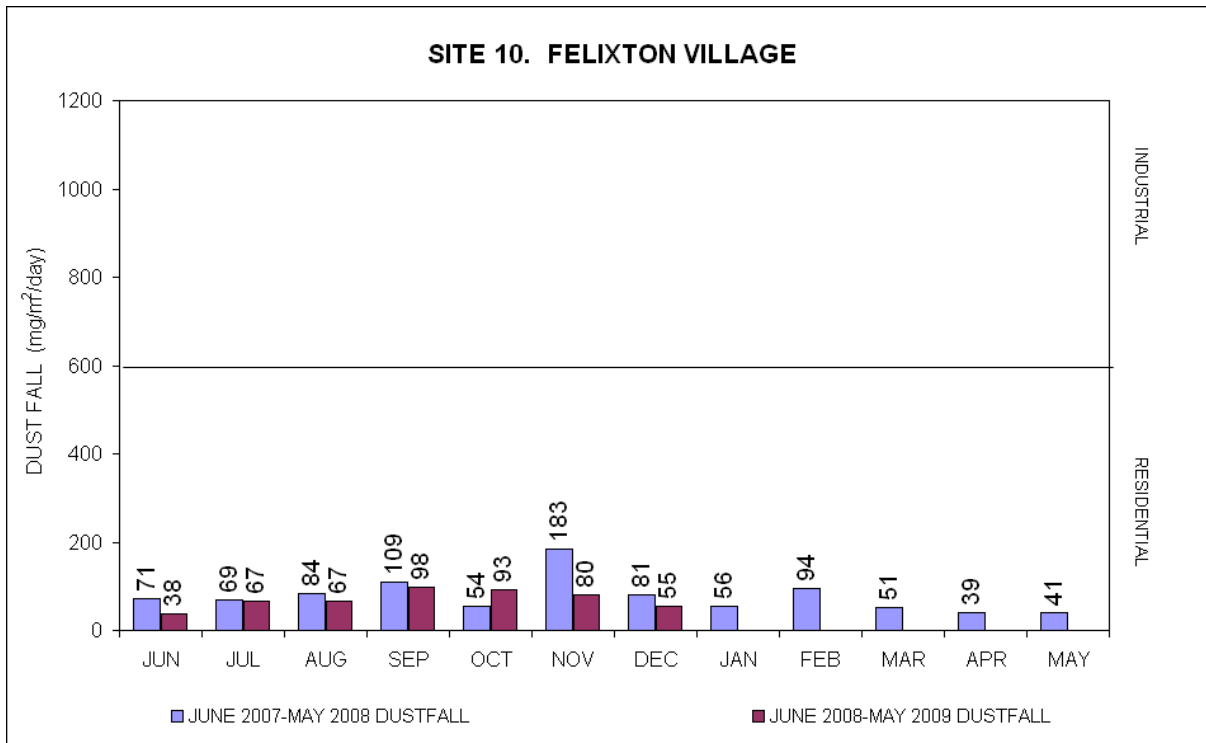
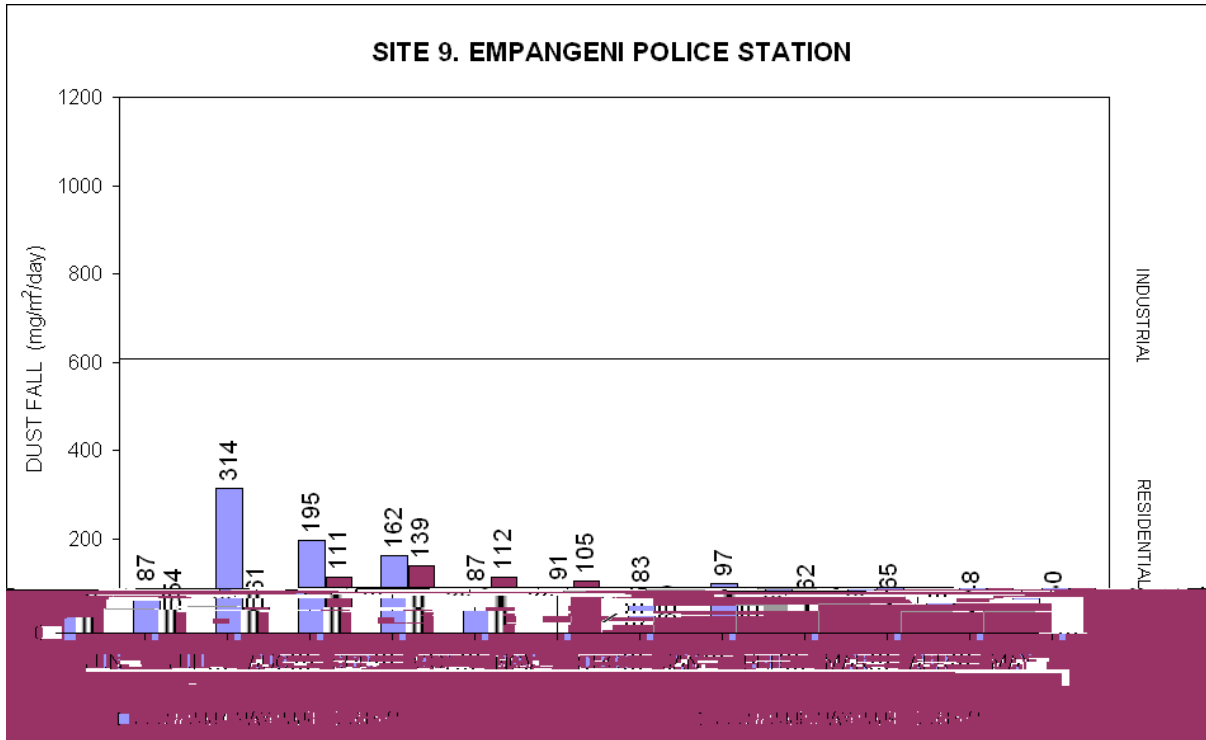
APPENDIX A RBCAA DUST FALLOUT MONTHLY TIMEPLOTS 2007 – 2008

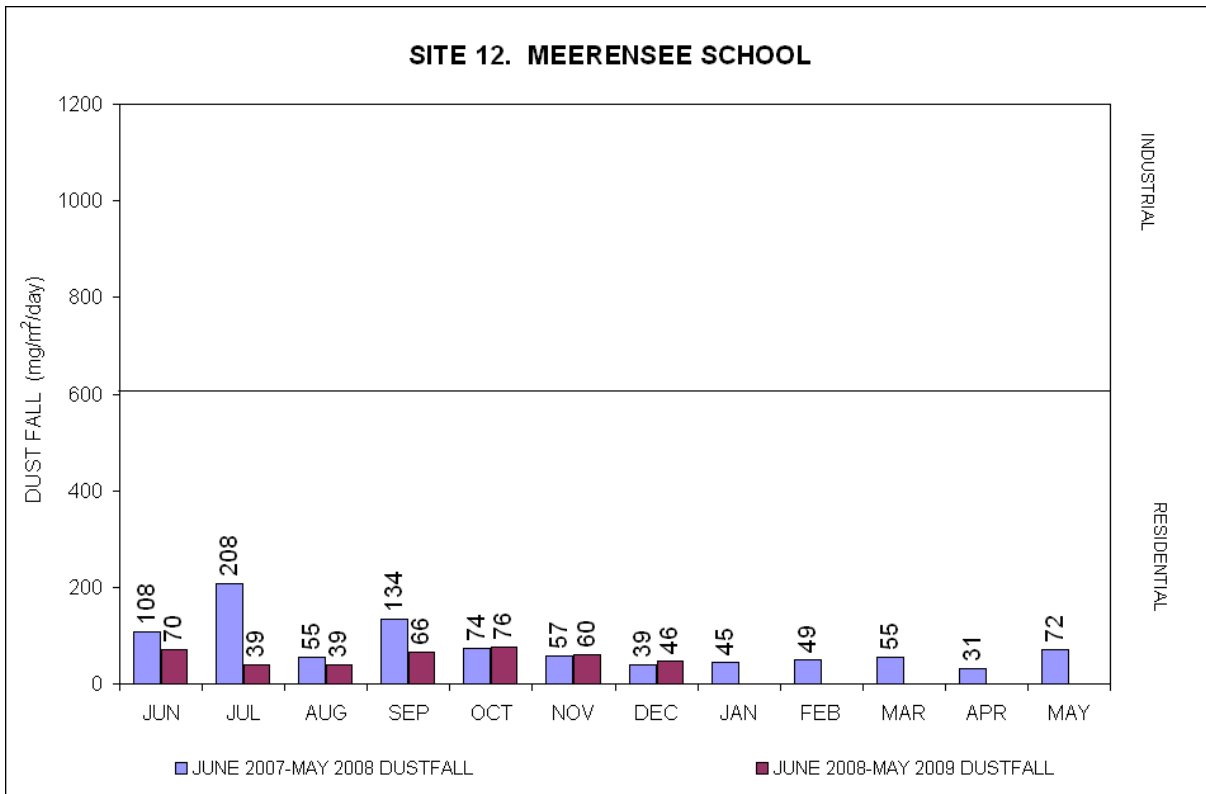
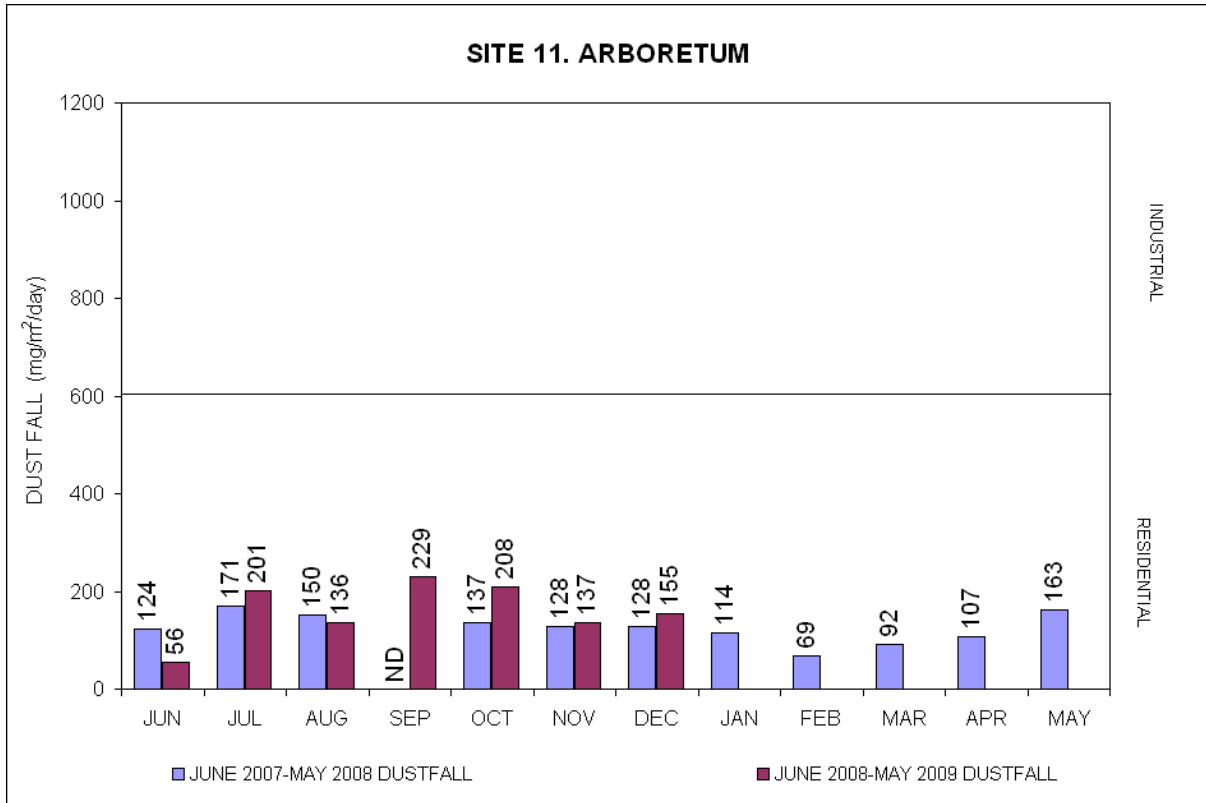












APPENDIX B: Sample Locations of all sites

