

RICHARDS BAY CLEAN AIR ASSOCIATION

DUSTFALL MONITORING

SEPTEMBER 2007

Sampling period: 24 August – 21 September 2007

Monthly Progress Report

Contact Person: Q. Hurt
Designation: Managing Director

Project Leader: H.J. Annegarn

Project Officers: P. Maseloa
T. Masethe
N. Lebogang
J. Smith
Z. Mpina
H. Nuwarinda

ANNEGARN ENVIRONMENTAL RESEARCH
P.O. BOX 30981
BRAAMFONTEIN
2017

1. METHODOLOGY

This project commenced operation in June 2006. Windblown settle-able dust (fall-out) is monitored using the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). This method employs a simple device consisting of a cylindrical 5 L 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 litres of water bucket).



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

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 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 24 August to 21 September 2007 and samples were exposed for 28 days. This period complies with the standard exposure period of 30 ± 3 days. Site 11 (Arboretum) recorded no data as the bucket was found missing. No other operational problems were encountered and a valid sample return of 92% was achieved.

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-days averaging period. Dust deposition is evaluated against a four-band scale as presented in Table 1. Target, action and alert thresholds indicated in and permissible frequency of exceedances are given in Table 2. Margins of tolerance are outline in Section 2.2 and allowances for exceptions in Section 2.3

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

1	2	3	4
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. New 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

3.1 Single Buckets

During the month of September 2007, all the monitoring sites recorded RESIDENTIAL threshold dustfall rates. Site 1 (Brackenham) recorded the highest dustfall rate of 458 mg/m²/day, while Site 4 (Harbour West) recorded the lowest rate of 58 mg/m²/day, all within that range. Site 11 (Arboretum) recorded no data as the bucket was found missing. Trends of the dust fallout results per site are presented in Appendix A of this report.

4. Recommendations and Actions

All the sites recorded RESIDENTAIL threshold levels. The results were considered satisfactory as they will not result in community complaints or nuisance.

Regards

T. Mfenqa

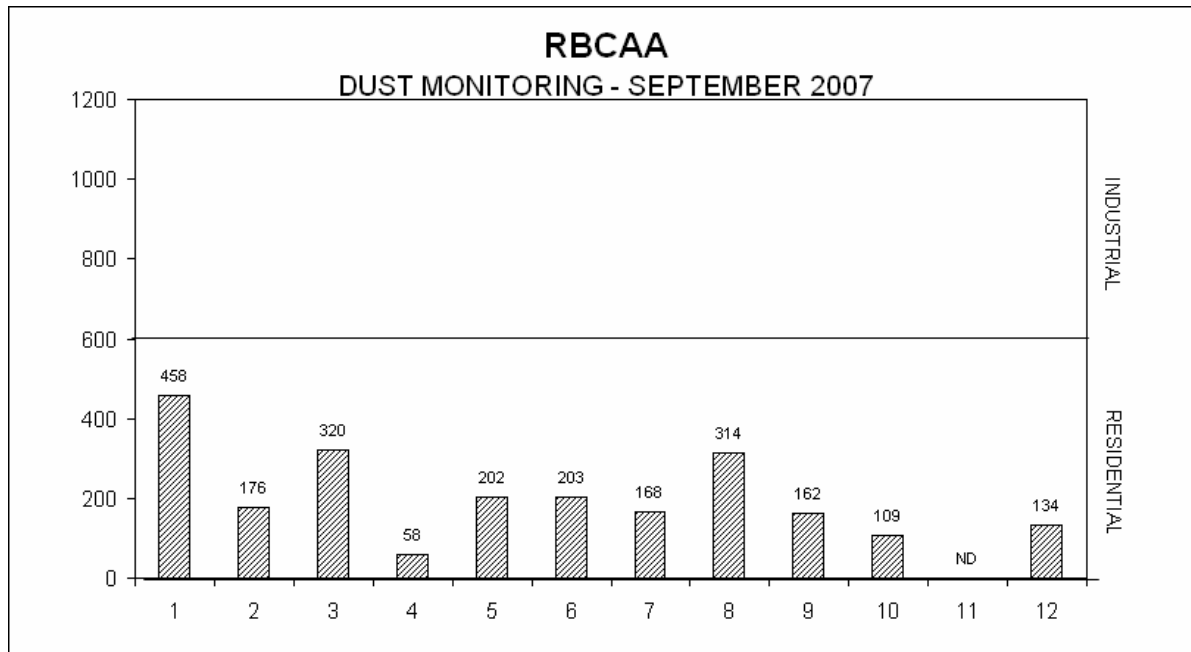
For AER (Pty) Ltd

Report compiled by H. Nuwarinda

APPENDIX A

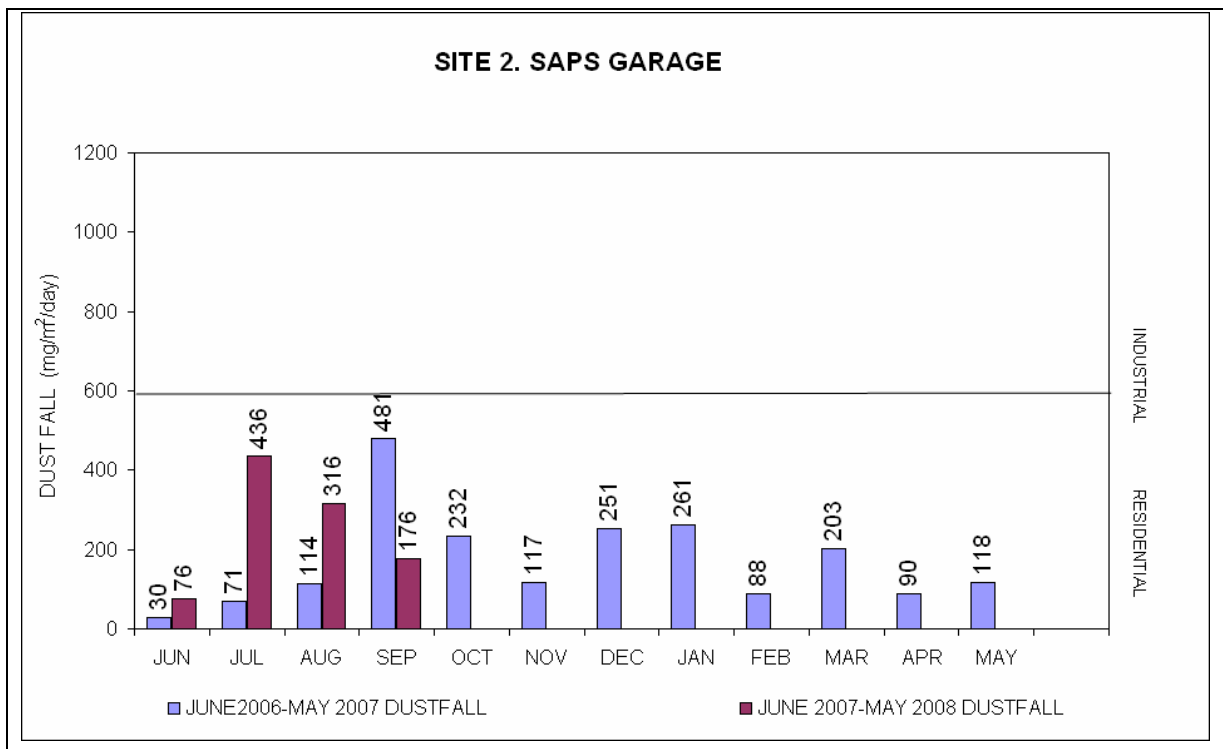
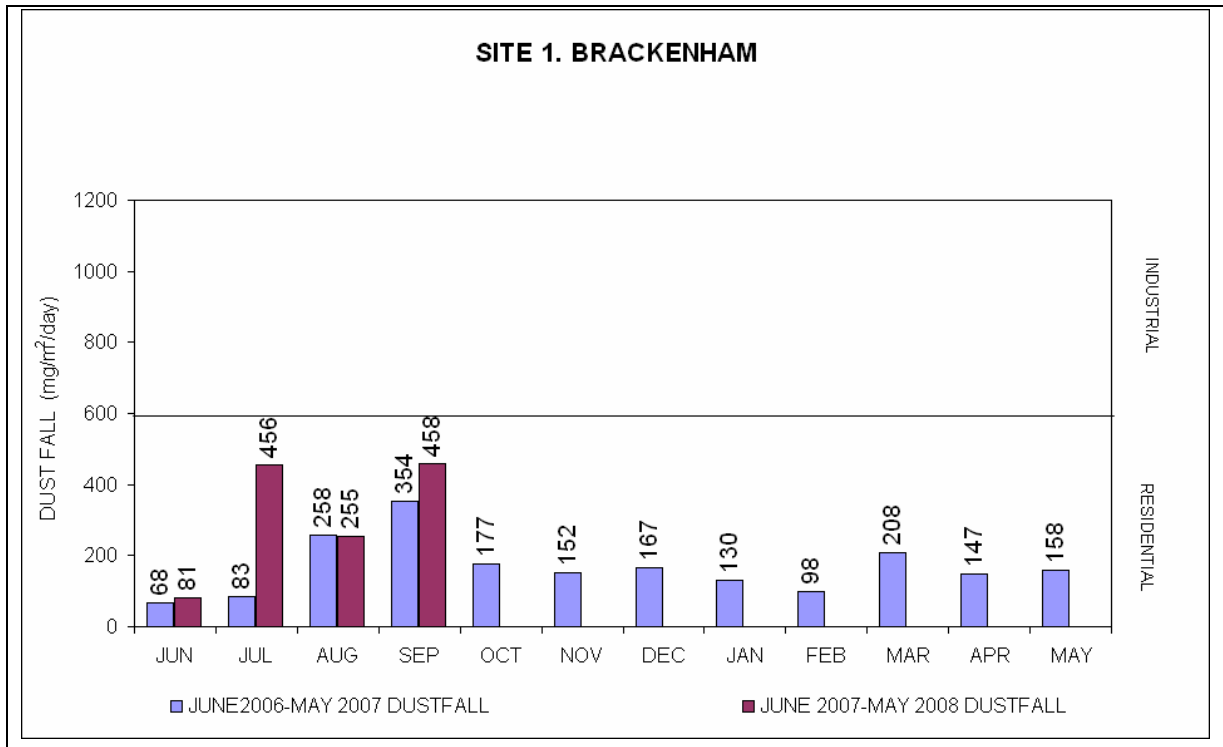
RBCAA DUST FALLOUT MONTHLY TIMEPLOTS 2006 – 2007

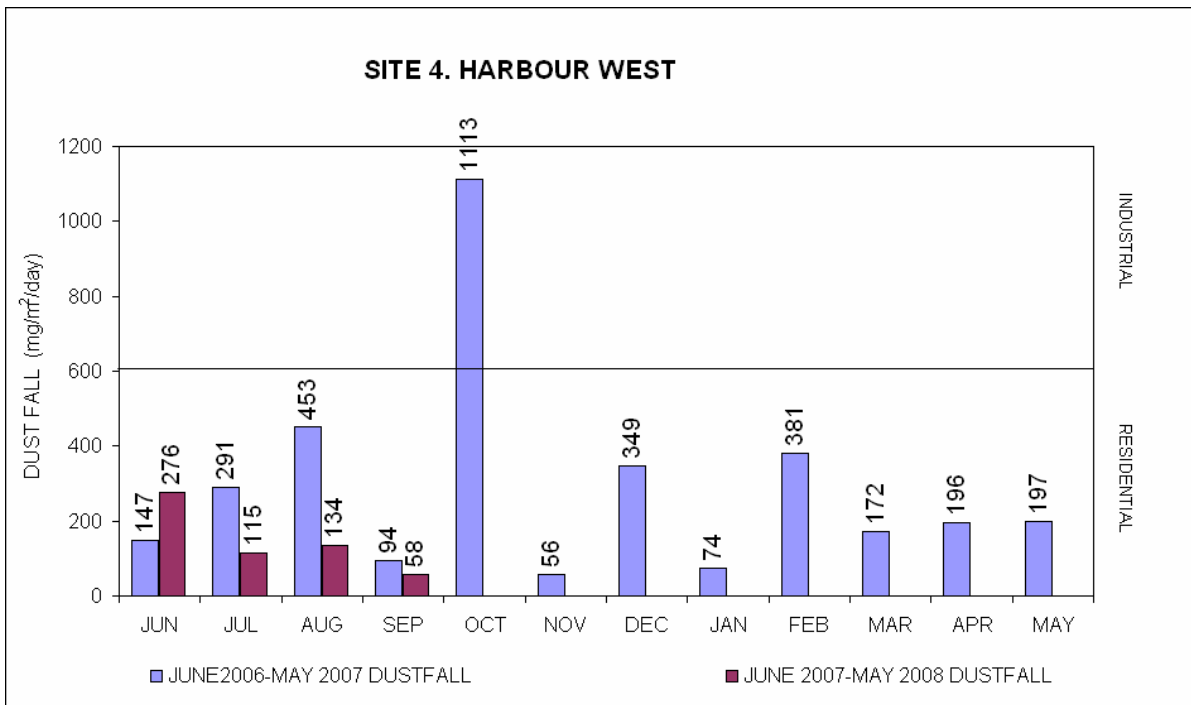
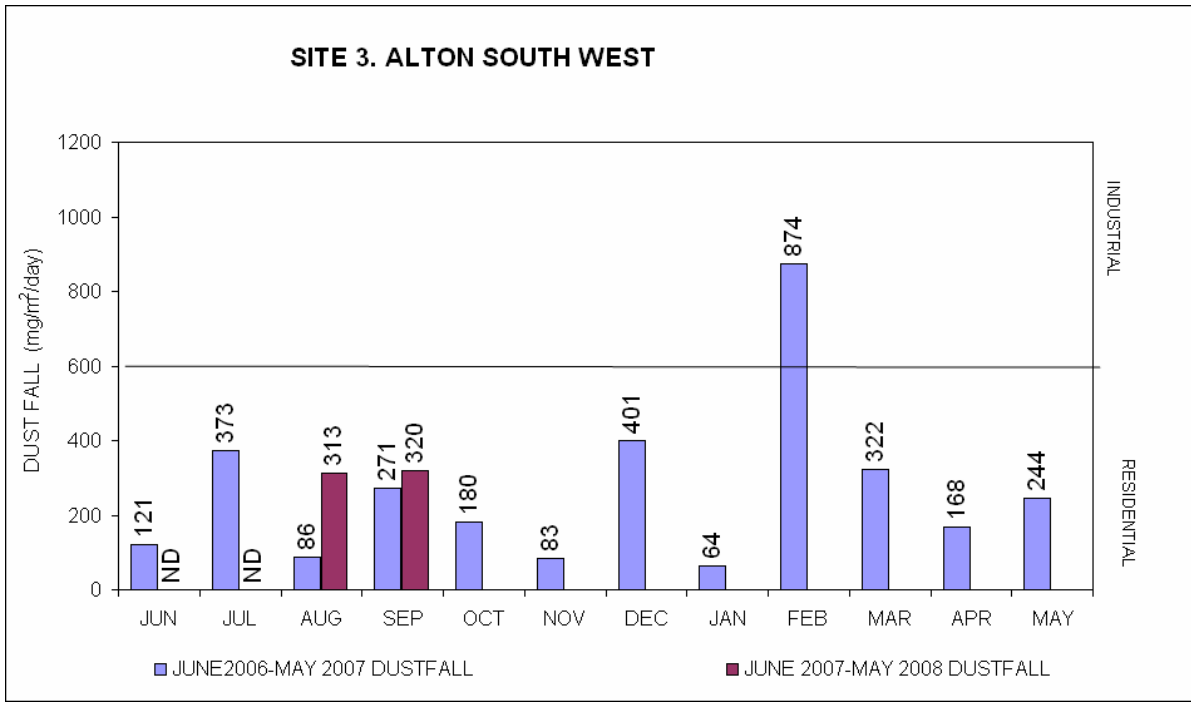
Figure 1: Graph showing results from all sites September 2007

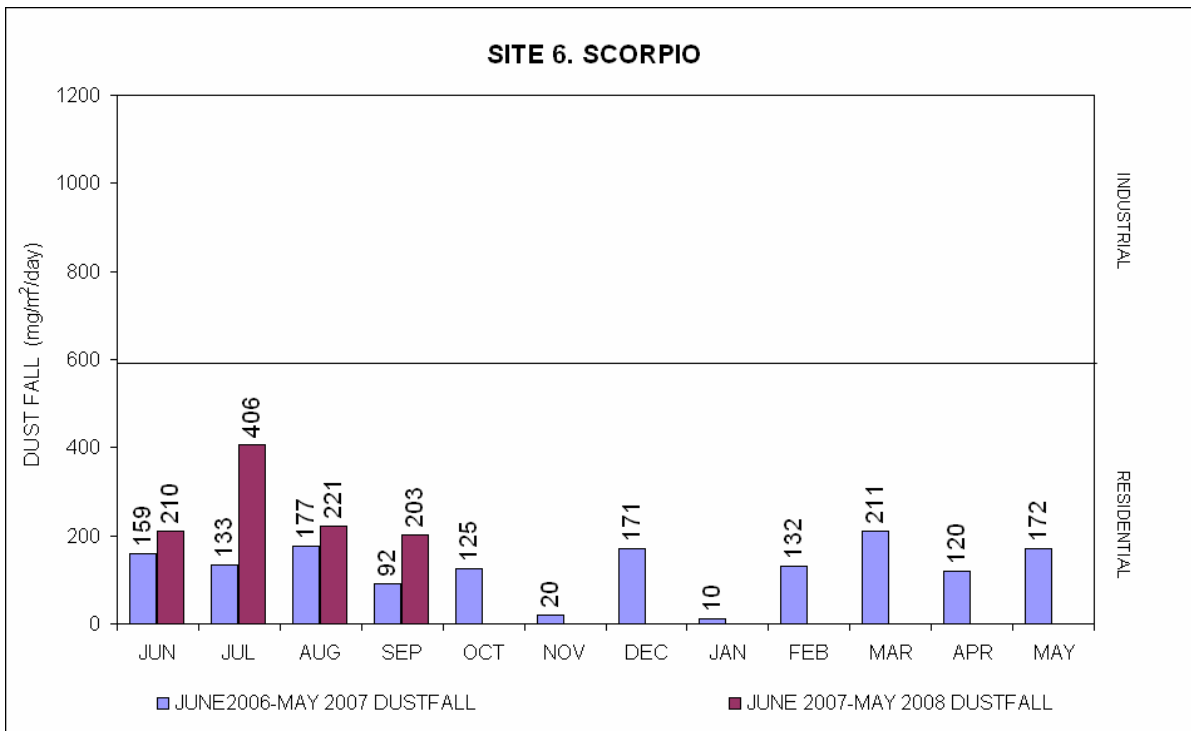
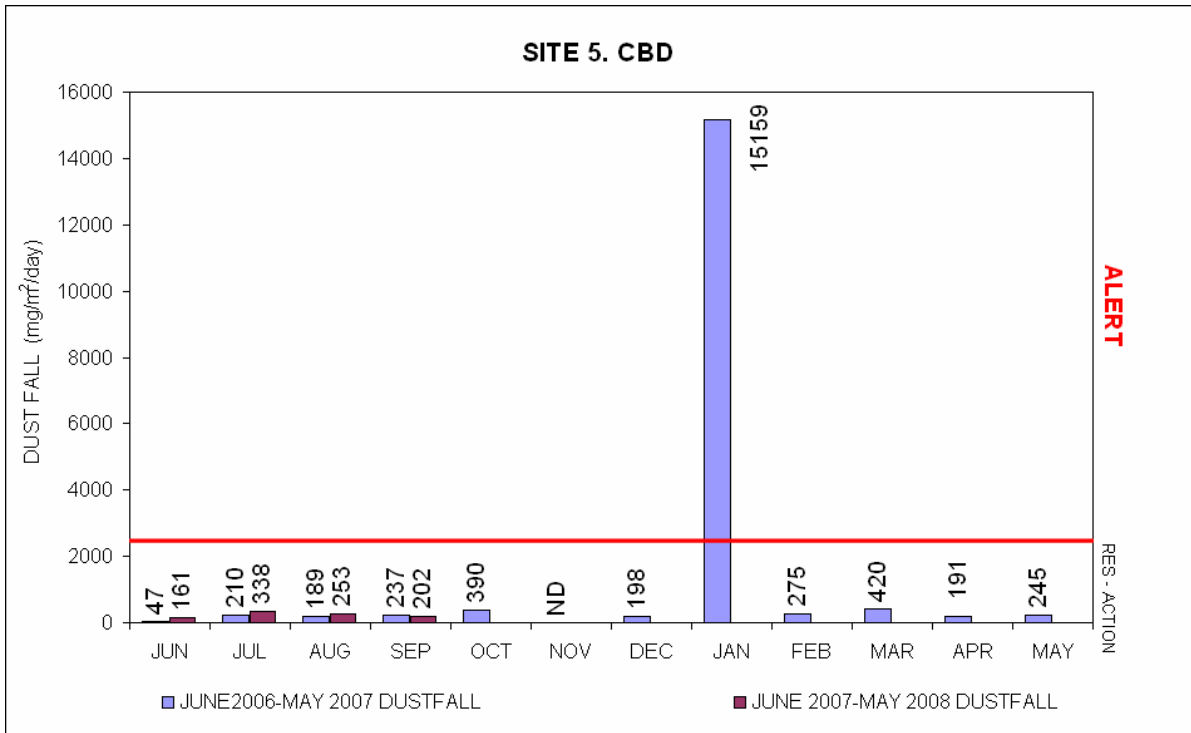


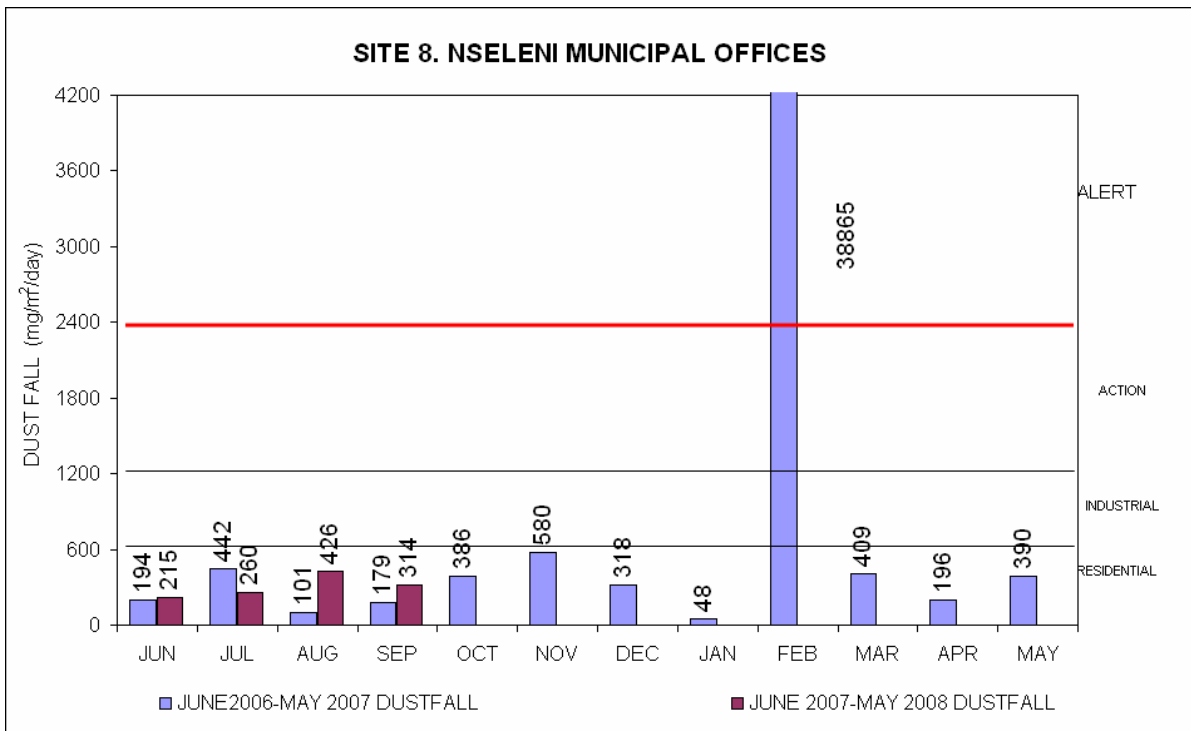
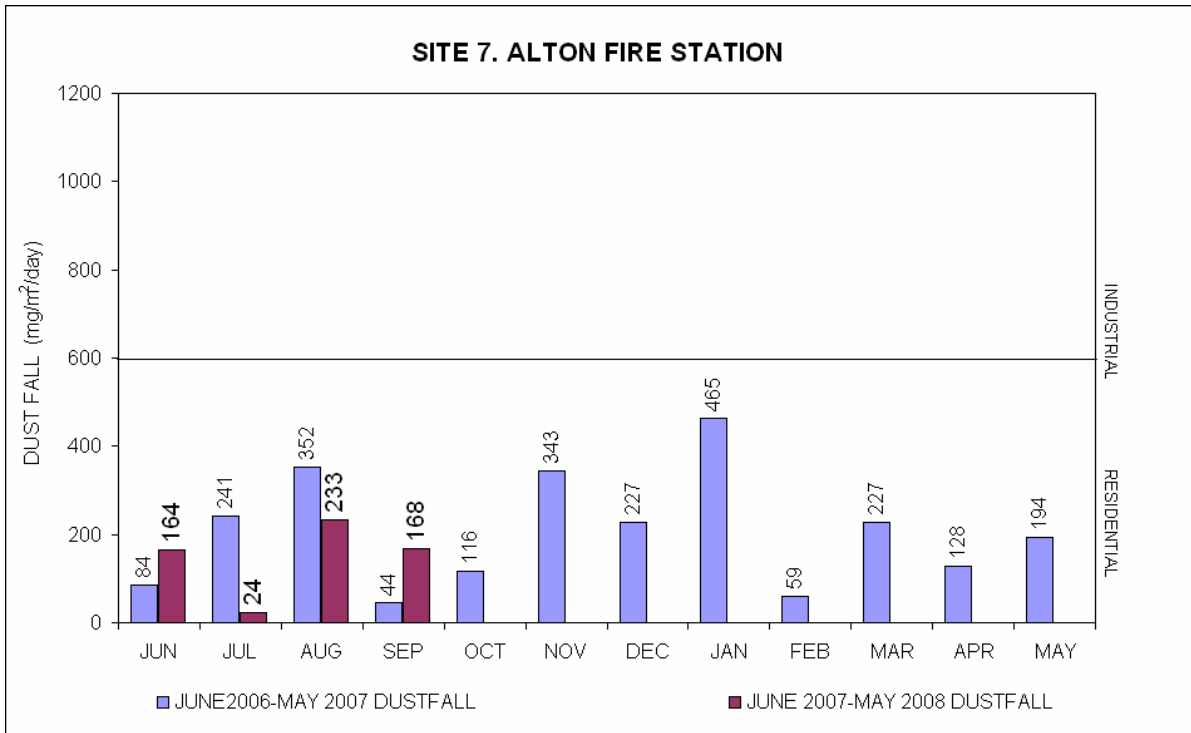
RICHARDS BAY CLEAN AIR ASSOCIATION DUSTFALL MONITORING			Month: September 2007 Sampling period: 24 August – 21 September 2007		
SITE DESCRIPTION	SITE No.	FILTER CODE	NETT MASS (mg)	No. DAYS	DUST FALLOUT (mg/m ² /day)
Brackenham	1	RBCAA 07/171	292	28	458
SAPS Garage	2	RBCAA 07/172	112	28	176
Alton South West	3	RBCAA 07/173	204	28	320
Harbour West	4	RBCAA 07/174	37	28	58
CBD(Municipal office)	5	RBCAA 07/175	129	28	202
Scorpio	6	RBCAA 07/176	129	28	203
Alton fire station	7	RBCAA 07/177	107	28	168
Nseleni Municipal office	8	RBCAA 07/178	199	28	314
Empangeni police station	9	RBCAA 07/179	103	28	162
Felixton Village	10	RBCAA 07/180	69	28	109
Arboretum	11	RBCAA 07/181	ND	ND	ND
Meerensee School	12	RBCAA 07/182	85	28	134

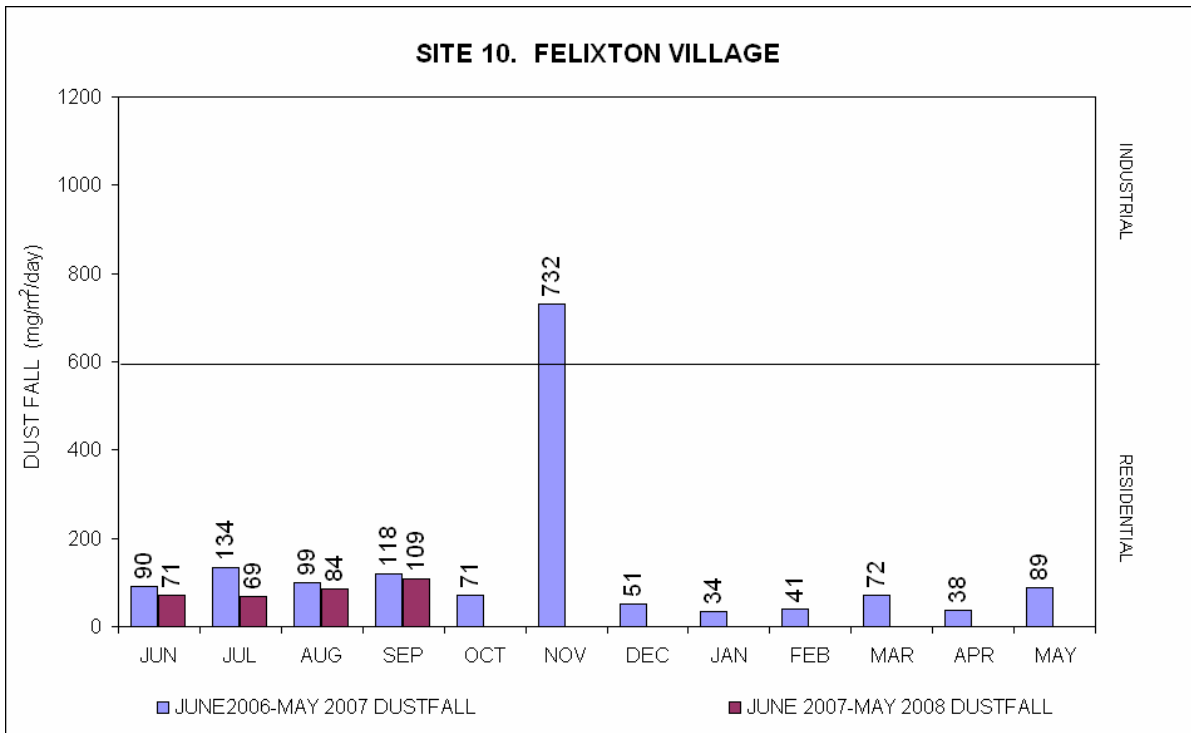
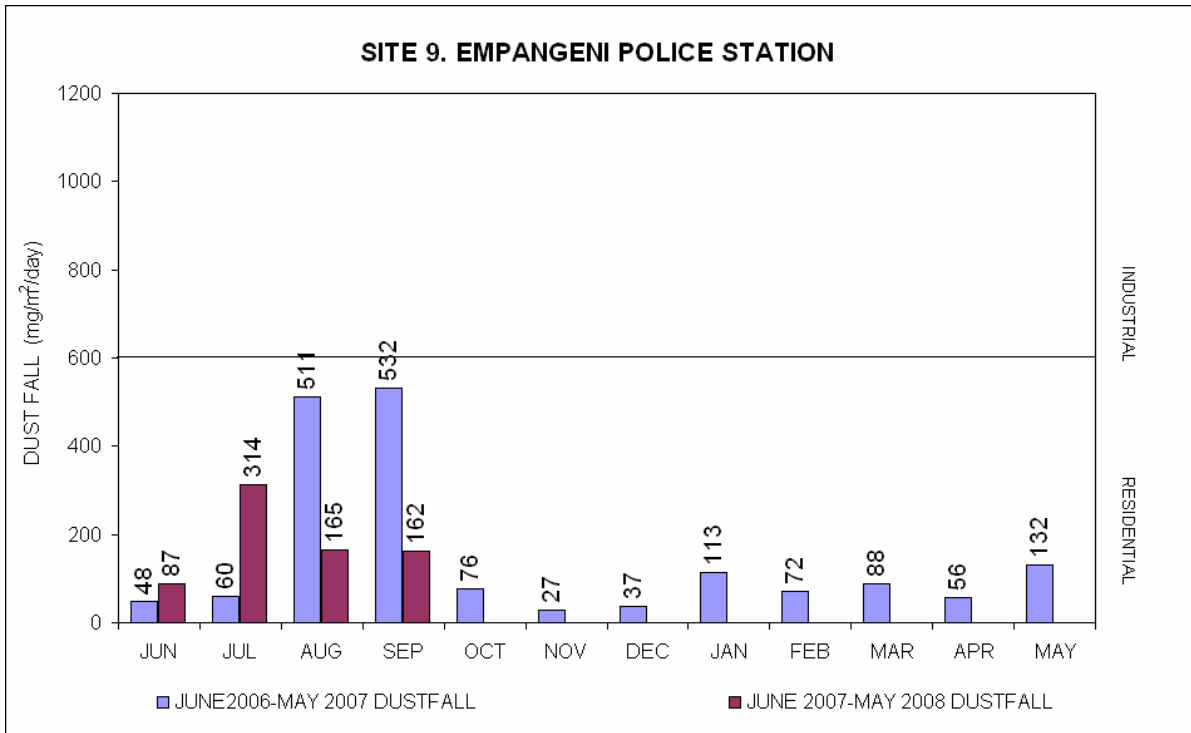
COMMENTS: ND: No data, bucket was found missing

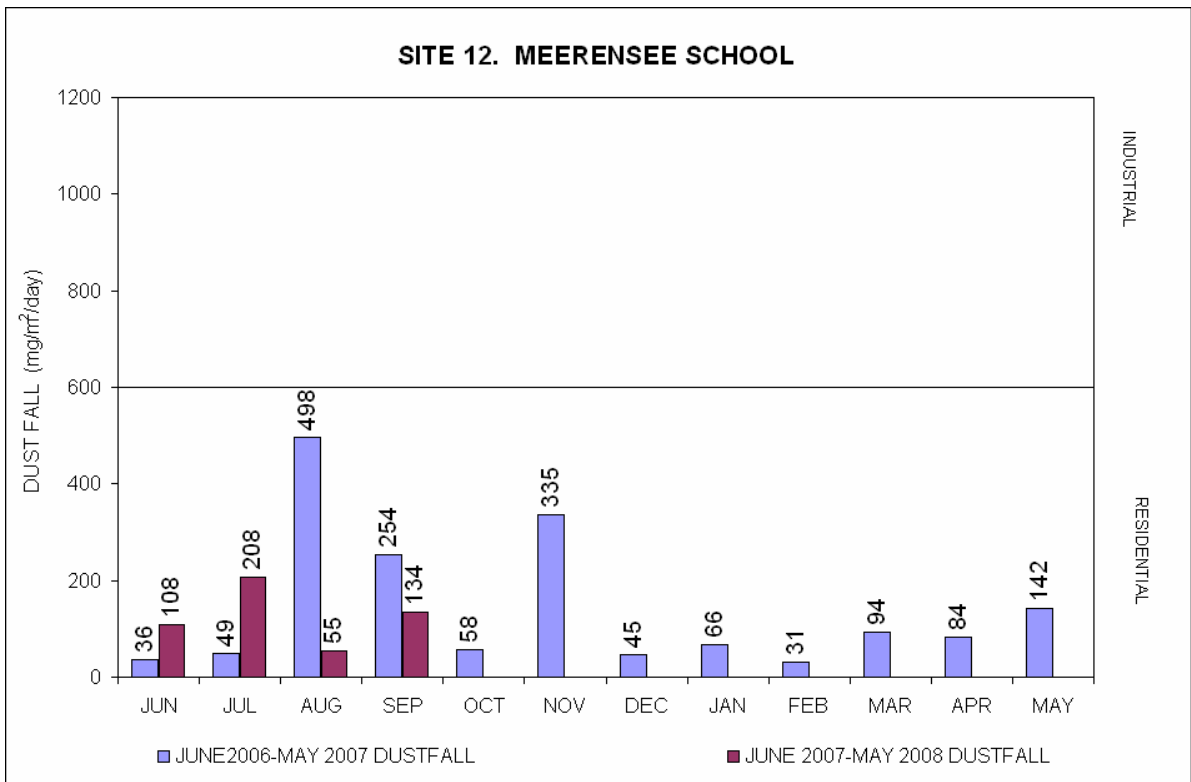
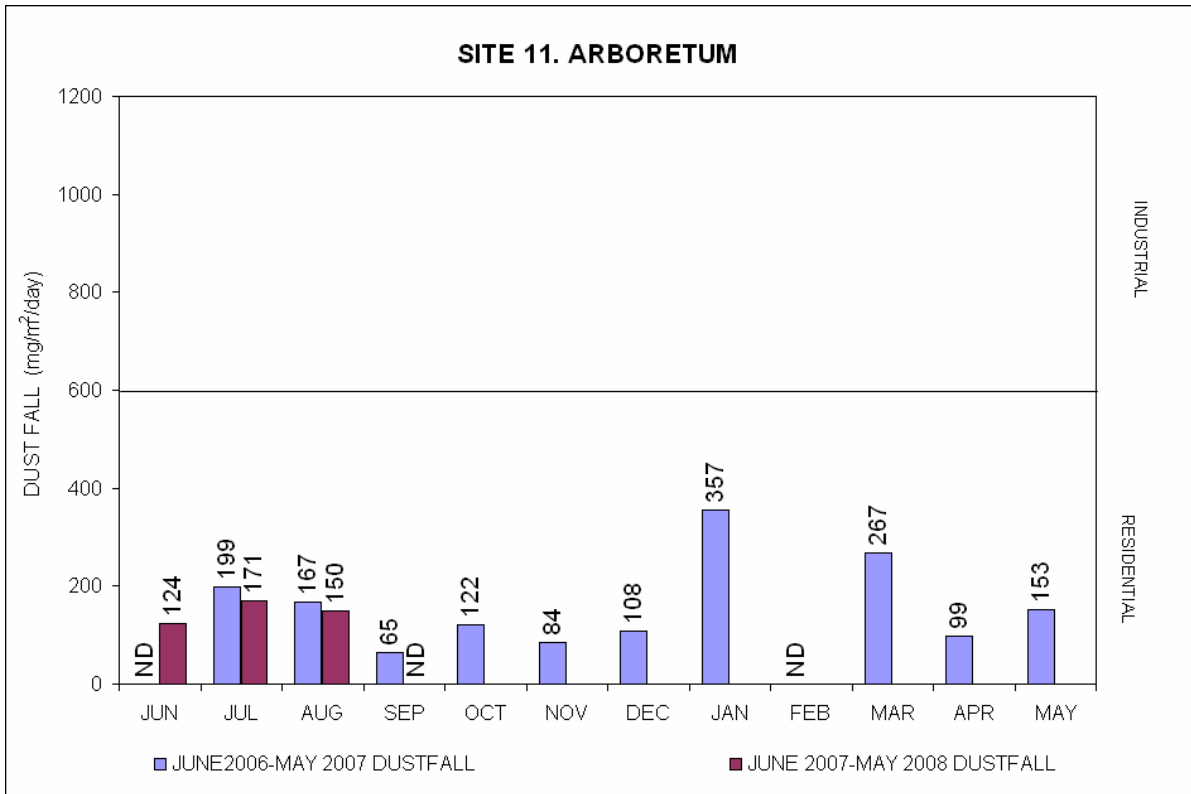












APPENDIX B

