

Olympic Park Dust and PM₁₀ Monthly Monitoring Report

December 2008

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Executive Summary

This report describes the results from the PM₁₀ and deposited dust monitoring in and around the Olympic Park site for December 2008.

December monitoring results confirm that short and long term statutory criteria are currently (or are likely to be) met at all off-site locations, most representative of public exposure.

During December, there were no exceedances of the 24-hour mean PM₁₀ criterion of 50 µg/m³ recorded by any of the particulate analysers. There was one exceedance nearby on the 30th of December, at Ruckholt Close; a TEOM-FDMS site operated on behalf of the London Borough of Waltham Forest.

During December there were no 24-hour mean exceedance observed at the CZ4 Soil Wash (Tower Hamlets) on-site analyser. The number of 24-hour mean exceedances at the on-site analyser at the CZ4 Soil Wash was already exceeding the statutory maximum allowable of 35 per year, but it should be noted that the sampling point is on-site, located close to a haul road and at some distance from any points of relevant exposure such as residential properties. As such, results from this site represent an over-estimate of the exposure at the nearest receptors.

A single one-off exceedances of the 15-minute PM₁₀ site action limit was recorded at the Marshgate Lane (Newham) site (CZ8a). The breach observed at the Marshgate Lane site appeared not to be related to activities at the Olympic Park. There were no exceedances at any of the other off-site analysers during December; including key sensitive receptor locations Gainsborough School (Hackney); Quartermile Lane (Hackney); the Greenway (Newham); and Ruckholt Close (Waltham Forest). There were also no exceedances of the 15-minute PM₁₀ criterion at any of the on-site analysers.

Soiling levels in excess of 5% coverage were not recorded by any of the off- and on-site locations. In addition, sites that had in the past recorded soiling levels over 5% recorded lower levels during December.

December monitoring results show an overall reduction in exceedances as well as rates of dust deposition, suggesting that dust abatement measures continue to have the desired effect and that wintry conditions are helping to dampen stockpiles and reduce dust. However, it should be borne in mind that activities ceased for the Christmas shutdown from Friday 19th December for the remainder of the calendar month. During December, data capture was below 75% for two Olympic Park Osiris sites; Marshgate Lane had 71% capture and Metronet had 68% capture; the other six sites had data capture of over 75%.

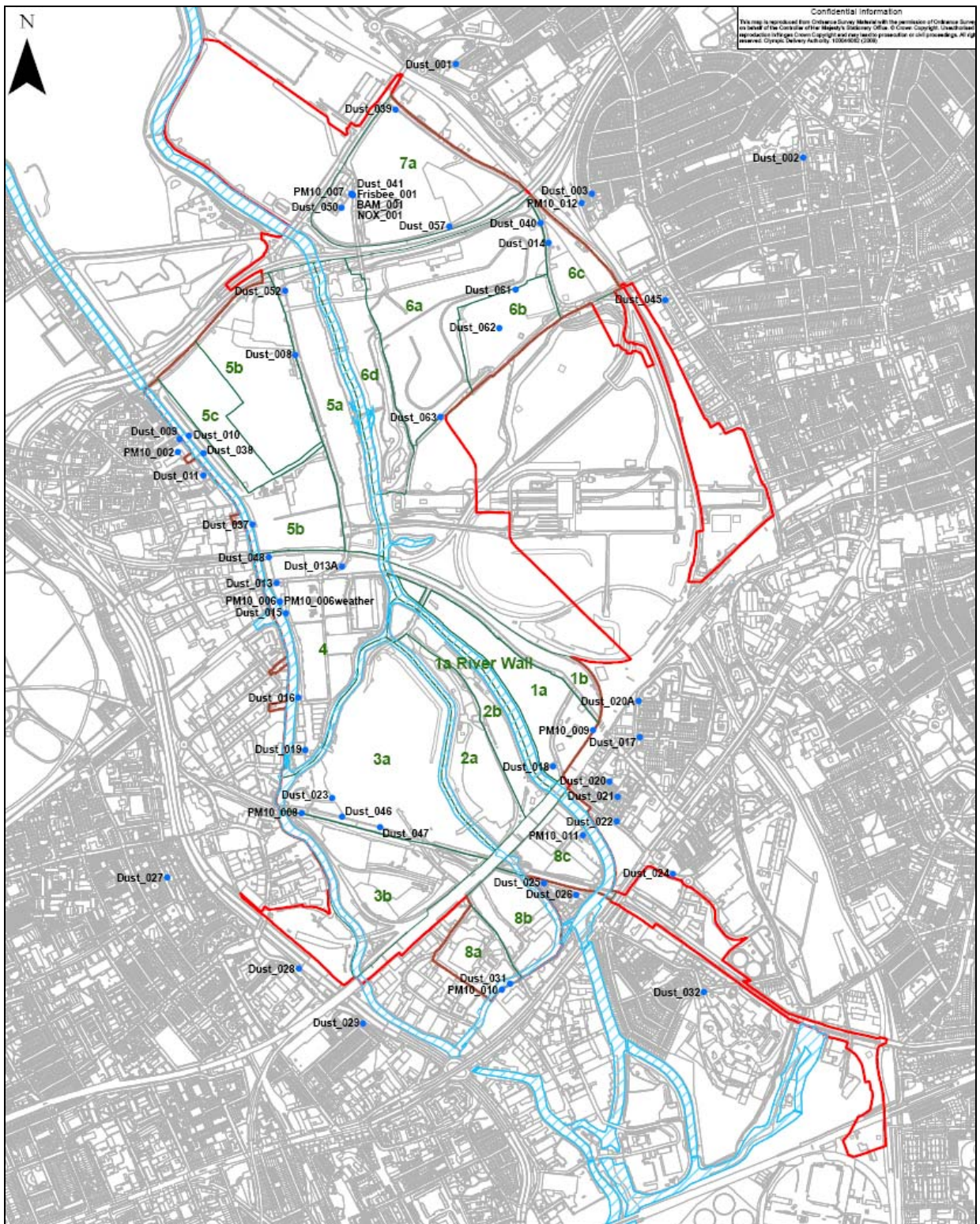
1. Introduction

- 1.1 As part of the monthly reporting requirement, Atkins has prepared the December 2008 summary report for dust and PM₁₀ data collected by the Tier 1 contractors (Morrison Construction Limited - MCL and BAM Nuttall Limited - BNL) and their consultants at the Olympic Park site. The report is in accordance with section 5.5, Reporting Requirements, of the Olympic Park Dust Monitoring Scheme (REP-ATK-TE-ZZZ-XXX-ZZZ-E-0002).
- 1.2 The report presents the December PM₁₀ and dust results. The dust and PM₁₀ monitoring sites selected, their descriptions, operators (BNL/MCL), locations and data coverage are presented in Appendix A. All of these locations can be found on the site map in Section 2.
- 1.3 Appendix B of the report includes background information to the parameters covered, their guidelines, criteria, monitoring coverage and techniques used.
- 1.4 Data from eight Osiris locations monitoring real-time PM₁₀ during December are presented and discussed in this report. Data from a total of 20 Fablon Sticky Pad monitoring sites located off-site are also presented and discussed. Further results from on-site Fablon Sticky Pad locations are presented in Appendix C.

2. Monitoring Locations

2.1 All of the dust and PM₁₀ monitoring site locations discussed can be found in the site map Figure 2.1. The monitoring sites' descriptions, operators (BNL/MCL), grid locations and data coverage are presented in Appendix A.

Figure 2.1 – Site Map

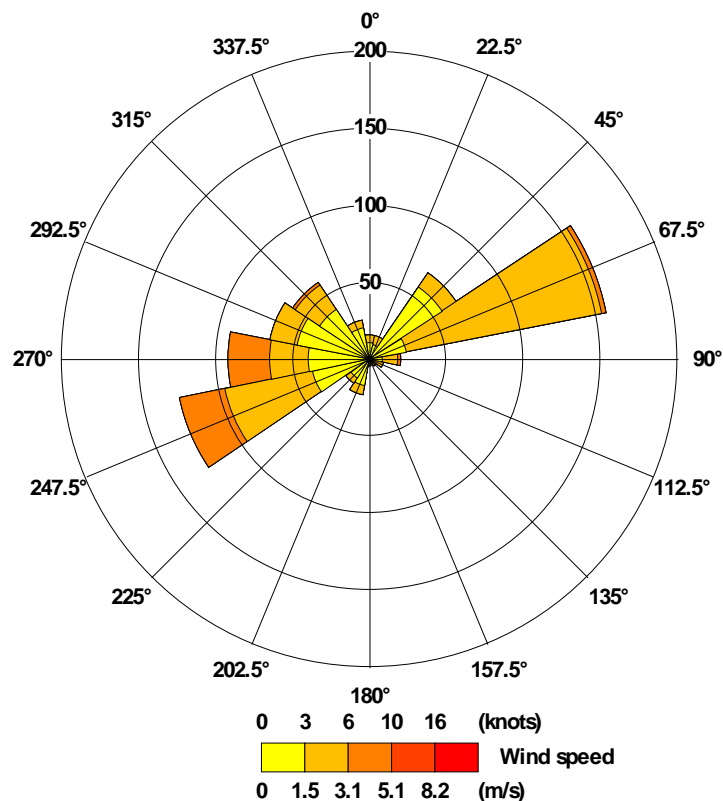


3. Results and Discussion

Meteorology

- 3.1 The meteorological station co-located with the Osiris analyser known as PM10_06 (CZ4 Soil Wash) has been providing meteorological data since April 2008. Wind speed and direction data were collected for most of the month of December at the PM10_06 site. Data were missing from 05/12/08 at 13:45 to 12/12/08 at 10:30 due to loss of power to Osiris analyser when the mobile generator was removed. The analyser was connected to mains supply on Friday 12/12/08. Meteorological information from the London Air network site at Dawlish Road was used where data was missing from the PM10_06 site.
- 3.2 The PM10_06 wind rose for December is illustrated in Figure 3.1.

Figure 3.1 – December 2008 Wind rose for PM10_06 Meteorological Station



- 3.3 The windrose gives a good indication of the prevailing wind direction during the month of December, which is predominantly blowing from the east north-easterly direction as well as from the west south-westerly direction. The latter is in line with the predominant wind direction for southeast England which is known to be south-westerly.
- 3.4 Data from the on-site meteorological station is routinely compared with data from the London Air network Dawlish Road site, which also monitors wind speed and direction. The wind rose in Appendix D shows a similar wind direction to that observed at the PM10_06 meteorological station, with slightly more prevalent north-easterly winds recorded at the Dawlish Road site during December.

3.5 Soiling levels may differ by orders of magnitude depending on location from source and also according to the weather. Heavy rainfall dampens down open loads and dusty surfaces around the site, thus reducing rates of dust generation. Prolonged sunshine evaporates moisture and increases substrate friability and hence higher rates of dust/ PM₁₀ particle formation.

3.6 The Met Office¹ UK overview for the month of December 2008 is as follows:

Mean temperatures were above average for England. The provisional mean value for the month is 3.1 °C, which is 0.7 °C below the 1961-1990 average. The provisional rainfall total for the month is 87.4 mm, which is 75% of the 1961-1990 average. It was mostly mild at first, but turning much colder later with sharp frost. Rainfall and sunshine close to average.

PM₁₀ Results

3.7 Data from the eight Osiris analysers are presented, compared to PM₁₀ criteria and discussed in this section. Data from each site are presented in summary form including:

- 1) An in-month site discussion;
- 2) A summary table of the monthly and annual (or period, where less than a calendar year's worth of data currently is recorded) means and the number of 24 hourly mean exceedances of 50 µg/m³ compared with local networked analysers. It should be noted that there are no monthly criteria for PM₁₀ and that these are only presented for comparison with previous months and other sites;
- 3) A figure presenting both the 24 hourly mean and 15 minute exceedances throughout the month;
- 4) A table of the 15-minute mean exceedances, conditions at the time and action taken (if any); and
- 5) A table of the daily mean exceedances summary for the site, if any.

Osiris data are printed in italics if below 75% capture.

3.8 The sites presented are:

- Gainsborough School, Hackney; located 100 metres from the Olympic Park CZ5c boundary;
- Greenway, Newham; located outside the Olympic Park opposite CZ3 located 40 metres from new relevant receptors, operated by BNL;
- Quartermile Lane, Hackney; in CZ7a but also located next to a site with relevant exposure (traveller's site), operated by MCL;
- On-site CZ1, Carpenters Road South, Newham; located 60 metres west of the nearest relevant receptor, operated by BNL;
- On-site CZ4 Soil Wash, Tower Hamlets; near the soil washing facilities, located 60 metres north-east from the nearest relevant receptor, operated by BNL;
- Metronet, Waltham Forest; off-site location for short-term boundary monitoring, located within 10 metres from the nearest receptor;
- Marshgate Lane, Newham (previously located within CZ8a); short-term boundary monitoring located ten metres from the nearest receptor; and
- On-site, CZ8C, Newham, short-term boundary monitoring, located 80 metres from the nearest receptor.

¹ <http://www.metoffice.gov.uk/climate/uk/2008/December.html>

- 3.9 Table 3.1 summarises the 24 hour mean exceedances at each site in December. The table includes the London Network sites at Ruckholt Close, Dawlish Close and Cam Road for comparison. These data are contemporary and subject to later ratification.
- 3.10 It should be noted that high ambient PM₁₀ concentrations are commonly expected in late December due in part to firework activity. This is likely to be the cause of higher concentrations measured by the analysers, leading to an exceedance of the 24 hour mean at Ruckholt Road, a London Air monitoring site.

Table 3.1 – PM₁₀ Concentrations December Summary Table

Site Name	Park-wide ID (Operator)	Location	December Mean	December Exceedances of 24 hour mean criterion	Comment
Gainsborough School (Hackney)	PM10_002 (MCL)	30m West from CZ5c	26.8	0	n/a
Greenway (Newham)	PM10_008 (BNL)	Outside boundary of CZ3a/ 3b	19.8	0	n/a
Quartermile Lane (Hackney)	PM10_007 (MCL)	Within CZ7a next to Travellers' Site	19.7	0	n/a
On-site, Carpenters Road South (Newham)	PM10_009 (BNL)	Within CZ1a	21.3	0	n/a
On-site CZ4 Soil Wash (Tower Hamlets)	PM10_006 (BNL)	Boundary of CZ4	23.2	0	n/a
Metronet (Waltham Forest)	PM10_012 (Hyder)	Offsite 100m East from CZ7a	18.7	0	n/a
Marshgate Lane, (Newham), previously CZ8a	PM10_010 (Hyder)	Within CZ8a	23.2	0	n/a
On-site CZ8c (Newham)	PM10_011 (Hyder)	Within CZ8c	16.3	0	n/a
Ruckholt Close*	(Waltham Forest)	Offsite 90m North from CZ7a	19.9 (25.9)	1 (1)	Daily exceedances on the 30 th of December- (in December the highest levels of PM ₁₀ across all analysers were recorded on the 30 th , not including Metronet and Marshgate Lane which had missing data). Likely to have been a regional event possibly caused by fireworks.
Dawlish Road*	(Waltham Forest)	Off-site >1km North from CZ7a	16.7 (21.7)	0 (1)	As above.
Cam Road	(Newham)	Off-site 370m East from CZ1a, 1b and 8c	24.2	0	n/a

Italics – indicates < 75% data capture

Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Data provided in gravimetric units is presented in brackets ().

- 3.11 Data from the MetOne Beta Attenuation Meter located at the Quartermile Lane monitoring station is being collected but not yet being used to apply a correction factor to any site Osiris data. A number of issues are awaiting resolution including:
- The collection of a suitable large data set to determine long term performance differences between the two types of analyser
 - An investigation into the suitability of applying a correction factor from one analyser across the whole Olympic Park monitoring regime
 - Confirmation that the BAM is performing to manufacturer's specifications (due in January 2009)
 - An adjustment of the Quartermile Lane Osiris' position to ensure that no systematic errors are being introduced as a result of the two analyser's spatial separation (due in January 2009).

Gainsborough School, Hackney

- 3.12 The Gainsborough School (PM10_002) December data included no exceedances of the daily mean and no breaches of the 15 minute action limit.
- 3.13 The site had been collecting data since the 6th of July 2007, albeit with a break for maintenance. It is the longest running analyser at the Olympic Site with a robust annual mean directly comparable to the Air Quality Objectives.
- 3.14 Gainsborough School results show that the annual mean concentration is not exceeding the annual mean objective of 40 $\mu\text{g}/\text{m}^3$ and is comparable to the local networked analysers. Gainsborough School has completed over a year of monitoring, and the annual mean refers to a rolling 12 monthly average. With 90% coverage, and with an annual mean of 27.7 $\mu\text{g}/\text{m}^3$, the annual mean was below the objective during the last year of monitoring.

**Table 3.2– Gainsborough School PM₁₀ Concentrations –
December and Rolling Annual Mean Results (366 days; 01/01/08 – 31/12/08)**

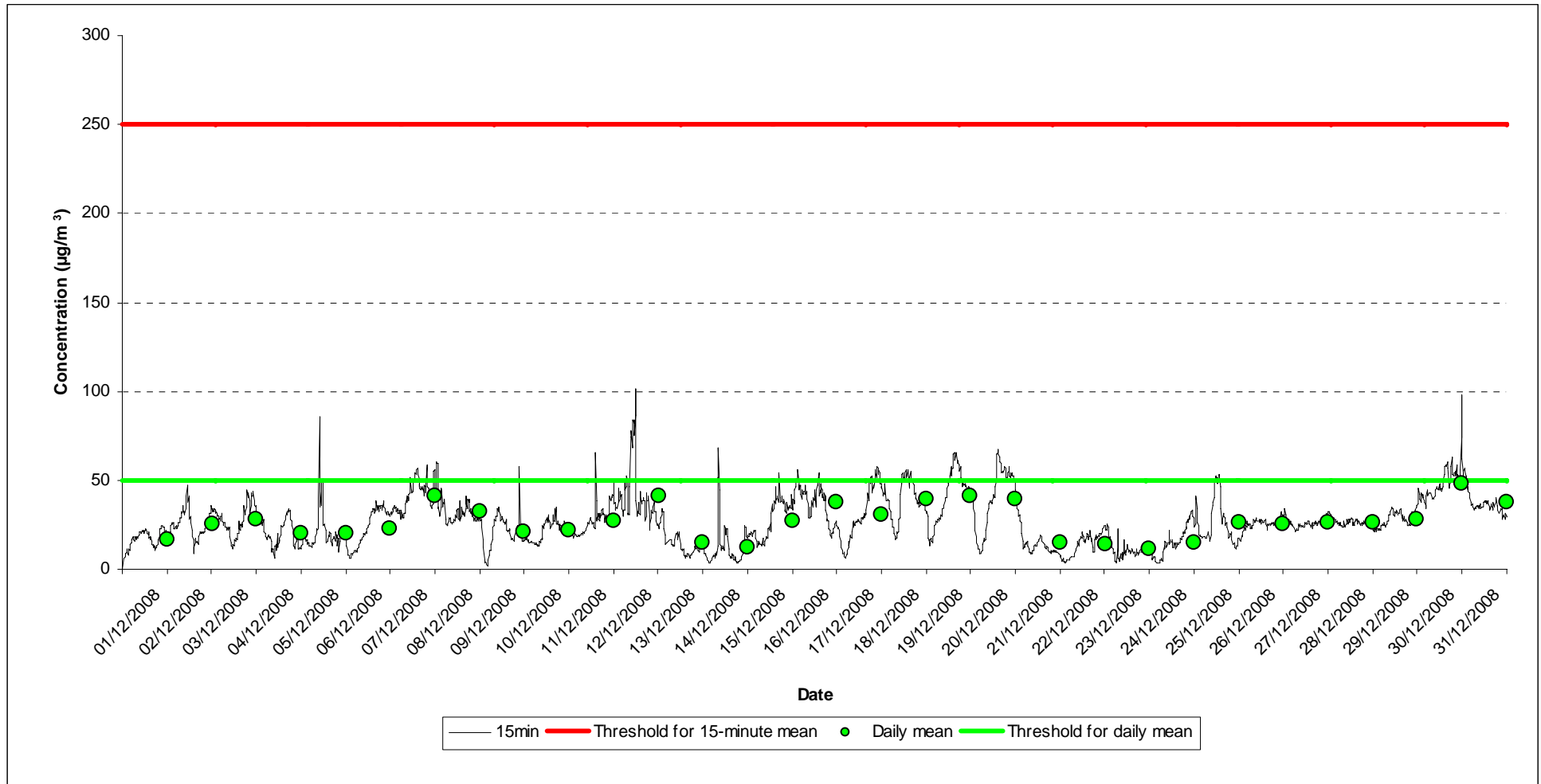
Site Name	Operator	December Mean (Exceedances)	Annual Mean * (Exceedances **)
Gainsborough School	MCL	26.8 (0)	27.7 (21)
Ruckholt Close [^]	Waltham Forest	28.4 (1) (36.9) [^]	24.9 (6) (32.3) [^]
Cam Road	Newham	24.4 (0)	24.9 (6)
Dawlish Close [^]	Waltham Forest	16.7 (0) (21.8) [^]	17.8 (2) (23.1) [^]

*Annual Mean Objective of 40 $\mu\text{g}/\text{m}^3$

** Objective is less than 35 exceedances of a 24 hour mean of 50 $\mu\text{g}/\text{m}^3$ per year

[^]Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.2 - Gainsborough School 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



Greenway, Newham

- 3.15 The Greenway (PM10_008) December data includes no exceedances of the 15-minute action limit and no exceedances of the daily mean. Relatively low concentrations have been consistently observed at this off-site location. The commissioning of new properties adjacent to the Greenway to the south west of the monitoring position ensures the site's relevance to human exposure.
- 3.16 The Greenway analyser began collecting data on the 1st of December 2007, albeit with a month break due to a power cut and during site repositioning on the 10th of July 2008. The new location was 40 metres east of its original position, and for annual mean purposes has been considered the same site. A full year set of data is therefore available and results are now directly comparable to Air Quality Objectives.
- 3.17 The Greenway analyser annual mean refers to a rolling 12 monthly average. With 75% coverage and with an annual mean concentration of 21.5 µg/m³, this was well below the objective during the last year of monitoring.

**Table 3.3 - Greenway PM₁₀ Concentrations –
December and Rolling Annual Mean Results (366 days; 01/01/08 – 31/12/08)**

Site Name	Operator	December Mean (Exceedances)	Annual Mean * (Exceedances **)
Greenway, Newham	BNL	21.0 (0)	21.5 (4)
Ruckholt Close [^]	Waltham Forest	28.4 (1) (36.9) [^]	24.9 (6) (32.3) [^]
Cam Road	Newham	24.4 (0)	24.9 (6)
Dawlish Close [^]	Waltham Forest	16.7 (0) (21.8) [^]	17.8 (2) (23.1) [^]

*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year

[^]Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.3 – Annual Trend of Greenway Daily Mean PM₁₀ Compared to Local Background Site (Cam Road)

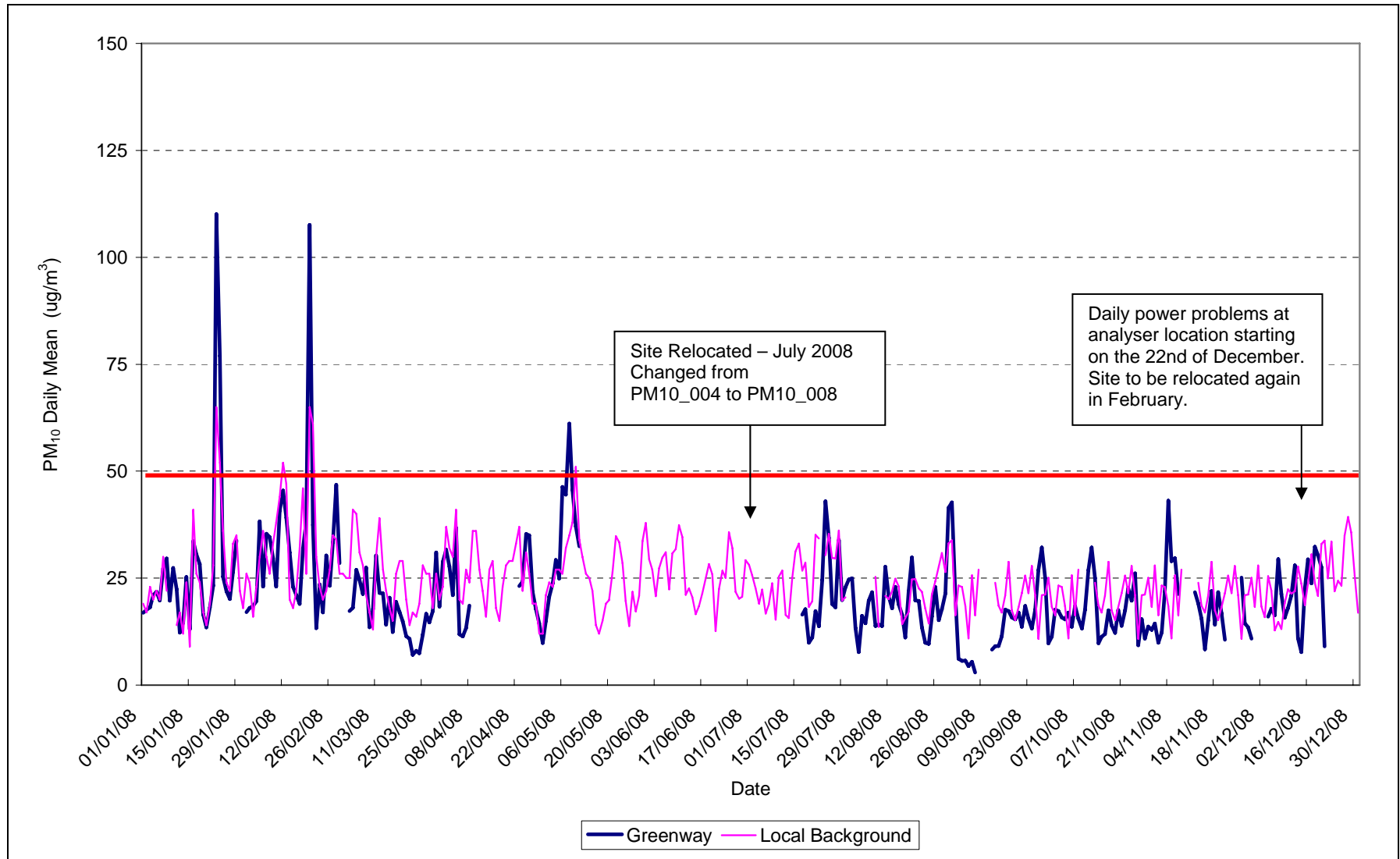
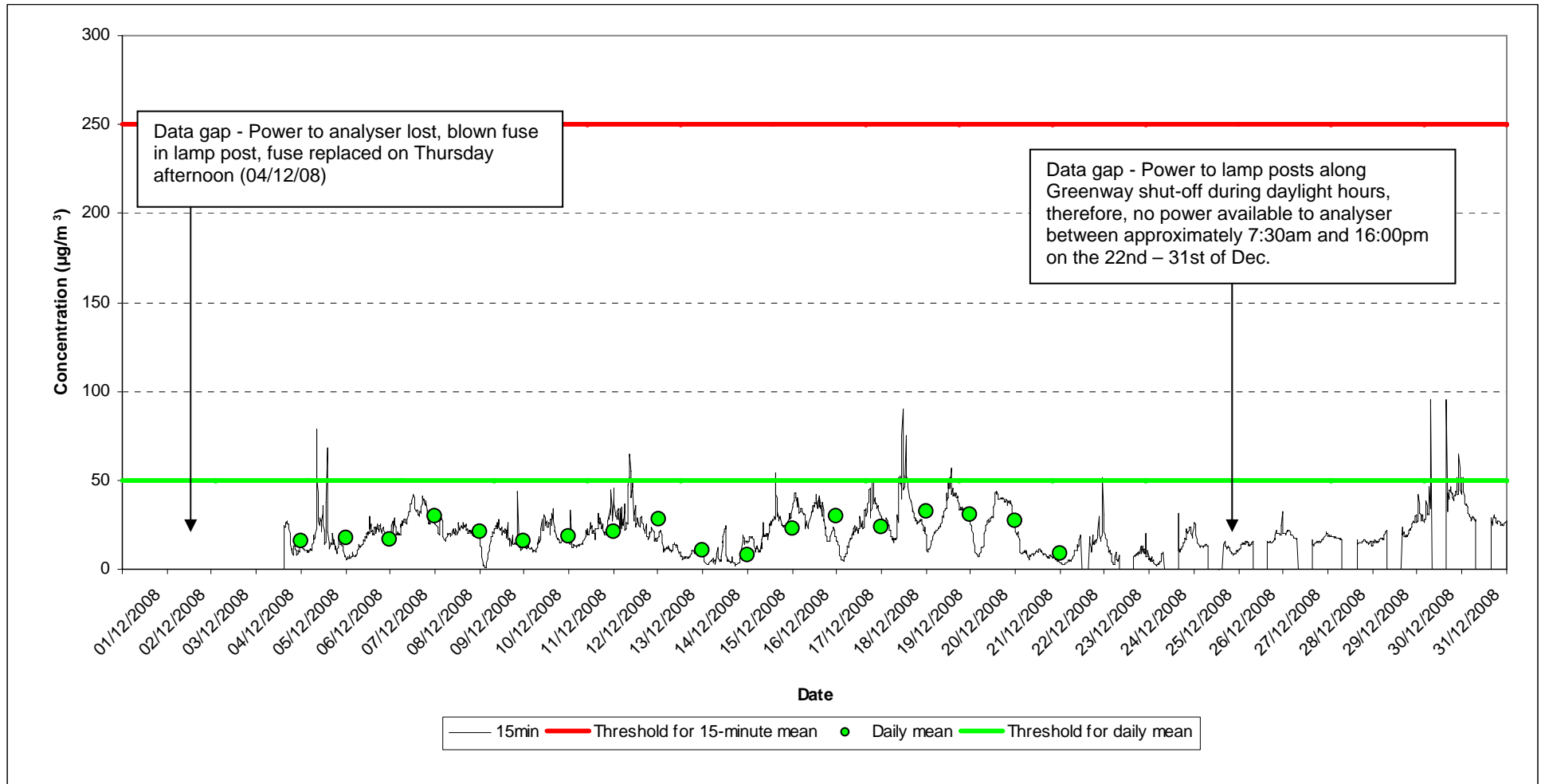


Figure 3.4 – Greenway, Newham 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



Quartermile Lane, Hackney

- 3.18 The Quartermile Lane (PM10_007) December data included no exceedances of the 15-minute action limit and no exceedances of the daily mean.
- 3.19 The Quartermile Lane analysers began collecting data on the 14th of March 2008 when the Travellers' site was relocated. The site, although located within the Olympic Park, is representative of sensitive receptors (the Travellers' site) and is therefore of relevance when compared to the AQS Objectives. A full year of data is not available yet, and whilst results are therefore not yet directly comparable to Air Quality Objectives, they provide an indication of likelihood of compliance.
- 3.20 The long-term mean concentration and number of daily exceedances at Quartermile Lane are well below their objective during the period of operation and concentrations at this location are likely to meet the annual mean objectives if conditions remain similar.

**Table 3.4 - Quartermile Lane, Hackney PM₁₀ Concentrations –
December and Rolling Annual Mean Results (293 days; 14/03/08 – 31/12/08)**

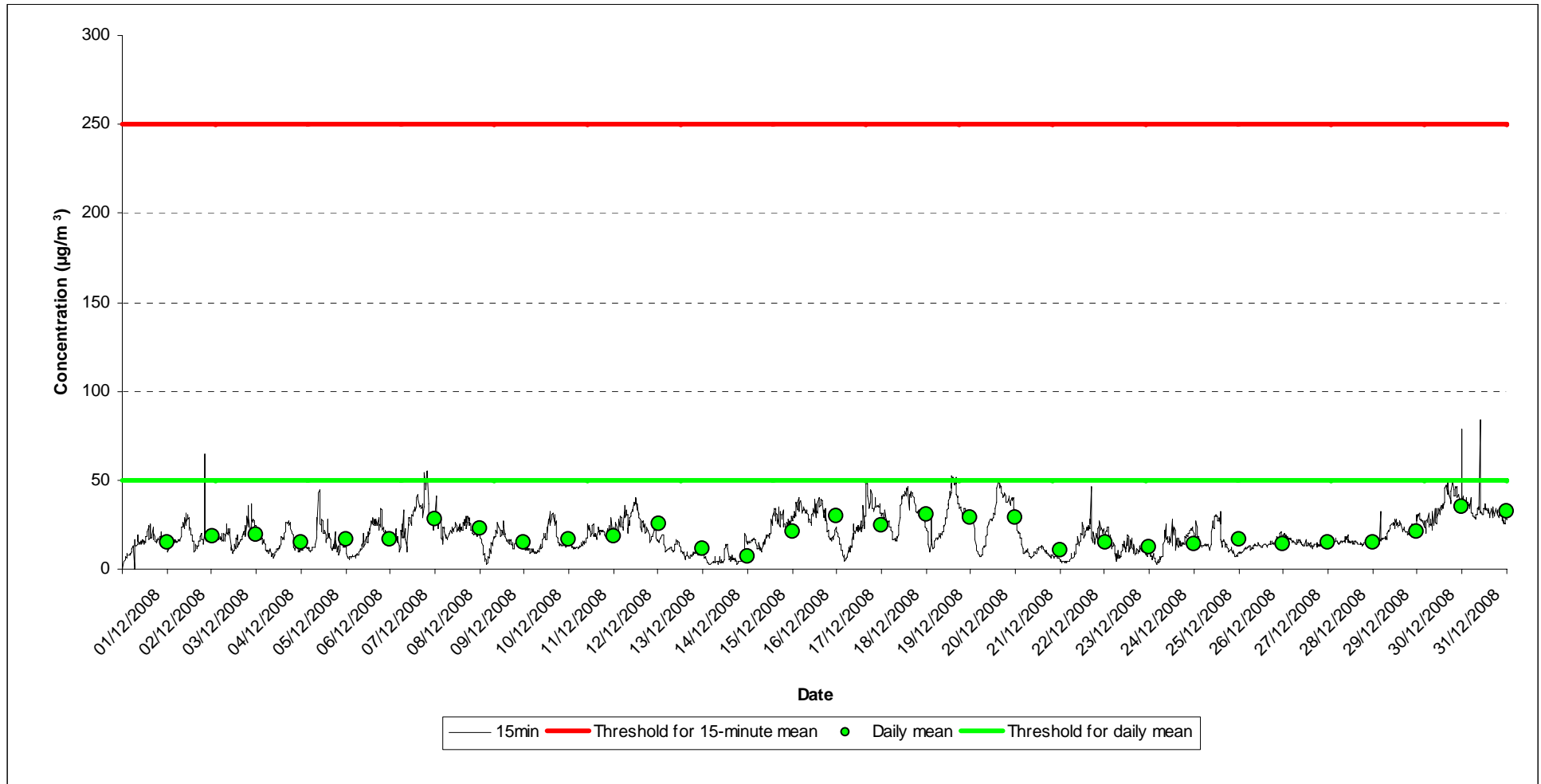
Site Name	Operator	December Mean (Exceedances)	Period Mean (Mar 08 – Dec 08) * (Exceedances **)
Quartermile Lane, Hackney	MCL	19.7 (0)	27.0 (16)
Ruckholt Close	Waltham Forest	28.4 (1) (36.9)^	24.4 (2) (31.7)^
Cam Road	Newham	24.4 (0)	24.0 (1)
Dawlish Close	Waltham Forest	16.7 (0) (21.8)^	16.9 (0) (21.9)^

*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year

^Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.5 - Quartermile Lane 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



Carpenters Road South, Newham (on-site)

- 3.21 The Carpenters Road South, Newham (PM10_09) December data included no exceedances of the 15-minute action limit and no exceedances of the daily mean.
- 3.22 The site began collecting data on the 23rd of September at CZ1a, near the boundary and about 50 metres east from the previous location of the analyser (PM10_03). The new location is closer to off-site residential receptors and is therefore a more representative location. The new site has so far been observed to have lower concentrations as it is nearer to the boundary. This section presents the period mean and exceedances of the new location (PM10_09) only. A full year of data is not available yet, and whilst results are therefore not yet directly comparable to Air Quality Objectives, they provide an indication of likelihood of compliance.
- 3.23 Mean concentration and daily exceedances at the Carpenters Road South location are well below their objective during the period of operation and concentrations at this location are likely to meet the annual mean objectives if they remain the same.

Table 3.5 - Carpenters Road South, Newham (on-site) PM₁₀ Concentrations – December and Rolling Period Mean Results (100 days; 23/09/08 – 31/12/08)

Site Name	Operator	December Mean (Exceedances)	Period Mean (Sep 08 – Dec 08) * (Exceedances **)
Carpenters Road South	BNL	21.3 (0)	23.5 (1)
Ruckholt Close	Waltham Forest	28.4 (1) (36.9) [^]	25.7 (1) (33.4) [^]
Cam Road	Newham	24.4 (0)	23.6 (0)
Dawlish Close	Waltham Forest	16.7 (0) (21.8) [^]	16.3 (0) (21.2) [^]

*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year

[^]Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.6 – Annual Trend of Carpenters Road South, Newham: Daily Mean PM₁₀ Compared to Local Background Site (Cam Road)

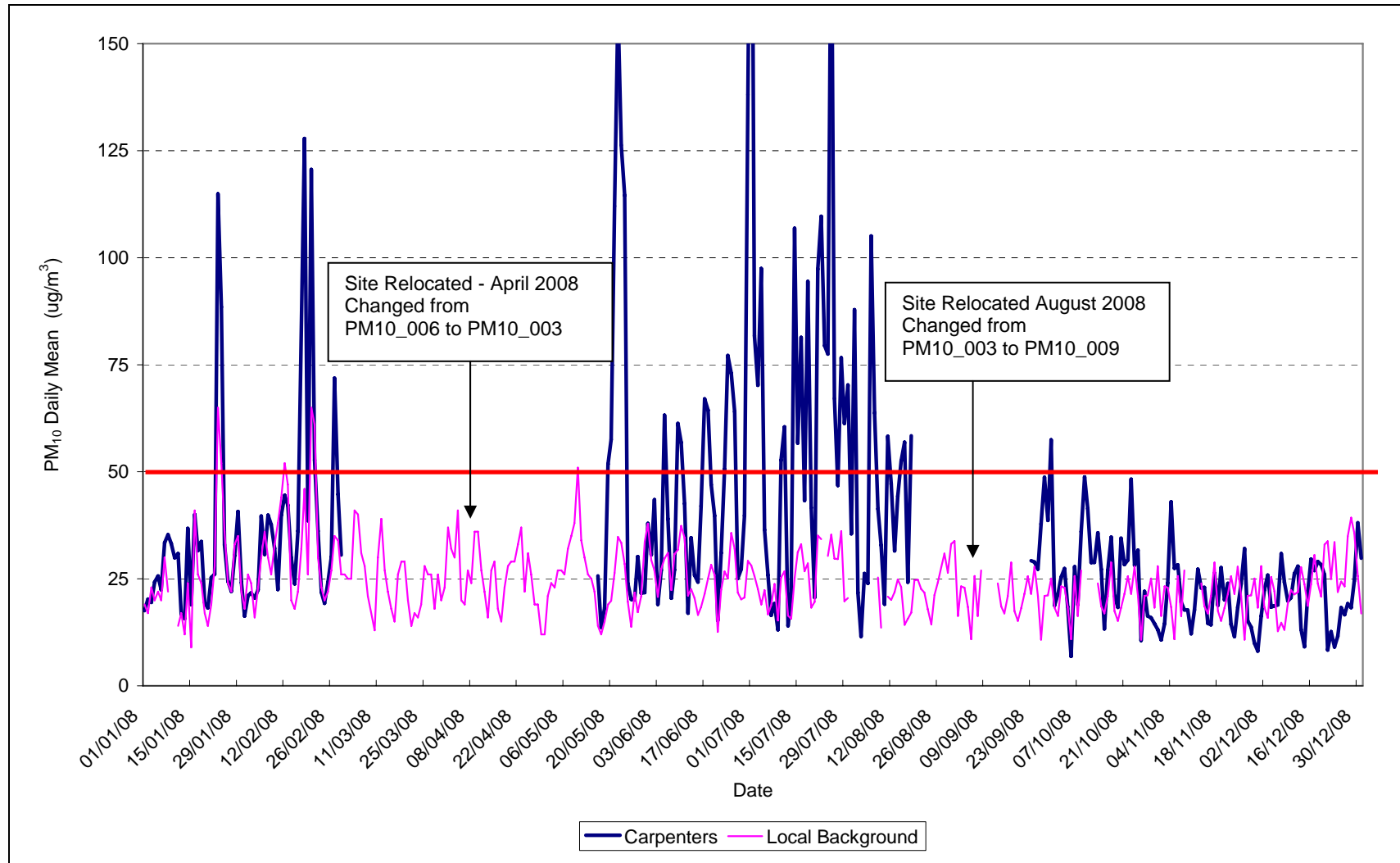
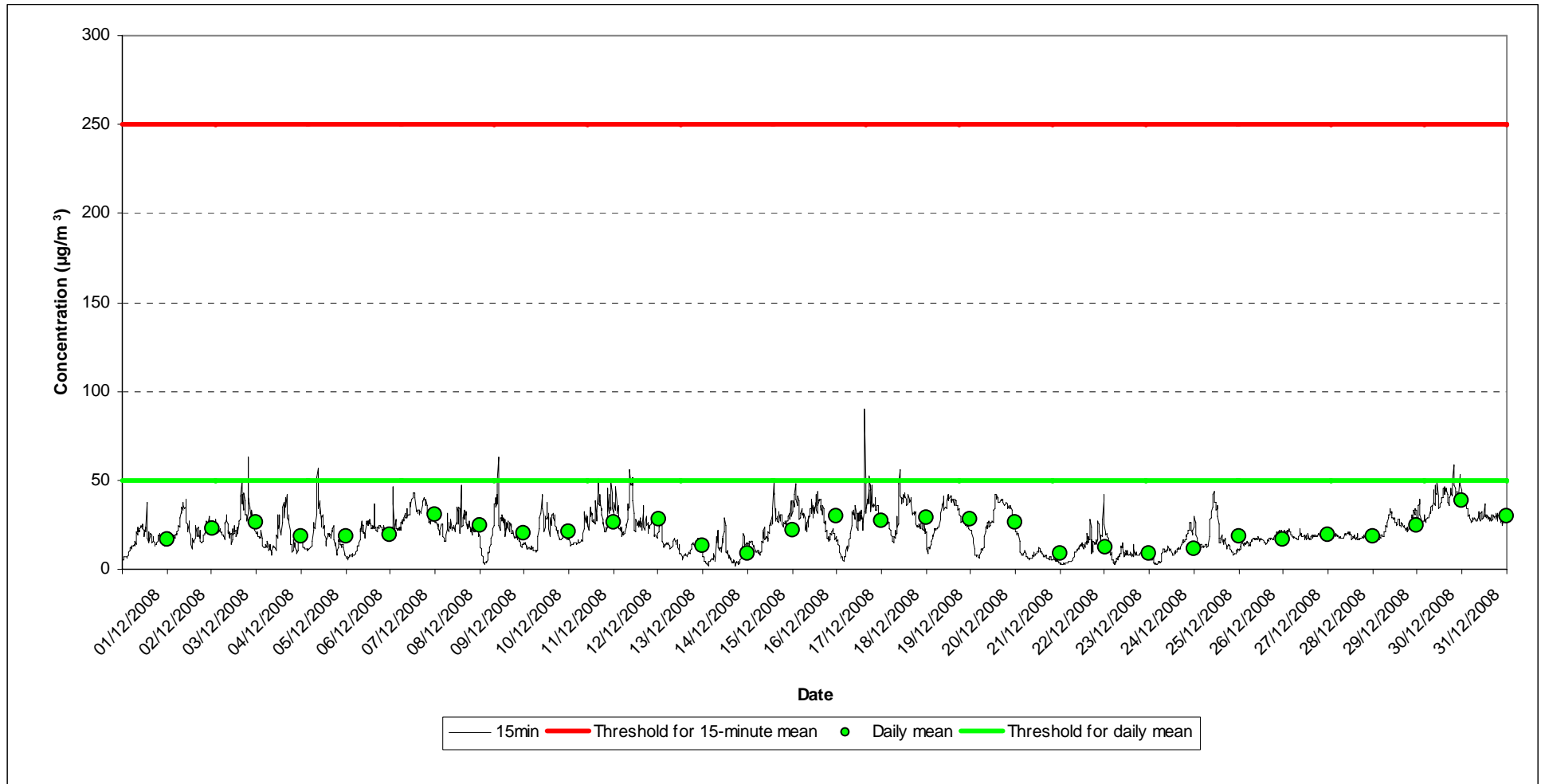


Figure 3.7 – Carpenters Road South, Newham 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



CZ4 Soil Wash, Tower Hamlets (on-site)

- 3.24 The CZ4 Soil Wash, Tower Hamlets (PM10_006) December data had no breaches of the 15-minute action limit and no exceedances of the daily mean.
- 3.25 The site has been collecting data since the 11th of January 2008; hence a full year set of data is not quite yet available. Whilst results are therefore not yet directly comparable to Air Quality Objectives, they provide an indication of the likelihood of compliance.
- 3.26 The period mean concentration is likely to meet the annual mean objective as it is currently below the objective and is generally reducing with better mitigation in place and wetter conditions. However, the number of daily exceedances has already exceeded the objective of 35 days. It should also be noted that the analyser is located on site, close to the main haul road through the site, and is not representative of relevant receptors to which the Objectives apply.
- 3.27 Soil washing operations in CZ5b ceased on the 19th of December 2008 and no material has been put through the system. Nevertheless, daily mean concentrations, as in other sites, appear highest during the 30th of December.

Table 3.6 – CZ4 Soil Wash, Tower Hamlets PM₁₀ Concentrations – December and Rolling Period Mean Results (356 days; 11/01/08 – 31/12/08)

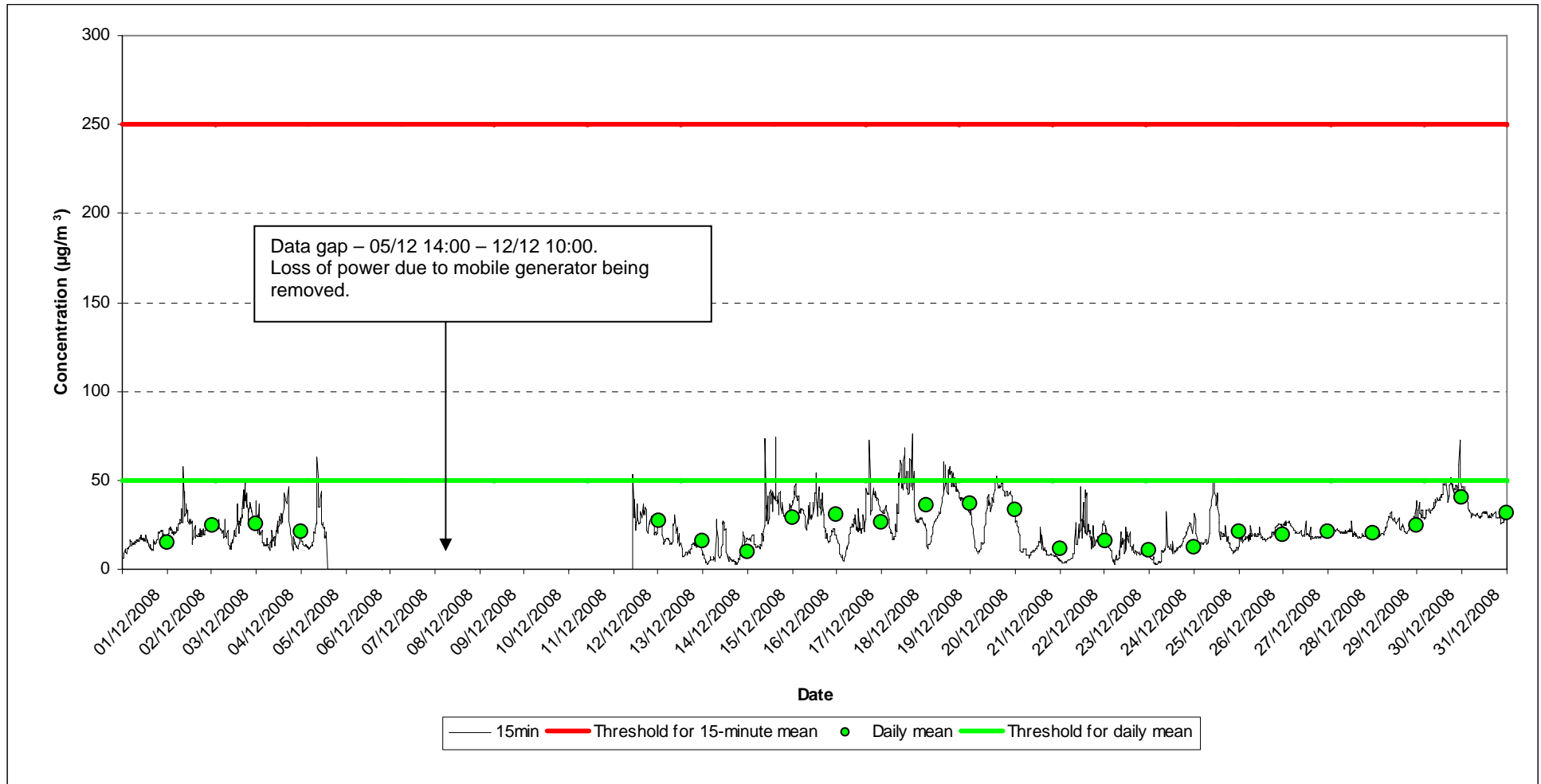
Site Name	Operator	December Mean (Exceedances)	Period Mean (Jan 08 – Dec08)* (Exceedances **)
CZ4 Soil Wash	BNL	23.2 (0)	33.5 (39)
Ruckholt Close	Waltham Forest	28.4 (1) (36.9) [^]	25.1 (6) (32.7) [^]
Cam Road	Newham	24.4 (0)	25.0 (6)
Dawlish Close	Waltham Forest	16.7 (0) (21.8) [^]	15.9 (2) (20.7) [^]

*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year

[^]Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.8 - CZ4 Soil Wash, Tower Hamlets (on-site) 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



Boundary Monitoring – Metronet, Waltham Forest

- 3.28 Additional PM₁₀ monitoring commenced in August recording PM₁₀ at additional boundary or off-site locations. They included locations in CZ8a (later moved offsite to Marshgate Lane), CZ8c and an external location referred to as Metronet, approximately 100 metres east of CZ7a. The external Metronet analyser is part of the supplementary Boundary Monitoring regime. It is located on Metronet land behind residential properties along Westdown Road, adjacent to the North London line.
- 3.29 The Metronet, Waltham Forest (PM10_012) December data had no breaches of the 15-minute action limit and no exceedances of the daily mean objective. Loss of power to the analyser, however, resulted in a ten day data gap in December.
- 3.30 Monitoring at the Metronet site commenced on the 8th of October but considered robust only from the 15th of October. A full year of data is not available yet, and whilst results are therefore not yet directly comparable to Air Quality Objectives, they provide an indication of likelihood of compliance.
- 3.31 The overall data set for this site is insufficiently large to directly compare with Air Quality Objectives.

**Table 3.7– Metronet, Waltham Forest PM₁₀ Concentrations –
December and Rolling Period Mean Results (78 days; 15/10/08 – 31/12/08)**

Site Name	Operator	December Mean (Exceedances)	Period Mean (Oct 08 –Dec 08)* (Exceedances **)
Metronet	Hyder	18.7 (0)	22.4 (0)
Ruckholt Close	Waltham Forest	28.4 (1) (36.9)^	24.0 (1) (31.1)^
Cam Road	Newham	24.4 (0)	22.7 (0)
Dawlish Close	Waltham Forest	16.7 (0) (21.8)^	15.2 (0) (19.7)^

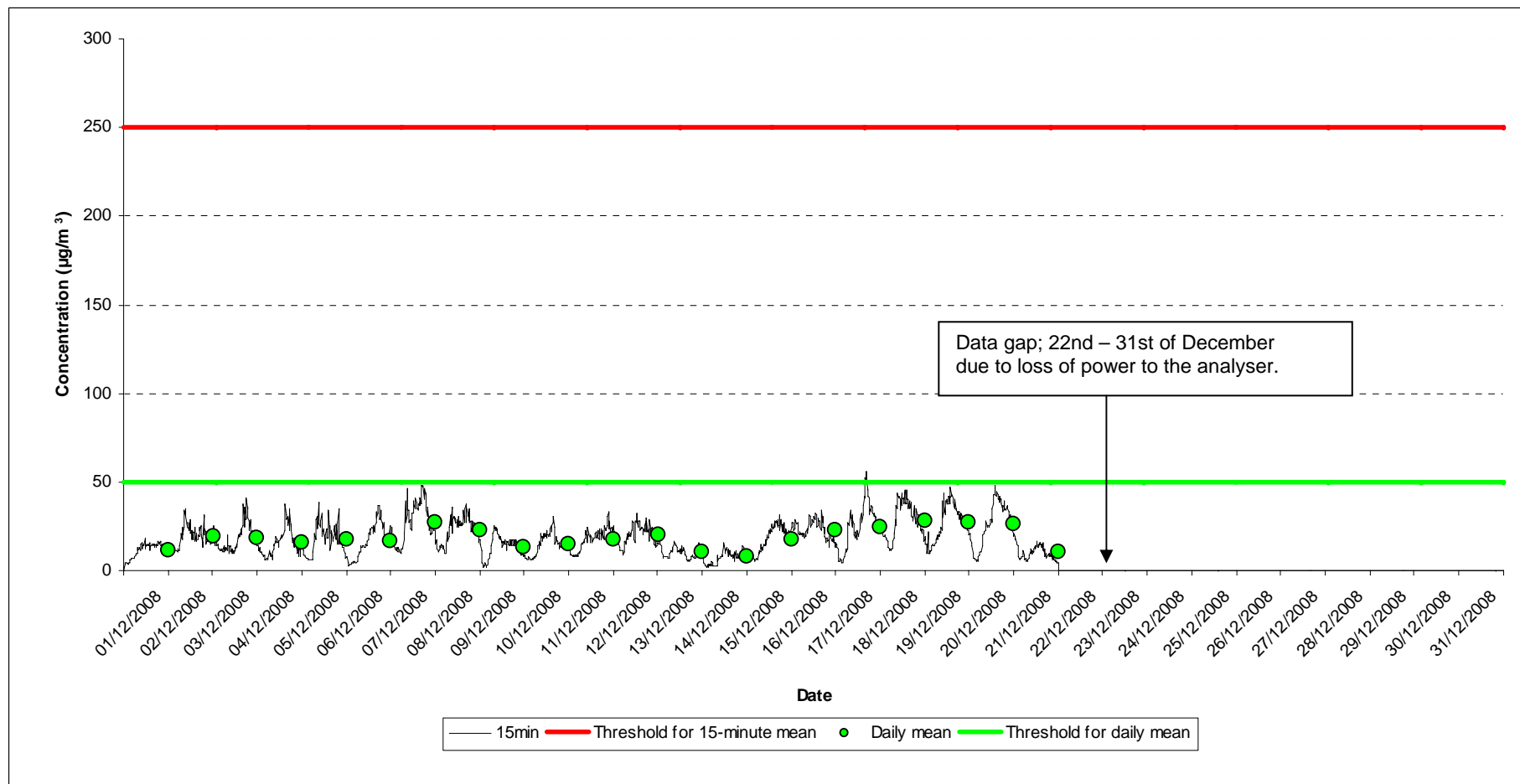
*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year;

Italics – indicates < 75% data capture

^Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.9 – Metronet, Waltham Forest 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



Boundary Monitoring – Marshgate Lane, Newham (CZ8a)

- 3.32 The Marshgate Lane (PM10_010) December data included one exceedances of the 15-minute action limit on Monday 22nd December and no exceedances of the daily mean objective. There was a westerly wind direction during the 15-minute exceedance period. The exceedance is not related to the Olympics park activities since no activity was taking place within the Olympics Park due to the Christmas break. Loss of power to the analyser resulted in a ten day data gap in December resulting in less than 75 percent data capture.
- 3.33 The analyser is part of the supplementary Boundary Monitoring regime. It was located on the Bow Back River boundary wall, south east of CZ8a and had been collecting data since the 13th of August 2008. The analyser was removed at the beginning of November due to works affecting the hoarding to which it was attached. The analyser was relocated off-site to the nearest dwelling to the Olympic Park boundary on the 17th of November and has subsequently been referred to as Marshgate Lane.
- 3.34 The overall data set for this site is insufficiently large to directly compare with Air Quality Objectives.

**Table 3.8–Boundary Monitoring – Marshgate Lane, Newham PM₁₀ Concentrations
December and Rolling Period Mean Results (141 days; 13/08/08 – 31/12/08)**

Site Name	Operator	December Mean (Exceedances)	Period Mean (Aug 08 – Dec 08) * (Exceedances **)
Marshgate Lane	Hyder	23.2 (0)	30.2 (9)
Ruckholt Close	Waltham Forest	28.4 (1) (36.9)^	25.7 (1) (33.4)^
Cam Road	Newham	24.4 (0)	23.0 (0)
Dawlish Close	Waltham Forest	16.7 (0) (21.8)^	15.9 (0) (20.6)^

*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year

Italics – indicates < 75% data capture

^Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.10 – Marshgate Lane, Newham 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)

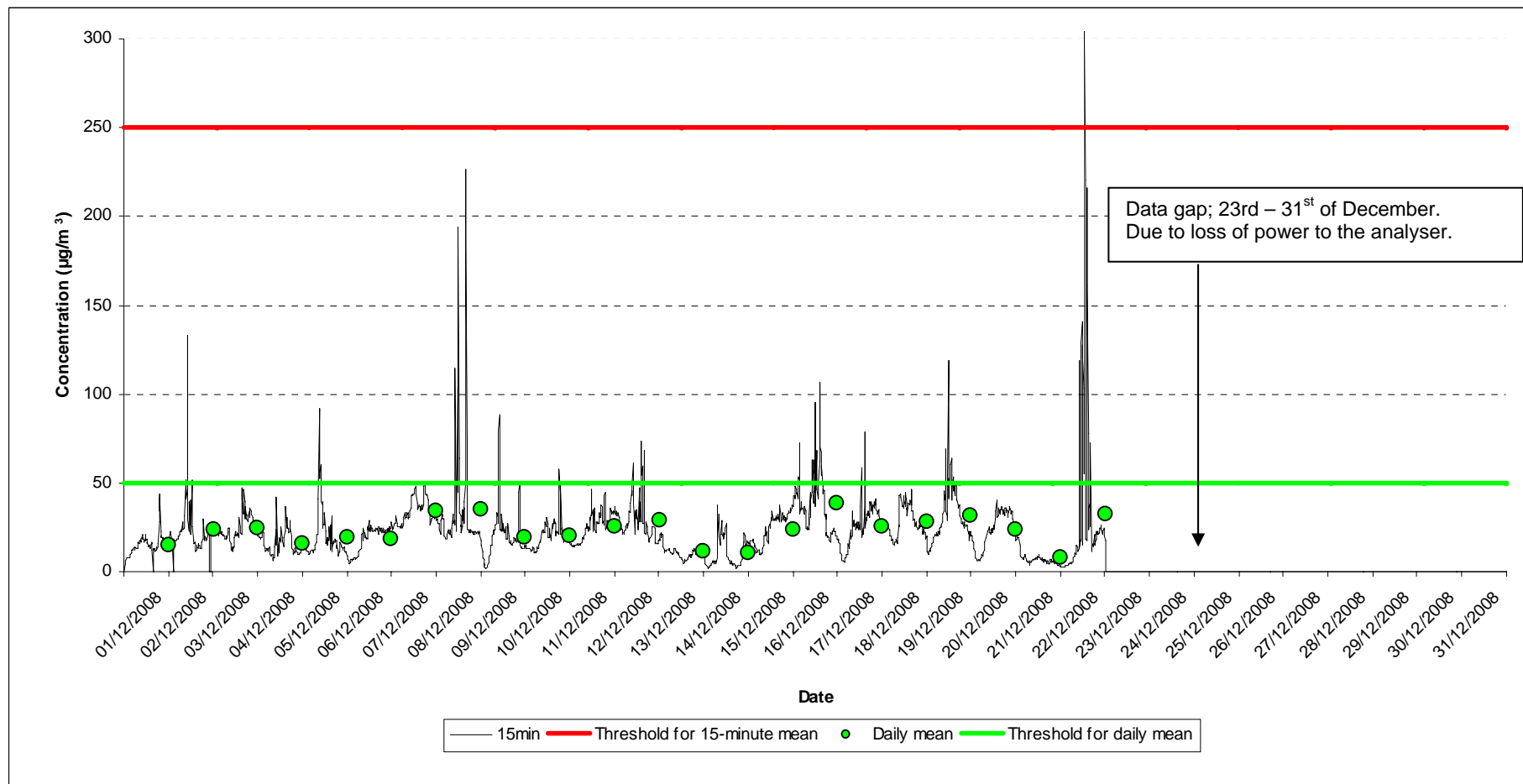


Table 3.9 – Marshgate Lane, Newham, 15-minute Site Action Limit* Breaches – December

Date	Day	Time	No. of breaches	Maximum Exceedance ($\mu\text{g}/\text{m}^3$) (15-min)	Wind Direction (15-min)	Wind Speed (m/sec) (15-min)	Rainfall (mm/hour) (15-min)	Temperature (Celsius) (15-min)	Possible Source	Mitigation at Olympic Park
22-Dec	Monday	1230 – 1245	1	323.1	W (analyser is downwind of Olympic Park)	1.2	0.0	12.4	Source likely to be unrelated to Olympic Park activity as site was inactive.	n/a – one-off incidence.
Total			1							

* London Best Practice Guidance for the Control of Dust and Emissions from Construction and Demolition (2006) recommends a minimum site action limit of $250 \mu\text{g}/\text{m}^3$ over a 15 minute average

Boundary Monitoring – Bridgwater Road, Newham (On-site CZ8c)

- 3.35 The Bridgwater Road (PM10_011) December data had no breaches of the 15-minute action limit and no exceedances of the daily mean objective.
- 3.36 The analyser is part of the supplementary Boundary Monitoring regime. It is located on the wall of substation at the entrance to CZ8c on Bridgwater Road. The site has been collecting data since 19th August 2008, hence a full year's set of data is not yet available. The results are therefore not yet directly comparable to Air Quality Objectives, but they provide an indication of the likelihood of compliance.
- 3.37 Mean concentration and daily exceedances at the Bridgwater Road location are well below their objective during the period of operation and concentrations at this location are likely to meet the annual mean objectives if they remain the same.

**Table 3.10 – Boundary Monitoring –Bridgwater Road, Newham (On-site CZ8c)
PM₁₀ Concentrations
December and Rolling Period Mean Results (135 days; 19/08/08 – 31/12/08)**

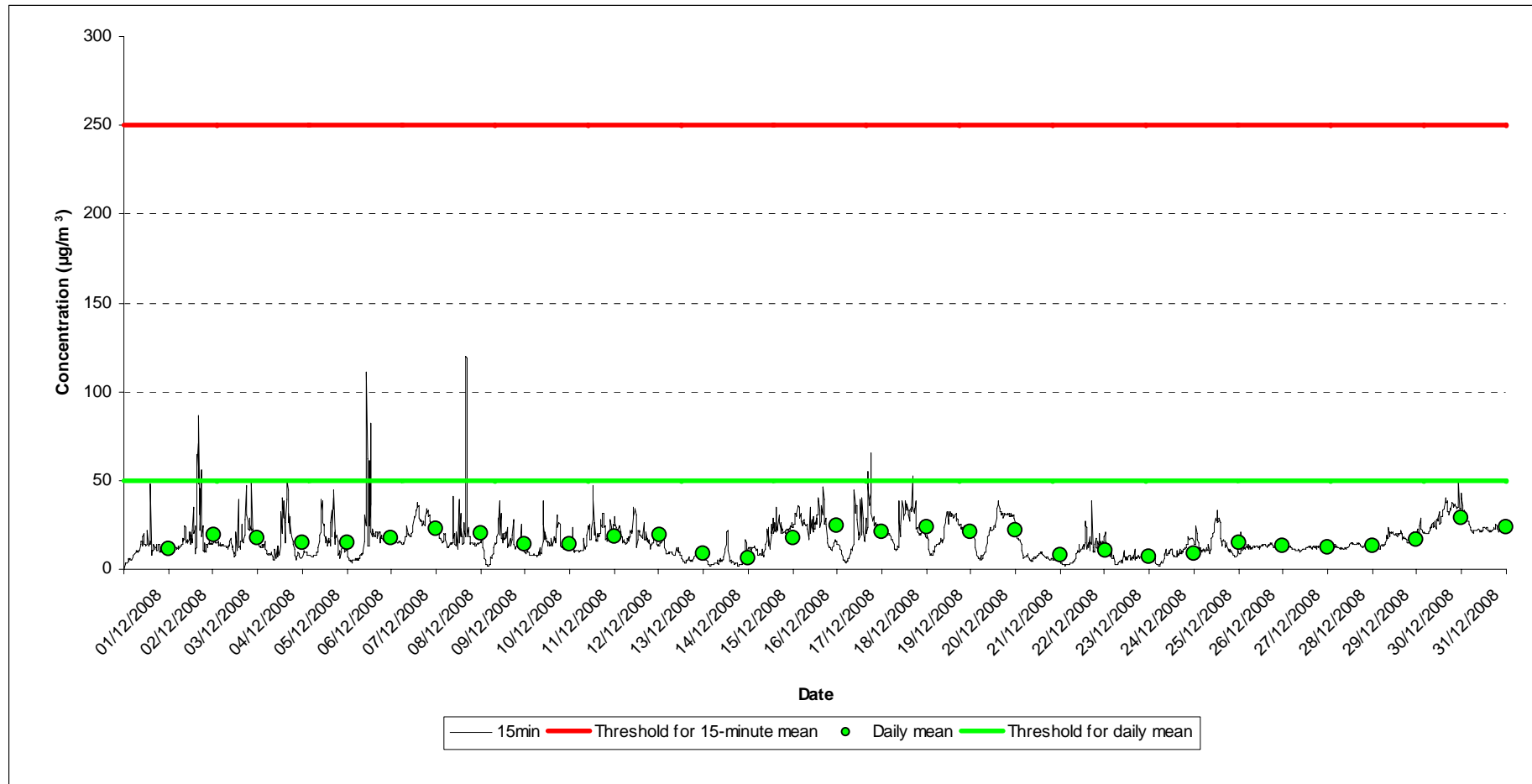
Site Name	Operator	December Mean (Exceedances)	Period Mean (Aug 08 – Dec 08) * (Exceedances **)
Bridgwater Road, Newham (CZ8c)	Hyder	16.3 (0)	24.3 (4)
Ruckholt Close	Waltham Forest	28.4 (1) (36.9)^	25.7 (1) (33.4)^
Cam Road	Newham	24.4 (0)	23.1 (0)
Dawlish Close	Waltham Forest	16.7 (0) (21.8)^	15.9 (0) (20.7)^

*Annual Mean Objective of 40 µg/m³

** Objective is less than 35 exceedances of a 24 hour mean of 50 µg/m³ per year

^Ruckholt Close and Dawlish Road are not Osiris sites; PM₁₀ is monitored by FDMS. Mean data provided in gravimetric units is presented in brackets.

Figure 3.11 – Bridgwater Road 15-minute mean and daily mean PM₁₀ Concentrations – December (µg/m³)



Dust Results

- 3.38 This section discusses results of monitoring at off-site and boundary locations. The dust data are collected weekly over a period of five weeks to include all of December (see Appendix E for week periods). A full treatment of the results is given in Appendix C. Only locations which exceeded the 5% relative soiling (Effective Area Coverage) criterion are generally discussed in detail; however, during December, all sites, including on-site locations, had soiling levels below the 5% coverage.
- 3.39 Table 3.11 below summarises the weeks when exceedances of the suggested guideline thresholds were observed, as well as the relevant directional bearing for all off-site and boundary sites.
- 3.40 The bearing of the maximum %EAC can assist in determining the dust source. The wind direction in month was predominantly from the south west (see Figure 3.1) which also helps in assessing the dust source.
- 3.41 Appendix F usually presents an examination of >5% EAC events by week and location, but no sites exceeded the 5% threshold during December. The “traffic light” matrix in Appendix G provides an in-month snapshot of relative soiling at off-site and boundary locations. The higher number of decreases observed in the maximum concentration is consistent with the number of green entries, indicating a decrease in soiling as it appears more often throughout the matrix than the red colour. Arguably the overall trend observed is that of a slight decrease in soiling.

Table 3.11 - Exceedances of Guideline Threshold Values at Directional Dust Sticky Pads

Site Reference	Construction Zone Reference	Direction							
		North		East		South		West	
		Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC
Off-site Fablon Sticky Pads:									
Dust_01	Offsite (7)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_02	Offsite Residential	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_03	Offsite (6)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_09	Offsite (5c)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_11	Offsite (5c)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_11D1	Offsite (5c)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_17	Offsite Residential (1a)	n/e	n/e	n/e	n/e	Week 3	n/e	Week 3	n/e
Dust_20	Offsite Residential (1a)	n/e	n/e	Week 1	n/e	n/e	n/e	n/e	n/e
Dust_21	Offsite residential (1b)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_20A	Offsite residential (1a / 8c)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_22	Offsite residential and school (OLY 3)	Week 2	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_24	Offsite – residential (OLY 3/ 12)	Week 1, 2, 3	n/e	Week 3	n/e	n/e	n/e	Week 3	n/e
Dust_25	Offsite (8c / 8b)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_26	Offsite (8c / 8b)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_27	Offsite (OLY 3)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_28	Offsite (OLY 4)	n/e	n/e	Week 1, 2, 3	n/e	n/e	n/e	n/e	n/e
Dust_29	Offsite (OLY 4)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_31	Offsite (8)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_32	Offsite (8c)	n/e	n/e	n/e	n/e	n/e	n/e	Week 1	n/e
Dust_45	Offsite (11)	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e

Site Reference	Construction Zone Reference	Direction							
		North		East		South		West	
		Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC
Boundary Fablon Sticky Pads:									
Dust_10	5c	n/e	n/e	No Data	No Data	No Data	No Data	No Data	No Data
Dust_12	5a/5b	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Dust_13A	4	Week 1	n/e	Week 3	n/e	Week 3	n/e	n/e	n/e
Dust_13	4	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_14	6a/ 6c	Week 4	n/e	n/e	n/e	n/e	n/e	Week 4	n/e
Dust_15	4	n/e	n/e	n/e	n/e	Week 3	n/e	No data	No data
Dust_16	4	n/e	n/e	n/e	n/e	n/e	n/e	No data	No data
Dust_18	1a	No Data	No Data	n/e	n/e	n/e	n/e	n/e	n/e
Dust_19	4	No Data	No Data	n/e	n/e	No Data	No Data	No Data	No Data
Dust_23	3a	n/e	n/e	n/e	n/e	n/e	n/e	No Data	No Data
Dust_37	5b	n/e	n/e	No Data	No Data	No Data	No Data	No Data	No Data
Dust_38	5c	n/e	n/e	No Data	No Data	No Data	No Data	No Data	No Data
Dust_39	7a	n/e	n/e	n/e	n/e	Week 1	n/e	n/e	n/e
Dust_40	6a/ 6c	n/e	n/e	n/e	n/e	Week 1	n/e	n/e	n/e
Dust_41	7a	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e
Dust_46	3a	n/e	n/e	n/e	n/e	n/e	n/e	No Data	No Data
Dust_47	3a	n/e	n/e	n/e	n/e	No Data	No Data	n/e	n/e
Dust_48	4	No Data	No Data	n/e	n/e	No Data	No Data	No Data	No Data
Dust_50	7a	n/e	n/e	No Data	No Data	No data	No data	No data	No data
Dust_52	5b	n/e	n/e	n/e	n/e	n/e	n/e	n/e	n/e

Site Reference	Construction Zone Reference	Direction							
		North		East		South		West	
		Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC	Weeks >2% EAC	Weeks >5% EAC
Dust_57	7a	Week4	n/e	No Data	No Data	No Data	No Data	No Data	No Data
Dust_61	6a/ 6b	n/e	n/e	No Data	No Data	No Data	No Data	No Data	No Data
Dust_62	6b	Week 4	n/e	No Data	No Data	No Data	No Data	No Data	No Data
Dust_63	6a	n/e	n/e	No Data	No Data	No Data	No Data	No Data	No Data

italic numbers in >2% EAC columns indicate >5% EAC; n/e – no exceedances

4. Conclusions

- 4.1 PM_{10} data were available for periods of between three month to over one year. Gainsborough School and Greenway have both collected over a year's worth of data. Data from both sites show compliance with both the annual mean and the number of daily exceedances permitted. Other sites have yet to complete a full year of monitoring and are therefore not directly comparable with long-term Air Quality Objectives, which are applied on an annual basis. The on-site analyser at the CZ4 Soil Wash (Tower Hamlets) has recorded a gradual decrease in PM_{10} concentrations due to dust control measures and favourable weather conditions. The annual mean is now likely to be less than the annual mean PM_{10} criterion if results remain similar to the past couple of months. The Quartermile Lane, Carpenters Road, and the three boundary "health monitoring" sites also appear likely to meet this annual mean PM_{10} criterion.
- 4.2 Data from on-site analysers strongly suggests that maximum permitted number of 35 exceedances of the 24 hour mean concentration for PM_{10} criterion may not be met at one or more of the sites. The number of daily exceedances permitted in a year had already been exceeded at the CZ4 Soil Wash on-site location with 39 exceedances so far. Boundary monitoring at CZ8a and CZ8c has collected around four months worth of data, but if considered pro rata, the number of days above $50 \mu\text{g}/\text{m}^3$ permitted is likely to be exceeded at CZ8a. However, this analyser has been relocated in November to an off-site location more representative of human exposure (Marshgate Lane) and appears to have since recorded reduced concentrations. The previous location of the on-site analyser at Carpenters Road (Newham) also recorded over 35 daily exceedances permitted, but has since been relocated closer to the boundary and recorded reduced concentrations. Finally, the Quartermile Lane analyser, also located on-site but close to receptors, is recording concentrations below the annual objective which is expected to be met, once a full year's worth of data is collected.
- 4.3 None of the on- or off-site analysers recorded any exceedance of the 24-hour PM_{10} criterion during December.
- 4.4 A one-off breach of the 15 minute site action level was recorded at Marshgate Lane on Wednesday, the 22nd of December at 12:30 PM. The exceedance is not thought to be related to the Olympic park since no activity was taking place due to the Christmas break.
- 4.5 The PM_{10} data at the Olympic Park Osiris sites appear to generally follow the trends of the local analysers. Concentrations have generally decreased in month, as expected with the wet and cold winter conditions but also suggesting that dust abatement measures are having the desired effect, though the site was inactive for eleven days in December.
- 4.6 Soiling rates did not exceeded the >5% EAC criterion in any of the weeks. A reduction in soiling was observed in comparison to the previous month of November. The wind direction in month as recorded on-site was predominantly west south-westerly.
- 4.7 The trends in relative soiling observed from November to December, as with previous trends, do not follow an obvious pattern. This is to be expected given the nature of the measurement technique. The overall trend in %EAC from November to December on each bearing has shown more decreases than increases or instances of no change.

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Appendix A - Locations of Monitoring Sites

Table A.1 - Monitoring Locations of Sticky Pads (Dust) and Osiris Analysers (PM₁₀)

Park-wide ID	OS Grid Reference		Description	Managed by	Delivery Zone	Change from Previous Report	Missing or Delayed
Dust_01	537852	186049	Located on lamp column at the end of the cul-de-sac outside 33 Ruckholt Close. Urban Background site	MCL	Off-site (7)	None	-
Dust_02	538881	185772	Background site on lamp post outside Downsell Primary School and opposite No. 34 Hall Road E15	MCL	Off-site (Residential)	None	-
Dust_03	538255	185665	141 Westdown Road. Urban Background site	MCL	Off-site (6)	None	-
Dust_09	537034	184940	Rear of Wick Village TMC on lamp column on Windsor Wharf, outside Ferry House. Urban Background site	MCL	Off-site (5c)	None	-
Dust_10	537062	184948	Towing path on canal opposite Windsor Wharf. Urban Background site. Only one direction is available (North).	MCL	Boundary (5c)	None	-
Dust_11	537103	184830	Leabank Square. Urban Background site	MCL	Off-site (5c)	None	-
Dust_11A	537103	184830	Duplicate for site	MCL	Off-site (5c)	None	-
Dust_13A	537516	184561	Carpenters Rd - Lamp post 100m West of road bridge over River Lea.	BNL	On-site (4)	None	-
Dust_13	537320	184511	River Lea – adjacent to railway bridge. Urban Background site	BNL	Boundary (4)	None	-
Dust_14	538127	185520	Located on lamp column 30 metres west of the site entrance to Fitzpatrick's depot on Temple Mill Lane. Kerb Site	MCL	Boundary (6a)	None	-
Dust_15	537348	184423	Bow Industrial Park. Kerb site. Pad wrapped around hoarding post monitoring in 3 directions only (N, E & S)	BNL	Boundary (4)	None	-
Dust_16	537386	184173	Bow Industrial Park. Kerb site. Pad wrapped around hoarding post monitoring in 3 directions only (N, E & S)	BNL	Boundary (4)	None	-
Dust_17	538397	184056	Gibbins Road. Lamp post 61 adjacent to Flats Urban Background site	BNL	Off-site (Residential/ 1a)	None	-
Dust_18	538140	183968	Lamp post 15 opposite entrance to foot bridge over Water Works River Warton Road. Kerb site	BNL	On-site (1a)	None	Week 1 – Dust Pad Missing

Park-wide ID	OS Grid Reference		Description	Managed by	Delivery Zone	Change from Previous Report	Missing or Delayed
Dust_19	537406	184017	Lamp post 16 in car parking bay at rear of Old Ford Lock House. Kerb site	BNL	Boundary (4)	None	-
Dust_20	538308	183925	Lamp post 20 Rear of 1-27 Biggerstaff Road Adjacent to Lund Point Tower Block	BNL	Off-site (Residential/ 1a)	None	-
Dust_20A	538394	184162	Biggerstaff Rd Denison Point, Lamp post adjacent to flats	BNL	Off-site (Residential/ 1b)	None	-
Dust_21	538332	183879	Lamp post 10 44-46 Biggerstaff Road0	BNL	Off-site (Residential/ 1a/ 8c)	None	-
Dust_22	538329	183805	Lamp post on Friendship Way / Warton Rd adjacent to flats 26 -38b	BNL	Off-site (Residential/ School/ 8c)	None	-
Dust_23	537482	183884	Construction Zone 3a adjacent to The Greenway	BNL	On-site (3a)	None	-
Dust_24	538496	183651	Rick Roberts Lamp post adjacent to mini roundabout	BNL	Offsite – residential (OLY 3/ Planning Delivery Zone 12)	None	-
Dust_25	538114	183623	Otter Close. Lamp post at West end of close adjacent to Flat no 85 -92	BNL	Off-site (8c / 8b)	None	-
Dust_26	538209	183588	Otter Close. Lamp post at East end of close adjacent to Flat no's 61 -68	BNL	Off-site (8c / 8b)	None	-
Dust_27	536996	183638	On lamp post on Legion Terrace outside Flora House	MCL	Off-site (Residential/ Planning Delivery Zone 14/ 3b)	None	-
Dust_28	537578	183208	West Side of Blackwall approach tunnel Road. Lamp post W7948 on road adjacent to Park East Apartment Building	BNL	Off-site (Planning Delivery Zone 14/ 3b)	None	-
Dust_29	537387	183369	West Side of Blackwall approach tunnel Road. Lamp post W 10513 on bottom of Wrexham Road adjacent to Paddock St	BNL	Off-site (Residential/ 3b)	None	-
Dust_31	538059	183329	Lamp Post On Bridge over Bow Back River adjacent to Porsche Garage	BNL	Off-site (8a)	None	-
Dust_32	538587	183299	Junction of Abbey Lane and Gay Road	BNL	Offsite – residential (OLY 3/ Planning Delivery Zone 12)	None	-
Dust_37	537259	184660	Located on western boundary fence at the far end of the site (bordering the canal). Only one direction is available	MCL	Boundary (5b)	None	-

Park-wide ID	OS Grid Reference		Description	Managed by	Delivery Zone	Change from Previous Report	Missing or Delayed
			(North).				
Dust_38	537105	184897	River Lea – Disused Footbridge. Urban Background site. Only one direction is available (North).	MCL	Boundary (5c)	None	Week 1 – Value was 0%
Dust_39	537673	185915	On lamp column near junction of Temple Mill Lane and Ruckholt Road on opposite side of fence to original site.	MCL	Boundary (7a)	None	-
Dust_40	538103	185578	Located on lamp column on cycle track behind clays lane estate	MCL	On-site (6a)	None	-
Dust_41	537545	185663	On lamp Column at Junction of Quatermile Lane and Core Office	MCL	On-site (7a)	None	-
Dust_45	538473	185352	On lamp column outside depot on Leyton Road	MCL	Off-site (Planning Delivery Zone 11)	None	-
Dust_46	537516	183821	Zone 3a on South Hoarding. Pad wrapped around hoarding post monitoring in 3 directions only (N, E & S)	BNL	Boundary (3a/ 3b)	None	-
Dust_47	537612	183794	Zone 3 on South Hoarding. Pad wrapped around hoarding post monitoring in 3 directions only (N, E & S)	BNL	Boundary (3a/ 3b)	None	-
Dust_48	537298	184588	North West Corner of Kings Yard. Only site direction is available (East).	BNL	Boundary (4)	None	Week 2 – Dust Pad Missing
Dust_50	537514	185625	South side of boarding at Quatermile Lane Travellers' site. Only one direction is available (North).	MCL	Boundary (7a)	None	Week 2 – Value was 0%
Dust_52	537346	185377	Waterden Rd entry gates northern	MCL	Boundary (5a/ 5b)	None	-
Dust_57	537832	185569	Located on fence pole, SE of Core Team Office. Only one direction is available (North).	MCL	On-site (7a)	None	-
Dust_61	538029	185380	Dust_61, 62 and 63 are flat boards located on fences therefore only one direction is available (North).	MCL	On-site (6b)	None	Week 1 and 2 – Sample missing on collection.
Dust_62	537981	185269	Dust_61, 62 and 63 are flat boards located on fences therefore only one direction is available (North).	MCL	On-site (6b)	None	-
Dust_63	537806	185004	Dust_61, 62 and 63 are flat boards located on fences therefore only one direction is available (North).	MCL	On-site (6a)	None	-
PM10_02 (Gainsborough Primary School, Hackney)	537037	184928	Gainsborough Community Primary School. Background Site	MCL	Off-site Residential and School (5c)	None	-
PM10_09 (Onsite, Newham)	538227	184159	On the hoarding around the Murphy's site, approximately 100 metres south-east along Carpenters Road	BNL	On-site (1b)	None	-

Park-wide ID	OS Grid Reference		Description	Managed by	Delivery Zone	Change from Previous Report	Missing or Delayed
(Carpenters Road South))							
PM10_08 (West Greenway, Newham)	537396	183831	The Greenway, re-positioned on the 10/07/08. The monitor will be moved in the new year and will become PM10_013 due to lack of power between daytime hours at PM10_08.	BNL	3a/ 3b	None	Data gap b/w 01/12/08 00:00 to 04/12/08 14:45 (Power to Osiris monitor lost, blown fuse in lamp post, Nuttall electrician replaced fuse on Thursday afternoon (04/12/08). Daily ongoing data gap from the 22/12/08 - power to lamp post was shut-off during daylight hours, therefore no power available to analyser between 7:30 – 16:00
PM10_06 (On site monitor, Tower Hamlets (CZ4 Soil Wash))	537332	184458	On hoarding at CZ4, co-located with weather station.	BNL	On-site (4)	None	Data gap b/w 05/12/08 13:45 to 12/12/08 10:30 (loss of power to Osiris monitor due to mobile generator being removed. Osiris monitor connected to mains supply (fuse box) on Friday 12/12/08)
PM10_07 (Quartermile Lane, Hackney)	537543	185666	Located near core team office	MCL	7a	None	-
PM10_010 (Marshgate Lane, Newham (Site 8a))	537989	183306	South east of zone 8A, located on Bow Back River boundary wall	Hyder	Off-site (8a)	None	Data ends at 23/12/08 (the data loss is due to power loss as the monitors are powered by batteries rather than being connected to a mains supply)
PM10_011 (On site Monitor, Newham (Site 8c))	538228	183763	On wall of substation at entrance to zone 8C along Bridgewater Road	Hyder	On-site (8c)	None	-

Park-wide ID	OS Grid Reference		Description	Managed by	Delivery Zone	Change from Previous Report	Missing or Delayed
PM10_012 (Metronet, Waltham Forest)	538224	185638	Located on Metronet land behind residential properties along Westdown Road. Adjacent to underground.	Hyder	Off-site	None	Data ends at 22/12/08 (the data loss is due to power loss as the monitors are powered by batteries rather than being connected to a mains supply)

Appendix B – Background Information on the Parameters Covered

- B.1.1 The December report summarises the monitoring results over the period 01/10/2008 to 31/10/2008. This appendix includes background information to the parameters covered, their guidelines, criteria, monitoring coverage and techniques used.

Parameters

- B.1.2 The parameters covered in the scope of the report are deposited dust and fine particulate matter with an effective aerodynamic diameter of less than 10 micrometres (PM₁₀).
- B.1.3 Data are expressed as percentage effective area coverage (%EAC) for dust and micrograms per cubic metre (µg/m³) for PM₁₀.

Suggested Guidelines for Dust

- B.1.4 No statutory criteria for deposited dust or soiling are currently published in the United Kingdom. Although there are no statutory criteria, some guidance is provided in such publications as the UK Department of the Environment document "The Environmental Effects of Dust from Surface Mineral Workings" (1991) and more latterly the Environment Agency Guidance note M17 "Monitoring of particulate matter in ambient air around waste facilities" (2004). All publications suggest guidelines for dust monitoring as both deposition rates and soiling.
- B.1.5 These publications suggest a guideline of 200 milligrams per square metre per day (mg/m²/d) for general dust deposition and a guideline for soiling or percentage of Effective Area Coverage per day (% EAC) of 0.2% as noticeable, 0.5% as a marginal nuisance, 2.0% as a probable nuisance and 5.0% as a severe nuisance.
- B.1.6 Further background on sampling rationale, strategy and guidelines can be found in the 2007 January to November Summary Report.

Statutory and Advisory Criteria for Fine Particulate Matter

- B.1.7 The Government's Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS¹) provides details of national air quality standards and objectives for a number of local air pollutants, including PM₁₀.
- B.1.8 The air quality criteria for PM₁₀ are detailed in Table B.1.

Table B.1 – Local Air Quality Criteria

Pollutant	Objective	Compliance date
PM ₁₀	24-hour mean concentration should not exceed 50µg/m ³ more than 35 times a year	31 December 2004 [1 January 2005]
	Annual mean concentration should not exceed 40µg/m ³	
Notes: [] denotes EU Limit Value compliance date in UK Regulations		

- B.1.9 Air quality objectives for PM₁₀ are that the daily mean should not to exceed 50 µg/m³ more than 35 days per year and the annual mean must not exceed 40 µg/m³. Additionally, the London Best Practice Guidance for the Control of Dust and Emissions from Construction and Demolition (2006) suggest a site action limit of 250 µg/m³ over a 15 minute average. This guideline has been adopted by the Tier 1 contractors.

¹ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra, July 2007

Sampling Regime

- B.1.10 The following techniques are in use or proposed for use on the site:
- PM₁₀ by optical scattering technique using OSIRIS analysers which give indicative real time PM₁₀ data;
 - PM₁₀ by beta-attenuation meter (BAM) which gives more robust 24-hour average concentrations;
 - Fablon sticky pads, which give indicative data on soiling relative to wind direction; and
 - Frisbee gauges, which give direct mass of deposition per unit area data.
- B.1.11 22 sites were analysed for dust by MCL and 22 sites by BNL in December. These 44 monitoring locations were chosen on the basis of security and distance from the site and sensitive receptors. Monitoring of dust at the 44 sites was undertaken using Fablon sticky pads. Only 34 of these sites are fully discussed in the December report; the ten sites removed include sites which are located too close to haul roads or activity to be representative of the local environment.
- B.1.12 Fablon is a proprietary self-adhesive material used in sheet form to collect coarse particulate material. The "pads" are wrapped around an upright item of street furniture such as a signpost to ensure 360 degree coverage. The relative degree of soiling at the desired bearing (generally north, south, east and west) is determined in the laboratory using a calibrated reflectance meter.
- B.1.13 The dust data are collected weekly over a period of five weeks to include all of December. The periods in the report are described by week numbers. The north section managed by MCL and south section managed by BNL both correspond to slightly different days in the week. MCL had started collecting measurements on a Thursday, so that Week 1 for MCL commences on the 27/11/2008 and week 2 for MCL on the 04/12/08 and so forth. BNL had started collecting measurements on a Wednesday, so that Week 1 for BNL commences one day before MCL's week, on the 26/11/08 and week 2 on the 03/12/08. This inconsistency has been synchronised so that both contractors start their monitoring on the same day from next month on.
- B.1.14 Monitoring of PM₁₀ was undertaken using Osiris dust monitors, which are continuous analysers operating on the principle of measuring light scattering proportionate to particulate concentrations in various size fractions. This method is the most practicable available to measure particulates in real time and the method performance by comparison with EU Reference Method equivalents is the subject of ongoing investigation.
- B.1.15 Eight locations were selected for real-time PM₁₀ monitoring during December, namely:
- Gainsborough School, Hackney, outside the Olympic Park, opposite CZ5c, operated by MCL;
 - On-site, Carpenters Road South, Newham in CZ1 operated by BNL;
 - On-site, CZ4 Soil Wash, Tower Hamlets near the soil washing unit operated by BNL;
 - The Greenway, Newham, in CZ3 operated by BNL;
 - Quartermile Lane, Hackney, in CZ7a operated by MCL;
 - Metronet, Waltham Forest operated by MCL;
 - Marshgate Lane, Newham just off site from construction zone 8a operated by MCL; and

- On-site, 8C, Newham within construction zone 8C and operated by MCL.

B.1.16 The dust and PM₁₀ monitoring sites selected and their descriptions (and data coverage) are presented in Appendix A. Site locations remained the same as those discussed in the previous month for all sites. All of these locations can be found on the site map in Section 2 of the main report.

Appendix C - Sticky Pad Analysis Results Graphs

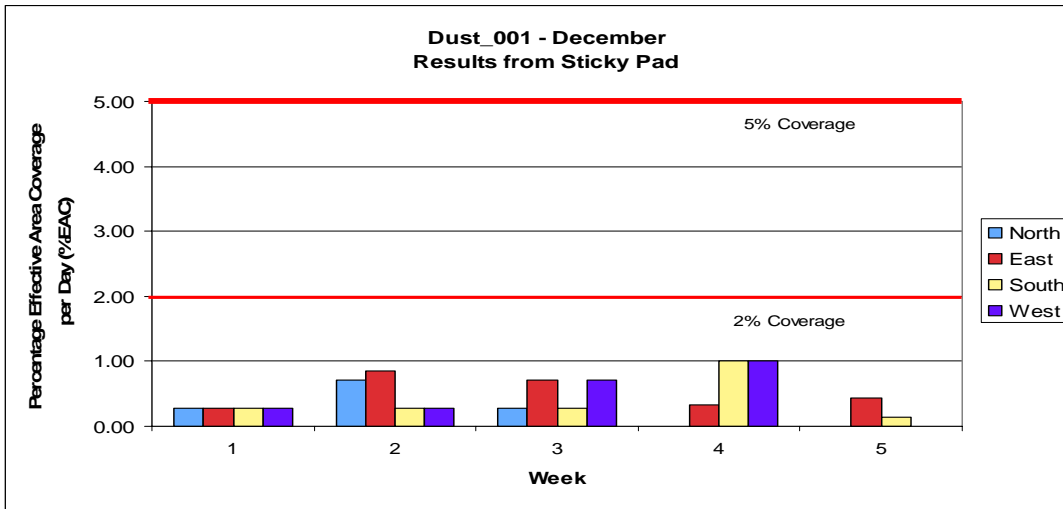
- C.1.1 The complete results of the Fablon Sticky Pad monitoring at all sites are presented here in Appendix C; this includes data from both on-site and off-site locations (total of 43 sites). Ten on-site locations which have been deemed not representative of sensitive receptors were removed from the report discussion. These are: Dust_12 (already decommissioned on the 30/10/08), Dust_13A, Dust_18, Dust_23, Dust_40, Dust_41, Dust_57, Dust_61, Dust_62 and Dust_63. These sites are located along main haul roads or at locations with high construction activity proving unrepresentative of the surrounding environment. Data from these on-site locations can still be found in Appendix C and D.

Table C.1 - The appendix presents December graphs for the following sites:

Park-wide ID	On or Off- Site
Dust_01	Off-site
Dust_02	Off-site
Dust_03	Off-site
Dust_09	Off-site
Dust_10	On-site (boundary)
Dust_11	Off-site
Dust_11A	Off-site
Dust_13A	On-site
Dust_13	On-site (boundary)
Dust_14	On-site (boundary)
Dust_15	On-site (boundary)
Dust_16	On-site (boundary)
Dust_17	Off-site
Dust_18	On-site
Dust_19	On-site (boundary)
Dust_20	Off-site
Dust_21	Off-site
Dust_20A	Off-site
Dust_22	Off-site
Dust_23	On-site
Dust_24	Off-site
Dust_25	Off-site
Dust_26	Off-site
Dust_27	Off-site
Dust_28	Off-site
Dust_29	Off-site
Dust_31	Off-site
Dust_32	Off-site
Dust_37	On-site (boundary)
Dust_38	On-site (boundary)
Dust_39	On-site (boundary)
Dust_40	On-site
Dust_41	On-site
Dust_45	Off-site
Dust_46	On-site (boundary)
Dust_47	On-site (boundary)
Dust_48	On-site (boundary)
Dust_50	On-site (boundary)
Dust_52	On-site (boundary)
Dust_57	On-site
Dust_61	On-site
Dust_62	On-site
Dust_63	On-site

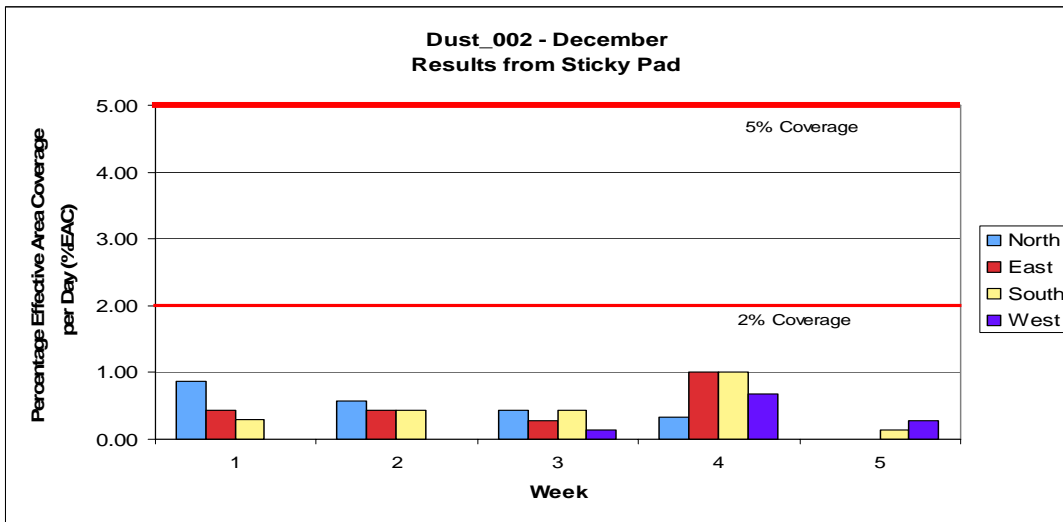
Site Dust_001

North – offsite; East – offsite; South – offsite/ CZ7a; West – offsite



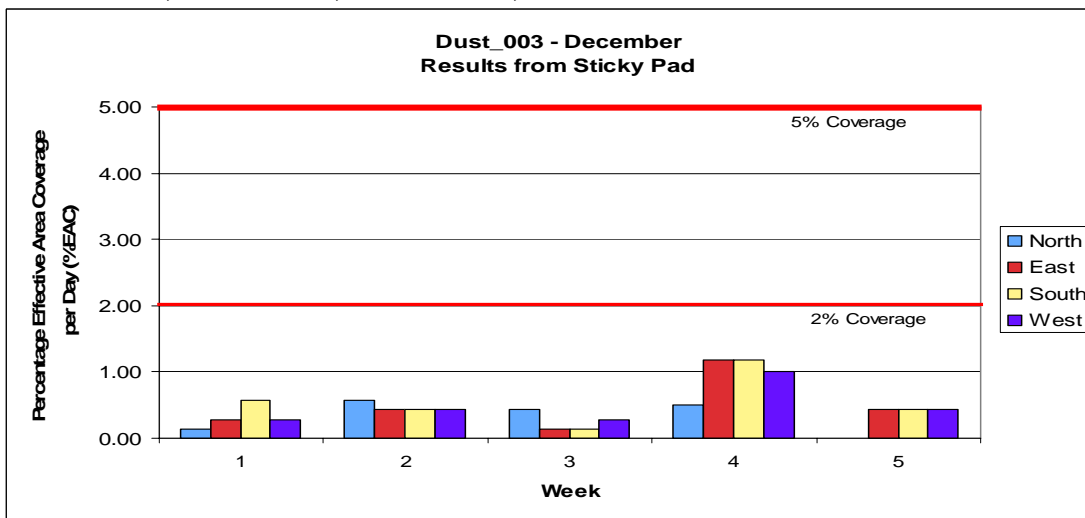
Site Dust_002

North – offsite; East – offsite; South – offsite; West – offsite/CZ6/7a



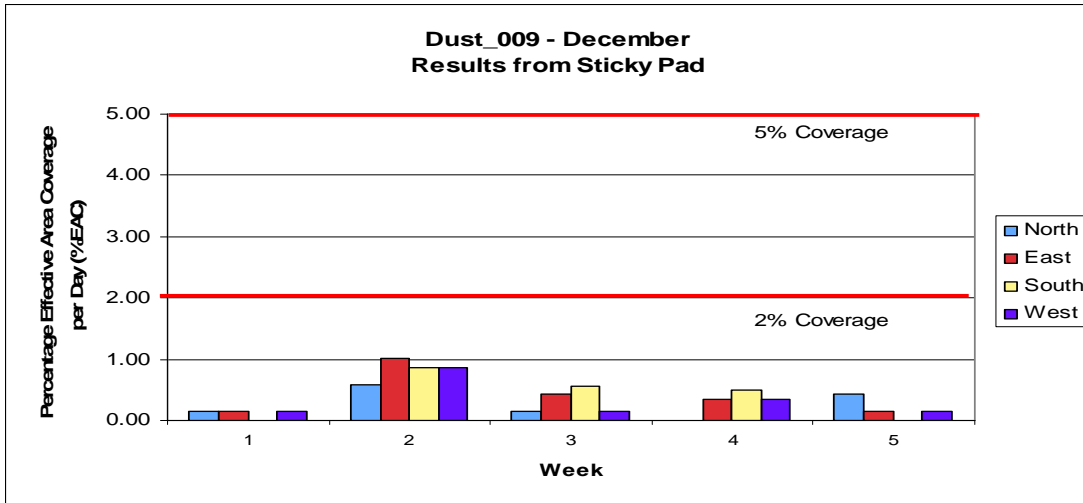
Site Dust_003

North – offsite; East – offsite; South – CZ6c; West – CZ6a/7a



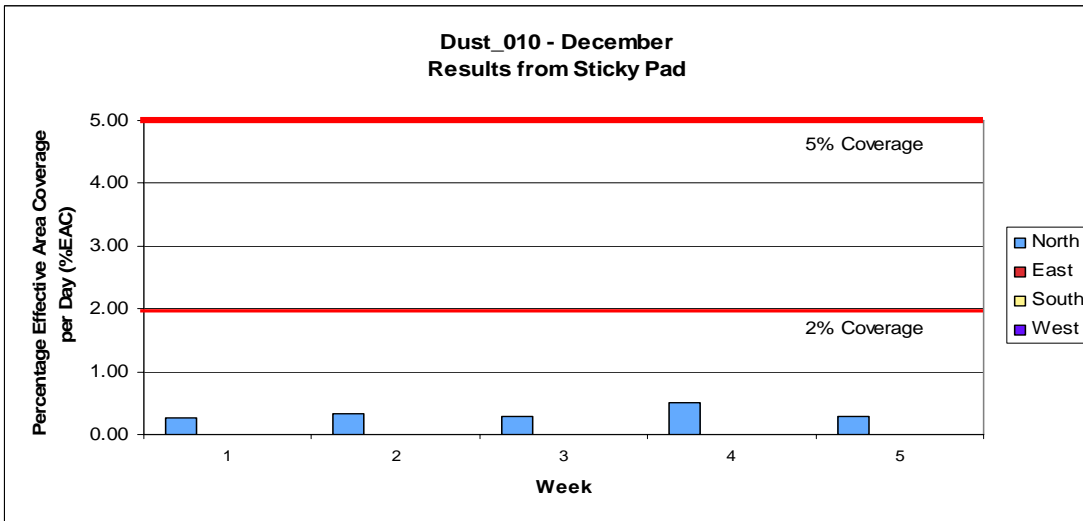
Site Dust_009

North – CZ5c; East – CZ5c/5b; South – offsite; West – offsite



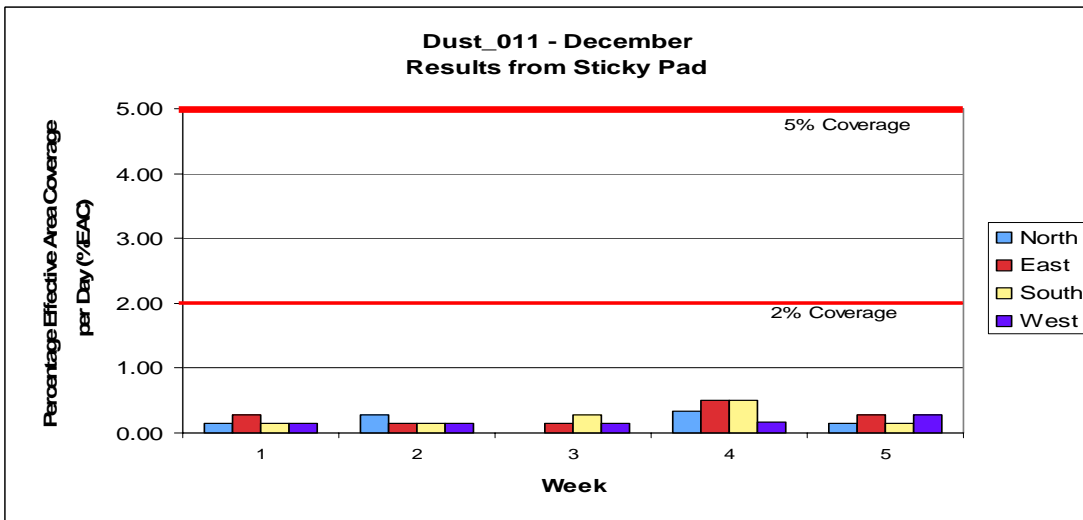
Site Dust_010

North – CZ5c; East – CZ5c/5b; South – offsite; West – offsite



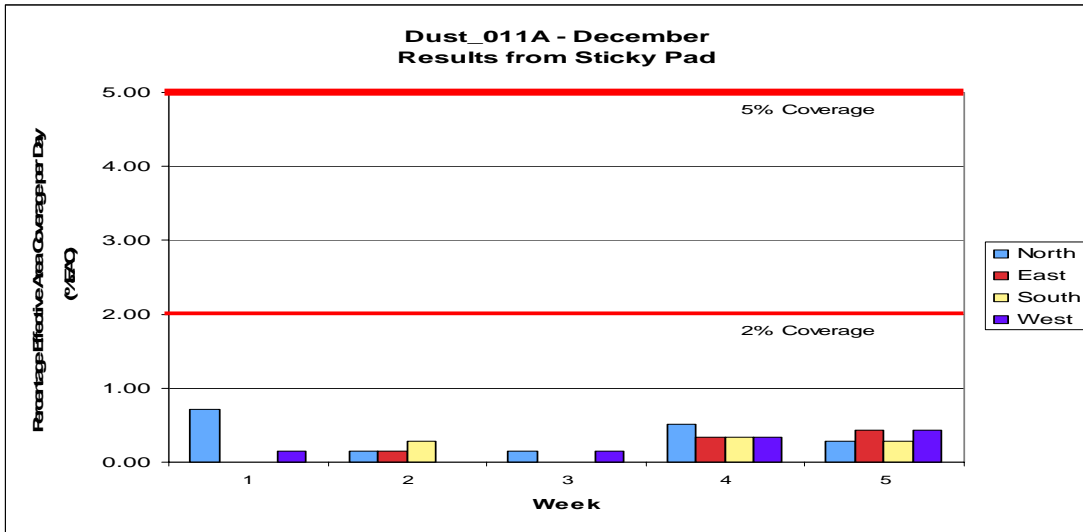
Site Dust_011

North – CZ5c/5b; East – CZ5c/b; South – offsite; West – offsite



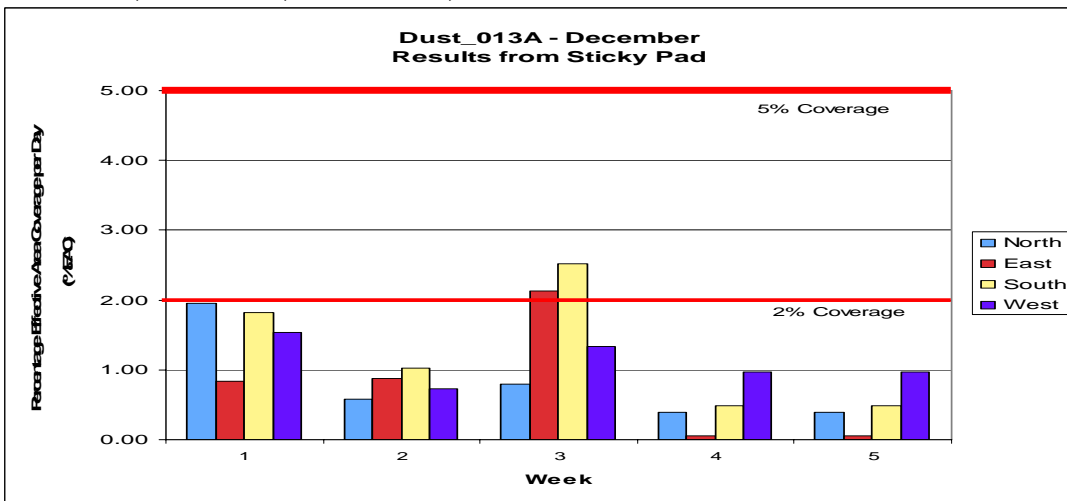
Site Dust_011A

North – CZ5; East – CZ5; South – offsite; West – offsite



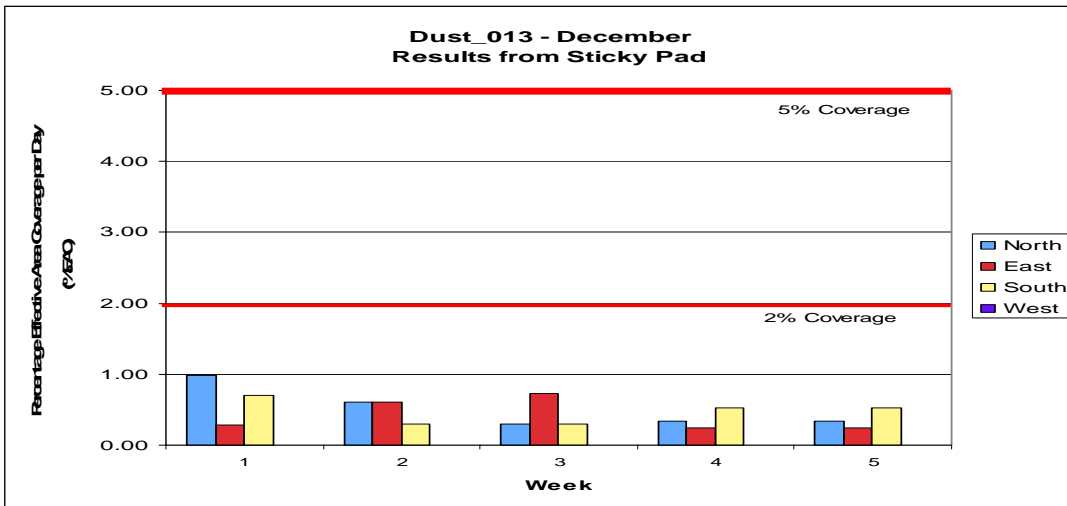
Site Dust_013A

North – CZ5; East – CZ4; South – CZ4; West – CZ5b/4



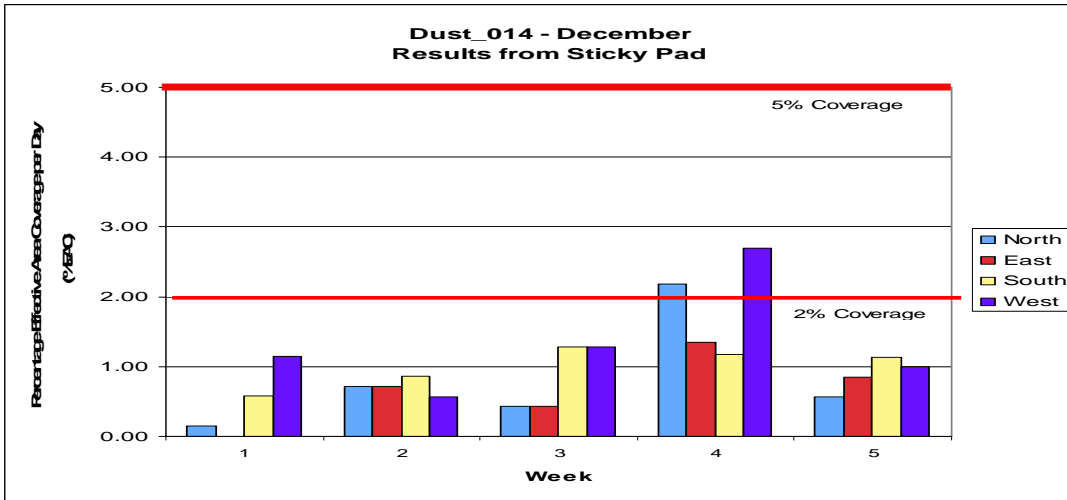
Site Dust_013

North – CZ5b/4; East – CZ4; South – CZ4; West – offsite/ CZ4



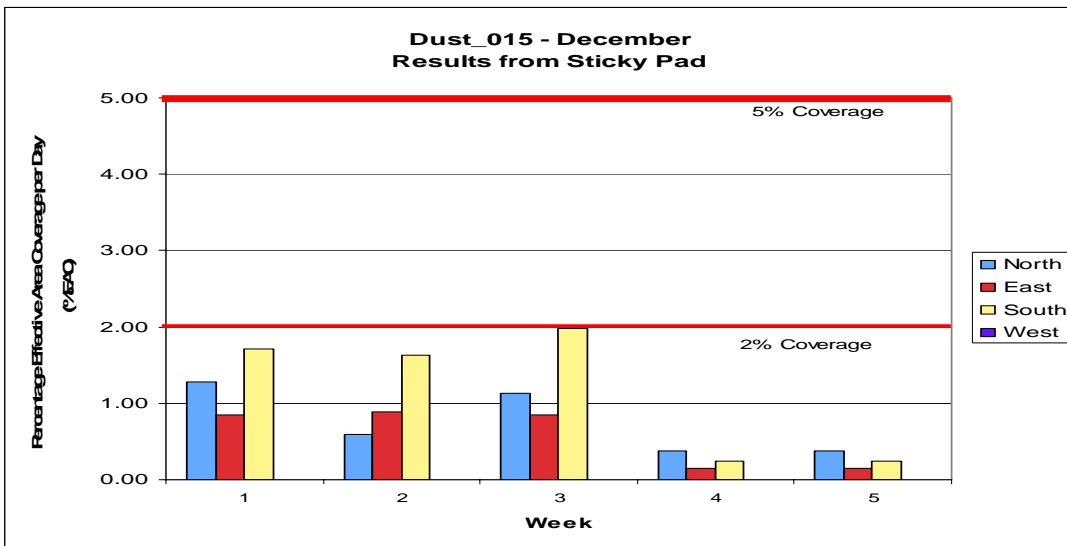
Site Dust_014

North – CZ6c/offsite; East – CZ6c/offsite; South – CZ6c; West – CZ6a



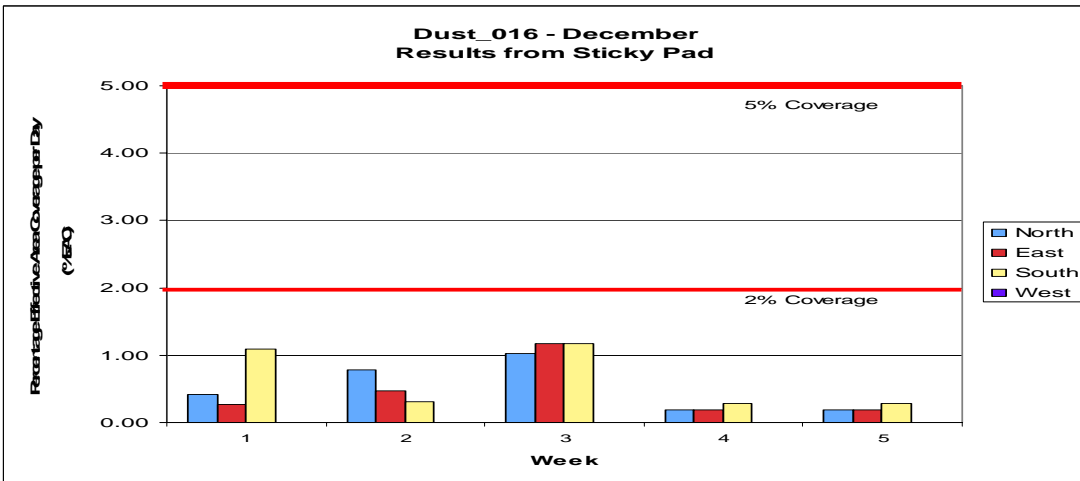
Site Dust_015

North – CZ4/ 5b; East – CZ4; South – CZ4; West – offsite



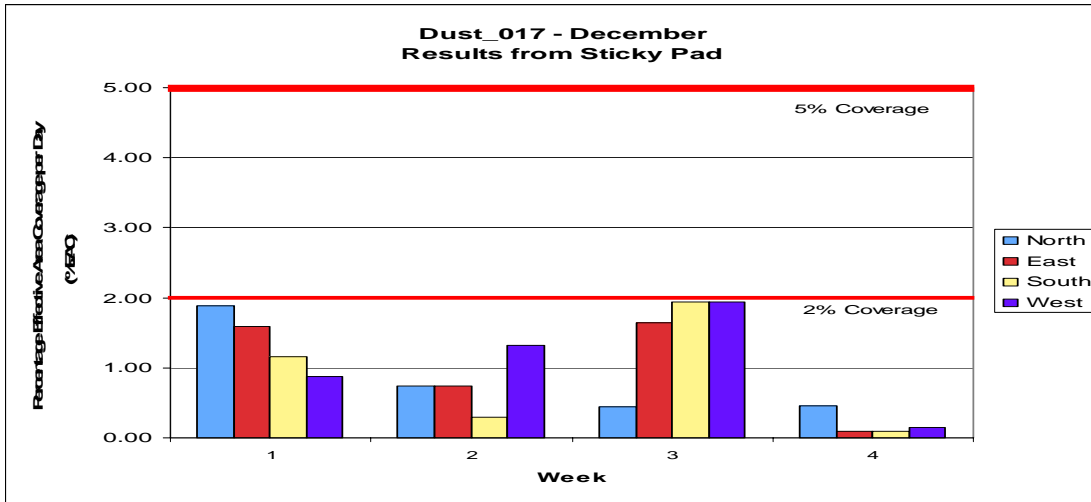
Site Dust_016

North – CZ4; East – CZ4; South – CZ4; West – offsite



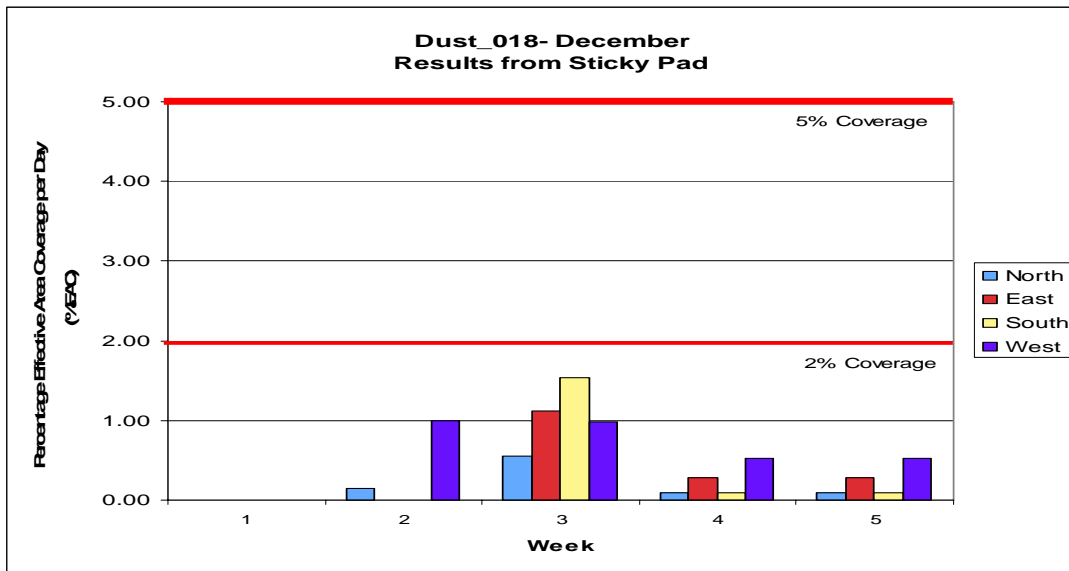
Site Dust_017

North – offsite; East – offsite; South – CZ8c/offsite; West – offsite



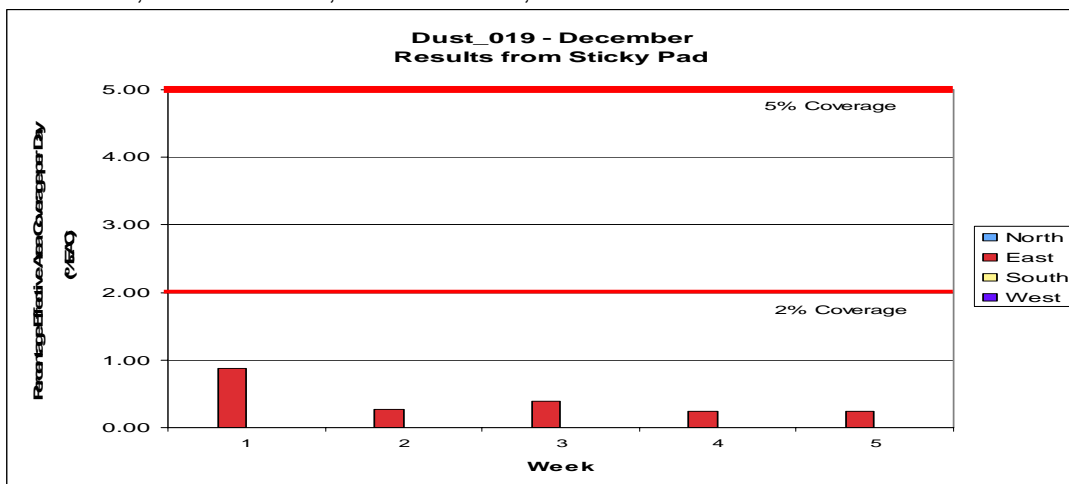
Site Dust_018

North – CZ1a; East – CZ1a/offsite; South – CZ2b/8c; West – CZ2



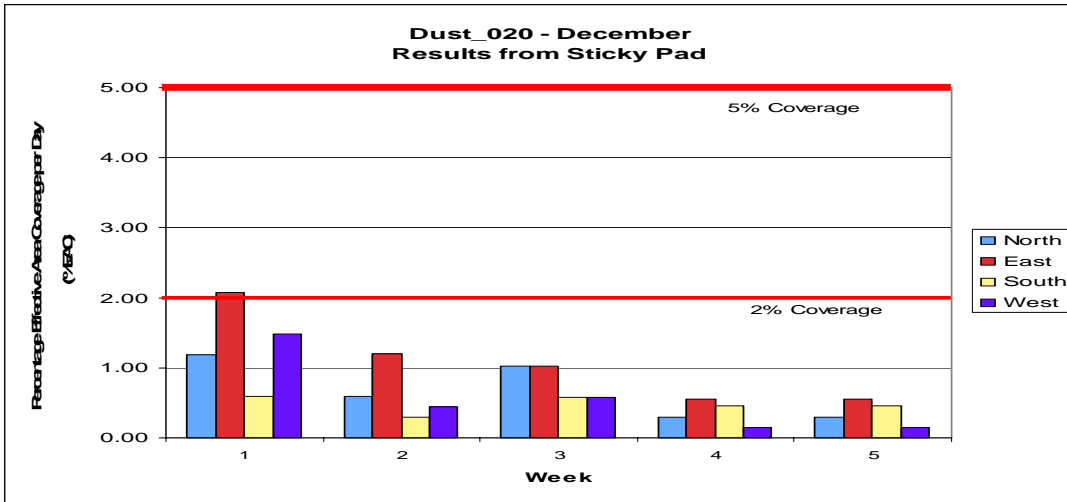
Site Dust_019

North – CZ4; East – CZ4/ 3a; South – CZ4/ 3; West – CZ4/offsite



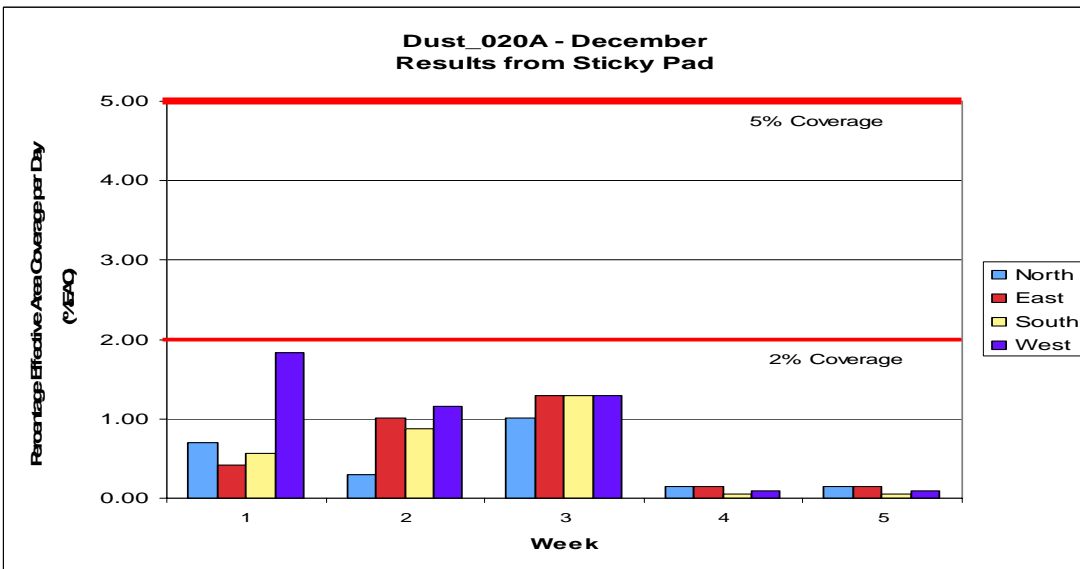
Site Dust_020

North – offsite; East – offsite; South – offsite/ CZ8c; West – offsite/ CZ1a/ 2b



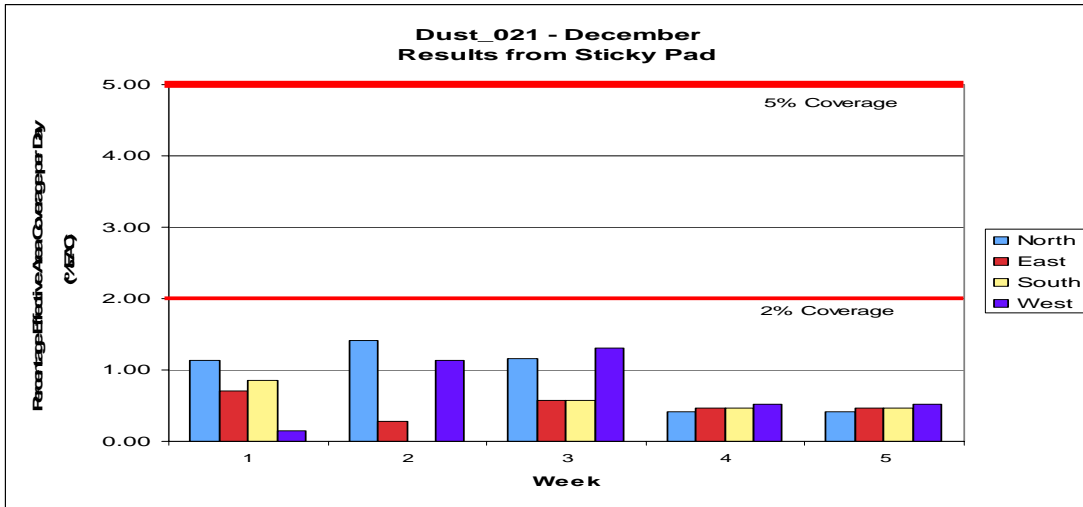
Site Dust_020A

North – offsite/ CZ9; East – offsite; South – offsite; West – offsite/ CZ1b



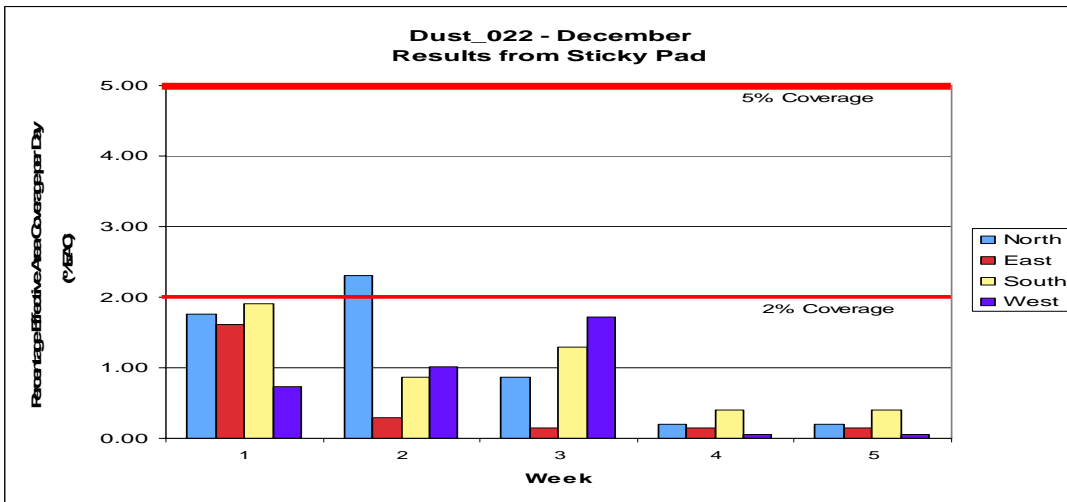
Site Dust_021

North – offsite; East – offsite; South – offsite/ CZ8c; West – offsite/ CZ2b



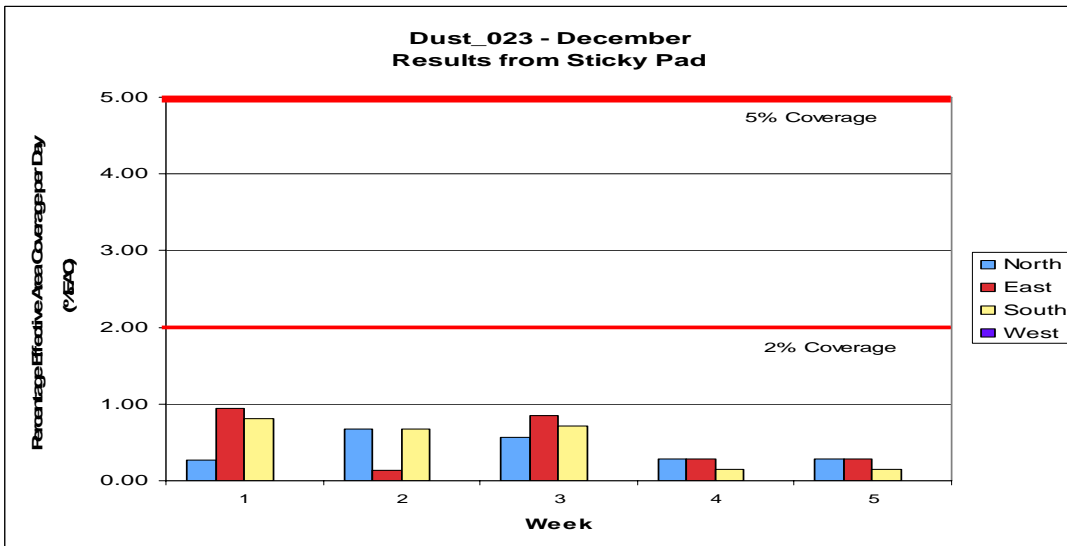
Site Dust_022

North – offsite; East – offsite; South – offsite; West – CZ8c



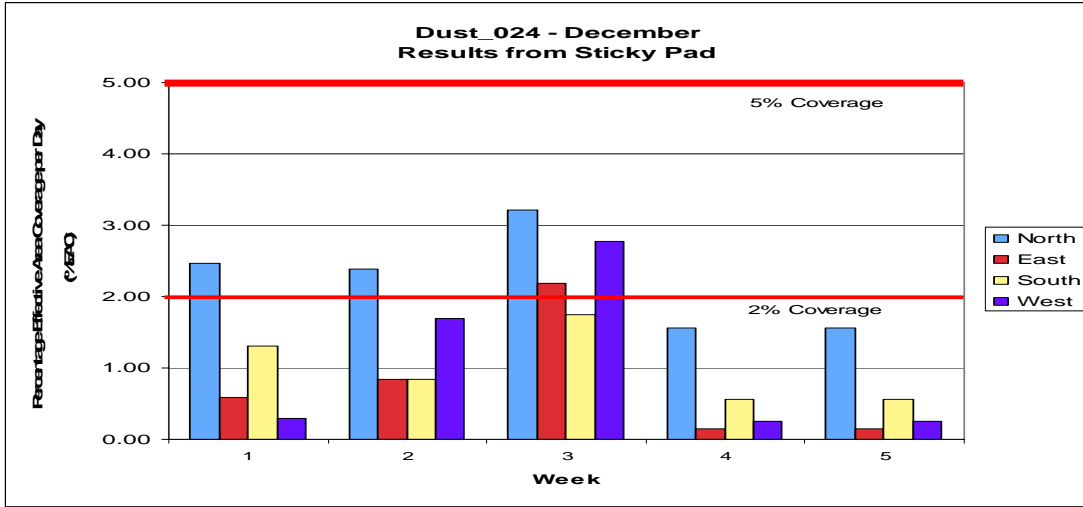
Site Dust_023

North – CZ3a; East – CZ3a; South – CZ3a/b; West - CZ3a



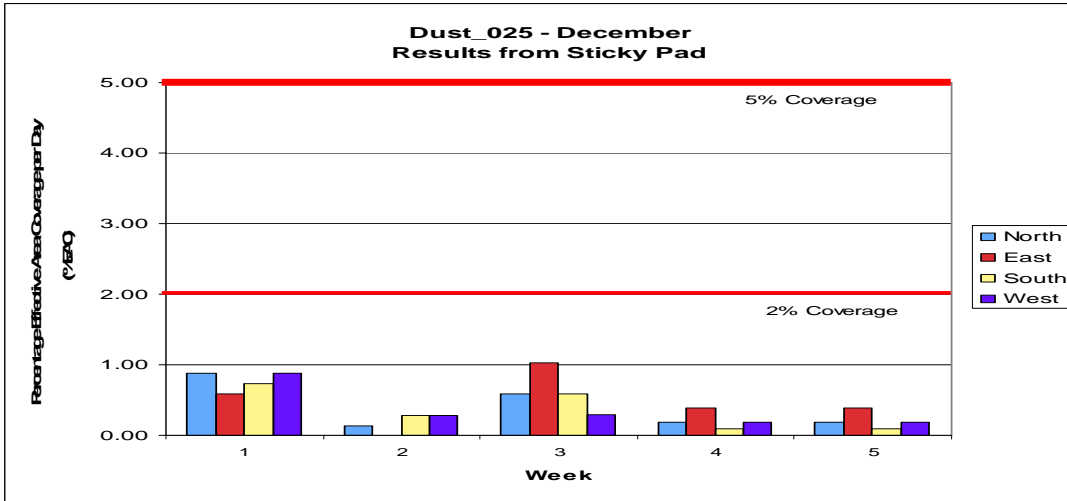
Site Dust_024

North – CZ8; East – offsite; South – offsite; West – CZ8c



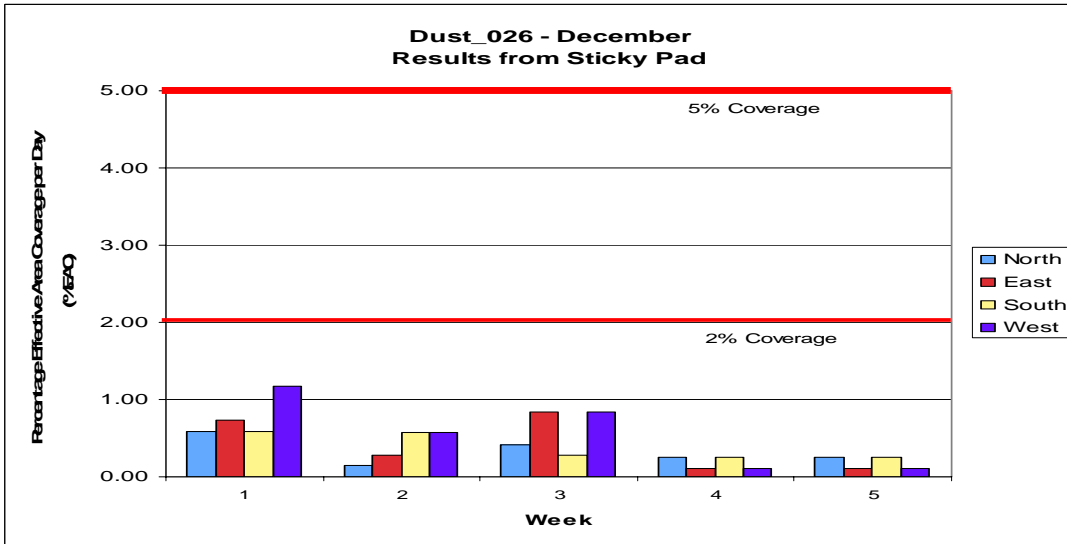
Site Dust_025

North – CZ8c; East – CZ8c; South – CZ8c/b; West – CZ8b



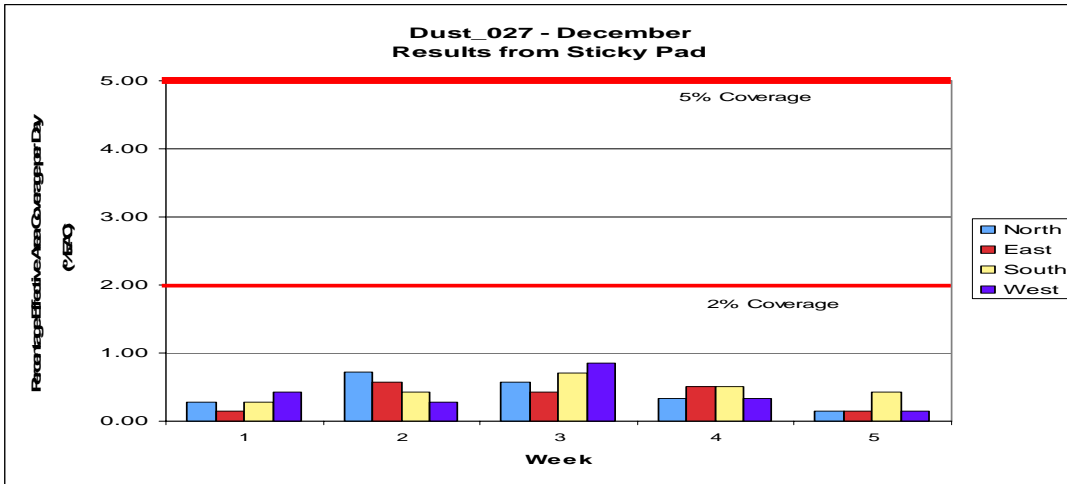
Site Dust_026

North – CZ8; East – offsite; South – offsite; West – CZ8b



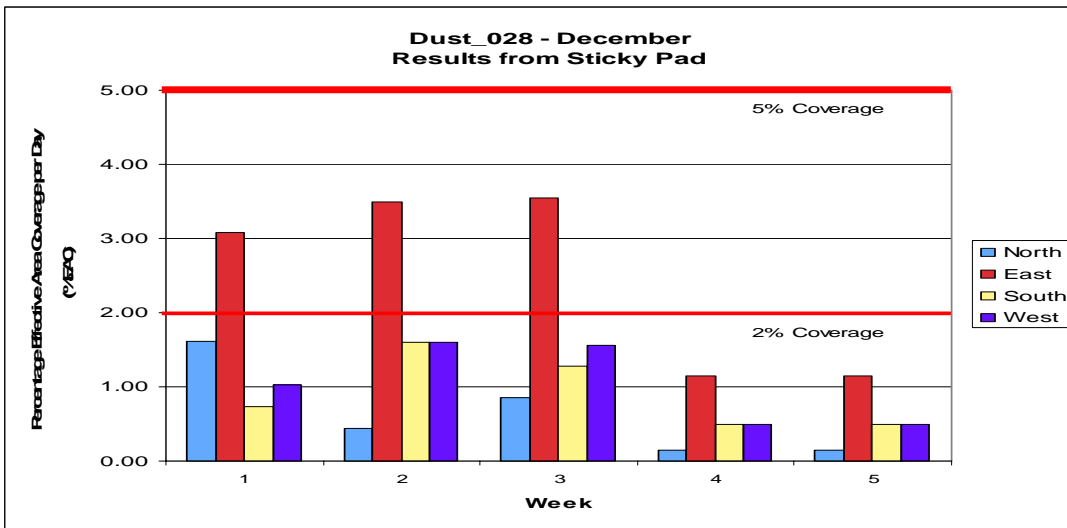
Site Dust_027

North – offsite; East – offsite/CZ3; South – offsite; West – offsite



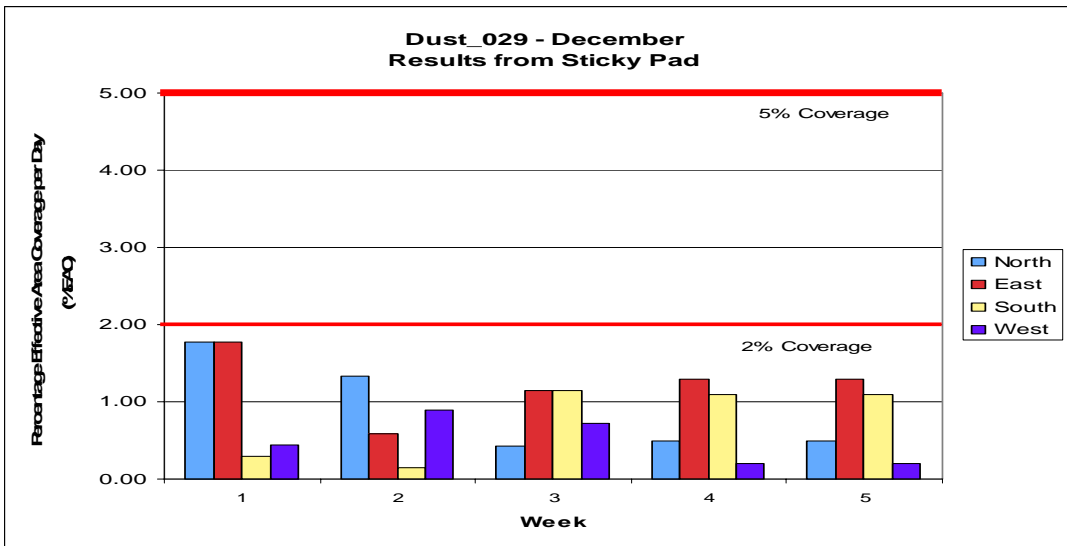
Site Dust_028

North – CZ3b; East – CZ3b; South – offsite; West – offsite



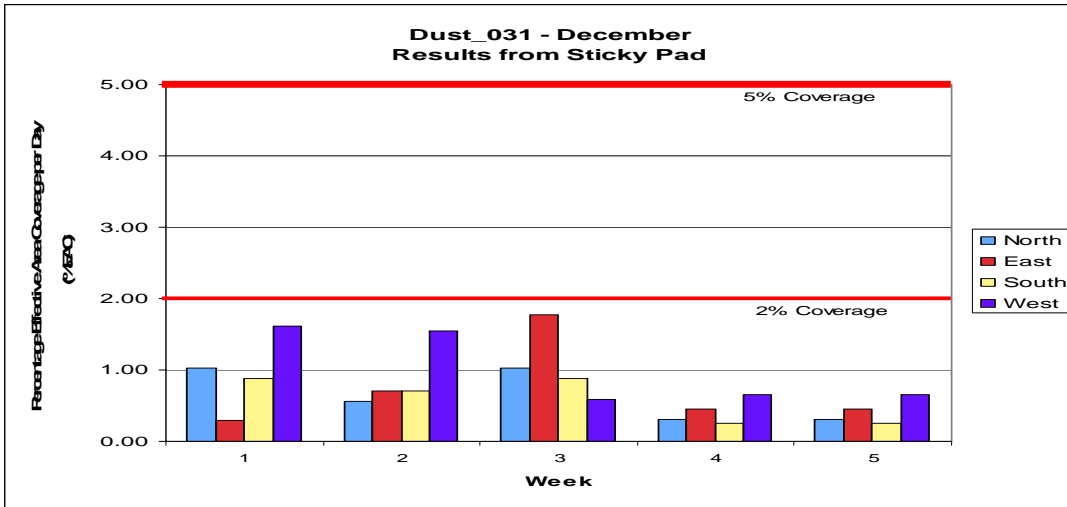
Site Dust_029

North – CZ3b/ 14; East – offsite; South – offsite; West – offsite



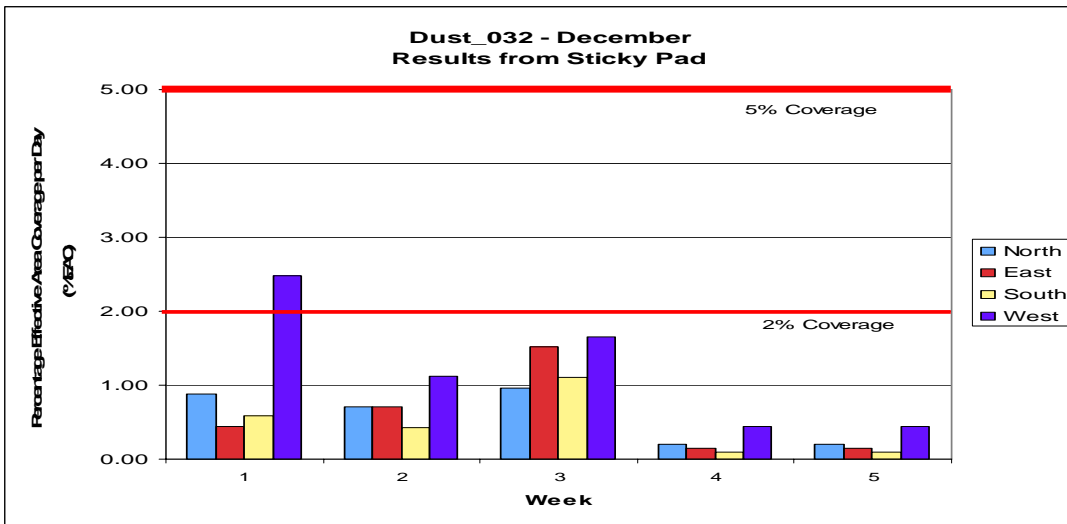
Site Dust_031

North – CZ8a/ 3b; East – offsite; South – offsite; West – offsite



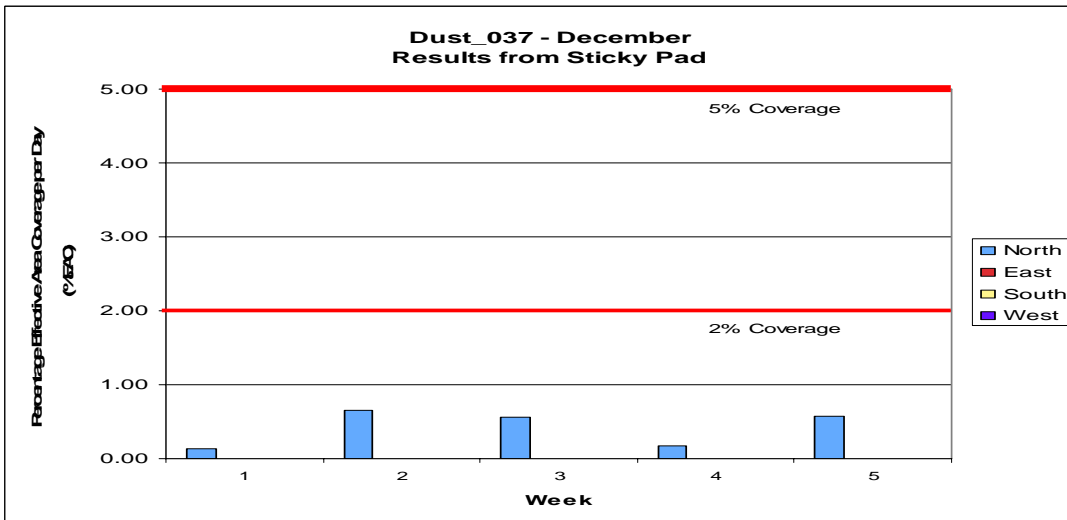
Site Dust_032

North – offsite/CZ8; East – offsite; South – offsite; West – offsite



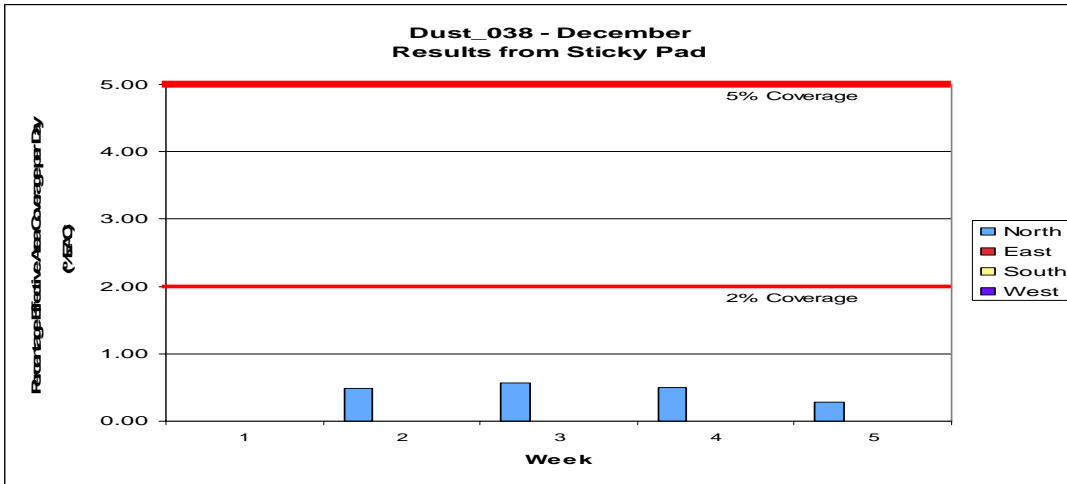
Site Dust_037

North – CZ5b; East – CZ5b; South – CZ5b/4; West – offsite



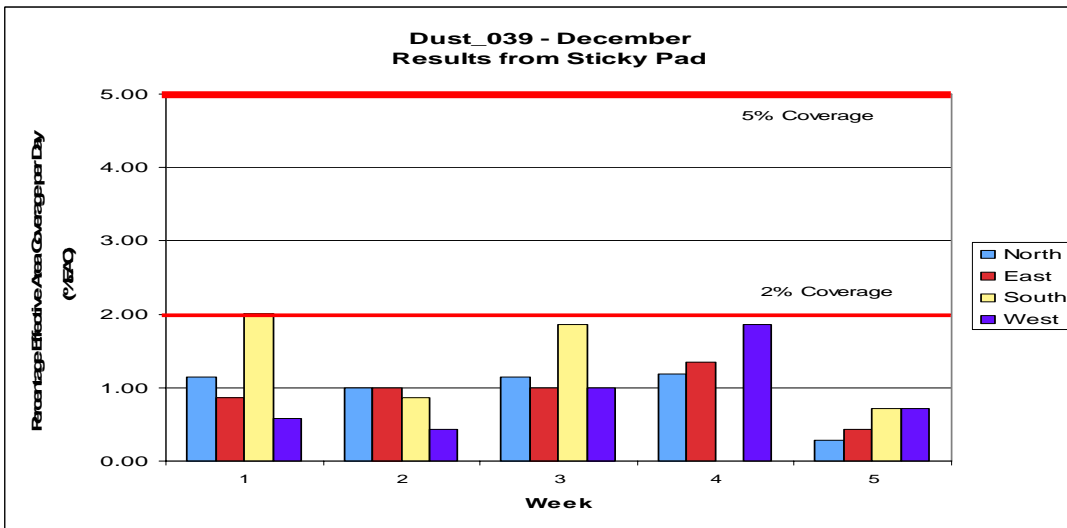
Site Dust_038

North – CZ5c; East – CZ5c; South – offsite; West – offsite



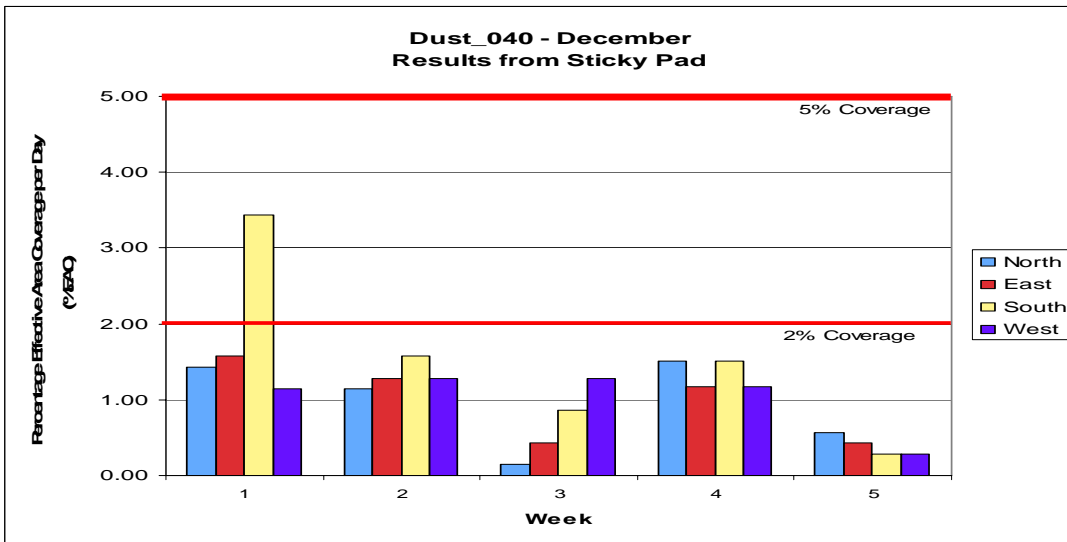
Site Dust_039

North – offsite; East – offsite; South – CZ7a; West – CZ7a



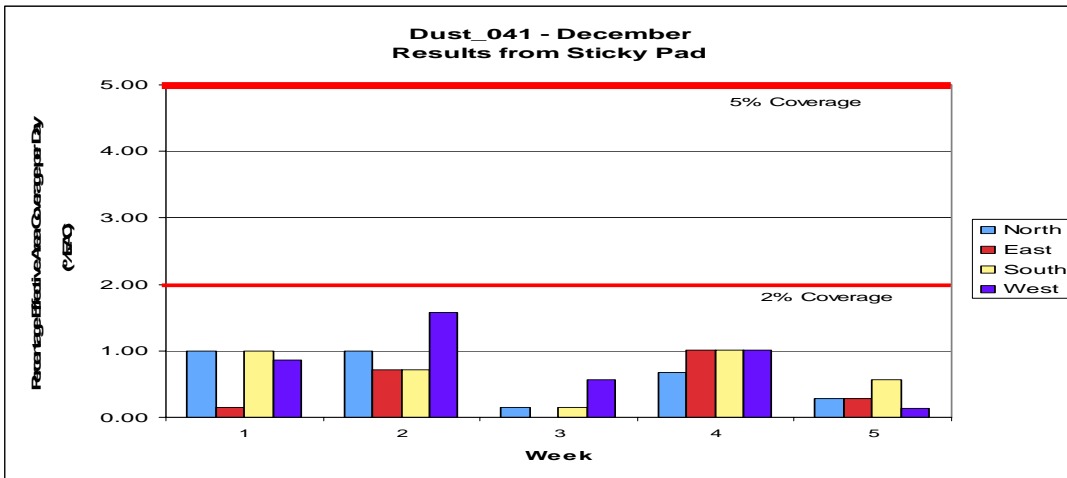
Site Dust_040

North – CZ6a/c; East - CZ6a/c; South – CZ6a/c; West – CZ6a/c



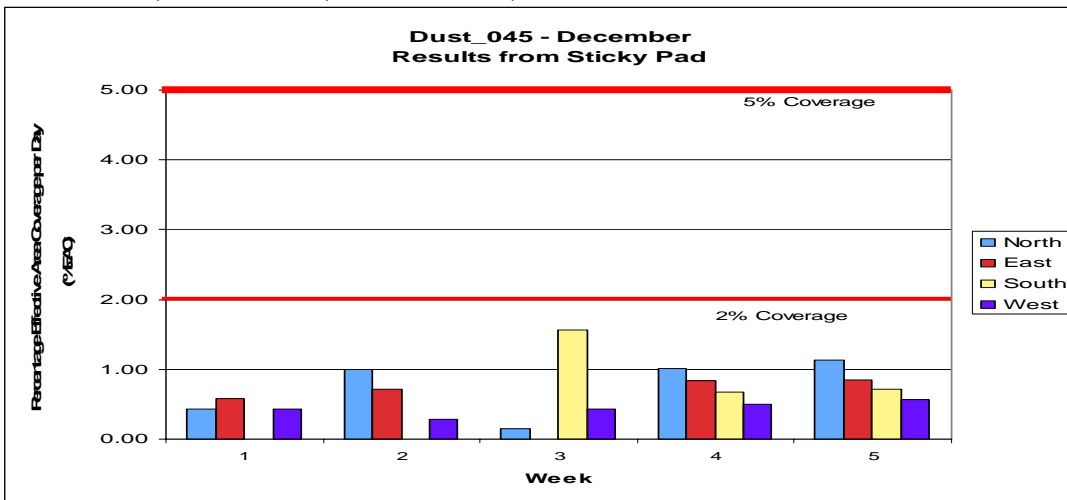
Site Dust_041

North – CZ7a; East - CZ7a; South – CZ7a; West – CZ7a



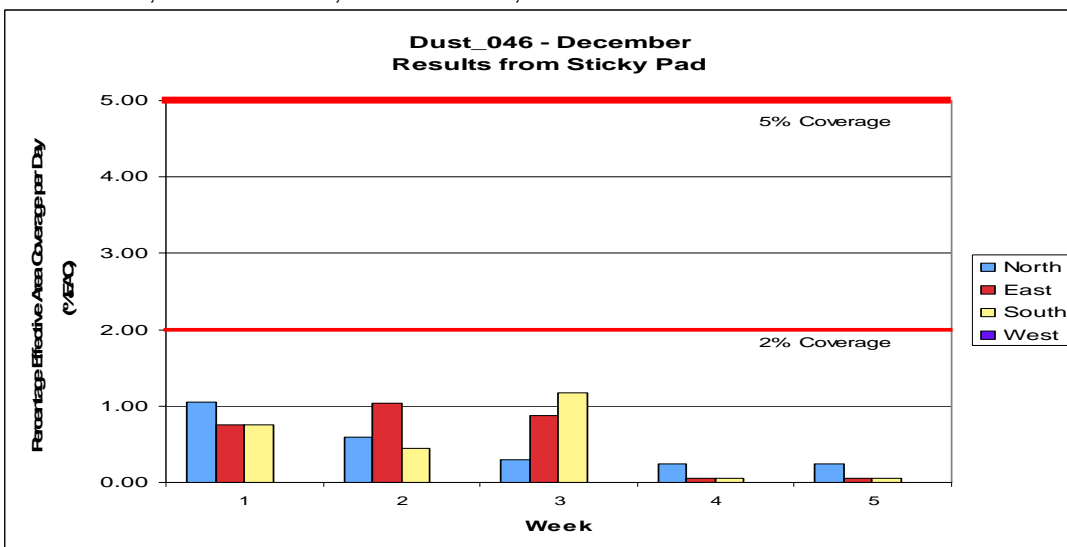
Site Dust_045

North – offsite; East – offsite; South – offsite; West – CZ6b/c



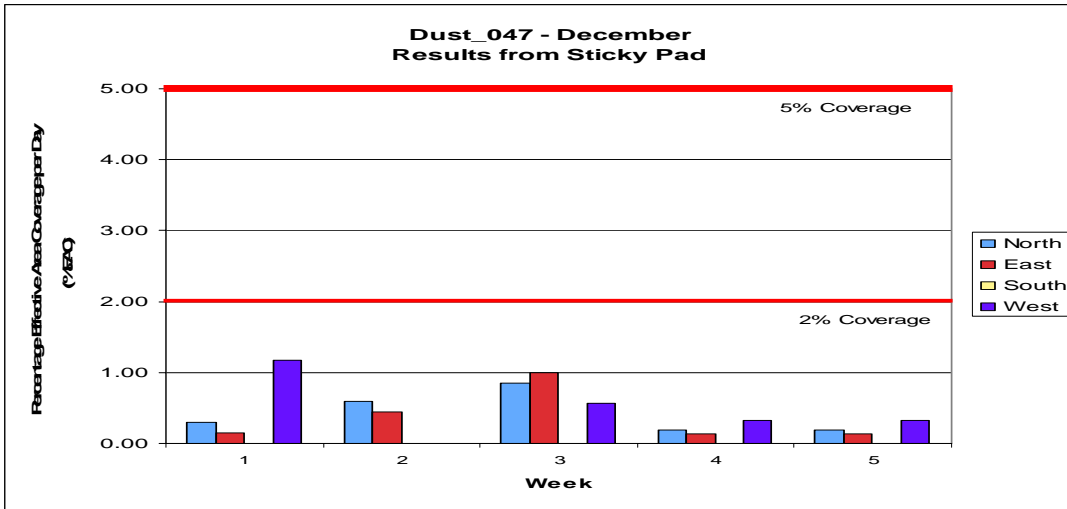
Site Dust_046

North – CZ3a; East – CZ3a/b; South – CZ3b; West – CZ3a/b



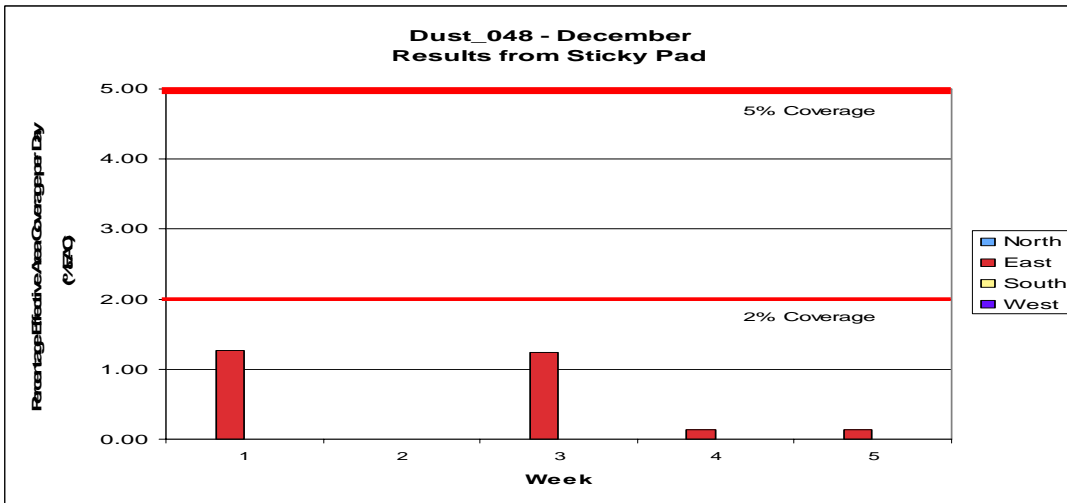
Site Dust_047

North – CZ3a; East – CZ3a/b; South – CZ3b; West – CZ3a/b



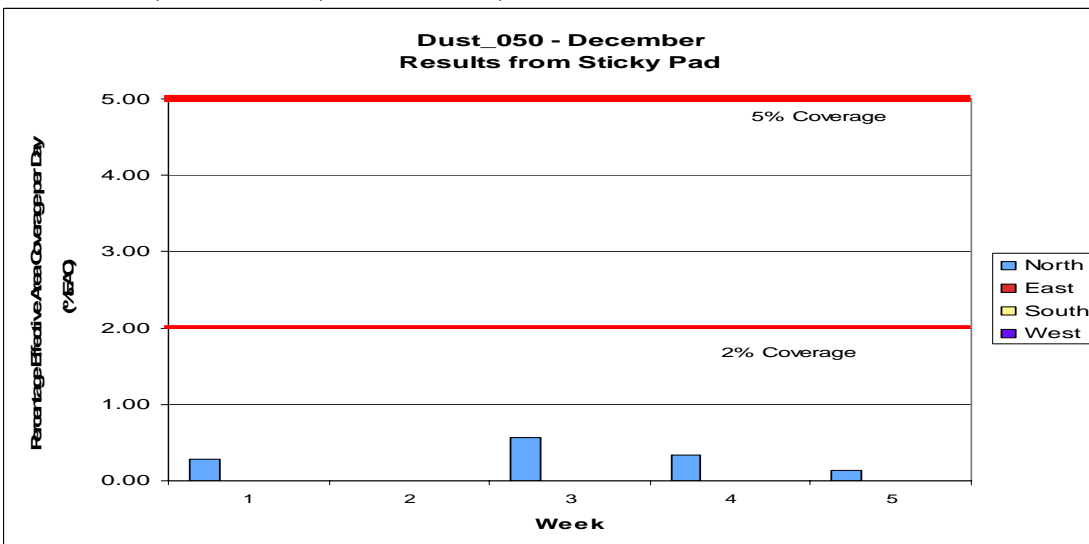
Site Dust_048

North – CZ5b; East – CZ5b/4; South – CZ4; West – offsite



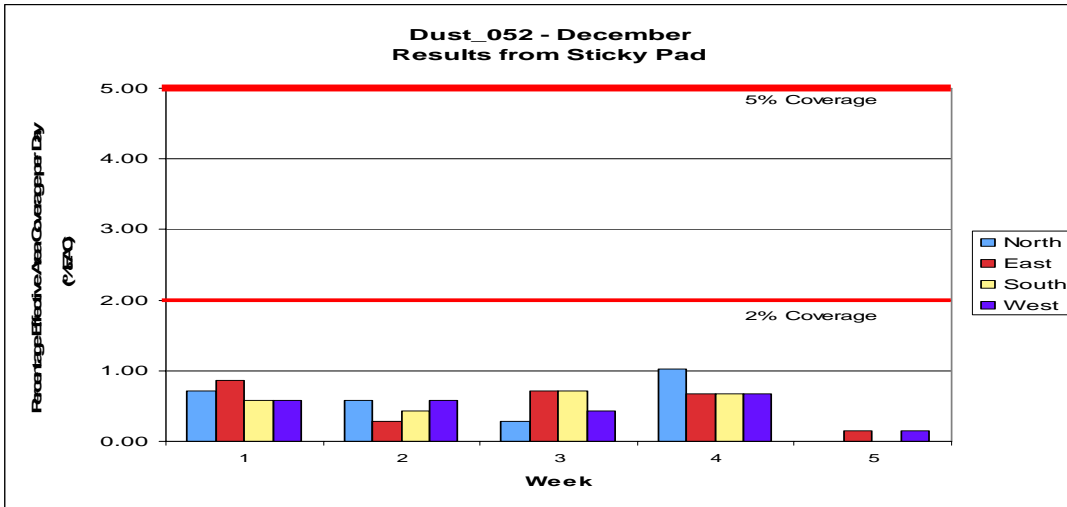
Site Dust_050

North – CZ7a; East – CZ7a; South – CZ7a; West – offsite



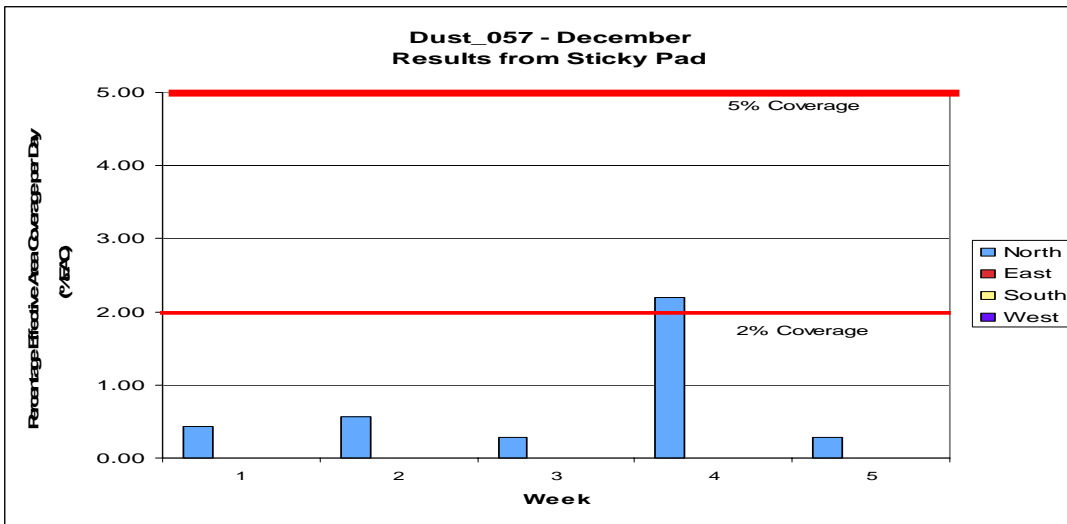
Site Dust_052

North – CZ7a; East – CZ5a/6d; South – CZ5a/b; West – CZ5b



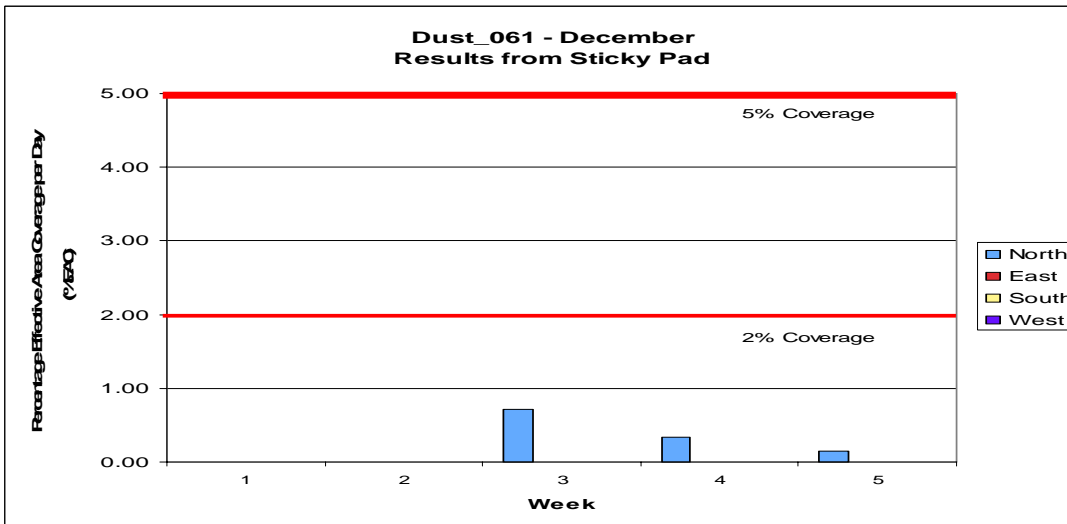
Site Dust_057

North – CZ7a; East – CZ7a/ 6a; South – CZ6a; West – CZ7a



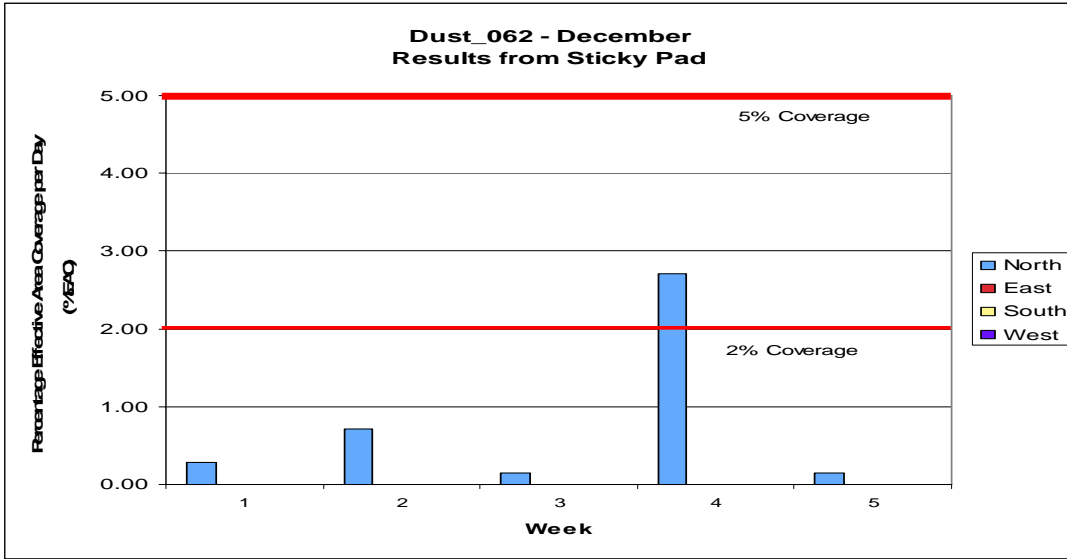
Site Dust_061

North – CZ6a; East – CZ6; South – CZ6b; West – CZ6



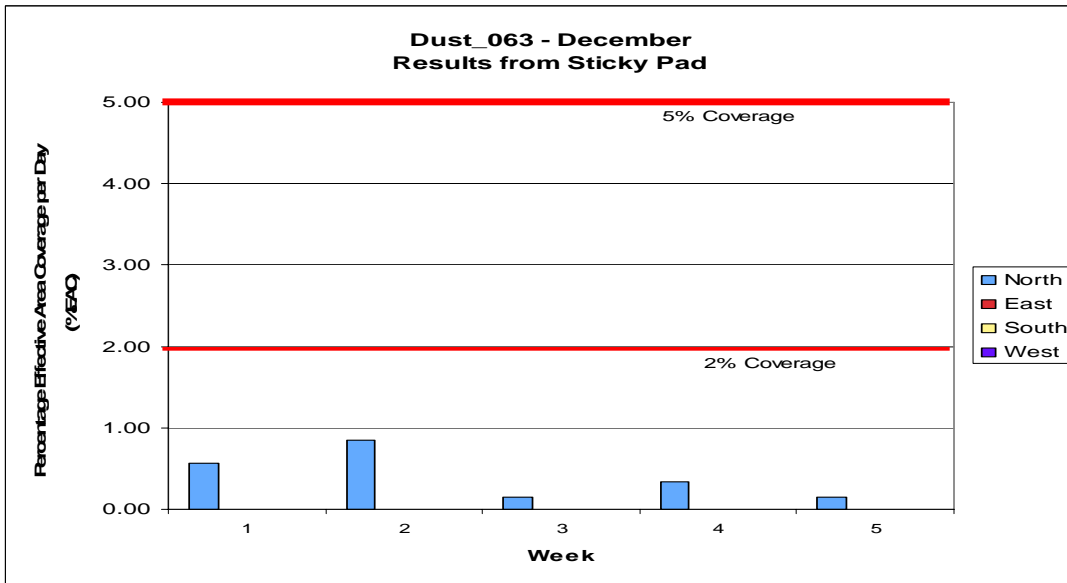
Site Dust_062

North – CZ6a; East – CZ6b; South – CZ6; West – CZ6a



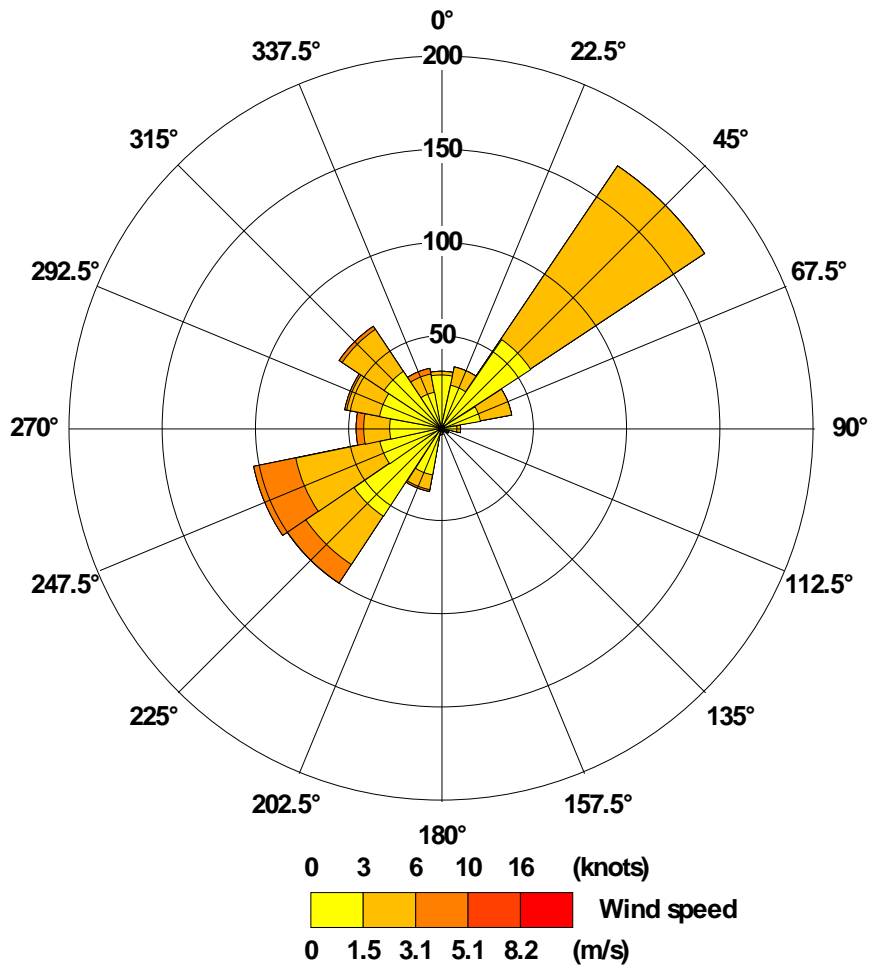
Site Dust_063

North – CZ6a; East – CZ6b; South – CZ6; West – CZ6a



Appendix D - Dawlish Road Site December Windrose

Figure D.1 – December 2008 Windrose for London Air network Dawlish Road site Meteorological Station



Appendix E - Details of Monitoring Periods

- E.1.1 Dust monitoring was undertaken over a period of 5 weeks with result data collected approximately every week. The periods in the report are described using week numbers. The north side managed by MCL and south side managed by BNL both correspond to different weeks. The BNL monitoring in the fourth week was put up on 17/12/08 and then the sticky was changed only on 07/01/09 due to Christmas break. Table E.1 correlates each data week to a week number referred to often in the report.

Table E.1 - Week Period Definitions

Month	Week	Period (MCL)	Period (BNL)
December	1	27/11/08- 04/12/08	26/11/08- 03/12/08
	2	04/12/08 – 11/12/08	03/12/08 – 10/12/08
	3	11/12/08 – 18/12/08	10/12/08 – 17/12/08
	4	18/12/08 – 24/12/08	17/12/08 – 07/01/09*
	5	24/12/08 – 31/12/08	17/12/08 – 07/01/09*

* BNL monitoring during week 4 and 5 was put up on the 17/12/08 and collected on the 07/01/09 due to Christmas break.

Appendix F - Examination of in-week Soiling Events

F.1.1 Table D.1 presents an examination of >5% EAC events by week and location for all sites. The most probable cause of soiling has been suggested from a review of site activity logs kept by both Tier 1 contractors.

Table F.1 - Examination of in-week Soiling Events

Week	Monitoring Site (and if off-site)*	Most soiled bearing	Week's predominant Wind Direction	Zone upwind of monitoring site	Activities at the time	Dust and Mitigation Observations at the time
1					No Exceedances in 1 st week	
2					No Exceedances in 2 nd week	
3					No Exceedances in 3 rd week	
4					No Exceedances in 4 th week	

Appendix G – Trends of Sticky Pad Analysis

G.1 November – December Trends

- G.1.1 The trend of dust monitoring in comparison with the previous month of November is summarised in Table G.1 for all off-site and boundary locations. An increase is presented with a “+”, a decrease with a “-” and an insignificant change of <0.1 %EAC from the previous month with a “0”. Where no data are available, and a trend could hence not be established, the cell is left blank. Traffic light colour coding was added to illustrate the trend with green representing a reduction of soiling, red representing an increase and amber representing no change. Some of the sites were not comparable due to a lack of data on bearings for either month and are represented by “n/a”.
- G.1.2 The overall trend from November to December on all bearing appears to have more decreases in %EAC observed.

Table G.1 - November to December Trends at Directional Dust Sticky Pads

Park-wide ID	North	East	South	West
Dust_001	0	+	-	-
Dust_002	0	0	+	0
Dust_003	+	+	+	+
Dust_009	-	+	+	-
Dust_010	0	n/a	n/a	n/a
Dust_011	-	-	-	-
Dust_011A	-	-	-	-
Dust_013A	-	-	+	-
Dust_014	+	-	-	+
Dust_015	-	-	+	n/a
Dust_016	-	-	-	n/a
Dust_017	+	0	-	+
Dust_019	n/a	-	n/a	n/a
Dust_020	+	+	-	+
Dust_020A	-	-	+	+
Dust_021	-	-	-	+
Dust_022	-	-	-	+
Dust_024	-	0	-	+
Dust_025	-	-	-	-
Dust_026	-	-	-	-
Dust_027	+	-	-	+
Dust_028	-	+	-	0
Dust_029	-	-	0	-
Dust_031	-	-	-	-
Dust_032	-	-	-	+
Dust_037	0	n/a	n/a	n/a
Dust_038	0	n/a	n/a	n/a
Dust_039	-	-	-	-
Dust_045	+	-	+	-
Dust_046	-	-	+	n/a
Dust_047	-	-	n/a	n/a
Dust_048	n/a	+	n/a	n/a
Dust_050	-	n/a	n/a	n/a
Dust_052	0	-	-	-

Appendix H – Atkins QA/QC Process

Quality Control and Quality Assurance

- H.1.1 Quality Control (QC) is the term for the system of checks undertaken to ensure that the data produced by the Osiris analysers is of an appropriate standard and contains no material errors. Quality Assurance (QA) is the procedure by which the correct application of the QC system is confirmed.
- H.1.2 This note does not cover the procedures for calibration and maintenance which are assumed to be as per manufacturer's instructions. Routine checks on instrument functionality are performed on a weekly basis; consumables are replaced and inlet flow adjusted on a quarterly basis.
- H.1.3 The part of the QC process which Atkins undertakes is essentially the data validation (for Data Warehouse purposes) and ratification (for interpretation purposes).

Validation

- H.1.4 Validation in this context is the visual screening of a dataset for anomalies (paraphrased from Defra Local Air Quality Management Technical Guidance Note TG(03) Annex 1.70). Suspicious data are flagged for future investigation and possible removal by the Tier 1 contractors. This prepares the data for uploading to the Data Warehouse.

Data immediately flagged by the monthly Atkins validation process are:

- Zero readings;
- Negative readings; and
- PM₁₀ values which are lower than PM_{2.5} or PM₁.

- H.1.5 The Osiris analysers generate no zero or calibration spikes – optical instruments are calibrated by surrogate electronic means.

Data flagged as suspicious include:

- Spikes or sudden discrete peaks;
- Periods of abrupt change in concentration range;
- Periods of very low concentrations;
- 24-hour periods with >10% (>10 x 15-minute values) data gaps;
- Readings taken 30 minutes after reactivation of an analyser.

Ratification

- H.1.6 Traditionally ratification is undertaken on a quarterly or even less frequent basis, but in order to get the maximum value from the Olympic Park PM₁₀ data, Atkins undertakes contextual ratification on a monthly basis in connection with the production of the monthly review reports. The procedure includes the examination of:

- site activities (and any recorded off-site incidents) which may cause "suspicious" episodes as described above;
- prevailing meteorological conditions;
- site-wide PM₁₀ performance from the whole Osiris network;
- off-site LAQN analyser data (itself un-ratified if downloaded less than 3-6 months after monitoring data was generated); and
- removal of 24-hour means when less than 90% of the data points collected in any given day are missing.

- H.1.7 If, in the professional opinion of the reviewer and checker, suspicious data cannot be explained by the ratification process or other reasonable explanation, the data are removed from the monthly interpretation exercise. Un-ratified and ratified datasets are both kept on record.

Assurance

- H.1.8 The above processes are undertaken by a qualified air quality specialist and checked by a senior member of staff. A Quality Statement indicating that this process has been followed will be included in Atkins monthly reports.

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Appendix I - Hourly December Data

I.1.1 One-hour average Osiris data is presented in Appendix I for the most sensitive receptor representative Olympic Park Osiris Analysers; Gainsborough School, Greenway and Quartermile Lane alongside the nearest London-Networks sites; Cam Road in the south and Ruckholt Close in the North. The PM₁₀ data at the Olympic Park Osiris sites appear to generally follow the trends of the local analyser sites.

Figure I.1 - Gainsborough School, Greenway and Quartermile Lane Hourly Results vs. Local Analysers; Ruckholt Close and Cam Road

