



**AIR QUALITY MONITORING MONTHLY  
MONITORING REPORT  
JUNE 2018**

**CARNWATH ROAD RIVERSIDE  
(CARRR)**

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**TIDEWAY**
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MONITORING REPORT**
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(CARRR)**
**List of Contents**

1	Introduction .....	4
1.1	Monitoring Period.....	4
1.2	Monitoring Methods .....	4
1.3	Assessment Levels .....	4
1.4	Monitoring Locations.....	5
2	Osiris Monitoring Results.....	7
2.1	Results Summary.....	7
2.2	Results Discussion.....	9
2.3	Alert Level Exceedances.....	10
3	CMU Monitoring Results.....	12
3.1	Results Summary.....	12
3.2	Results Discussion.....	13
4	Secondary Data .....	14
	Appendix A.....	17
	Appendix B.....	19

**List of Tables**

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM <sub>10</sub> and PM <sub>2.5</sub> .....	5
Table 2: Osiris Unit Air Quality Monitoring Results: June 2018.....	7
Table 3: PM <sub>10</sub> Alert Level Exceedance Details .....	10
Table 4: PM <sub>10</sub> Alert Level Exceedance Investigation Summary .....	10
Table 5: Measured PM <sub>10</sub> and NO <sub>2</sub> Concentrations – June 2018 .....	12

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**List of Figures**

Figure 1 Graph of 15-min PM <sub>10</sub> Concentrations at CARRR/AA/1: June 2018 .....	7
Figure 2 Graph of 15-min PM <sub>10</sub> Concentrations at CARRR/AA/2: June 2018 .....	8
Figure 3 Graph of 15-min PM <sub>10</sub> Concentrations at CARRR/AA/3: June 2018 .....	8
Figure 4 Graph of 15-min PM <sub>10</sub> Concentrations at CARRR/AA/4: June 2018 .....	9
Figure 5 Graph of 15-min PM <sub>10</sub> Concentrations at CARRR/AA/5: June 2018 .....	9
Figure 6 Graph of 24-hour mean PM <sub>10</sub> (µg/m <sup>3</sup> ) at Philpot Square: June 2018 .....	12
Figure 7 Graph of 1-hour mean NO <sub>2</sub> (µg/m <sup>3</sup> ) at Philpot Square: June 2018 .....	13
Figure 8 Graph of 24-hour mean PM <sub>10</sub> (µg/m <sup>3</sup> ) at Wandsworth Putney: June 2018.....	14
Figure 9 Graph of 1-hour mean NO <sub>2</sub> (µg/m <sup>3</sup> ) at Wandsworth Putney: June 2018.....	15

# 1 Introduction

## 1.1 Monitoring Period

- 1.1.1 This report covers data captured by the air quality monitors at Carnwath Road Riverside (CARRR) during June 2018.
- 1.1.2 Data presented in this report are classified as 'Provisional'. Data Ratification, a detailed manual check of the data set, is carried out on a quarterly basis. This requires a longer-term view of the dataset incorporating the review of all calibration data, information from analyser services and repairs and any other information available for the particular site or analyser over the whole ratification period. Data are fully ratified at the end of each calendar year of monitoring.

## 1.2 Monitoring Methods

- 1.2.1 Monitoring is undertaken using Osiris instruments to measure concentrations of particulate matter, accompanied by a continuous monitoring unit (CMU) that contains equipment to measure particulate matter and nitrogen dioxide (NO<sub>2</sub>).

### Osiris Instruments

- 1.2.2 The Osiris instruments measure concentrations of Total Suspended Particles (TSP); particulate matter less than 10 micrometres in aerodynamic diameter, which is known as 'PM<sub>10</sub>'.
- 1.2.3 The monitoring is continuous, operating 24 hours a day, 7 days a week.
- 1.2.4 Where data capture is less than 90%, an explanation of the reason for the low data capture is provided.
- 1.2.5 Further details of the Osiris monitoring method are described in Appendix A.

### Continuous Monitoring Unit (CMU)

- 1.2.6 In addition to the Osiris instruments, air quality monitoring is undertaken using a continuous monitoring unit (CMU) located on the corner of Philpot Square.
- 1.2.7 This CMU contains two monitors; a TEOM-FDMS monitor to measure PM<sub>10</sub> concentrations, and a Thermo-42i chemiluminescent analyser to measure nitrogen dioxide concentrations.

## 1.3 Assessment Levels

- 1.3.1 The Osiris monitors are set up to raise an alert if PM<sub>10</sub> concentrations greater than 250 micrograms per cubic metre (µg/m<sup>3</sup>) are recorded during a 15-minute averaging period. This is to help identify when abnormal levels of dust may be being produced at Carnwath Road. Instances of PM<sub>10</sub> concentrations greater than 250 µg/m<sup>3</sup> are investigated and action is taken, if required, to stop dusty site activities.
- 1.3.2 The measurements from the CMU are compared against the UK's Air Quality Objectives (AQOs).

- 1.3.3 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000)<sup>1</sup> and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002)<sup>2</sup>.
- 1.3.4 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance<sup>3</sup>. The annual mean objectives for nitrogen dioxide and PM<sub>10</sub> are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour objective for PM<sub>10</sub> is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- 1.3.5 The relevant air quality criteria for this assessment are provided in Table 1.

**Table 1: Air Quality Criteria for Nitrogen Dioxide, PM<sub>10</sub> and PM<sub>2.5</sub>**

Pollutant	Time Period	Objective
<b>Nitrogen Dioxide</b>	1-hour Mean	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m <sup>3</sup>
<b>Fine Particles (PM<sub>10</sub>)</b>	24-hour Mean	50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m <sup>3</sup>
<b>Fine Particles (PM<sub>2.5</sub>)<sup>a</sup></b>	Annual Mean	25 µg/m <sup>3</sup>

<sup>a</sup> The PM<sub>2.5</sub> objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

## 1.4 Monitoring Locations

- 1.4.1 There are five Osiris monitors installed at CARRR and one CMU installed on the corner of Philpot Square, the locations of which are shown in Appendix B.

<sup>1</sup> The Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000), HMSO.

<sup>2</sup> The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO.

<sup>3</sup> Defra (2016) Review & Assessment: Technical Guidance LAQM.TG16, Defra.

- 1.4.2 The locations have been agreed with the local planning authority, the London Borough of Hammersmith and Fulham (LBHF).

## 2 Osiris Monitoring Results

### 2.1 Results Summary

2.1.1 The measured concentrations recorded by the Osiris instruments located at Carnwath Road are shown in the Table 2 and Figures 1, 2, 3, 4 and 5 below.

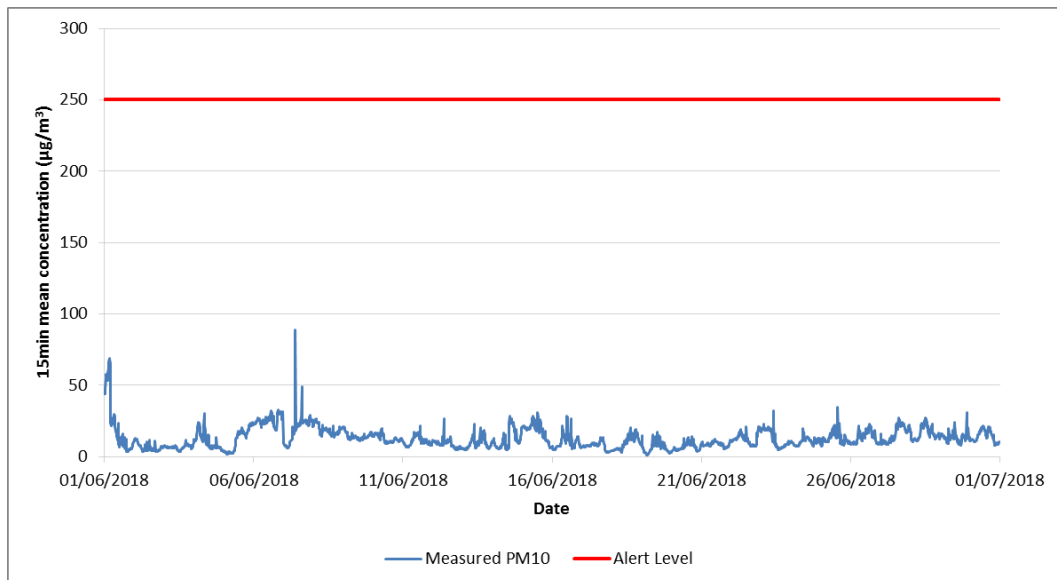
**Table 2: Osiris Unit Air Quality Monitoring Results: June 2018**

Osiris Monitor ID	Average PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	Data Capture (%)	Number of Exceedances of the 15-Minute PM <sub>10</sub> Alert Level of 250 µg/m <sup>3</sup> .
CARRR/AA/1	12.6	100	0
CARRR/AA/2	25.4	99.9	2
CARRR/AA/3 <sup>a</sup>	22.1	86.2	2
CARRR/AA/4	18.0	100	4
CARRR/AA/5 <sup>b</sup>	35.5	0.2	0

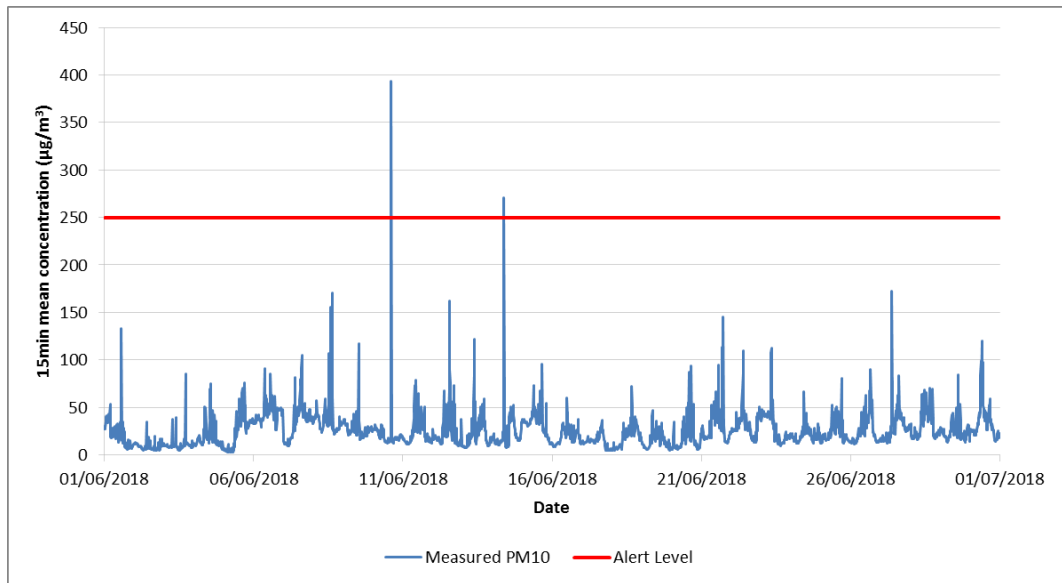
<sup>a</sup> Data capture at CARRR/AA/3 was low due to technical issues with the monitoring unit.

<sup>b</sup> Monitoring at CARRR/AA/5 commenced on 18<sup>th</sup> June 2018. Data capture has only been considered for the period since the monitor has been active.

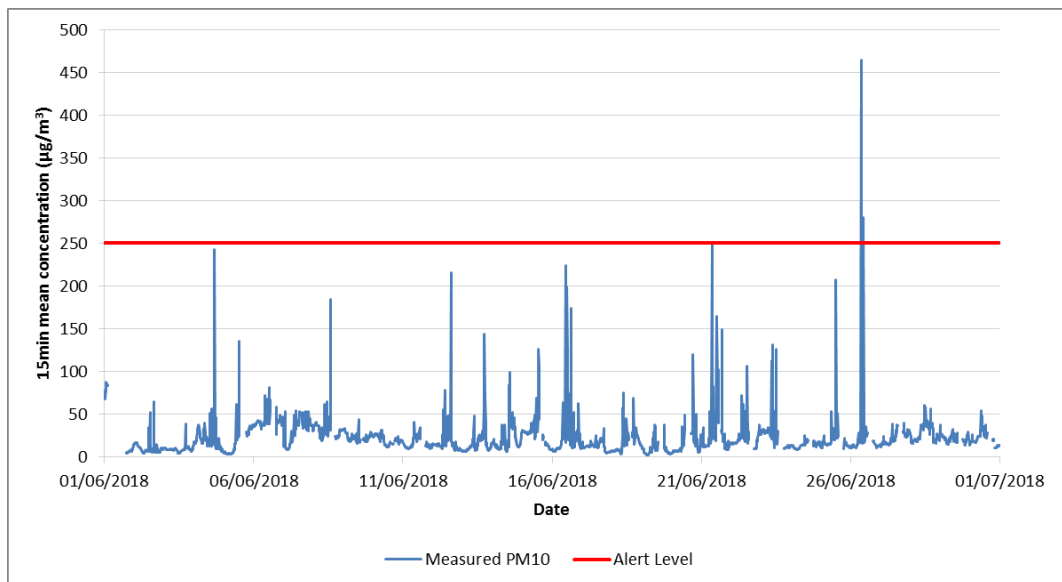
**Figure 1 Graph of 15-min PM<sub>10</sub> Concentrations at CARRR/AA/1: June 2018**



**Figure 2 Graph of 15-min PM<sub>10</sub> Concentrations at CARRR/AA/2: June 2018**

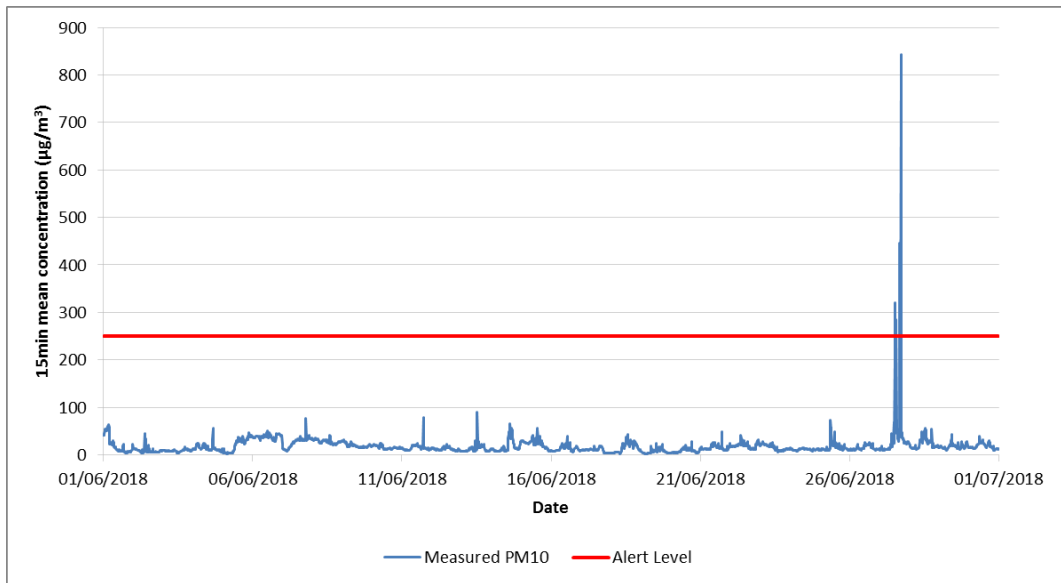


**Figure 3 Graph of 15-min PM<sub>10</sub> Concentrations at CARRR/AA/3: June 2018**

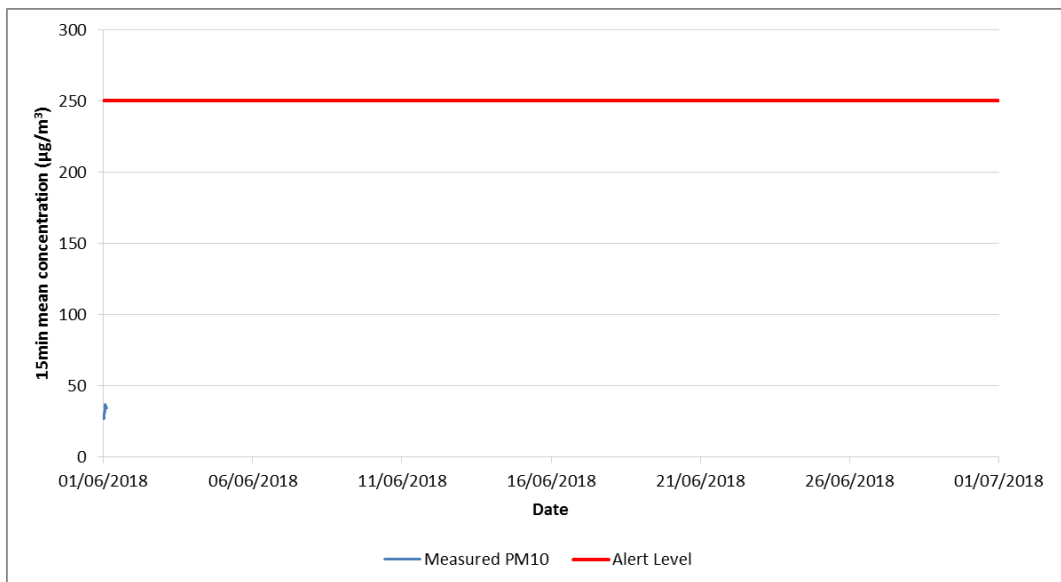




**Figure 4 Graph of 15-min PM<sub>10</sub> Concentrations at CARRR/AA/4: June 2018**



**Figure 5 Graph of 15-min PM<sub>10</sub> Concentrations at CARRR/AA/5: June 2018**



## 2.2 Results Discussion

2.2.1 The key observations in relation to the measured concentrations of PM<sub>10</sub> are summarised below:

2.2.2 PM<sub>10</sub>:

- Data capture for the month was 100% at sites CARRR/AA/1 and CARRR/AA/4, 99.9% at CARRR/AA/2 and 86.2% at CARRR/AA/3. At CARRR/AA/5 data capture was 0.2% due to loss of power to the monitoring unit; and
- There were two exceedances of the 15-minute PM<sub>10</sub> alert level of 250 µg/m<sup>3</sup> at CARRR/AA/2 and CARRR/AA/3, and four exceedances at CARRR/AA/4. There were no exceedances at CARRR/AA1 or CARRR/AAA/5.

## 2.3 Alert Level Exceedances

2.3.1 There was a total of eight exceedance of the 15-minute PM<sub>10</sub> alert level of 250 µg/m<sup>3</sup>, recorded at Osiris monitors CARRR/AA/2, CARRR/AA/3 and CARRR/AA/4. A summary of these occurrences is shown in Table 3 below.

**Table 3: PM<sub>10</sub> Alert Level Exceedance Details**

Alert ID	Osiris Monitor Location	Date	Time	PM <sub>10</sub> Conc. (µg/m <sup>3</sup> )	Wind Direction	Wind from CARRR?
CARRR/AA/2_W23_1	CARRR/AA/2	10/06/2018	14:30	393.5	North	N/A
CARRR/AA/2_W24_1	CARRR/AA/2	14/06/2018	09:15	270.9	South east	N/A
CARRR/AA/3_W26_1	CARRR/AA/3	26/06/2018	08:30	464.5	South west	N/A
CARRR/AA/3_W26_2	CARRR/AA/3	26/06/2018	10:15	279.7	South west	N/A
CARRR/AA/4_W26_1	CARRR/AA/4	27/06/2018	12:30	320.2	North east	N/A
CARRR/AA/4_W26_2	CARRR/AA/4	27/06/2018	13:30	284.5	South south-east	N/A
CARRR/AA/4_W26_3	CARRR/AA/4	27/06/2018	16:15	445.6	South west	N/A
CARRR/AA/4_W26_4	CARRR/AA/4	27/06/2018	17:15	842.6	South west	N/A

2.3.2 On each occasion where the alert level was exceeded, an investigation was carried out to determine the potential source(s) of dust which may be causing the high PM<sub>10</sub> levels. A summary of the identified potential sources of dust and the action taken to remediate these sources are provided in Table 4 below.

**Table 4: PM<sub>10</sub> Alert Level Exceedance Investigation Summary**

Alert ID	Source of Dust	Action Taken
CARRR/AA/2_W23_1	Vehicle was idling in the vicinity of monitor however offsite. All works at time around the period of the exceedance were taking place within acoustic shed	Inspection of site to ensure no other sources for PM10 / nusainice
CARRR/AA/2_W24_1	Exceedance believed to have been caused by emissions from passing vehicles (on Carnwath Road) and plant. Carnwath Road traffic noted to be quite busy. Haul road near the monitor (on the northern side of the acoustic shed) was damp and clear of visible dust. No significant activities taking place in the area of the monitor. No dust visible beyond site boundary. LAQN forecast for	n/a

	PM10 was 'low'.	
CARRR/AA/3_W2 6_1	On inspection of the site boundary adjacent to the monitor nothing was observed that was considered likely to have caused/attributed to the exceedance and no dust was observed leaving the site during this inspection. On arrival at the area on site in the vicinity of the monitor no activities were being undertaken, however the hard standing was wet and it was confirmed by a site operative that the area had just been damped down with a hose	n/a
CARRR/AA/3_W2 6_2	On inspection of the site boundary adjacent to the monitor nothing was observed that was considered likely to have caused/attributed to the exceedance. There was a vehicle being loaded on the opposite side of the road to the north-western corner of the site, however the engine was turned off and the fork lift undertaking the loading operation was on the other side of the vehicle furthest away from site. No dust was observed leaving the site. On arrival at the area on site in the vicinity of the monitor no activities were being undertaken however site personnel were hosing down the area again and wet sweeping. The use of the hose to damp down in the area below the monitor is considered to be the cause of both alerts.	n/a
CARRR/AA/4_W2 6_1	Monitor being field calibrated and tested by AQC BMB's AQ specialist	n/a
CARRR/AA/4_W2 6_2	Monitor being field calibrated and tested by AQC BMB's AQ specialist	n/a
CARRR/AA/4_W2 6_3	Monitor being field calibrated and tested by AQC BMB's AQ specialist	n/a
CARRR/AA/4_W2 6_4	Monitor being field calibrated and tested by AQC BMB's AQ specialist	n/a

### 3 CMU Monitoring Results

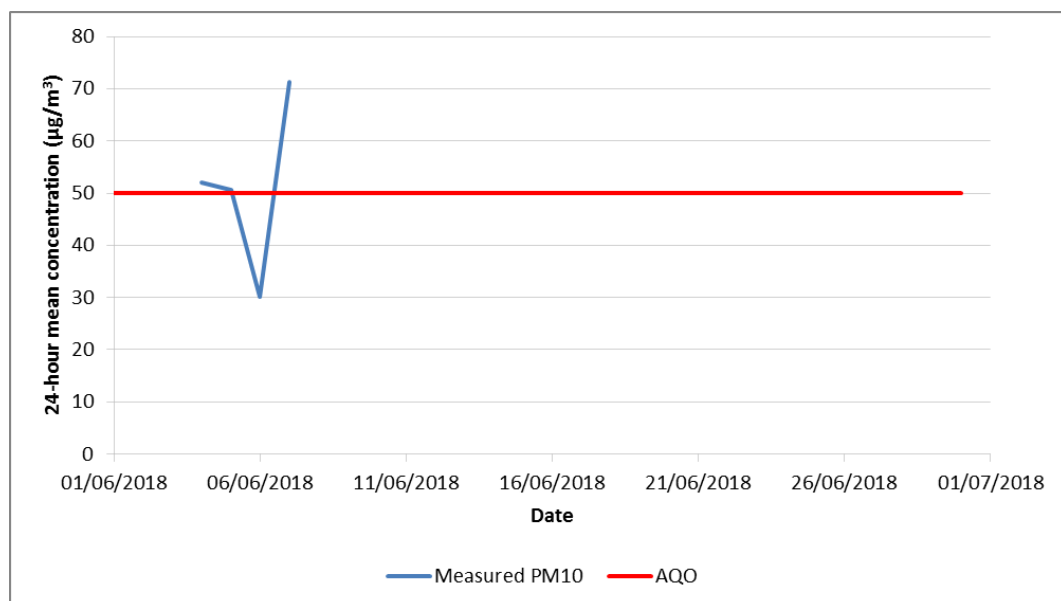
#### 3.1 Results Summary

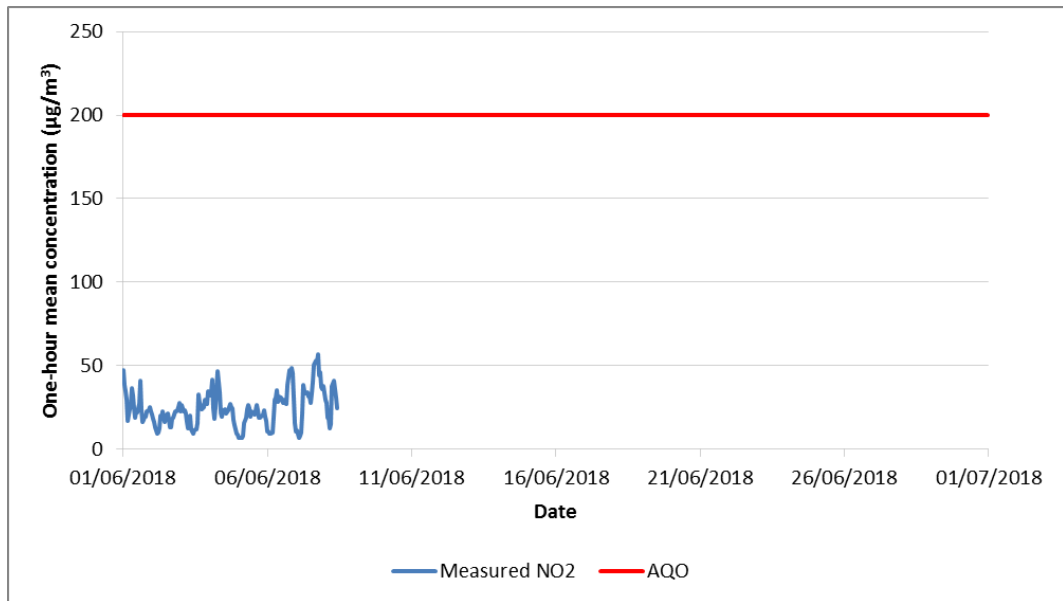
3.1.1 Summary statistics from the CMU on the corner of Philpot Square are shown in Table 5, Figure 6 and Figure 7. Data capture was low due to ongoing problems with the air conditioning unit.

**Table 5: Measured PM<sub>10</sub> and NO<sub>2</sub> Concentrations – June 2018**

Site	Statistic	PM <sub>10</sub>	NO <sub>2</sub>
CARRR/CM/1	Period Data Capture (%)	13.3	24.9
	Period mean (µg/m <sup>3</sup> ) (compare to Annual mean Air Quality Objective of 40 µg/m <sup>3</sup> )	51.1	24.3
	Maximum 24-hour mean PM <sub>10</sub> (µg/m <sup>3</sup> )	71.4	n/a
	Number of 24-hour PM <sub>10</sub> readings exceeding objective level of 50 µg/m <sup>3</sup>	3	n/a
	Maximum 1-hour mean NO <sub>2</sub> (µg/m <sup>3</sup> )	n/a	56.7
	Number of 1-hour NO <sub>2</sub> readings exceeding objective level of 200 µg/m <sup>3</sup>	n/a	0

**Figure 6 Graph of 24-hour mean PM<sub>10</sub> (µg/m<sup>3</sup>) at Philpot Square: June 2018**



**Figure 7 Graph of 1-hour mean NO<sub>2</sub> (µg/m<sup>3</sup>) at Philpot Square: June 2018**

## 3.2 Results Discussion

3.2.1 The key observations in relation to the measured concentrations of PM<sub>10</sub> and NO<sub>2</sub> are summarised below:

3.2.2 PM<sub>10</sub>:

- Data capture for the month was 13.3%;
- The measured period mean PM<sub>10</sub> concentration was 51.1 µg/m<sup>3</sup>, which is above the annual mean AQO of 40 µg/m<sup>3</sup>; and
- The 24-hour mean PM<sub>10</sub> AQO of 50 µg/m<sup>3</sup> was exceeded three times (35 exceedances are permitted in a calendar year).

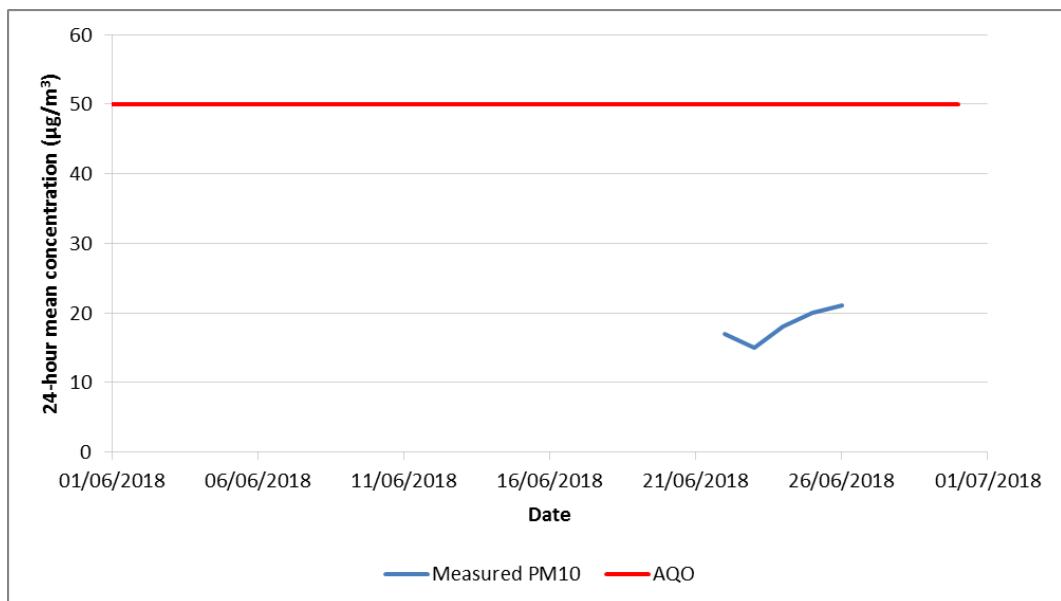
3.2.3 NO<sub>2</sub>:

- Data capture for the month was 24.9%;
- The measured period mean NO<sub>2</sub> concentration was 24.3 µg/m<sup>3</sup>, which is below the annual mean AQO of 40 µg/m<sup>3</sup>; and
- The hourly mean NO<sub>2</sub> Air Quality Objective of 200 µg/m<sup>3</sup> was not exceeded (18 exceedances are permitted in a calendar year).

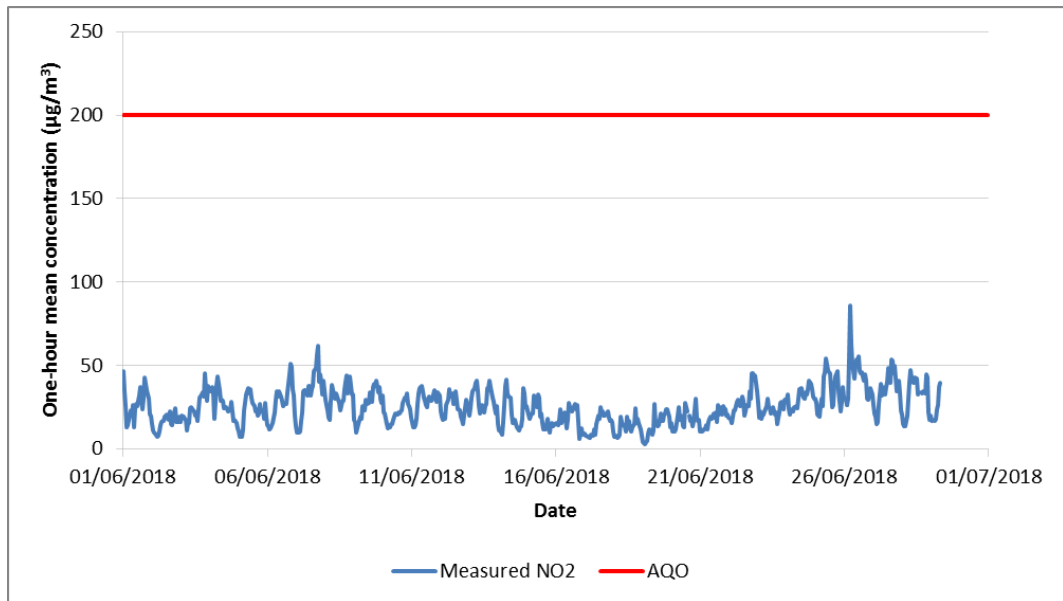
## 4 Secondary Data

- 4.1.1 Monitoring data for PM<sub>10</sub> and nitrogen dioxide are available from the nearby Wandsworth Putney air quality monitoring station. This station is operated by Kings College London as part of the London Air Quality Network (LAQN), which is the major centralised air quality network in London.
- 4.1.2 Results of PM<sub>10</sub> monitoring at Wandsworth Putney for June 2018 are shown in Figure 8 below. Results of nitrogen dioxide monitoring are shown in Figure 9.

**Figure 8 Graph of 24-hour mean PM<sub>10</sub> (µg/m<sup>3</sup>) at Wandsworth Putney: June 2018**



- 4.1.3 The average PM<sub>10</sub> concentration at Wandsworth Putney during this period was 18.2 µg/m<sup>3</sup>, which was lower than the average concentrations at Carnwath Road set out in Table 5. There is insufficient data capture for both the CMU and LAQN monitors to compare the datasets.

**Figure 9 Graph of 1-hour mean NO<sub>2</sub> (µg/m<sup>3</sup>) at Wandsworth Putney: June 2018**

- 4.2 The average NO<sub>2</sub> concentration at Wandsworth Putney during this period was 25.2 µg/m<sup>3</sup>, which was higher than the average concentration at the Philpot Square CMU set out in Table 5. The NO<sub>2</sub> concentrations plotted in Figure 9 show a lack of discernible trends. There is insufficient data capture for the CMU monitor to compare the datasets throughout the rest of June.

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## Appendices

Appendix A.....	17
A.1    Air Quality Monitoring Methodology - Osiris .....	17
A.2    Alert Levels .....	17
A.3    Air Quality Monitoring Methodology - CMU .....	18
Appendix B.....	19
B.1    Air Quality Monitoring Locations.....	19

### List of figures

Figure B.1 Osiris Air Quality Monitor Location Plan .....	20
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## Appendix A

### A.1 Air Quality Monitoring Methodology - Osiris

- A.1.1 The Osiris air quality monitoring units installed at CARRR measure concentrations of particulate matter with a diameter of less than 10 micrometres, known as PM<sub>10</sub>.
- A.1.2 The Osiris monitors are operated continuously and work by pumping air through a heated inlet to remove moisture, and past an optical sensor which measures the concentration of PM<sub>10</sub> in the sampled air.
- A.1.3 The Osiris monitors are set up to record average PM<sub>10</sub> measurements every 15 minutes, which are sent via a mobile connection to an online database which stores the recorded data. Concentrations are recorded in micrograms of PM<sub>10</sub> per cubic metre of air (µg/m<sup>3</sup>).
- A.1.4 One of the Osiris monitors at CARRR is connected to a wind sensor which records local wind speed and direction. This is to help identify possible sources of any high PM<sub>10</sub> measurements which are recorded.
- A.1.5 The Osiris monitors are all subject to the following routine checks and maintenance:
- Daily online checks of monitoring data and power connection;
  - Quarterly on-site calibration checks; and
  - Annual monitor servicing.
- A.1.6 It is desirable to achieve over 90% successful data capture on the Osiris monitors. An overall data capture rate of 100% is ideal; however, best practice guidance acknowledges that monitoring methods such as the Osiris can be prone to occasional power losses, communication errors and erroneous readings, which result in data capture lower than 100%. Successful data capture greater than 90% represents a high performance with no devaluation of the monitoring results. Where data capture is less than 90% in any monitoring period, justification as to the reasons for the low data capture are to be provided.

### A.2 Alert Levels

- A.2.1 The Osiris monitors are set up so that they send an automated alert message to CARRR site management, environmental managers and air quality specialists if 15-minute PM<sub>10</sub> concentrations exceed a set level known as an 'alert level'.
- A.2.2 The purpose of the alert level is to provide a warning of unusually high concentrations of PM<sub>10</sub>, which may be an indication that dust is being produced by site works, but might also indicate other causes such as regional dust episodes (e.g. Saharan dust clouds) and other local dust and PM<sub>10</sub> sources such as road traffic, roadworks and utility works, bonfires, or adjacent construction sites. Dry and windy weather conditions are often the cause of high dust and PM<sub>10</sub> levels.

- 
- A.2.3 When an alert level message is received, it is immediately investigated. If site works are identified as a possible contributory factor in the high PM<sub>10</sub> levels, then remedial action is taken. This might include using additional dust mitigation measures, relocating or stopping the dusty activity, or completely stopping works.

### **A.3 Air Quality Monitoring Methodology - CMU**

- A.3.1 The CMU installed at Philpot Square measures concentrations of particulate matter with a diameter of less than 10 micrometres, known as PM<sub>10</sub>.
- A.3.2 Particulate matter is measured by a TEOM-FDMS analyser which operates by drawing air through a permeation dryer and then into a sensor unit where particulate matter is collected and weighed. Auxiliary air is directed through a purge filter, and then to the sensor unit to provide a 'reference' measurement. This allows the monitor to account for volatile particulates.
- A.3.3 Nitrogen dioxide concentrations are measured by a Thermo 42i chemiluminescent analyser. This operates by converting nitrogen dioxide to nitric oxide and measuring the resulting infrared light emissions to determine concentrations in the airflow.
- A.3.4 The TEOM-FDMS and Thermo 42i chemiluminescent analysers are set up to record average PM<sub>10</sub> and nitrogen dioxide measurements every 15 minutes, which are sent via a mobile connection to an online database which stores the recorded data. Concentrations are recorded in micrograms of per cubic metre of air ( $\mu\text{g}/\text{m}^3$ ).

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## Appendix B

### B.1 Air Quality Monitoring Locations

- B.1.1 There are five Osiris monitors installed at CARRR, in the following locations:
- CARRR/AA/1: Osiris monitor fitted to a lamppost on Peterborough Road. An anemometer (wind speed and direction sensor) is attached to this monitor.
  - CARRR/AA/2: Osiris monitor fitted to a lamppost on Carnwath Road.
  - CARRR/AA/3: Osiris monitor fitted to a lamppost on the redirected Thames Path west of the CARRR site.
  - CARRR/AA/4: Osiris monitor fitted to hoarding on the eastern boundary of the work site.
  - CARRR/AA/5: Osiris monitor fitted to hoarding adjacent to works at River Wall 922.
- B.1.2 The figure below shows the locations of the five Osiris monitors at CARRR (CARRR/AA/1, CARRR/AA/2, CARRR/AA/3, CARRR/AA/4 and CARRR/AA/5).
- B.1.3 The location of the Continuous Monitoring Unit (CMU) at Philpot Square is shown as CARRR/CM/1.

Figure B.1 Osiris Air Quality Monitor Location Plan

