



**AIR QUALITY MONITORING MONTHLY
MONITORING REPORT
MAY 2018**

**CARNWATH ROAD RIVERSIDE
(CARRR)**

TIDEWAY

AIR QUALITY MONITORING MONTHLY MONITORING REPORT

CARNWATH ROAD RIVERSIDE (CARRR)

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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 May 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 (NO₂).

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 'PM₁₀'.
- 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 PM₁₀ 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 PM₁₀ concentrations greater than 250 micrograms per cubic metre (µg/m³) 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 PM₁₀ concentrations greater than 250 µg/m³ 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) ¹ and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002)².
- 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 Guidance³. The annual mean objectives for nitrogen dioxide and PM₁₀ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour objective for PM₁₀ 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, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
Fine Particles (PM₁₀)	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
Fine Particles (PM_{2.5})^a	Annual Mean	25 µg/m ³

^a The PM_{2.5} 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 four Osiris monitors installed at CARRR and one CMU installed on the corner of Philpot Square, the locations are shown in Appendix B.

¹ The Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000), HMSO.

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

³ 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: May 2018

Osiris Monitor ID	Average PM ₁₀ Concentration (µg/m ³)	Data Capture (%)	Number of Exceedances of the 15-Minute PM ₁₀ Alert Level of 250 µg/m ³ .
CARRR/AA/1	17.8	100	0
CARRR/AA/2	24.9	100	3
CARRR/AA/3 ^a	26.7	93.3	2
CARRR/AA/5 ^a	13.7	70.0	1

^a Data capture at CARRR/AA/3 and CARRR/AA/5 was low due to loss of power to the monitoring units.

Figure 1 Graph of 15-min PM₁₀ Concentrations at CARRR/AA/1: May 2018

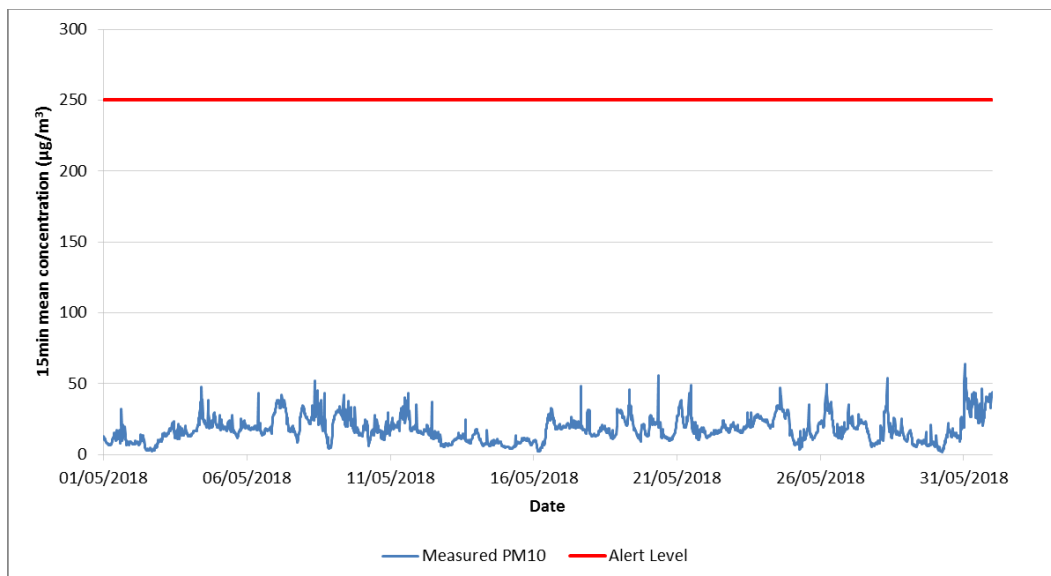


Figure 2 Graph of 15-min PM₁₀ Concentrations at CARRR/AA/2: May 2018

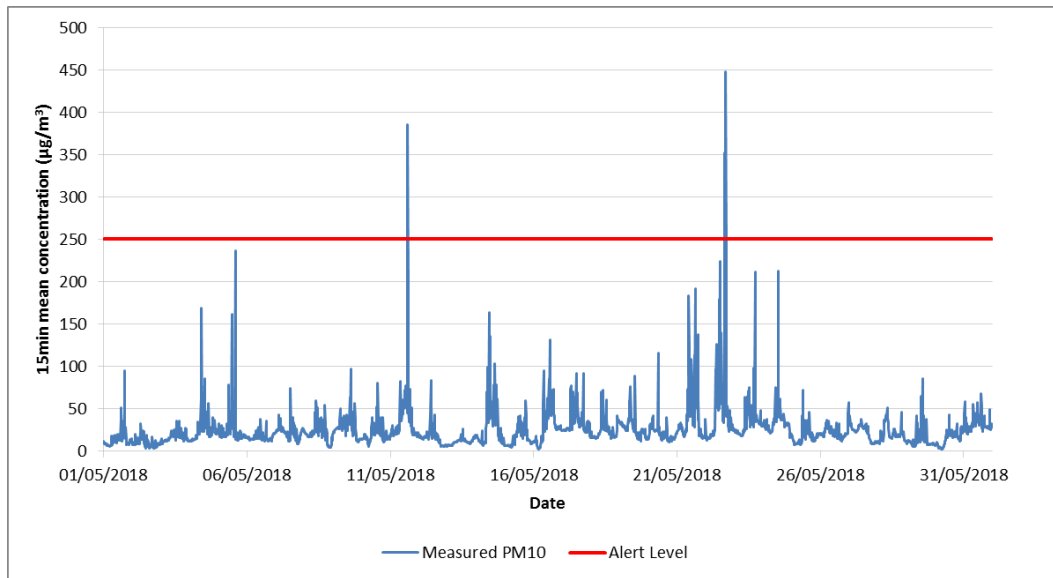


Figure 3 Graph of 15-min PM₁₀ Concentrations at CARRR/AA/3: May 2018

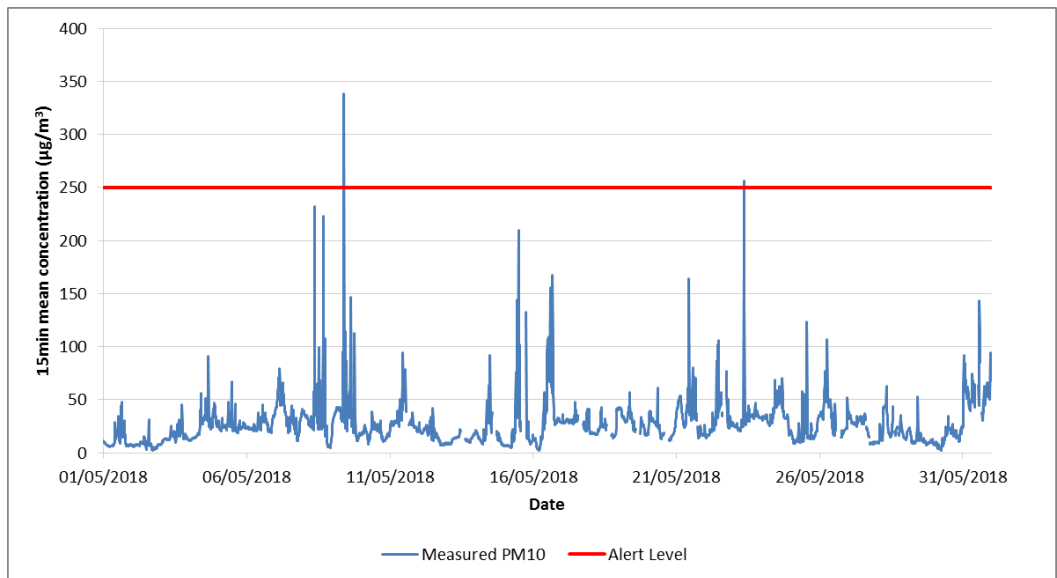
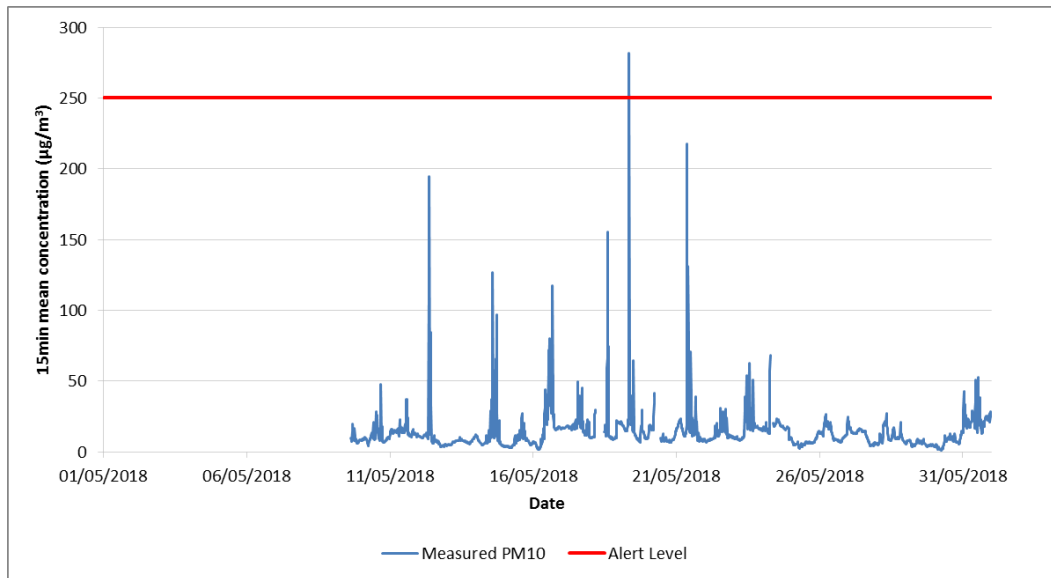


Figure 4 Graph of 15-min PM₁₀ Concentrations at CARRR/AA/5: May 2018



2.2 Results Discussion

2.2.1 The key observations in relation to the measured concentrations of PM₁₀ are summarised below:

2.2.2 PM₁₀:

- Data capture for the month was 100% at sites CARRR/AA/1 and CARRR/AA/2. Data capture was 93.3% at CARRR/AA/3 and 70.0% at CARRR/AA/5 due loss of power to the monitoring units; and
- There were three exceedances of the 15-minute PM₁₀ alert level of 250 µg/m³ at CARRR/AA/2, two exceedances at CARRR/AA/3, and one exceedance at CARRR/AA/5.

2.3 Alert Level Exceedances

2.3.1 There were three exceedances of the 15-minute PM₁₀ alert level of 250 µg/m³ at CARRR/AA/2, two exceedances at CARRR/AA/3 and one exceedance at CARRR/AA/5. A summary of these occurrences is shown in Table 3 below.

Table 3: PM₁₀ Alert Level Exceedance Details

Alert ID	Osiris Monitor Location	Date	Time	PM ₁₀ Conc. (µg/m ³)	Wind Direction	Wind from CARRR?
CARRR/AA/2_W19_1	CARRR/AA/2	11/05/2018	13:30	384.7	N/A	N/A
CARRR/AA/3_W19_1	CARRR/AA/3	09/05/2018	08:30	338.6	N/A	N/A
CARRR/AA/5_W20_1	CARRR/AA/5	19/05/2018	08:30	281.7	N/A	N/A

CARRR/AA/2_W21_1	CARRR/AA/2	22/05/2018	16:00	351.9	N/A	N/A
CARRR/AA/2_W21_2	CARRR/AA/2	22/05/2018	16:45	447.1	N/A	N/A
CARRR/AA/3_W21_1	CARRR/AA/3	23/05/2018	08:45	256.4	N/A	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 PM₁₀ 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: PM₁₀ Alert Level Exceedance Investigation Summary

Alert ID	Source of Dust	Action Taken
CARRR/AA/2_W19_1	The haul road in the vicinity of the monitor (running parallel with the northern façade of the acoustic shed) was observed to be very dry, and although no dust was observed at the time, the exceedance was likely to have been caused by wind whipping dust from the road and/or vehicles traversing it.	Road sweeper operator asked to clean the haul road in question as a priority. Additional damping down with a hose also requested
CARRR/AA/3_W19_1	Vehicles from local businesses parked or being loaded idling.	
CARRR/AA/5_W20_1	Exceedance believed to have been caused by emissions from an excavator which was operating in the area. Although there was no visible suspension of dust on unsurfaced areas it was thought that movement of plant/machinery may also have been a contributing factor.	Dampening of works area
CARRR/AA/2_W21_1	Traffic along Carnwath Road wasn't particularly busy and there were no idling vehicles identified in the vicinity of the monitor. No dust was observed leaving the site during this inspection.	
CARRR/AA/2_W21_2	Works had just ceased within the carpenter's workshop (sited immediately in front of the monitor) which involved cutting anti-slip decking strips. The dust created from this activity was obvious within the workshop and was consequently identified as the cause of the exceedances. The workshop is enclosed on three sides with a roof,	Site personnel were asked to Hoover up the dust from the operation using the dedicated dust control/capture vacuum within the workshop
CARRR/AA/3_W21_1	Jet wash was being used to damp down the hard standard. Following discussions with site personnel in the area it was ascertained that prior to damping down, mud that had accumulated from the previous evening's	Site personnel undertaking the cleaning operation reminded to damp down first prior to

	activity had been cleaned up with the bucket of an excavator and a broom.	cleaning up dry mud etc.
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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.

Table 5: Measured PM₁₀ and NO₂ Concentrations – May 2018

Site	Statistic	PM ₁₀	NO ₂
CARRR/CM/1	Period Data Capture (%)	80.6	100
	Period mean (µg/m ³) (compare to Annual mean Air Quality Objective of 40 µg/m ³)	62.2	30.5
	Maximum 24-hour mean PM ₁₀ (µg/m ³)	192.1	n/a
	Number of 24-hour PM ₁₀ readings exceeding objective level of 50 µg/m ³	16	n/a
	Maximum 1-hour mean NO ₂ (µg/m ³)	n/a	99.7
	Number of 1-hour NO ₂ readings exceeding objective level of 200 µg/m ³	n/a	0

Figure 5 Graph of 24-hour mean PM₁₀ (µg/m³) at Philpot Square: May 2018

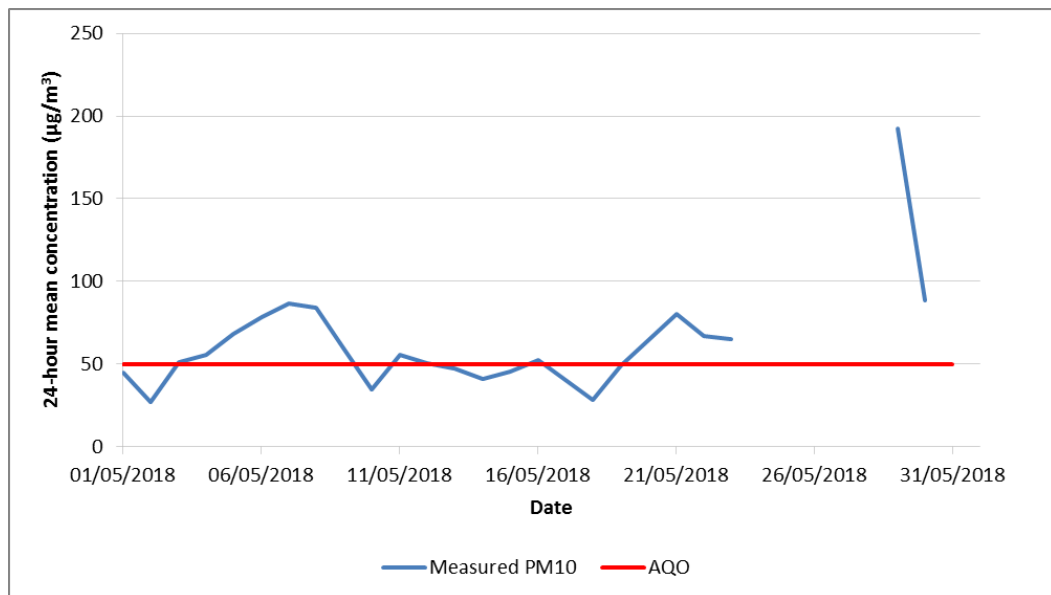
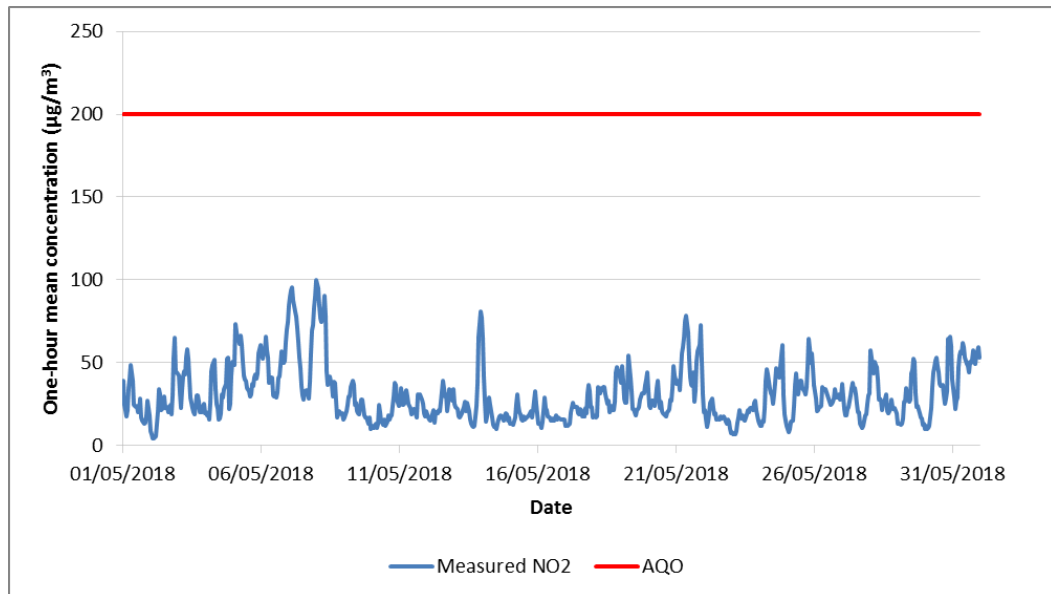


Figure 6 Graph of 1-hour mean NO₂ (µg/m³) at Philpot Square: May 2018

3.2 Results Discussion

3.2.1 The key observations in relation to the measured concentrations of PM₁₀ and NO₂ are summarised below:

3.2.2 PM₁₀:

- Data capture for the month was 80.6%;
- The measured period mean PM₁₀ concentration was 62.2 µg/m³, which is above the annual mean AQO of 40 µg/m³; and
- The 24-hour mean PM₁₀ AQO of 50 µg/m³ was exceeded 16 times (35 exceedances are permitted in a calendar year).

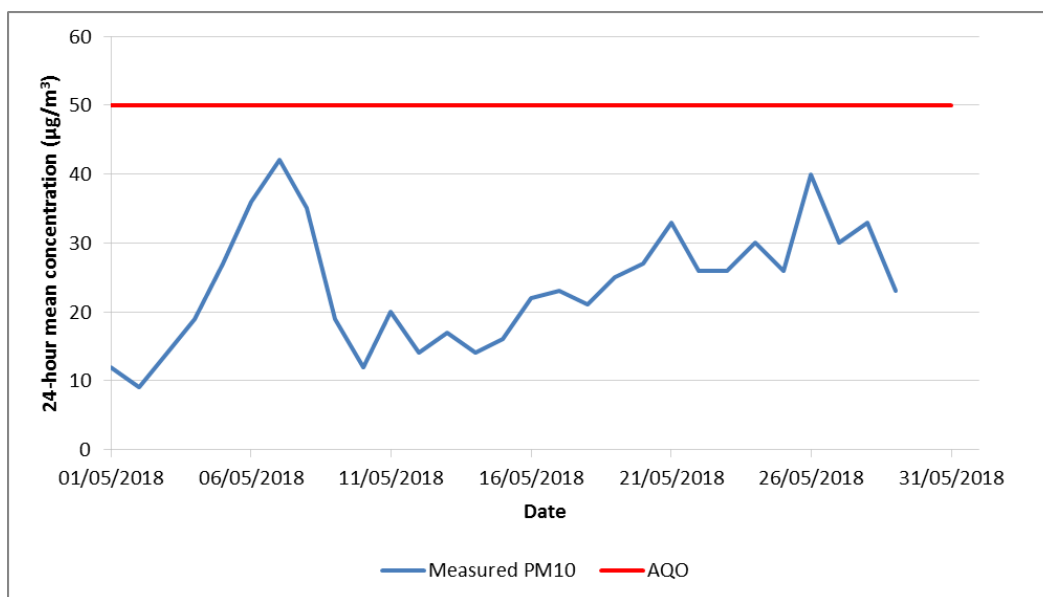
3.2.3 NO₂:

- Data capture for the month was 100%;
- The measured period mean NO₂ concentration was 30.5 µg/m³, which is below the annual mean AQO of 40 µg/m³; and
- The hourly mean NO₂ Air Quality Objective of 200 µg/m³ was not exceeded (18 exceedances are permitted in a calendar year).

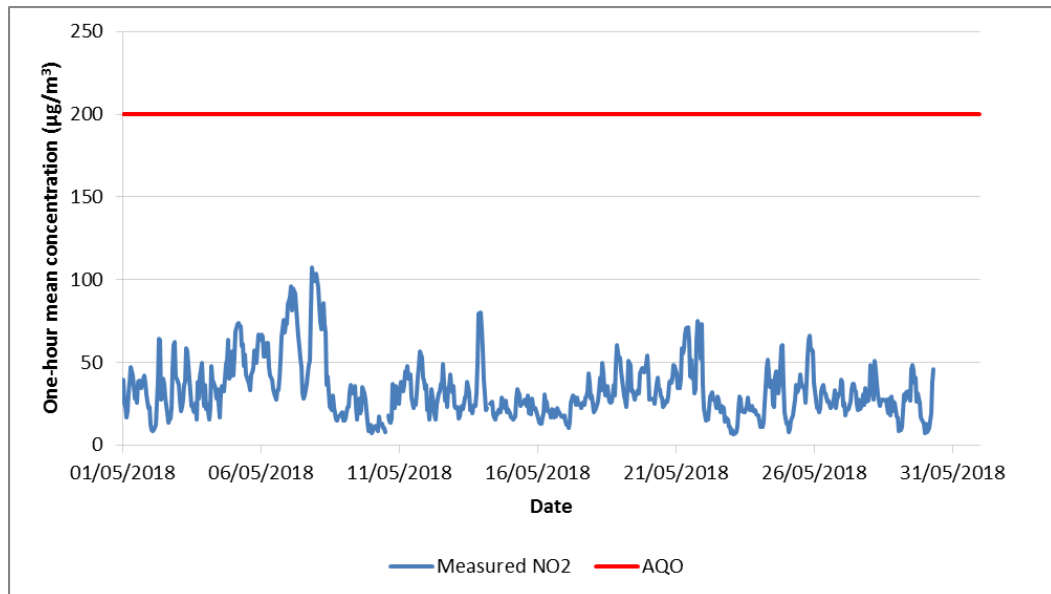
4 Secondary Data

- 4.1.1 Monitoring data for PM₁₀ 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 PM₁₀ monitoring at Wandsworth Putney for May 2018 are shown in Figure 8 below. Results of nitrogen dioxide monitoring are shown in Figure 9.

Figure 7 Graph of 24-hour mean PM₁₀ (µg/m³) at Wandsworth Putney: May 2018



- 4.1.3 The average PM₁₀ concentration at Wandsworth Putney during this period was 23.8 µg/m³, which was lower than the average concentrations at Carnwath Road set out in Table 5. Figure 8 shows a peak on the 7th May, a sharp decrease then a gradual increase in concentrations to another peak towards the end of the month. This somewhat reflects trends observed at the Philpot Square CMU, but not the Osiris monitors.

Figure 8 Graph of 1-hour mean NO₂ (µg/m³) at Wandsworth Putney: May 2018

- 4.2 The average NO₂ concentration at Wandsworth Putney during this period was 33.1 µg/m³, which was higher than the average concentration at the Philpot Square CMU set out in Table 5. The NO₂ concentrations plotted in Figure 9 show trends consistent with observations at the CMU at Philpot Square, with peak concentrations occurring at similar intervals throughout the month.

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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 PM₁₀.
- 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 PM₁₀ in the sampled air.
- A.1.3 The Osiris monitors are set up to record average PM₁₀ 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 PM₁₀ per cubic metre of air (µg/m³).
- 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 PM₁₀ 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 PM₁₀ 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 PM₁₀, 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 PM₁₀ 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 PM₁₀ levels.

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- 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 PM₁₀ 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 PM₁₀.
- 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 PM₁₀ 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 ($\mu\text{g}/\text{m}^3$).

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

