



SUMMARY MONITORING REPORT JUNE 2022

| | | | |
|-----------------|---|-------------------------|-----------------|
| DATE: | 29 July 2022 | CONFIDENTIALITY: | Restricted |
| SUBJECT: | Monthly Air Quality Monitoring Report – June 2022 | | |
| PROJECT: | NVCC TCAR | AUTHOR: | Caroline Odbert |
| CHECKED: | Peter Walsh | APPROVED: | Peter Walsh |

INTRODUCTION

WSP has been commissioned by NHS Wales to undertake air quality monitoring to meet Cardiff Councils (CC) Pre-commencement planning condition 11 in relation to the Temporary Construction Access Route for the Construction of the Approved Velindre Cancer Centre, Whitchurch Hospital, Park Road, Whitchurch, Cardiff, CF14 7XB.

Condition 11 (CC Reference: 20/01110/MJR) states that:

“Prior to commencement of the development hereby approved details of an air monitoring unit and its location shall be submitted to and approved in writing with the Local Planning Authority. The monitoring unit shall be implemented in accordance with the approved details and remain operational until cessation of the development. Data from the air monitoring unit shall be provided to the Local Planning Authority on request.

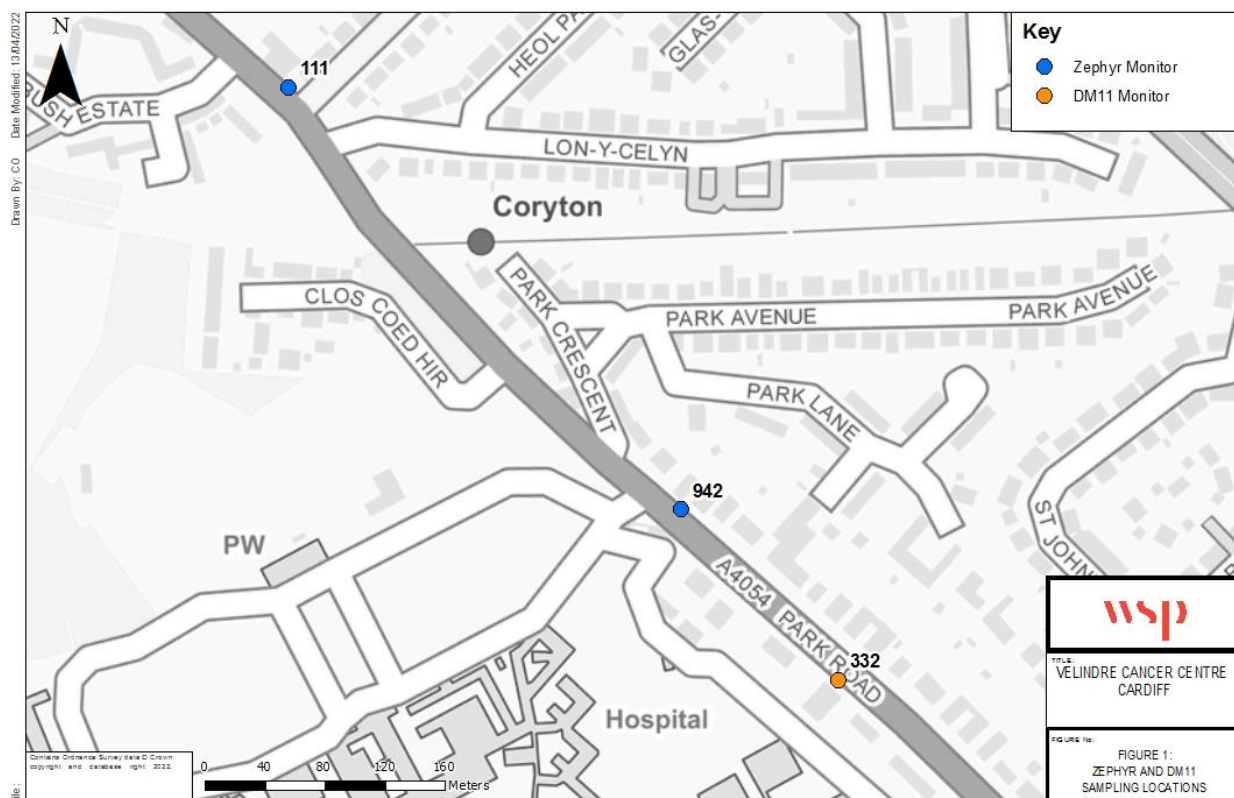
Reason: To monitor air quality in accordance with Policy EN13 of the adopted Cardiff Local Plan (2006-2026).’

During construction works there is the potential for air quality impacts from the generation of dust and particulate matter, which could lead to dust soiling and human health impacts at relevant sensitive receptors. There is also the potential for increases in pollutant emissions from construction vehicles using the local road network.

In order to discharge the pre-commencement planning condition 11, on behalf of NHS Wales, WSP is carrying out monitoring in the study area using Zephyr and DM11 Pro continuous monitors. The air quality monitoring within the study area is being undertaken to ensure that dust and vehicle exhaust emissions from construction traffic are monitored and effectively managed. This report provides a summary of the monitoring data for June 2022.

Concentrations of particulate matter (PM₁₀ and PM_{2.5}) and Nitrogen Dioxide (NO₂) are being continuously monitored at three locations within the study area (See Figure 1). There are Zephyr monitors (NO₂, PM₁₀ and PM_{2.5}) located close to the Hollybush Estate site and close to the construction site entrance. There is a DM11 Pro monitor (PM₁₀ and PM_{2.5}) located outside 19 Park Road.

Figure 1 Air Quality Monitoring Locations



The Zephyrs and DM11 Pro are able to detect localised pollution events and fluctuations in the concentrations and can send alerts to the project team when concentrations go above a certain threshold. The Zephyr continuous monitoring devices are supplied by Earthsense and the DM11 Pros by Air Quality Monitors, data from each of the monitors is uploaded onto a cloud system/website where it can be viewed and downloaded by specific individuals.

AIR QUALITY OBJECTIVES AND STANDARDS

The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)¹. The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union legislation².

The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) with regards to current scientific knowledge about the effects of each pollutant on health and the environment.

The air quality objectives are policy-based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

The relevant standards and objectives for this monitoring programme are given in Table 1.

¹ Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2)

² The UK formally left the EU on 31st January 2020 and new air quality legislation for the UK will be brought forward in due course. The Air Quality (Miscellaneous Amendment and Revocation of Retained Direct EU Legislation) (EU Exit) Regulations 2018 (SI 2018/1407) (see Regulation 5) makes changes to retained direct EU legislation relating to air quality, to ensure that it continues to operate effectively.

Table 1 – Relevant Air Quality Objectives and Standards

| Pollutant | Concentration ($\mu\text{g}/\text{m}^3$) | Duration | Exceedances permitted per 12 month period |
|--|--|--------------|---|
| Nitrogen Dioxide | 200 | 1-hour mean | 18 |
| | 40 | Annual mean | - |
| Particulate matter (PM_{10}) | 40 | Annual mean | - |
| | 50 | 24-hour mean | 35 |
| Particulate matter ($\text{PM}_{2.5}$) * | 20 | Annual mean | - |

* Local Authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area, however, there is no statutory objective given in the AQS for $\text{PM}_{2.5}$ at this time, only a framework.

DEFRA AIR QUALITY INDEX

Defra's Air Quality Index³ provides a useful indication of the levels of air pollution. The index is divided into four bands (low, moderate, high, very high), and the index is numbered from 1 to 10 within these bands (Figure 2). The bandings are based on hourly/24-hour mean concentrations depending on the pollutant.

| | | | | | | | | | | |
|--|------|--------|---------|----------|----------|----------|---------|---------|---------|-------------|
| Nitrogen Dioxide Based on the hourly mean concentration. | | | | | | | | | | |
| Index | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Band | Low | Low | Low | Moderate | Moderate | Moderate | High | High | High | Very High |
| $\mu\text{g}/\text{m}^3$ | 0-67 | 68-134 | 135-200 | 201-267 | 268-334 | 335-400 | 401-467 | 468-534 | 535-600 | 601 or more |

| | | | | | | | | | | |
|---|------|-------|-------|----------|----------|----------|-------|-------|--------|-------------|
| PM_{10} Particles Based on the daily mean concentration for historical data, latest 24 hour running mean for the current day. | | | | | | | | | | |
| Index | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Band | Low | Low | Low | Moderate | Moderate | Moderate | High | High | High | Very High |
| $\mu\text{g}/\text{m}^3$ | 0-16 | 17-33 | 34-50 | 51-58 | 59-66 | 67-75 | 76-83 | 84-91 | 92-100 | 101 or more |

| | | | | | | | | | | |
|--|------|-------|-------|----------|----------|----------|-------|-------|-------|------------|
| $\text{PM}_{2.5}$ Particles Based on the daily mean concentration for historical data, latest 24 hour running mean for the current day. | | | | | | | | | | |
| Index | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Band | Low | Low | Low | Moderate | Moderate | Moderate | High | High | High | Very High |
| $\mu\text{g}/\text{m}^3$ | 0-11 | 12-23 | 24-35 | 36-41 | 42-47 | 48-53 | 54-58 | 59-64 | 65-70 | 71 or more |

Figure 2 – Defra Air Quality Index

³ <https://uk-air.defra.gov.uk/air-pollution/daq>

MONITORING RESULTS

Zephyr Continuous Monitors

Nitrogen Dioxide

Figure 3 shows the NO₂ data monitored at each of the Zephyr continuous monitors for the period 1st to 30th June 2022. A summary of the monitored concentrations is provided in Table 2. The continuous monitors both had 100% data capture during the monitoring period.

Average hourly NO₂ concentrations across the monitoring period at both the monitoring sites were well below the air quality objective of 40µg/m³. There were also no exceedances of the one-hour objective (200µg/m³) at either of the sites. NO₂ concentrations at both Zephyr monitors follow a similar trend in data. The maximum hourly NO₂ concentration of 70.6µg/m³ occurred at the Hollybush Inn lamppost on the 2nd June at 11pm at night. This peak did not occur at the 15 Park Road monitor which would suggest it was a local pollution event.

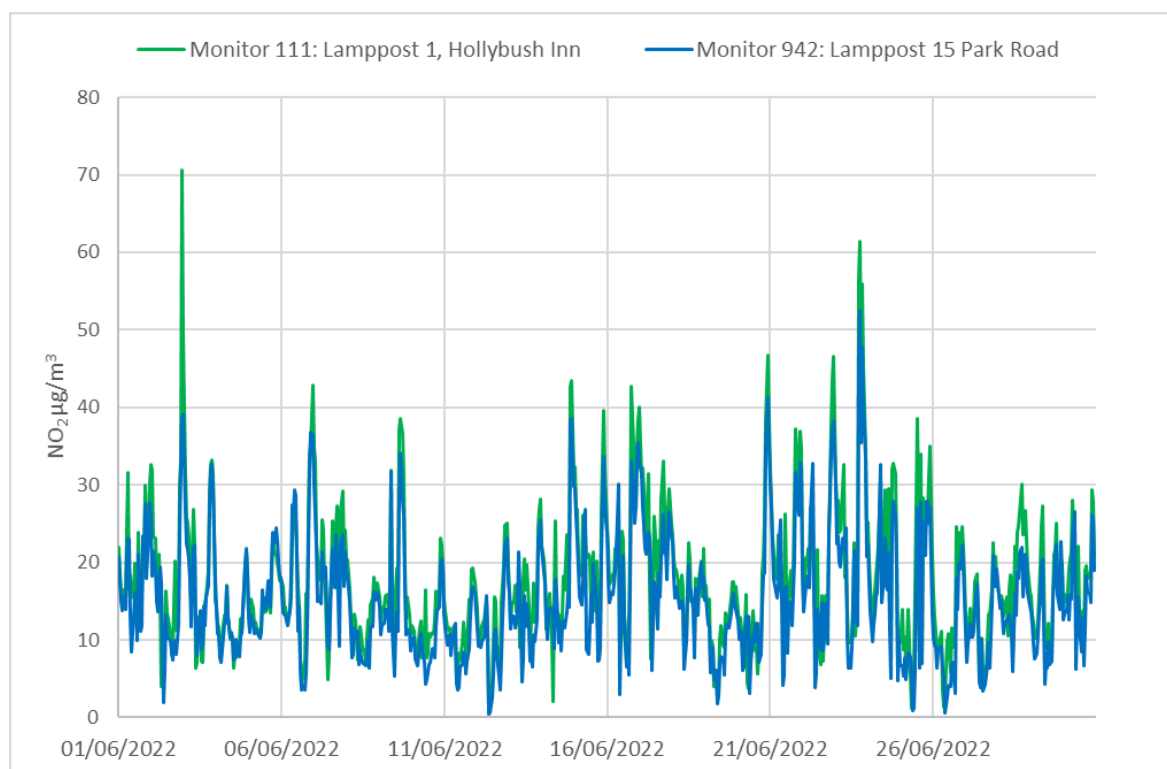


Figure 3 – Monitored Zephyr NO₂ Hourly Concentrations (µg/m³)

Table 2 – NO₂ Concentrations, June 2022

| Monitor | Location | NO ₂ Concentration Summary (µg/m ³) | |
|---------|---------------------------|--|----------------|
| | | Average | Hourly Maximum |
| 111 | Lamppost 1, Hollybush Inn | 17.7 | 70.6 |
| 942 | Lamppost 15, Park Road | 15.3 | 52.5 |

Particulate Matter (PM₁₀ and PM_{2.5})

Figure 4 and Figure 5 respectively, show the PM₁₀ and PM_{2.5} data monitored at each of the Zephyr continuous monitors for the period 1st to 30th June 2022. A summary of the monitored concentrations is provided in Table 3. The continuous monitors both had 100% data capture during the monitoring period.

Average hourly concentrations of PM₁₀ and PM_{2.5} at both the Zephyr continuous monitors are below the respective annual mean objectives of 40µg/m³ and 20µg/m³ during the monitoring period. In addition, there were no 24-hour mean concentrations above 50µg/m³. Concentrations follow a similar trend at both monitor locations.

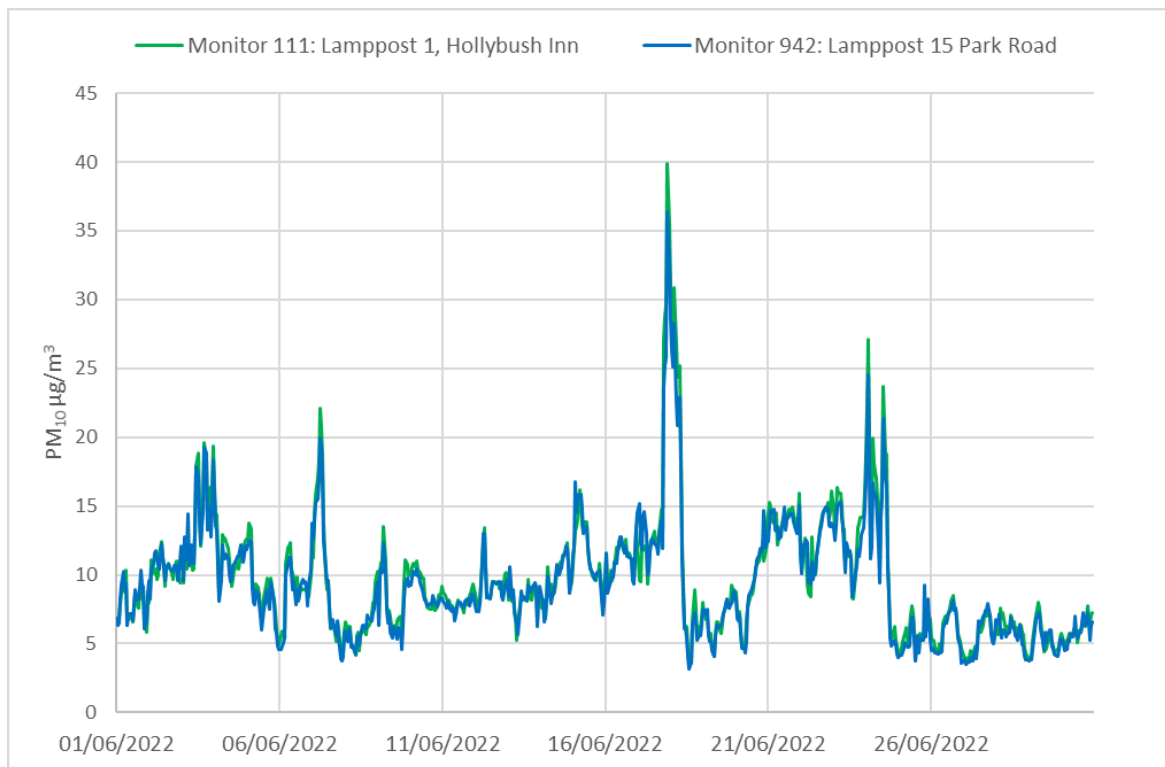


Figure 4 – Monitored Zephyr Hourly PM₁₀ Concentrations ($\mu\text{g}/\text{m}^3$)

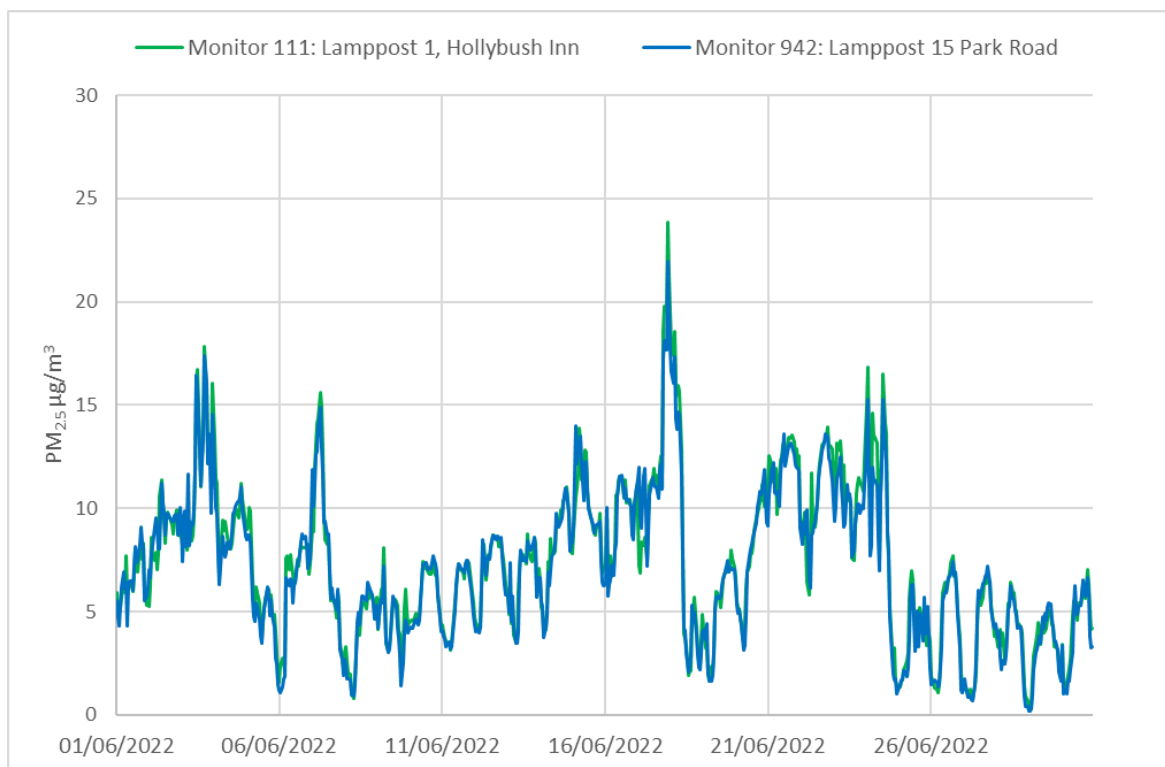


Figure 5 – Monitored Zephyr Hourly PM_{2.5} Concentrations ($\mu\text{g}/\text{m}^3$)

Table 3 – PM₁₀ and PM_{2.5} Concentrations, June 2022

| Monitor | Location | PM ₁₀ Concentrations (µg/m ³) | | | PM _{2.5} Concentrations (µg/m ³) | |
|---------|---------------------------|--|----------------|----------------------|---|----------------|
| | | Average | Maximum Hourly | Maximum 24-hour mean | Average | Maximum Hourly |
| 111 | Lamppost 1, Hollybush Inn | 9.6 | 39.9 | 16.1 | 7.3 | 23.9 |
| 942 | Lamppost 15, Park Road | 9.3 | 36.3 | 16.0 | 7.1 | 21.9 |

DM11 Pro Continuous Monitor

Particulate Matter (PM₁₀ and PM_{2.5})

Figure 6, shows the PM₁₀ and PM_{2.5} data monitored at the DM11 continuous monitor for the period 1st to 30th June 2022. A summary of the monitored concentrations is provided in Table 4. The continuous monitor had 100% data capture during the monitoring period. Average hourly concentrations of PM₁₀ and PM_{2.5} are below the respective annual mean objectives of 40µg/m³ and 20µg/m³ during the monitoring period. In addition, there were no 24-hour mean concentrations above 50µg/m³.

The DM11 was re-calibrated towards the end of June to ensure that the monitor was functioning correctly, which explains the step changes in the data between the 21st and 27th June. Outside of these dates both the PM₁₀ and PM_{2.5} concentrations followed a similar trend.

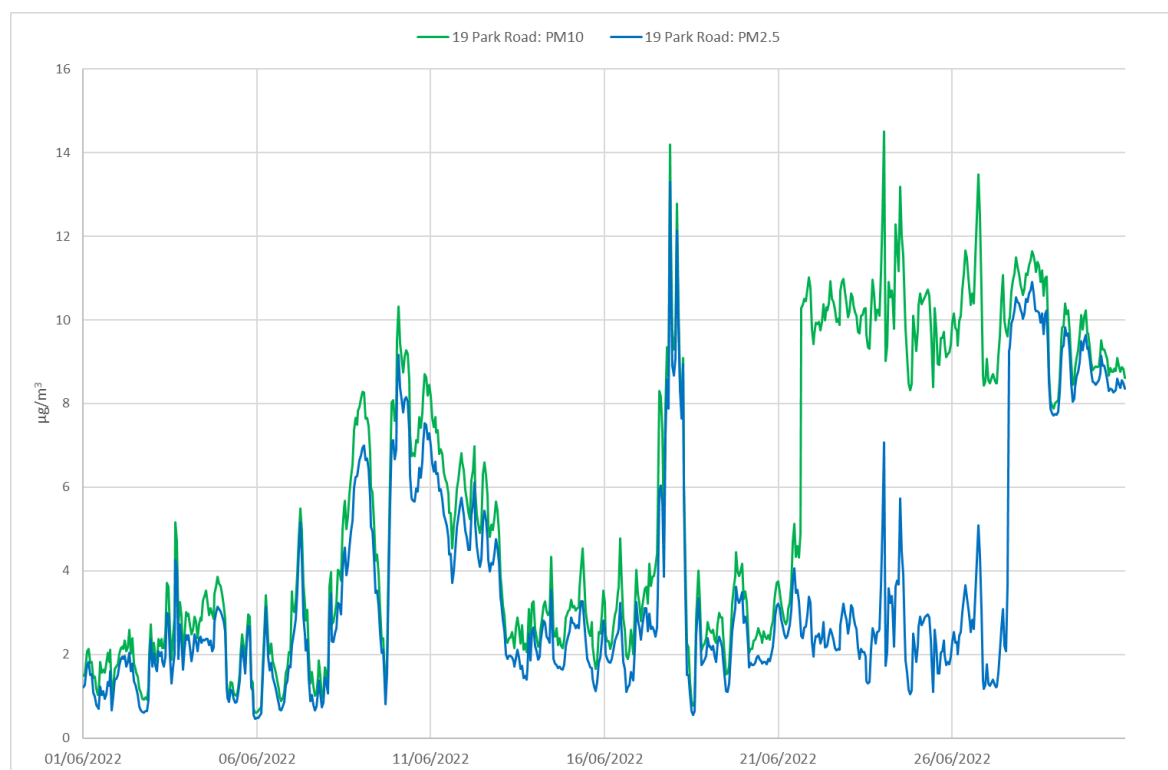


Figure 6 – Monitored DM11 PM₁₀ and PM_{2.5} Concentrations (µg/m³)

Table 4 – PM₁₀ and PM_{2.5} Concentrations, June 2022

| Monitor | Location | PM ₁₀ Concentrations (µg/m ³) | | | PM _{2.5} Concentrations (µg/m ³) | |
|---------|----------|--|----------------|----------------------|---|----------------|
| | | Average | Maximum Hourly | Maximum 24-hour mean | Average | Maximum Hourly |

| | | | | | | |
|-----|--------------|-----|------|------|-----|------|
| 332 | 19 Park Road | 5.6 | 14.5 | 10.6 | 3.6 | 13.3 |
|-----|--------------|-----|------|------|-----|------|