

# Air Quality Monitoring Report Dublin Airport Q3 2016

HSSE Department



## Glossary

EPA	Environmental Protection Agency
NO	Nitrogen Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
PM <sub>10</sub>	Airborne particulate matter, diameter less than 10 microns.
AQIHAir	Quality Index for Health
The Regulations	Ambient Air Quality Standards Regulations 2011

## Version Control

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## Executive Summary

Ambient air quality monitoring is carried out by daa by means of a stationary continuous air monitoring station located within the Dublin Airport boundary. Air quality is also monitored at 10 locations outside the airport boundary using diffusion tube sampling. This report provides an overview of the results of air quality monitoring undertaken by daa at Dublin Airport and its environs in Quarter 3 of 2016. Air monitoring locations are listed in Table 1 and presented on Figure 1 of this report.

The Ambient Air Quality Standards Regulations 2011 (the Regulations), S.I. No. 180 of 2011, implement EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe. The Regulations are referred to in this report for comparison/reference purposes only. There is no requirement under the Regulations for individual companies or operators to carry out air monitoring. In Ireland, compliance with the Regulations is the responsibility of the Environmental Protection Agency (EPA), which is deemed to be the competent authority for the purpose of Directive 2008/50/EC. The EPA is required to submit an annual Air Quality report to the Minister for the Environment, Heritage and Local Government and to the European Commission.

In Q3 of 2016, data collected from each monitoring location was within the limit values mandated in the Regulations. The recorded data is considered typical of that which would be expected to be measured in urban and inter-urban areas.

National monitoring results carried out by the EPA and local authorities and further information relating to air quality can be found at [www.epa.ie](http://www.epa.ie). The Air Quality Index for Health is available at [www.airquality.epa.ie](http://www.airquality.epa.ie).

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## **1.0 Introduction**

### **1.1. Background**

Dublin Airport is located approximately 10 km north of Dublin city. The Airport occupies approximately two and a half thousand acres and is bounded on two sides by the busiest highways in the country – the M1 and the M50.

### **1.2. Purpose of Report**

The purpose of this report is to present an overview of the results of air monitoring conducted onsite at Dublin airport and at 10 external monitoring locations in the vicinity of the airport during July to September (Q3) of 2016. The Ambient Air Quality Standards Regulations 2011 (the Regulations), S.I. No. 180 of 2011, implement EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe. This report compares the data collected during the daa monitoring programme with limit values contained in The Ambient Air Quality Standards Regulations 2011 (the Regulations) to assess air quality at each monitoring location.

The Regulations are referred to in this report for comparison and reference purposes only. There is no requirement under the Regulations that companies or operators shall carry out air monitoring. In Ireland, compliance with the Regulations is the responsibility of the Environmental Protection Agency (EPA), which is deemed to be the competent authority.

The following parameters were monitored during Q3 as part of Dublin Airport's air monitoring programme:

- Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>) at the Dublin Airport automatic station; and
- Nitrogen Dioxide (NO<sub>2</sub>) using diffusion tubes at 10 offsite locations.

## 2.0 Monitoring Locations

A list of the ambient air quality sampling locations is presented in **Table 1**. Sampling locations are presented on **Figure 1**.

**Table 1: Community Ambient Air Quality Monitoring Locations**

Reference	Location	Measurement Method	Parameters Reported
<b>On-site</b>	West of Castlemoate Road, Dublin Airport.	Continuous analyser <sup>1</sup>	NO <sub>2</sub> PM10
<b>A1</b>	Forrest Little Golf Club	Passive Tubes	NO <sub>2</sub>
<b>A2</b>	Kilreesk Lane, St. Margaret's	Passive Tubes	
<b>A3</b>	Ridgewood Estate West, Swords	Passive Tubes	
<b>A4</b>	St. Margaret's School & Parish	Passive Tubes	
<b>A5</b>	Fire Station, Huntstown, Dublin	Passive Tubes	
<b>A6</b>	Southern Boundary Fence, Dublin	Passive Tubes	
<b>A7</b>	Western Boundary Fence, Dublin	Passive Tubes	
<b>A8</b>	St. Nicholas of Myra School, Malahide	Passive Tubes	
<b>A9</b>	Naomh Mearnóg GAA Club,	Passive Tubes	
<b>A10</b>	Oscar Papa Site, Portmarnock	Passive Tubes	

### Notes

1. The onsite air monitoring station is located in the vicinity of ongoing construction works.





Figure 1: Air Quality Monitoring Locations

### **3.0 Parameters and Sampling Methodology**

#### **3.1. Offsite Passive Sampling: Nitrogen Dioxide (NO<sub>2</sub>)**

daa has installed a network of 10 passive diffusion tube samplers to establish NO<sub>2</sub> concentrations in the areas surrounding the Airport. Monitoring locations are shown on **Figure 1** and listed in **Table 1**. The diffusion tubes are exposed for approximately 4-week intervals. Diffusion tubes record monthly mean concentrations, which are averaged annually to give an annual mean. The tubes are analysed using UV Spectrophotometry at a UKAS (United Kingdom Accreditation Service) accredited laboratory. Results are expressed in µg/m<sup>3</sup> (micrograms per cubic metre).

#### **3.2. Onsite Sampling: Nitrogen Dioxide (NO<sub>2</sub>)**

Monitoring of NO<sub>2</sub> is carried out on a continuous basis at the stationary airport monitoring station. Measurement of NO<sub>2</sub> is carried out using a Horiba APNA-370 ambient NO<sub>x</sub> monitor which employs a cross-flow modulated chemiluminescence method.

#### **3.3. Onsite Sampling: Particulate Matter (PM<sub>10</sub>)**

Airborne particulate matter with an aerodynamic diameter equal to or less than 10µm is monitored using the onsite analyser on a continuous basis at the airport monitoring station. This instrument automatically measures and records airborne particulate concentration levels using the principle of beta ray attenuation. The sampler monitors the PM<sub>10</sub> content of air by drawing a measured volume of air through a chamber containing a pre-conditioned and pre-weighed filter in accordance with the internationally accepted US EPA protocol for PM10 sampling. The results are expressed in µg/m<sup>3</sup>.



## 4.0 Monitoring Results

### 4.1 Offsite NO<sub>2</sub> Monitoring Results

Each of the 10 diffusion tube locations (A1 – A10) record monthly mean concentrations of NO<sub>2</sub>. The results have been averaged to give the Q3 mean for each location, presented in Figure 2 below. The Regulations mandate an annual mean limit value of 40 µg/m<sup>3</sup> for NO<sub>2</sub>. As can be seen from **Figure 2**, the Q3 mean values were below the limit value at all monitoring locations.

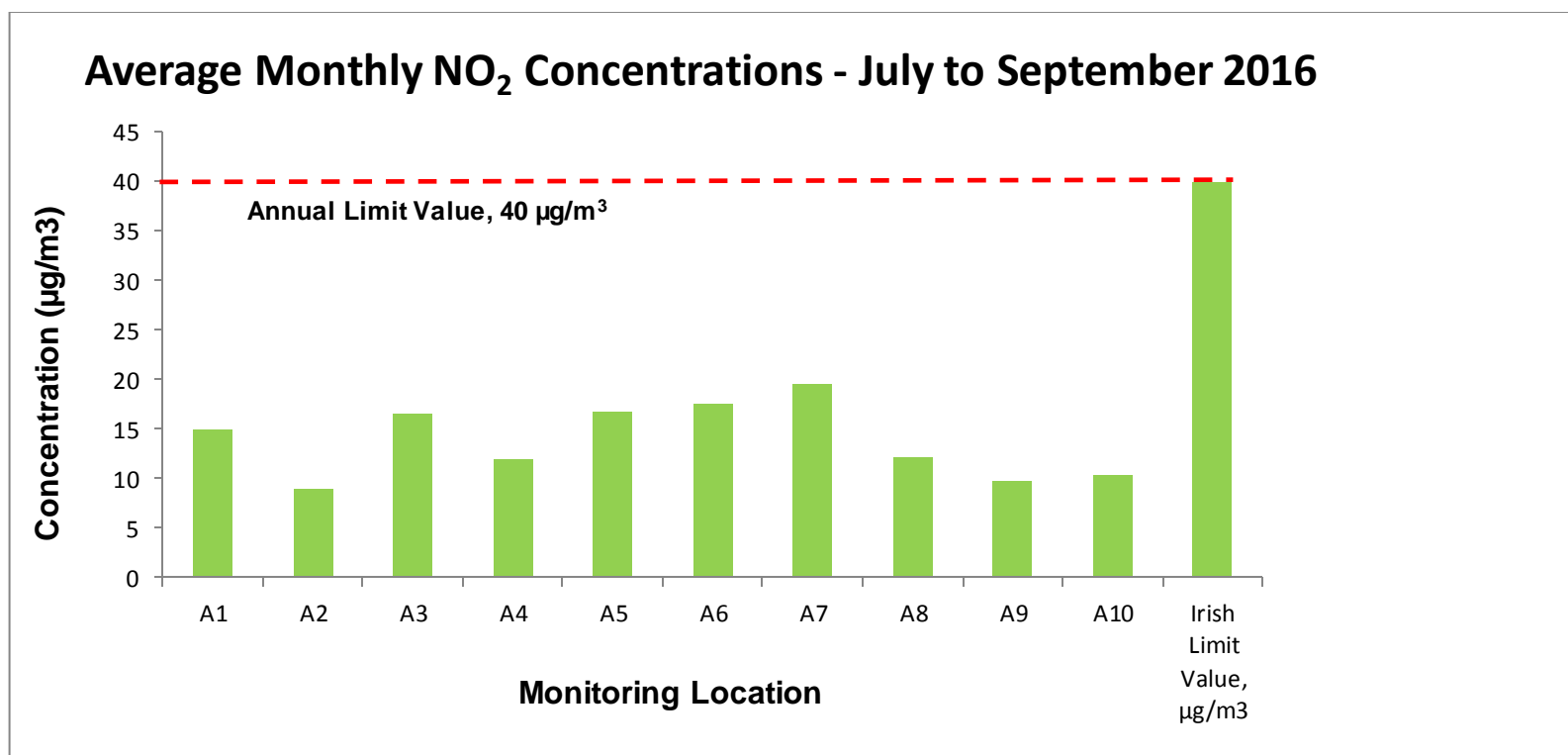


Figure 2: Average Monthly NO<sub>2</sub> Concentrations Q3 2016

#### 4.2. On-site Airport Monitoring Station Results: Daily Average NO<sub>2</sub>

NO<sub>2</sub> concentrations are measured at an hourly rate at the automatic station within Dublin Airport. The data is presented as Figure 3. The equivalent daily average was calculated as 21.87 µg/m<sup>3</sup>.

**Figure 3** presents the daily average NO<sub>2</sub> concentrations measured at the automatic station in Dublin Airport during Q1, Q2 and Q3 of 2016. Significant maintenance was carried out on the monitoring equipment between 22/03/2016 and 1/04/2016 and a fault registered from 19/08/2016 to 08/09/2016. Reliable data is not available for these dates.

The air monitoring station is serviced and calibrated on a regular basis and data is not considered to be accurate for 24 hours after calibration and maintenance is undertaken. The dates of calibration and maintenance of the air monitoring equipment in 2016 are as follows:

8<sup>th</sup> January

5<sup>th</sup> February

29 – 31<sup>th</sup> March

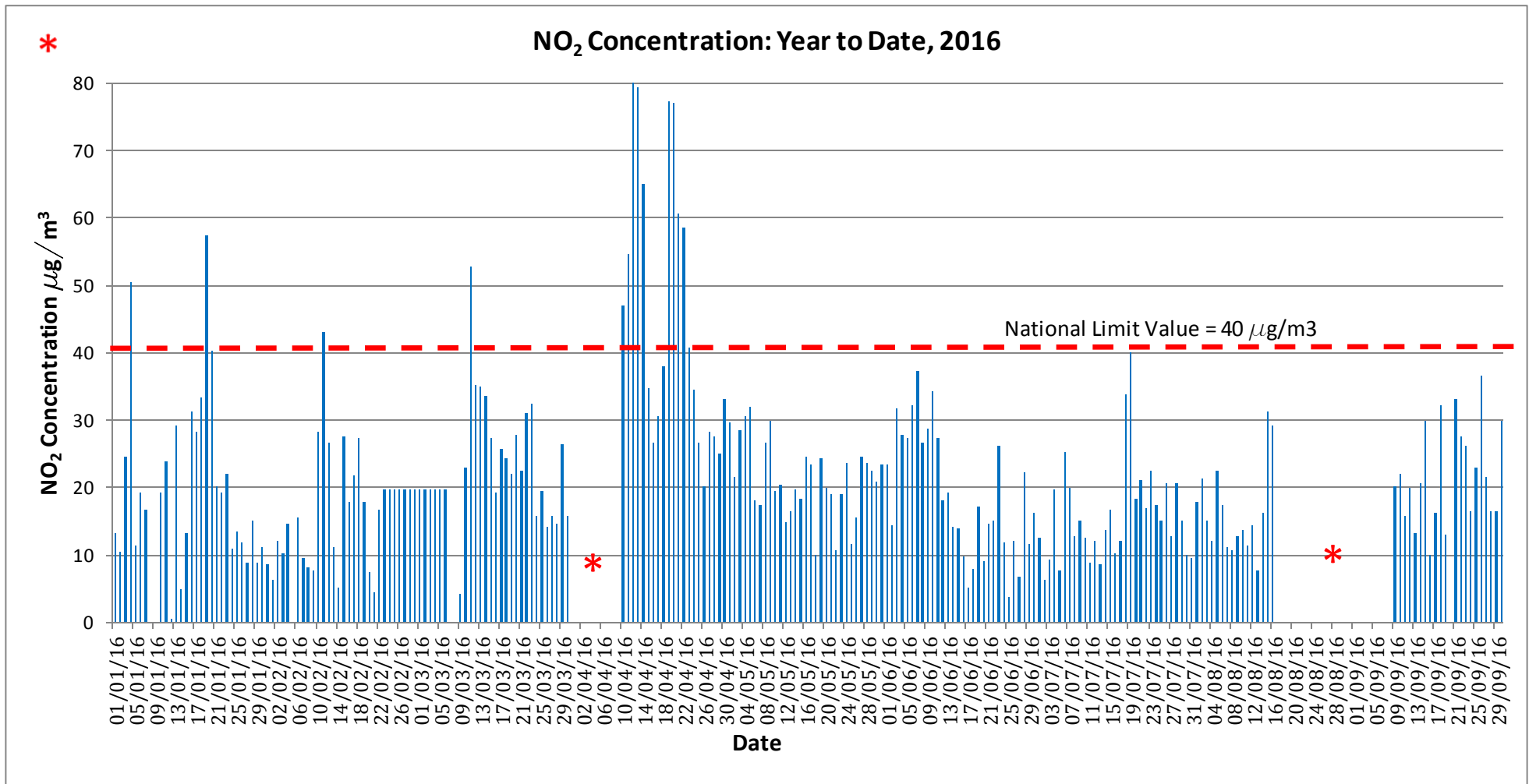
7<sup>th</sup> April

5<sup>th</sup> May

12<sup>th</sup> August

8<sup>th</sup> September

As outlined in Q2 Air Quality report, elevated NO<sub>2</sub> concentrations were recorded in April 2016. It is important to note that the onsite air monitoring station is currently located within an area of ongoing construction works. The movement of construction vehicles in this area may account for the elevated readings of NO<sub>2</sub> in April 2016. No elevated levels of NO<sub>2</sub> were recorded at the EPA monitoring station or diffusion tubes in April 2016.



**Figure 3:** Daily Average NO2 Q1, Q2, Q3 2016

\*Air Monitoring Station repairs

### 4.3. On-site Airport Monitoring Station Results: PM<sub>10</sub>

Daily average PM<sub>10</sub> concentrations measured at the automatic station in Dublin Airport for Q1, Q2 and Q3 of 2016 are presented in Table 3. The Q1/Q2/Q3 2016 mean PM<sub>10</sub> was calculated as 23.4 µg/m<sup>3</sup>. The Regulations set a one day PM<sub>10</sub> limit value of 50 µg/m<sup>3</sup>, and an annual mean limit value of 40 µg/m<sup>3</sup> as shown in Table 3. The annual limit value (40 µg/m<sup>3</sup>) was not exceeded in Q3 of 2016. The Q3 2016 daily values did not surpass the number of allowed exceedances as outlined in the Ambient Air Quality Regulations.

Objective	Averaging Period	Limit or Threshold Value	No. of Allowed Exceedances	No. of Exceedances (Year to date)
PM <sub>10</sub> Limit Value	One day	50	Not to be exceeded on more than 35 days per year	16 <sup>1</sup>
PM <sub>10</sub> Limit Value	Calendar Year	40	NA	NA

**Table 2: PM<sub>10</sub> Limit Values**

1. The onsite air monitoring station is located in the vicinity of ongoing construction works.

**Figure 4** presents the daily average PM<sub>10</sub> concentrations measured at the automatic station in Dublin Airport from January to September of 2016. Significant maintenance was carried out on the monitoring station equipment between 22/03/2016 and 1/04/2016 and a fault was registered between 18/09/2016 until 9/08/2016, as such, reliable data is not available for these dates. Reliable data is not available for 24 hours after calibration of the equipment. The dates during which calibration of the monitoring equipment was undertaken during Q1, Q2 and Q3 of 2016 are as follows:

8th January	5th May
5th February	12th August
29 - 31 <sup>st</sup> March	8 <sup>th</sup> September.
7th April	

It is important to note that the onsite air monitoring station is currently located within an area of ongoing construction works. The movement of construction vehicles may account for the elevated readings of PM<sub>10</sub> in March, April, May and June 2016. These periods coincided with the greatest intensity of construction works.

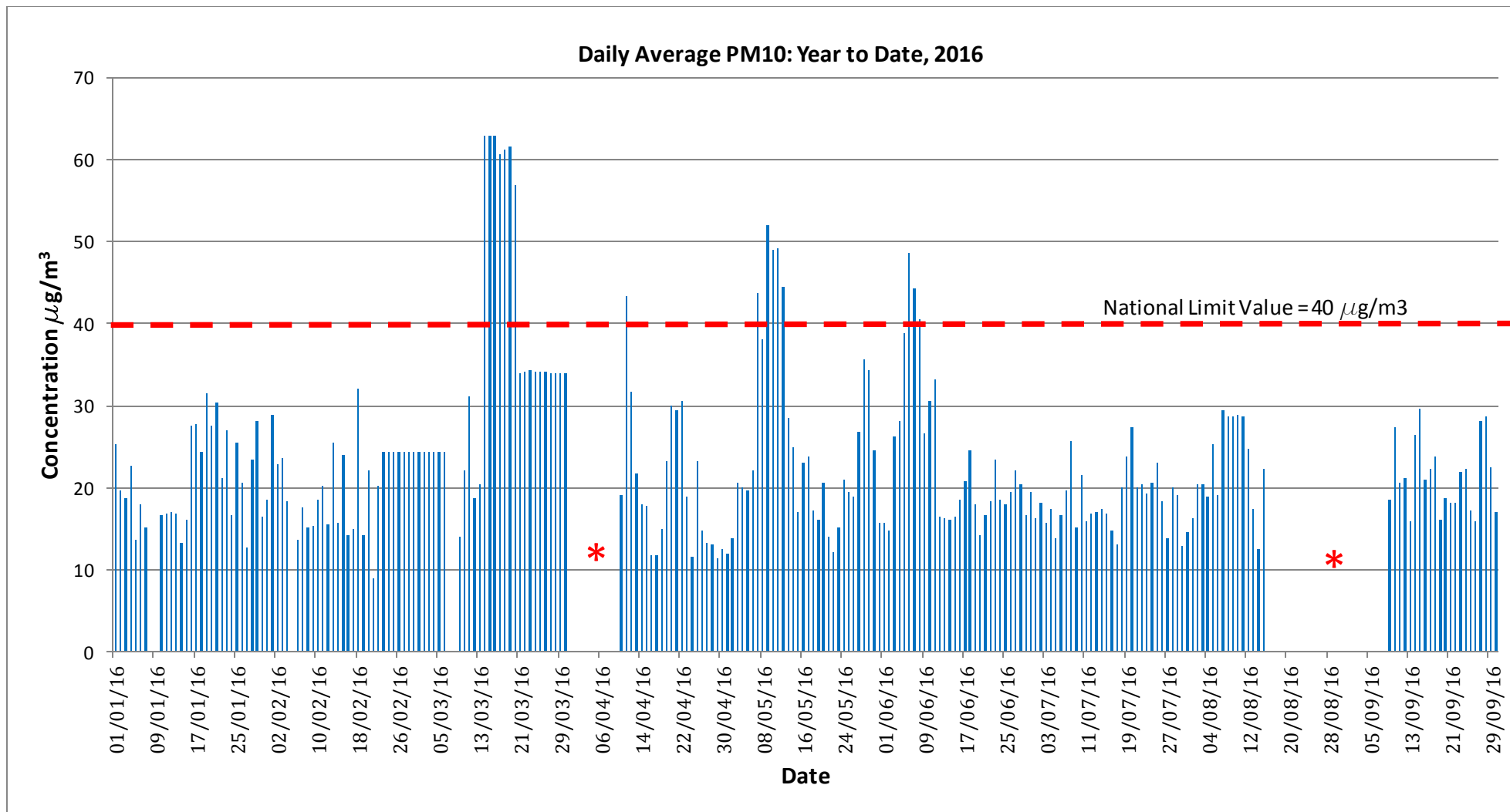


Figure 3: Daily Average PM10 Q1, Q2, Q3 2016

\*Air Monitoring Station repairs

## 5.0 Results Summary

Onsite Monitoring: The results of the NO<sub>2</sub> and PM<sub>10</sub> concentrations using the online analyser indicate concentrations are below the relevant long-term (annual) limit value of 40µg/m<sup>3</sup> and within the allowed criteria of short term limit values in Q3.

Offsite Monitoring: The diffusion tube results for NO<sub>2</sub> indicate that the highest concentrations are recorded adjacent to the main roads around the airport. The monitoring locations are only a few metres from the road and therefore pick up on roadside concentrations which are close to the vehicular emission source. Concentrations further away from the roadways are much lower and similar to the concentrations recorded at the on-site station. All concentrations are below the annual average limit value for NO<sub>2</sub>.

The EPA Air Quality Index for Health (AQIH) comprises a scale from one to ten which provides air quality information. A reading of 10 indicates that the air quality is very poor and a reading of one to three inclusive indicates that the air quality is good. For a complete AQIH assessment five parameters, including PM<sub>10</sub> and NO<sub>2</sub> are measured. The AQIH is calculated every hour. The current readings are available on the EPA's AQIH map.