Air Quality Monitoring at Dublin Airport Q2 2016

HSSE Department

Glossary

EPA	Environmental Protection Agency
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
PM_{10}	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

daa carries out ambient air monitoring at Dublin Airport and at a number of locations surrounding the airport. A continuous air monitoring station is located on site at the airport and diffusion tube monitoring is undertaken in the surrounding areas. This report provides an overview of air quality at Dublin Airport and the surrounding environs in Q2 of 2016. A list of air monitoring locations is presented in Table 1.1 and 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 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 Q2 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. The Air Quality Index for Health is available at 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 the results of air monitoring conducted onsite at Dublin airport and at monitoring locations surrounding the airport during April to June (Q2) 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 assessment 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 Q2 of 2016 as part of Dublin Airport's air monitoring programme:

- Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) at the Dublin Airport automatic station; and
- Nitrogen Dioxide (NO_2) using diffusion tubes at 9 offsite locations.

Monitoring locations are presented in Table 1 and Figure 1 of this report.

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: Air Quality Monitoring Locations

Table 1 Community ambient air monitoring locations			
Reference	**Location**	**Measurement Method**	**Parameters Reported**
On-site[1]	West of Castlemoate Road, Dublin Airport.	Continuous analyser	NO2 PM10
A1	Forrest Little Golf Club	Passive Tubes	NO_2
A2	Kilreesk Lane, St. Margaret's	Passive Tubes	
A3[2]	Ridgewood Estate West, Swords	Passive Tubes	
A4	St. Margaret's School & Parish	Passive Tubes	
A5	Fire Station, Huntstown, Dublin	Passive Tubes	
A6	Southern Boundary Fence, Dublin	Passive Tubes	
A7	Western Boundary Fence, Dublin	Passive Tubes	
A8	St. Nicholas of Myra School, Malahide	Passive Tubes	
A9	Naomh Mearnóg GAA Club,	Passive Tubes	
A10	Oscar Papa Site, Portmarnock	Passive Tubes	

Notes

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

2. This location is no longer sampled due to unauthorised removal.

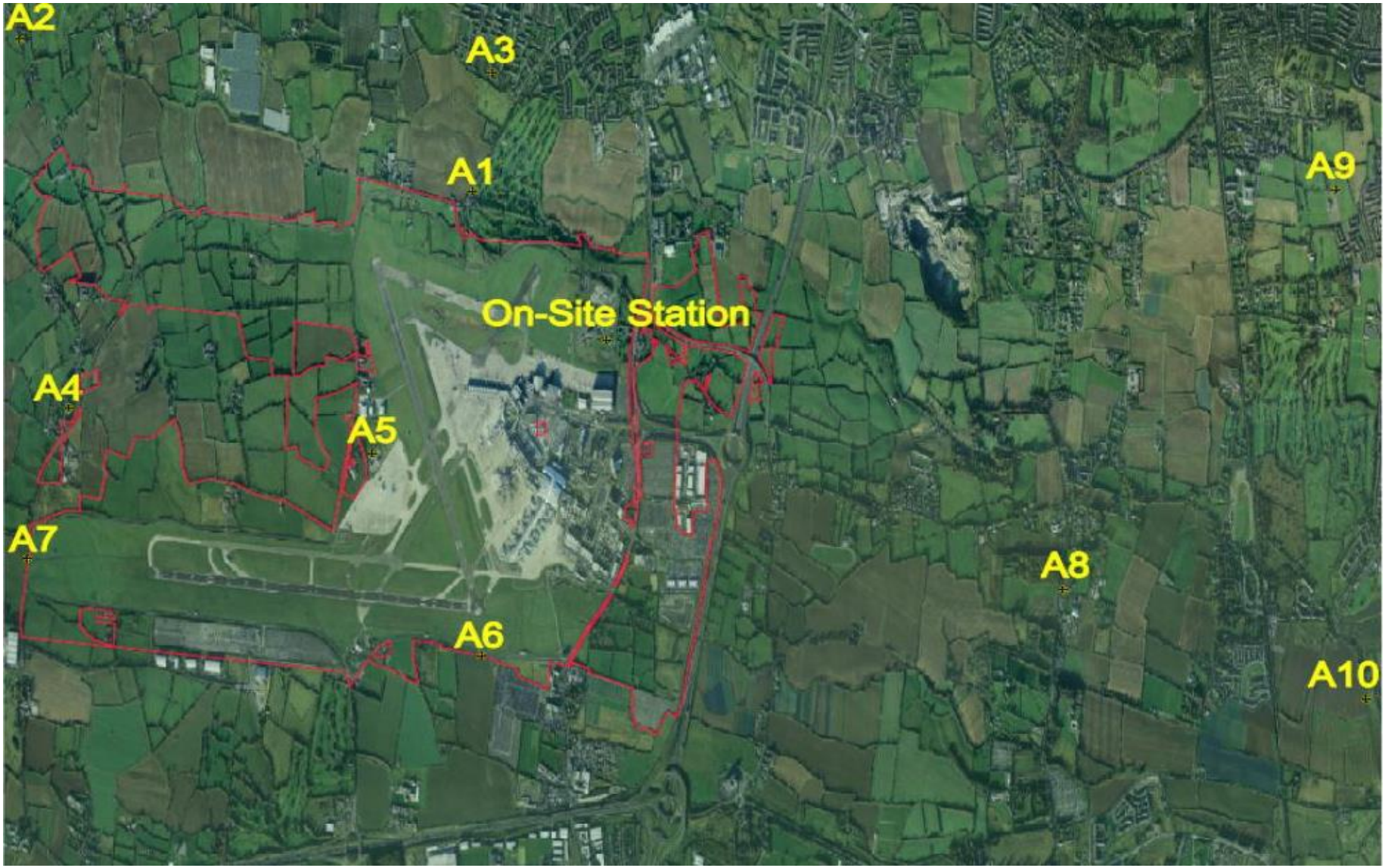

Figure 1: Air Quality Monitoring Locations

3.0 Parameters and Sampling Methodology

3.1. Offsite Passive Sampling: Nitrogen Dioxide (NO_2)

daa has installed a network of passive diffusion tube samplers to monitor NO_2. The purpose of this network is to establish NO_2 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. The 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/m³ (micrograms per cubic metre).

3.2. Onsite Sampling: Nitrogen Dioxide (NO_2)

Monitoring of NO_2 is carried out on a continuous basis at the airport monitoring station. Measurement of NO_2 is carried out using a Horiba APNA-370 ambient NOx monitor which employs a cross-flow modulated chemiluminescence method.

3.3. Onsite Sampling: Particulate Matter (PM_{10})

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_{10} 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/m³.

4.0 Monitoring Results

4.1. Offsite NO_2 Monitoring Results

Each of the 9 diffusion tube locations (A1 – A10) record monthly mean concentrations of NO_2. The results have been averaged to give the Q2 mean for each location, presented in Figure 2 below. The Regulations set an annual mean limit value of 40 µg/m³ for NO2. As can be seen from Figure 2, Q2 mean values were below the limit value at all monitoring locations**.**

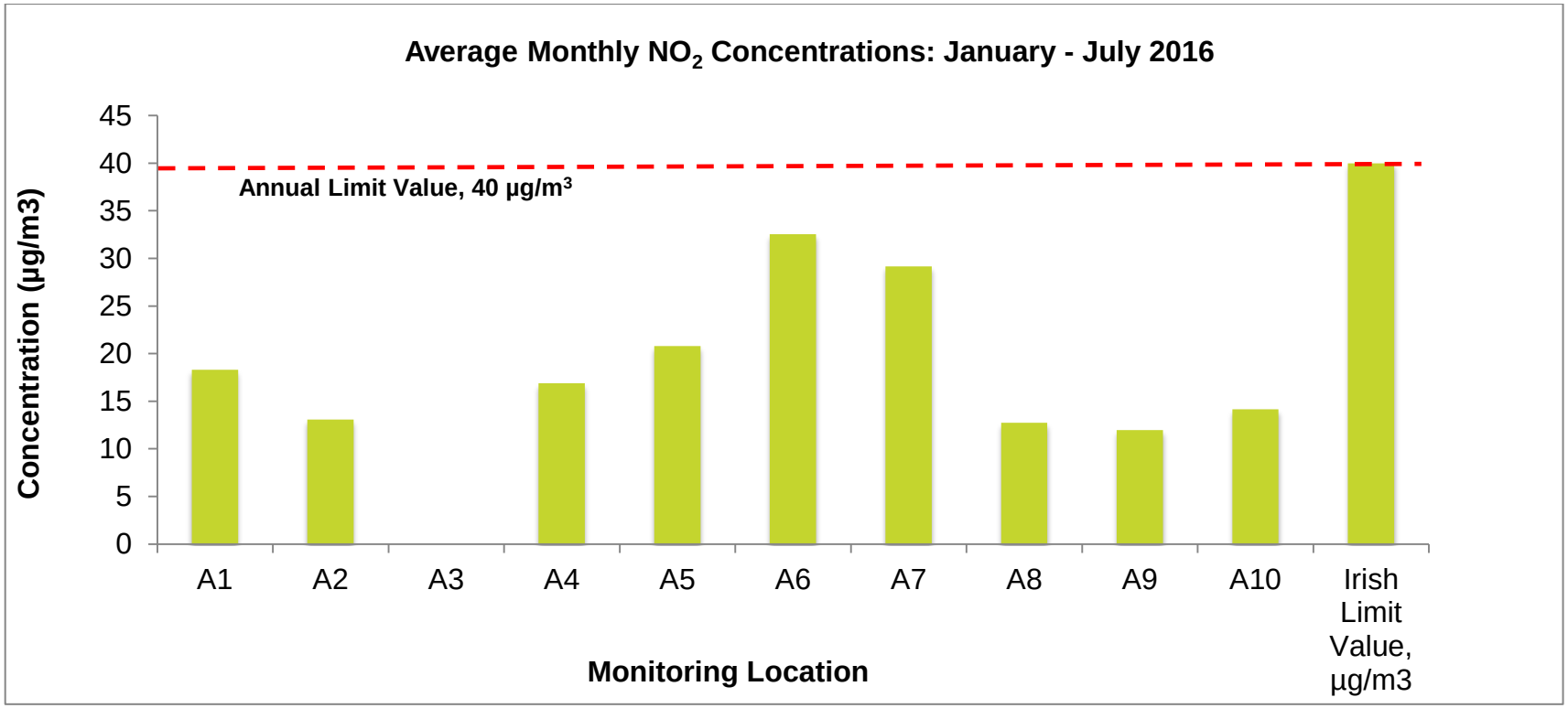

Figure 2: Average Monthly NO_2 Concentrations Q2 2016

4.2. On-site Airport Monitoring Station Results: Daily Average NO_2

NO_2 concentrations are measured at an hourly rate at the automatic station in Dublin Airport. The data is presented as Figure 3 below. The equivalent daily average was calculated as 23.4 µg/m^3. The annual mean limit value (40 µg/m3) was not exceeded during Q1 or Q2 of 2016. Some high levels of NO_2 concentration can be seen in April.

Figure 3 presents the daily average NO_2 concentrations measured at the automatic station in Dublin Airport during Q1 and Q2 of 2016. Significant maintenance was carried out on the monitoring equipment between 22/03/2016 and 1/04/2016 and, as such, reliable data is not available for these dates. The dates during which calibration of the monitoring equipment was undertaken is also indicated on Figure 3, data measured on these dates is considered not to be accurate.

The average NO_2 concentrations measured at the diffusion tube locations in April are provided in Table 2 for comparison. It can be seen from Table 2 that no elevated levels of NO_2 were recorded in April 2016.

Monitoring Location	Apr, Conc. µg/m^3
A1	14.07
A2	7.14
A4	11.38
A5	18.20
A6	34.36
A7	22.18
A8	10.78
A9	9.28
A10	11.66
Irish Limit Value, µg/m^3	**40.00**

Table 2: Diffusion Tube NO2 Readings April 2016

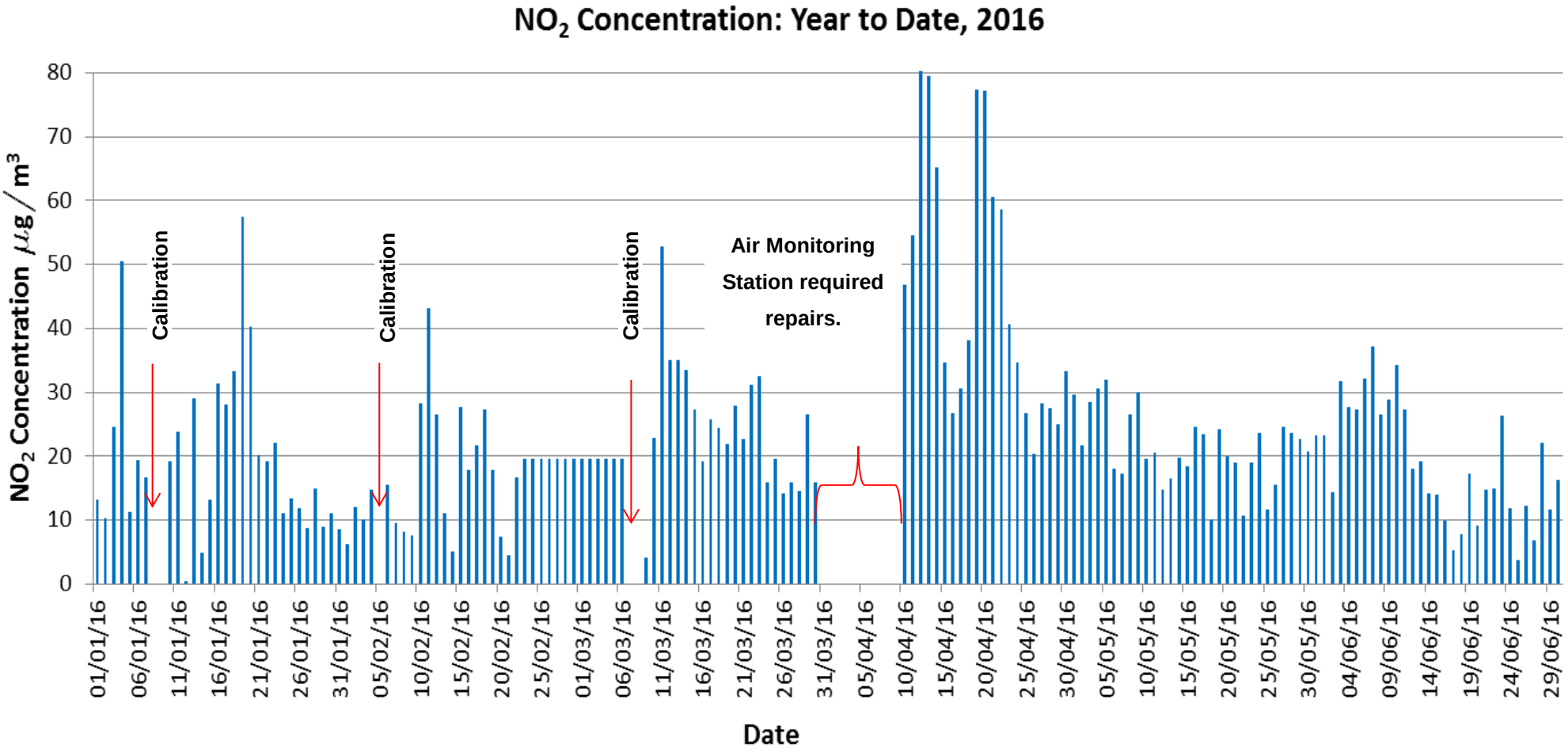

Figure 3: Daily Average NO_2 Q1 and Q2, 2016

4.3. On-site Airport Monitoring Station Results: PM_{10}

Daily Average PM_{10} concentrations measured at the automatic station in Dublin Airport for Q2 of 2016 are presented in Table 2. The Q1/Q2 2016 mean PM_{10} was calculated as 24.7 µg/m^3. The Regulations set a one day PM_{10} limit value of 50 µg/m^3, and an annual mean limit value of 40 µg/m^3 as shown in Table 3.The annual limit value (40 µg/m_3) was not exceeded in Q2 of 2016. The Q2 2016 daily values did not surpass the number of allowed exceedances.as per the Ambient Air Quality Regulations.

Objective	Averaging Period	Limit or Threshold Value	No. of Allowed Exceedances	No. of Exceedances
PM_{10} Limit Value	One day	50	Not to be exceeded on more than 35 days per year	8
PM_{10} Limit Value	Calendar Year	40	NA	NA

Table 3: PM_{10} Limit Values

Figure 4 presents the daily average PM_{10} concentrations measured at the automatic station in Dublin Airport during Q1 and Q2 of 2016. Significant maintenance was carried out on the monitoring equipment between 22/03/2016 and 1/04/2016 and, as such, reliable data is not available for these dates. The dates during which calibration of the monitoring equipment was undertaken is also indicated on Figure 4, data is not considered to be accurate on these dates.

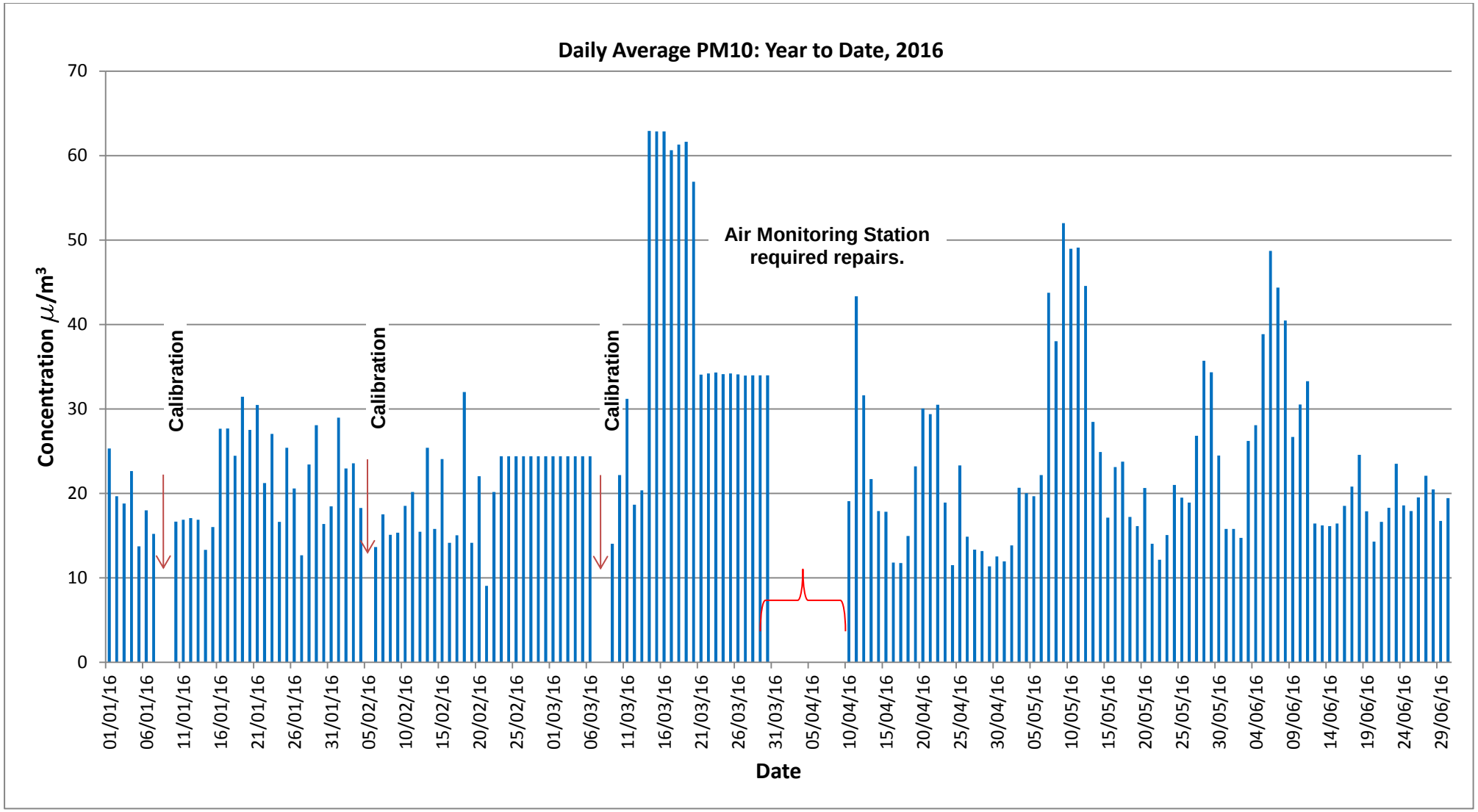

Figure 4: Daily Average PM10 Q1 and Q2 2016

5.0 Results Summary

Onsite Monitoring: The results of the NO_2 and PM_{10} concentrations using the online analyser indicate concentrations are below the relevant long-term (annual) limit value of 40µg/m³ and within the allowed criteria of short term limit values.

Offsite Monitoring: The diffusion tube results for NO_2 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_2.

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 PM10 and NO2 are measured. The AQIH is calculated every hour. The current readings are available on the EPA's AQIH map.