Herefordshire Air Quality Data Ratification 2023 and the LAQM Statistics

The 2023 data ratification for the Herefordshire air quality monitoring sites has been completed to the LAQM TG22 standards using the AURN methodology. This report summarises the individual Statistical Reports, includes network comparison plots and spreadsheets. The ratified concentrations, comparisons between stations, pollutants and across years have passed the quality control checks. The instruments continued to work well so high data captures can be expected during 2024.

QAQC Procedures

Attached is a summary of our QAQC procedures which can be added to the QAQC annex of the ASR.

Site Environment and Description

Station	Site Environment and Description
Hereford Victoria Street	Corner of Victoria Street and King Street ROADSIDE MAP PHOTO
Leominster Bargates Road	Leominster Bargates Road ROADSIDE MAP PHOTO

Spreadsheets

The spreadsheets contain the full monthly, daily, hourly and 15-minute mean datasets for 2023. These spreadsheets can act as a historical record of the measurements. The monthly means may be useful for any annualisation but not NO_2 diffusion tube bias corrections. These spreadsheets, not the website, must be used if the consultants writing the ASR want to calculate the LAQM statistics from scratch.

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12 January 2024

LAQM Statistics

Here are the LAQM statistics for the ASR.

Nitrogen Dioxide NO$_2$

The NO$_2$ annual mean and hourly mean Objectives were not exceeded.

The NO$_2$ annual means and annual data captures are shown below. The AQS annual mean Objective is 40 µg m^{-3} and the annual data capture target is 85%.

Station	Annual Data Capture %	Annual Mean µg m^{-3}	Objective Exceeded
Hereford Victoria Street	97.7	29.1	No
Leominster Bargates Road	98.2	20.3	No

The NO$_2$ hourly mean AQS Objective is 200 µg m^{-3}. The number of exceedances are shown below. There is an annual allowance of 18 hours.

Station	Number of Hourly Mean > 200 µg m^{-3}	Objective Exceeded	Maximum Hourly Mean µg m^{-3}	Annual Data Capture %	99.8[th] Percentile µg m^{-3}
Hereford Victoria Street	0	No	129.1	97.7	-
Leominster Bargates Road	0	No	104.8	98.2	-

PM$_{10}$

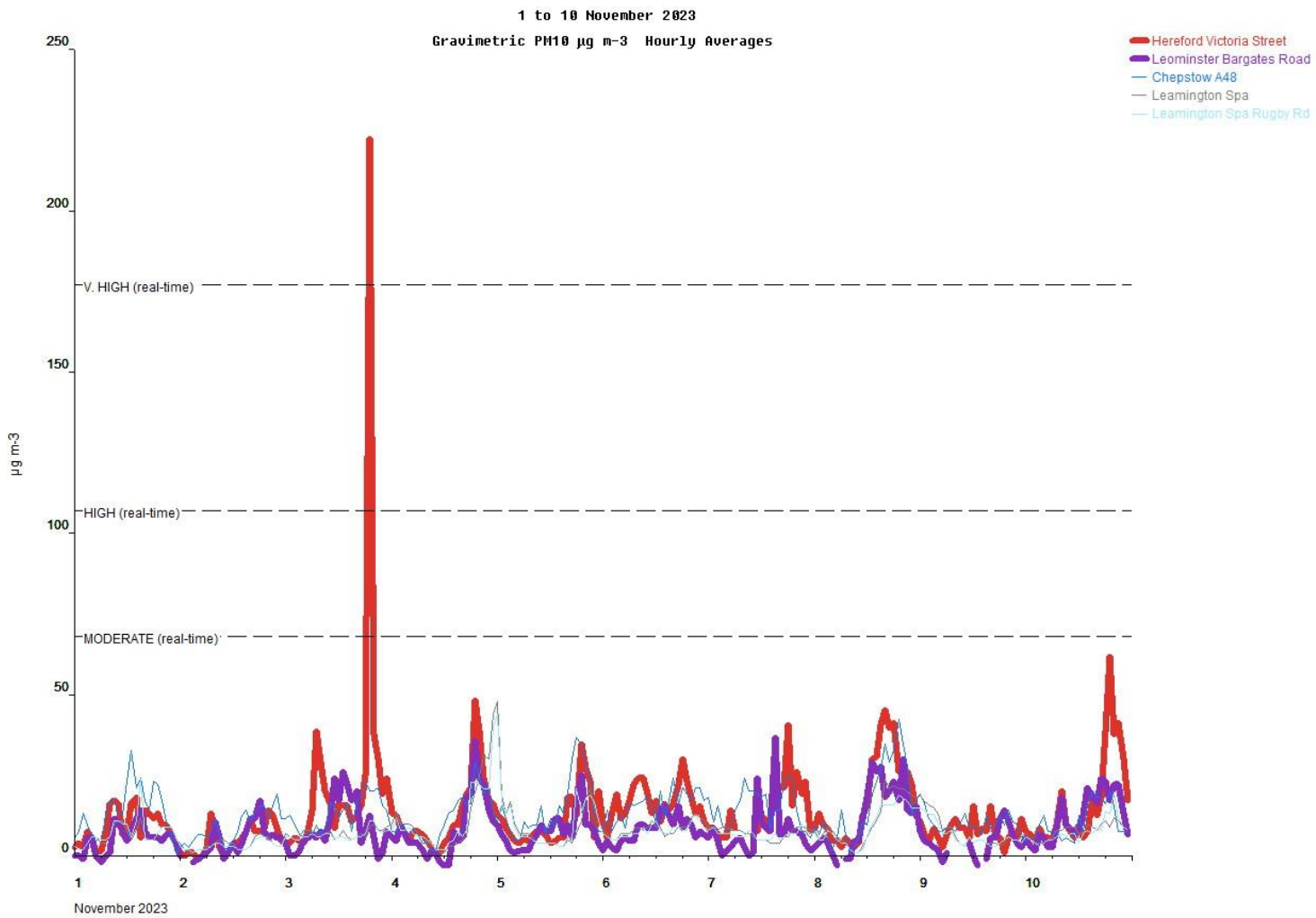The gravimetric PM$_{10}$ annual mean and daily mean Objectives were not exceeded.

The gravimetric PM$_{10}$ annual means and annual data captures are shown below. The annual mean AQS Objective is 40 µg m^{-3} and the annual data capture target is 85%.

Station	Annual Data Capture %	Annual Mean µg m^{-3}	Objective Exceeded
Hereford Victoria Street	95.2	17.3	No
Leominster Bargates Road	98.4	11.8	No

The gravimetric PM$_{10}$ daily mean AQS Objective is 50 µg m^{-3}. The number of exceedances are shown below. There is an annual allowance of 35 days.

Station	Number of Daily Mean > 50 µg m^{-3}	Objective Exceeded	Maximum Daily Mean µg m^{-3}	Annual Data Capture %	90.4th Percentile µg m^{-3}
Hereford Victoria Street	3	No	58.4	95.2	-
Leominster Bargates Road	0	No	41.4	98.4	-

There was a PM$_{10}$ peak at Hereford Victoria Road around the November bonfire night celebrations. The peak was too brief to exceed the daily mean limit.

1 to 10 November 2023
Gravimetric PM10 µg m-3 Hourly Averages

Legend:
— Hereford Victoria Street
— Leominster Bargates Road
— Chepstow A48
— Leamington Spa
— Leamington Spa Rugby Rd

y-axis: µg m-3 (0 to 250)

Reference lines: V. HIGH (real-time), HIGH (real-time), MODERATE (real-time)

x-axis: November 2023 (1 to 10)

PM$_{10}$ Particulate Matter Hourly Mean Concentrations during November 2023

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PM$_{2.5}$

The gravimetric PM$_{2.5}$ annual means and annual data captures are shown below. The annual mean AQS Objective is 20 µg m^{-3} and the annual data capture target is 85%.

There is a target of a 35% reduction in population exposure compared with the average population exposure baseline period (2016 - 2018) by end of 2040.

The annual mean AQS Objective of 10 µg m^{-3} should not to be exceeded at any relevant monitoring station by 31st December 2040.

Station	Annual Data Capture %	Annual Mean µg m^{-3}	Objective Exceeded
Hereford Victoria Street	95.3	8.4	No
Leominster Bargates Road	95.8	6.9	No

There was a PM$_{2.5}$ peak at Hereford Victoria Road around the November bonfire night celebrations.
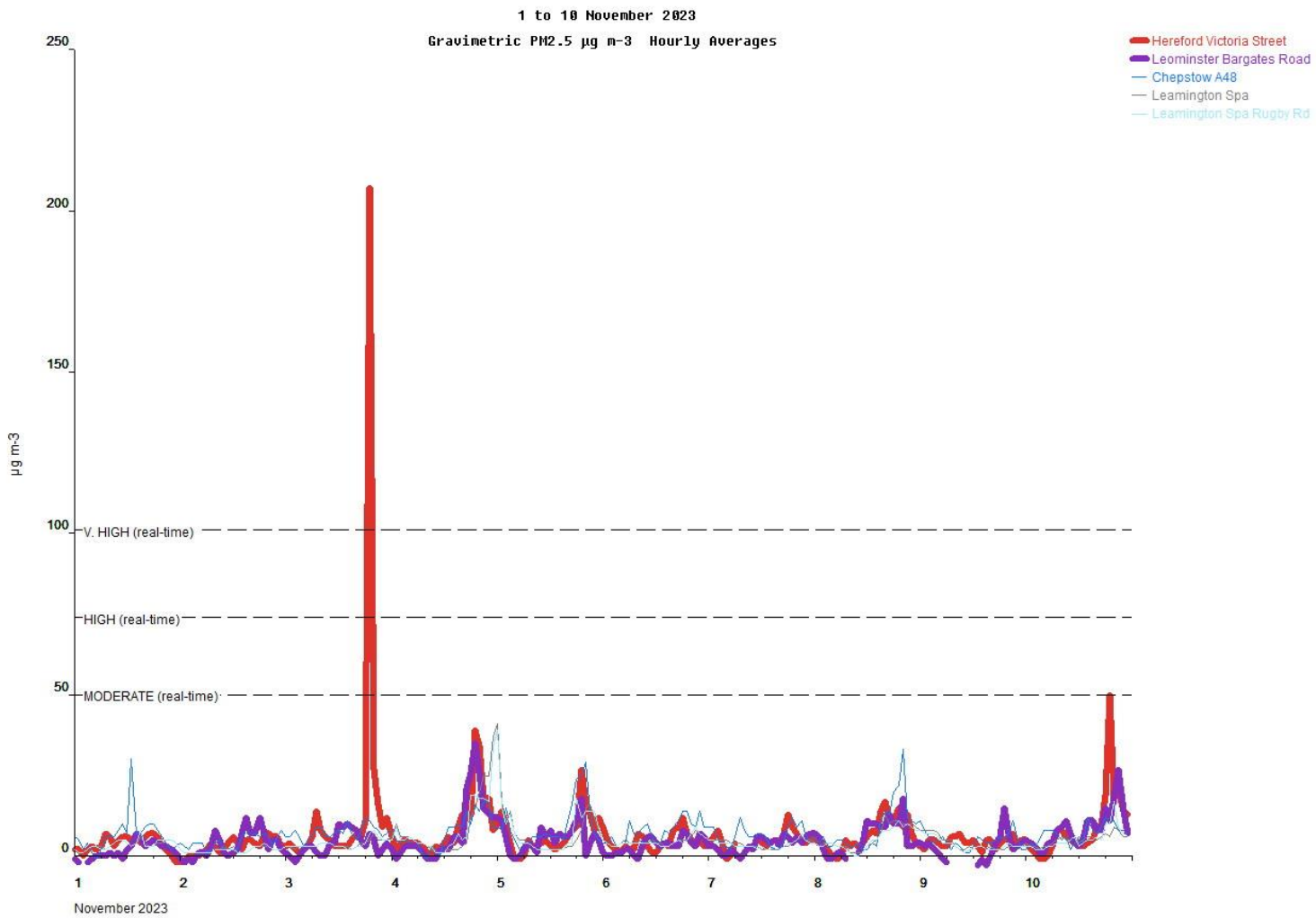
PM$_{2.5}$ Particulate Matter Hourly Mean Concentrations during November 2023

Daily Air Quality Index

The Daily Air Quality Index (DAQI) was introduced by Defra in January 2012 and revised April 2013. The number of occasions within each band is summarised as follows.

DAQI Pollutant	Station	Moderate	High	Very High
Gravimetric PM2.5	Hereford Victoria Street	0 hours	0	0
	Leominster Bargates Road	0	0	0
PM$_{10}$ Particulate Matter	Hereford Victoria Street	3 days	0	0
	Leominster Bargates Road	0	0	0
PM$_{2.5}$ Particulate Matter	Hereford Victoria Street	0 days	0	0
	Leominster Bargates Road	1	0	0

Hereford Victoria Street

Gravimetric PM$_{10}$ was Moderate on 6th 7th Feb, 4th Apr with a daily mean reaching 58.4 µg m^{-3}.

Leominster Bargates Road

Gravimetric PM$_{2.5}$ was Moderate on 23rd Jan with a daily mean reaching 37.3 µg m^{-3}.

Timeseries Comparison Plots

These timeseries plots compare the measurements with the provisional data from nearby AURN sites. Measurements from individual stations should never viewed in isolation.
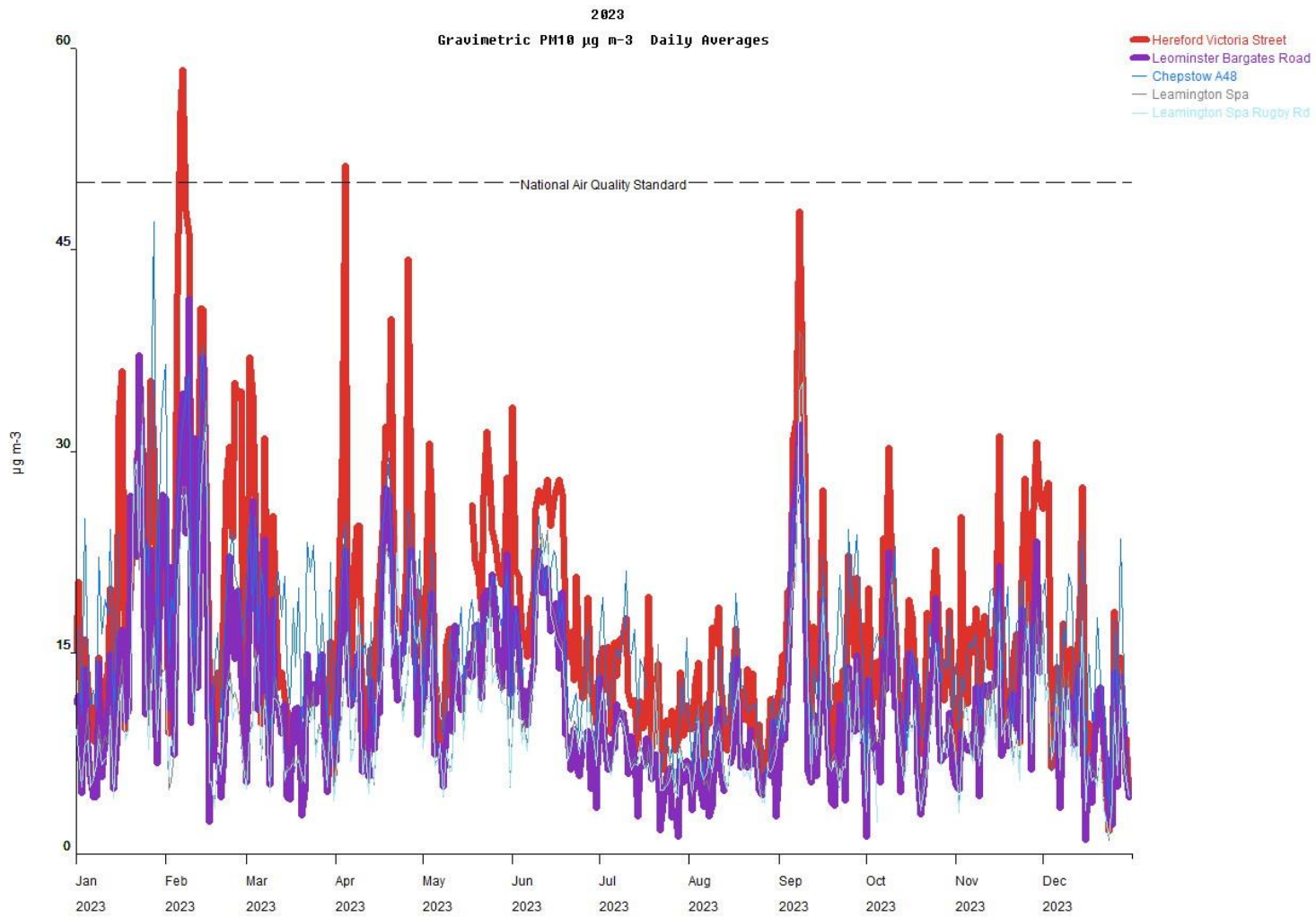

Nitrogen Dioxide μg m-3 Hourly Averages 2023
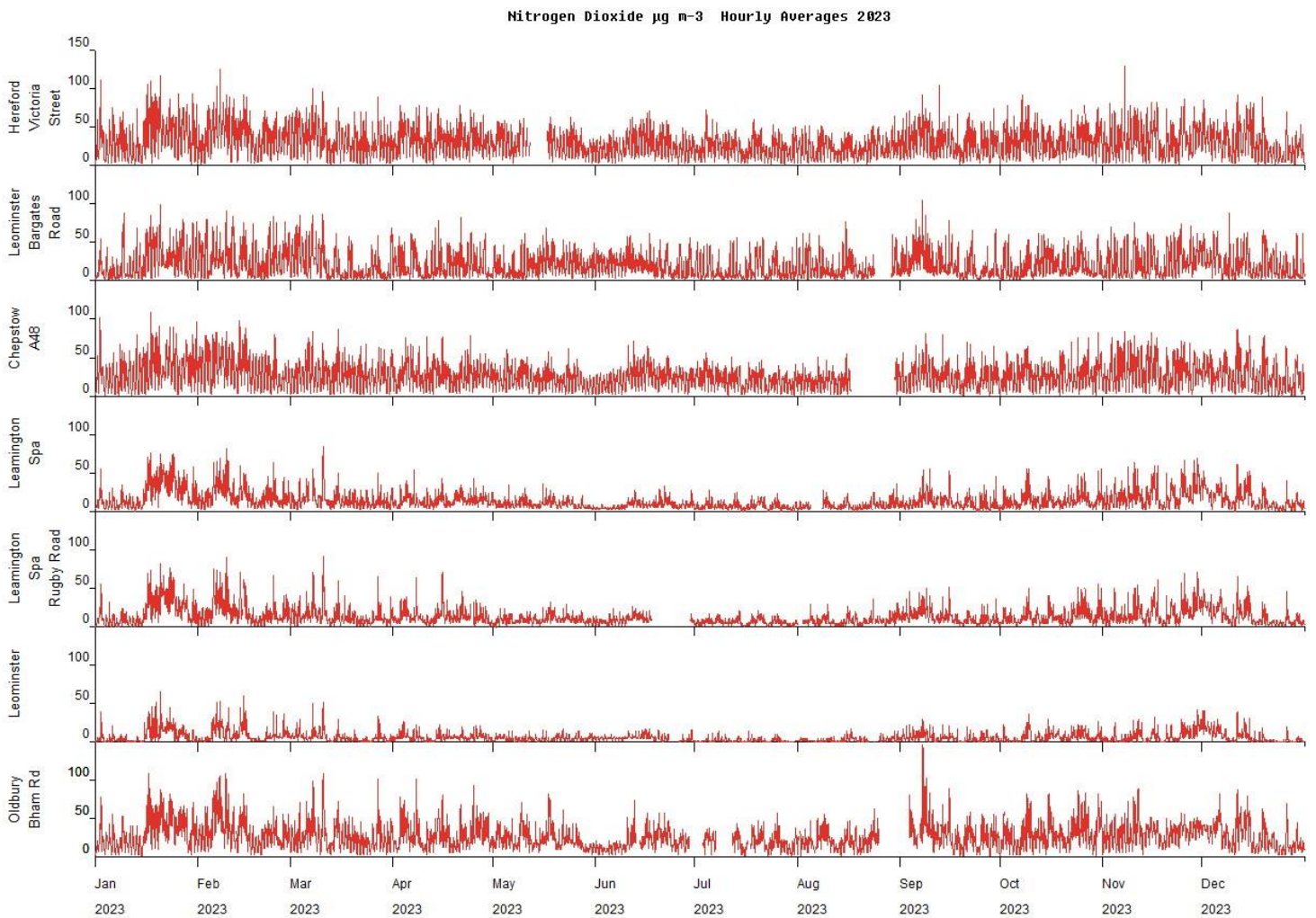
NO₂ Hourly Mean Concentrations during 2023

LAQM does not include Nitric Oxide (NO). This pollutant shows how the stations are influenced by traffic.
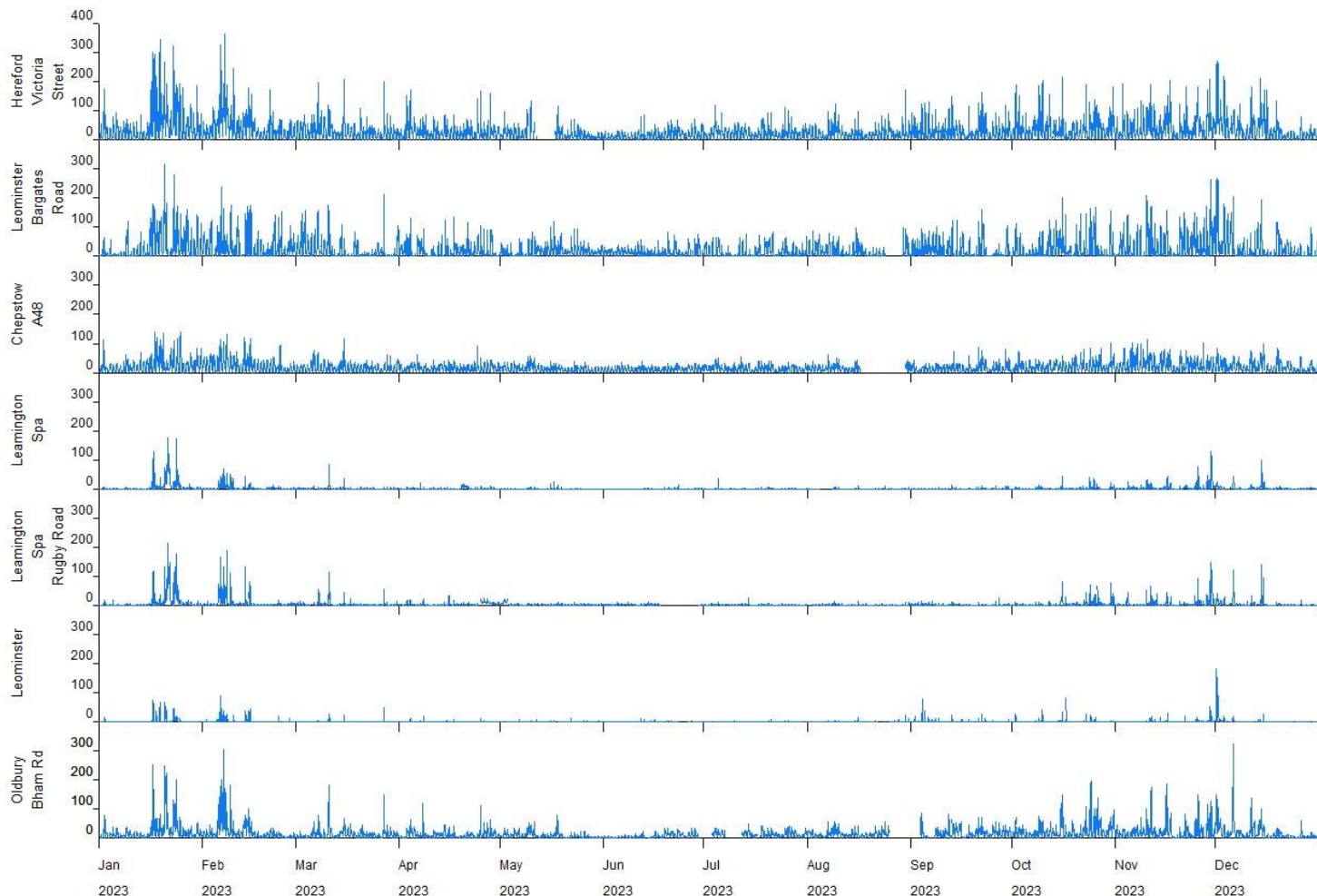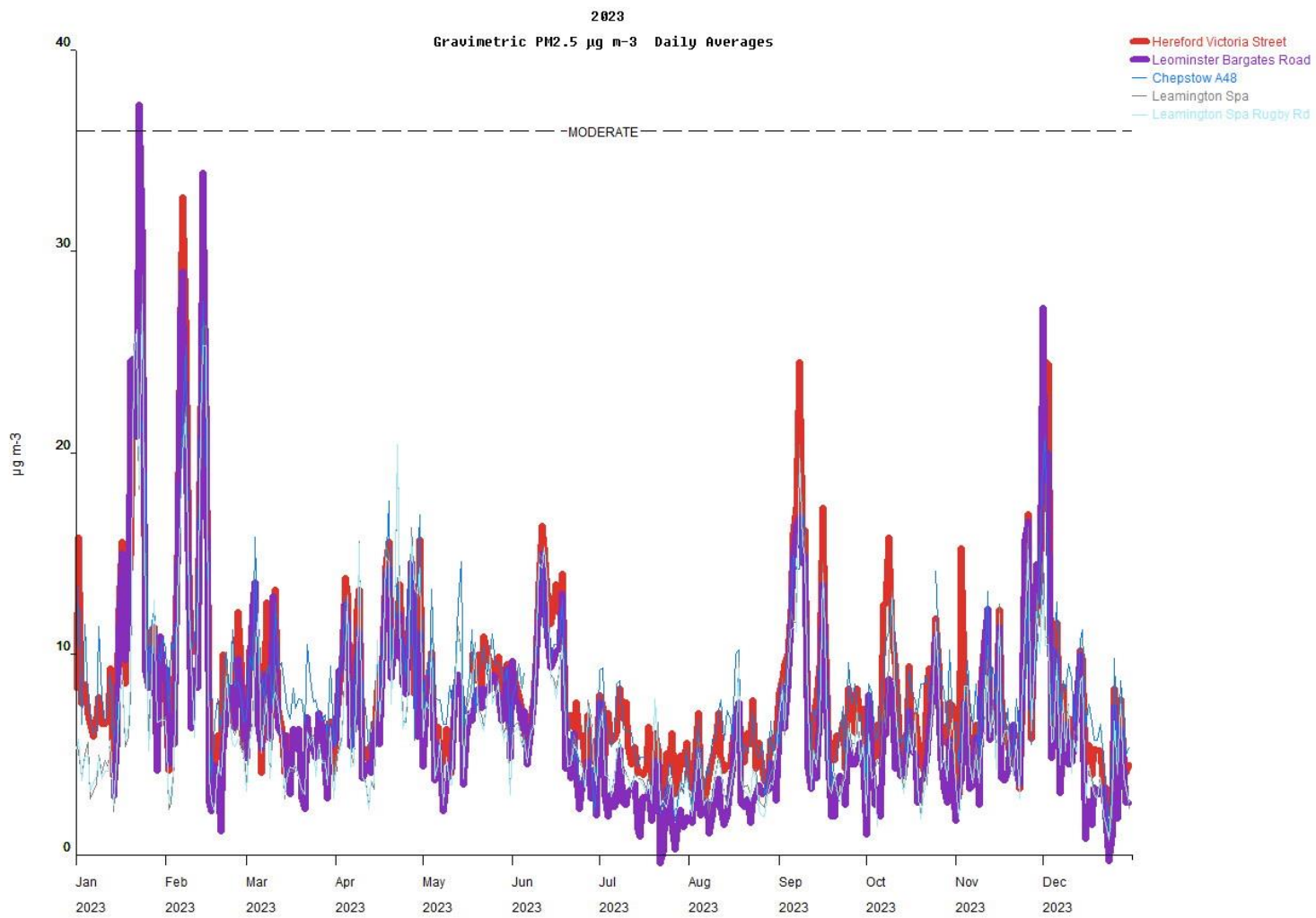

NO Hourly Mean Concentrations during 2023

PM₁₀ Daily Mean Concentrations during 2023

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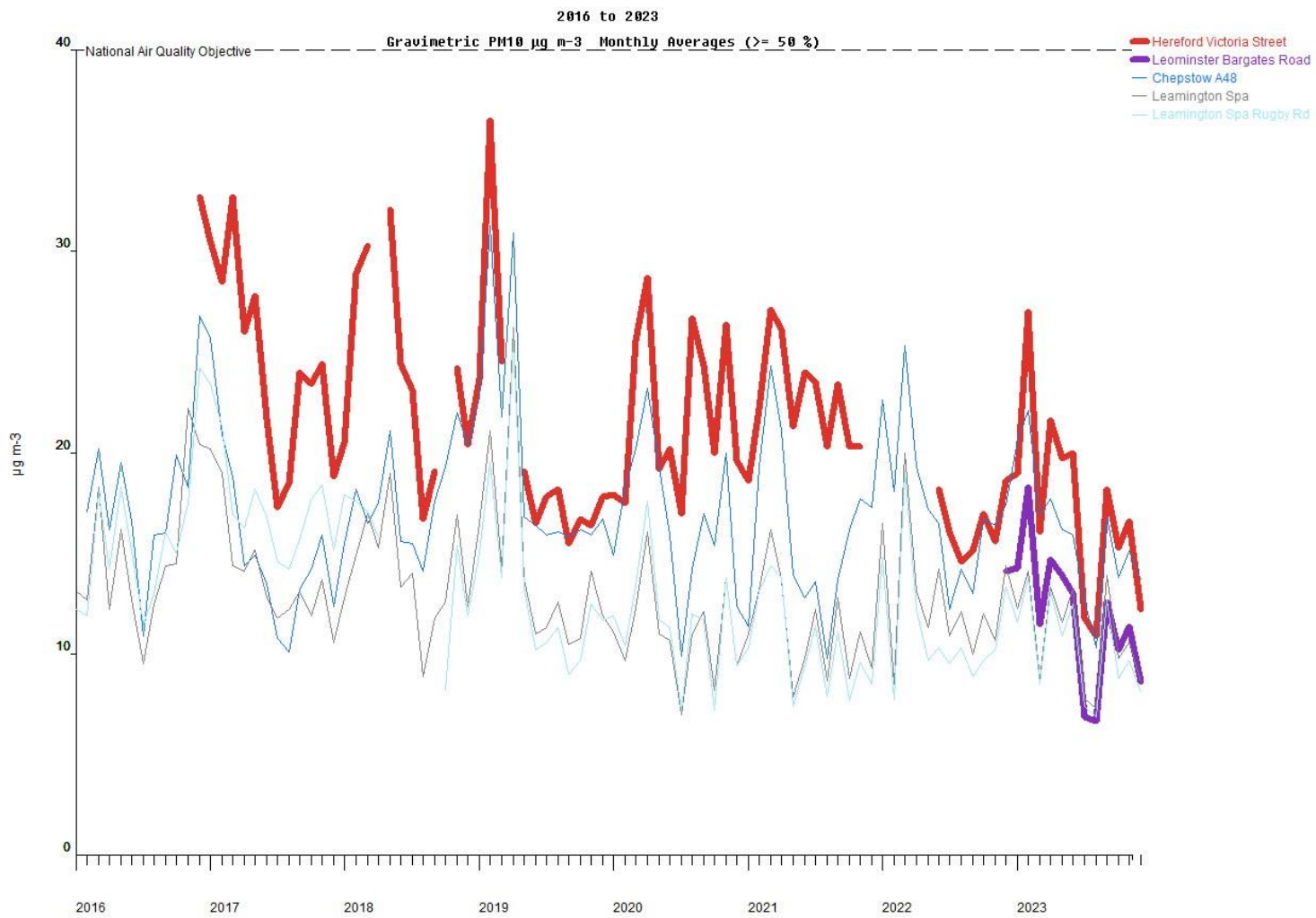12 January 2024

PM₂.₅ Daily Mean Concentrations during 2023
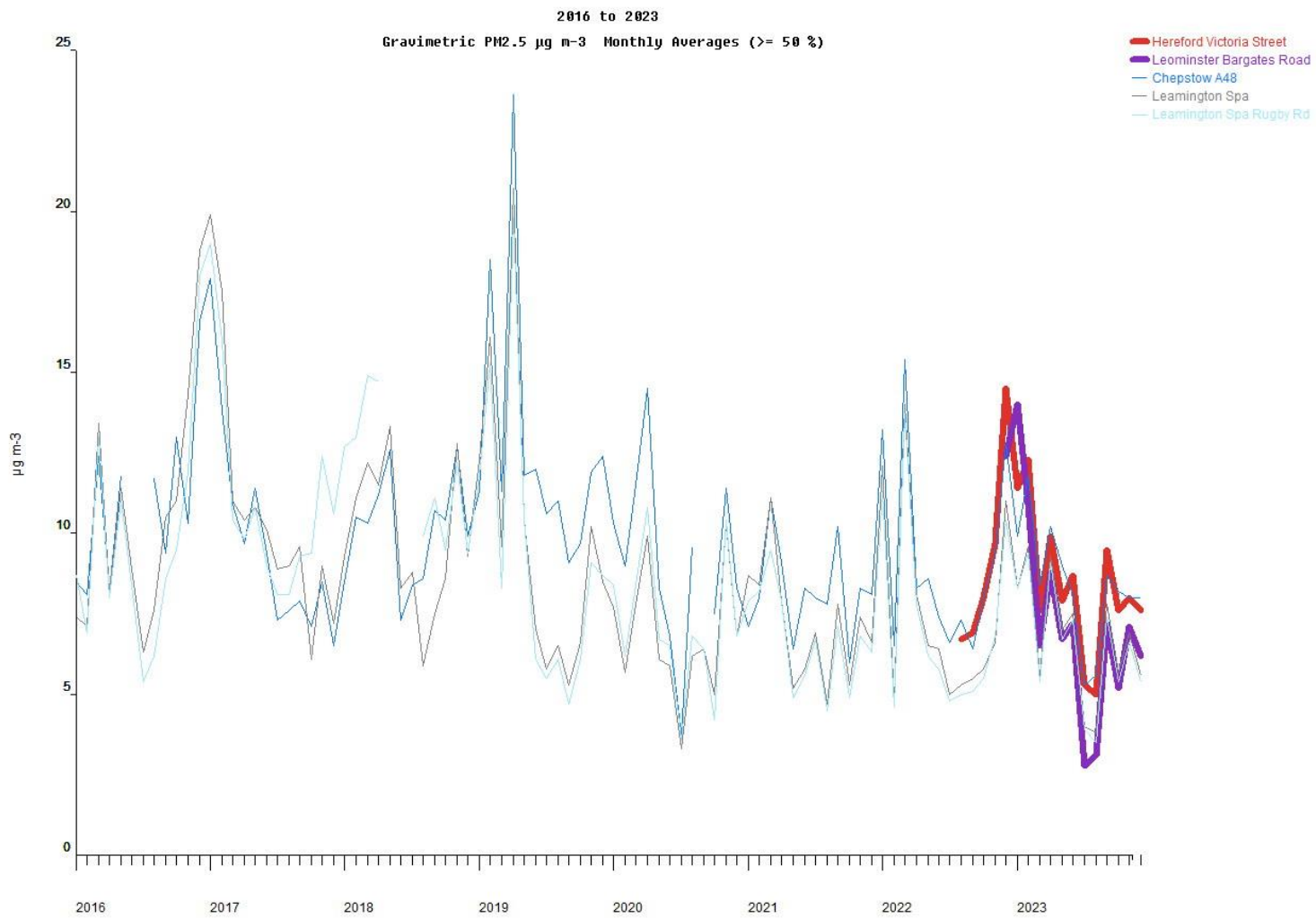
Monthly Means Comparison Plots

These timeseries plots compare the results with the nearby stations since 2016. These plots show the recent seasonal trends.
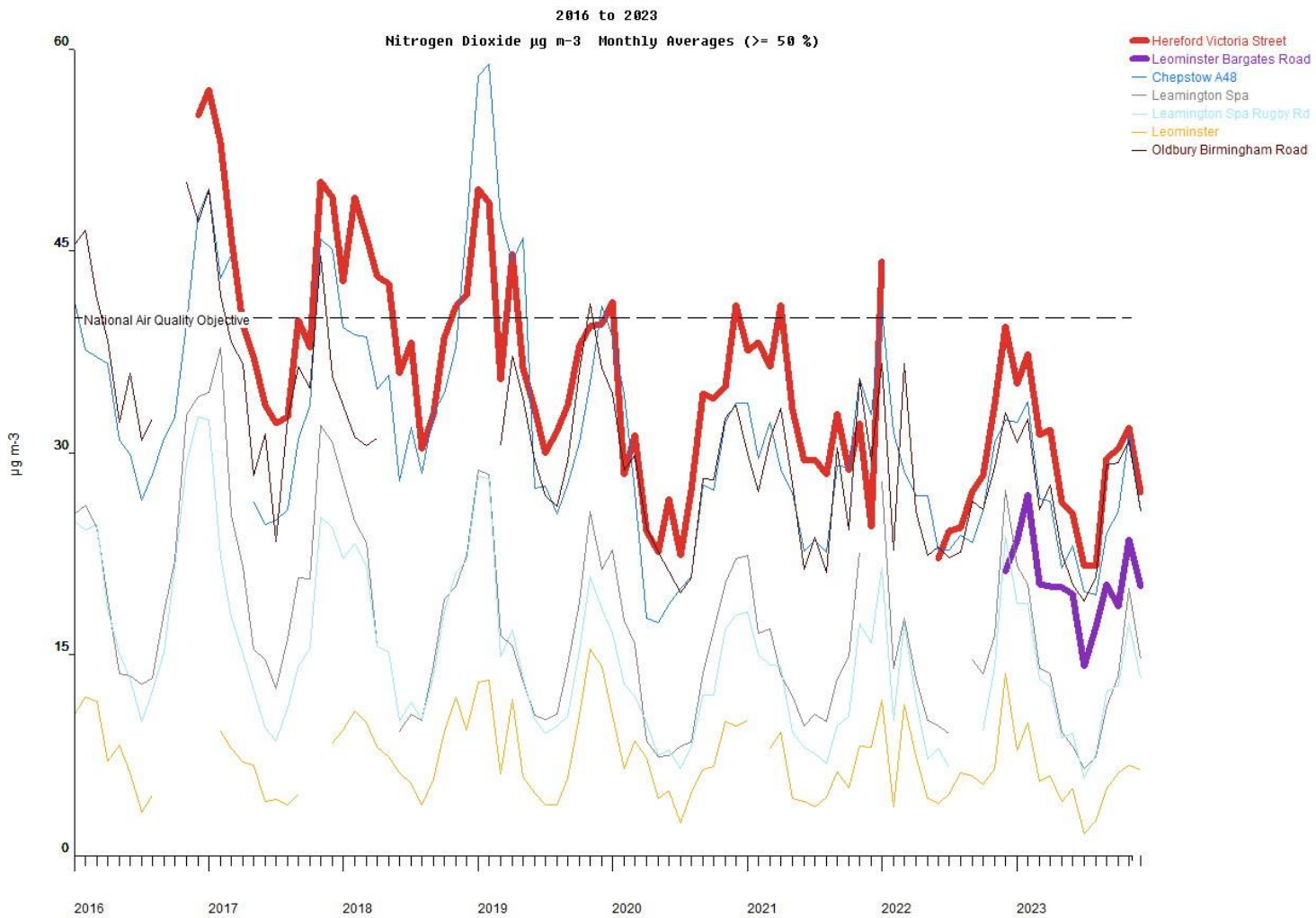
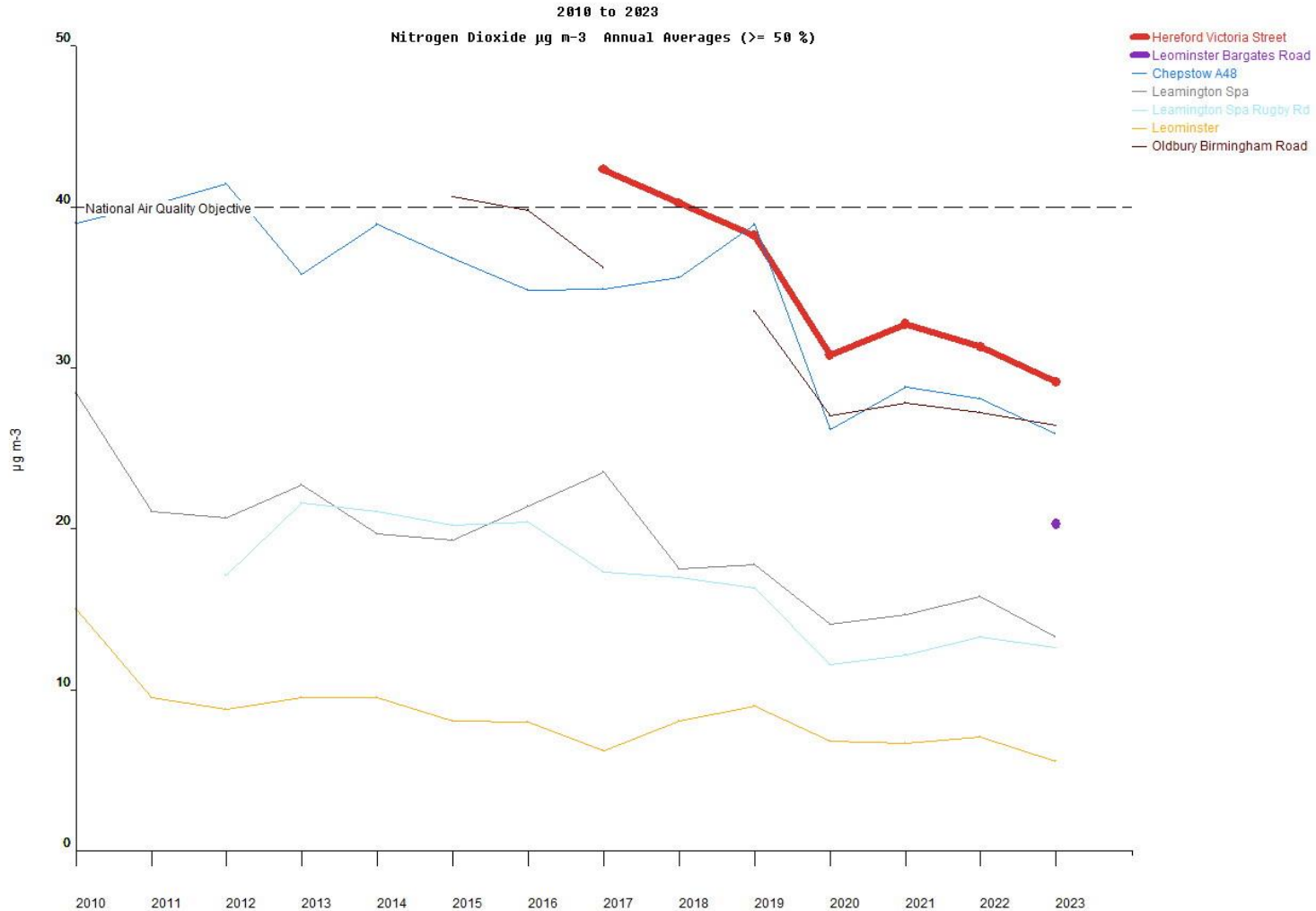**NO₂ Monthly Mean Concentrations from 2016**

PM$_{10}$ Monthly Mean Concentrations from 2016

PM$_{2.5}$ Monthly Mean Concentrations from 2016

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Annual Means Comparison Plots

These timeseries plots compare the results with the nearby stations since 2010. These plots show the long-term trends. Roadside locations generally have higher concentrations than Background and Rural locations.
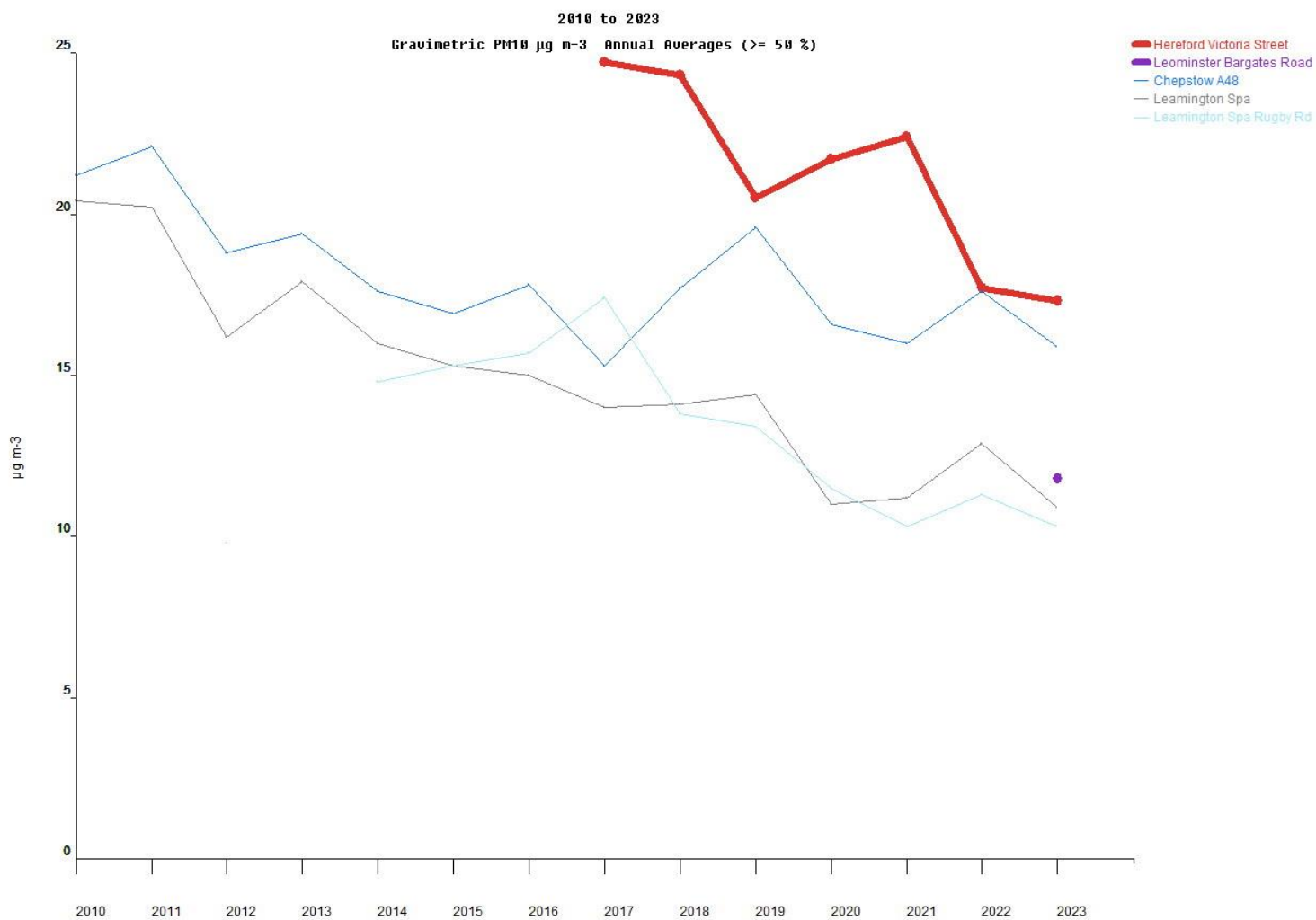

NO$_2$ Annual Mean Concentrations from 2010

LAQM does not include Oxides of Nitrogen ($NO_X = NO_2 + NO$). This pollutant shows the long term trend in emission reduction. Roadside locations generally have higher concentrations than Background and Rural locations.
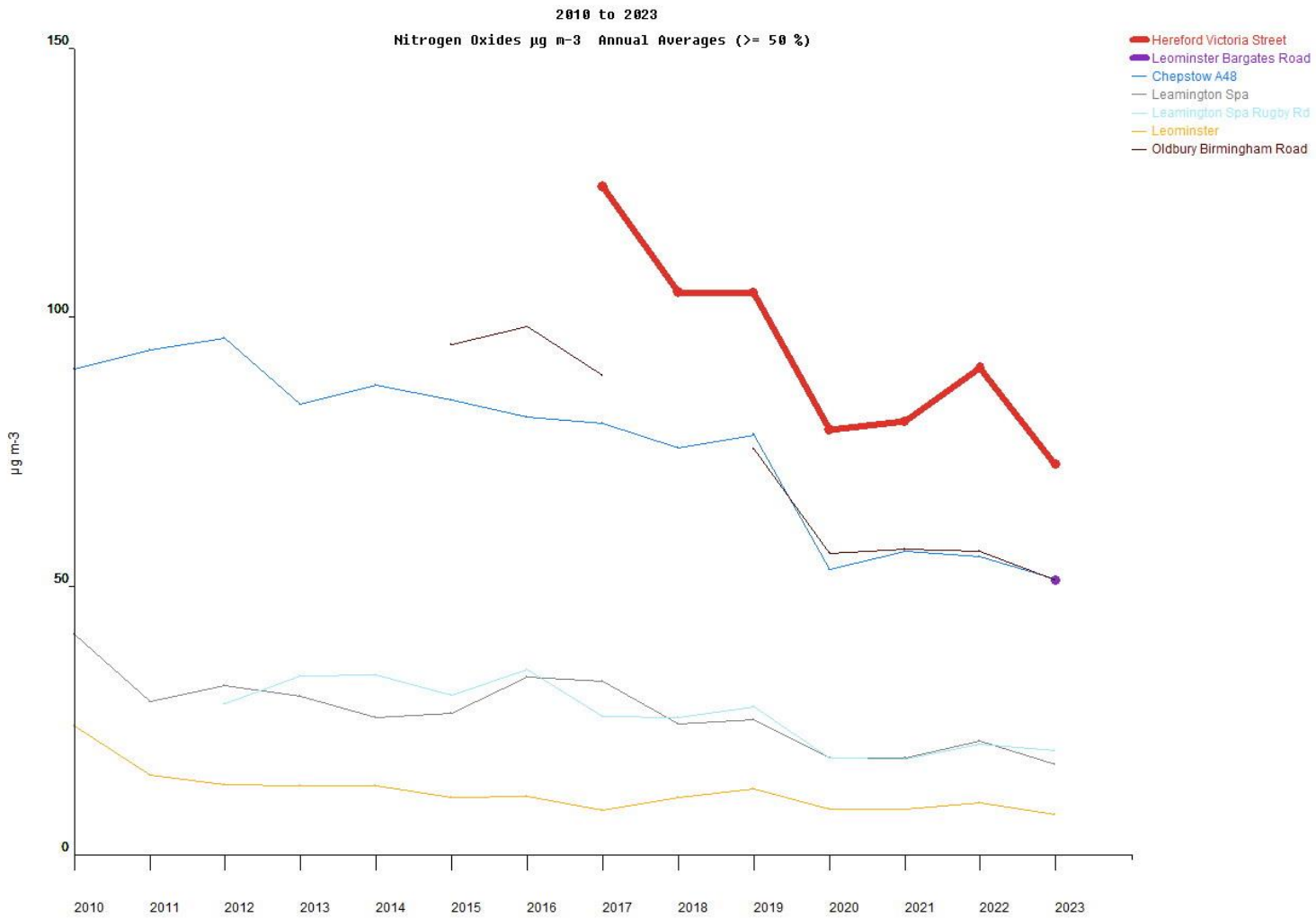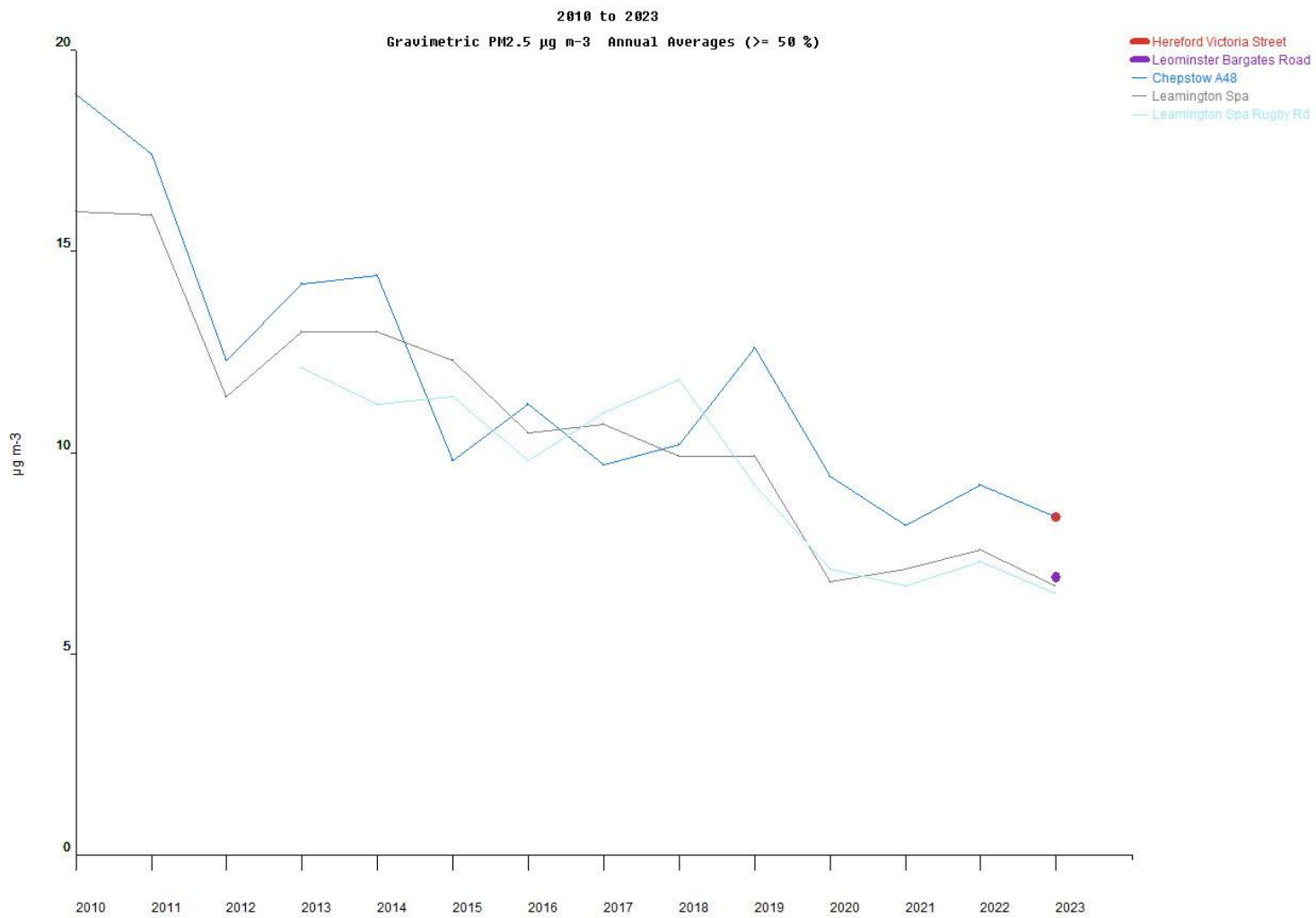

NO_X Annual Mean Concentrations from 2010

PM$_{10}$ Annual Mean Concentrations from 2010

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PM$_{2.5}$ Annual Mean Concentrations from 2010

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NO2 and NOx Annual Means Comparison Plot

This plot shows the relationship between the NO_2 and NOx annual means for monitoring stations, including the AURN, during 2023. Most 2023 data are still provisional and subject to change. The distribution begins with low pollution Rural stations near the origin and increases to the Roadside stations with the highest concentrations.

NO$_2$ and NO$_x$ Annual Mean Distribution: England 2023
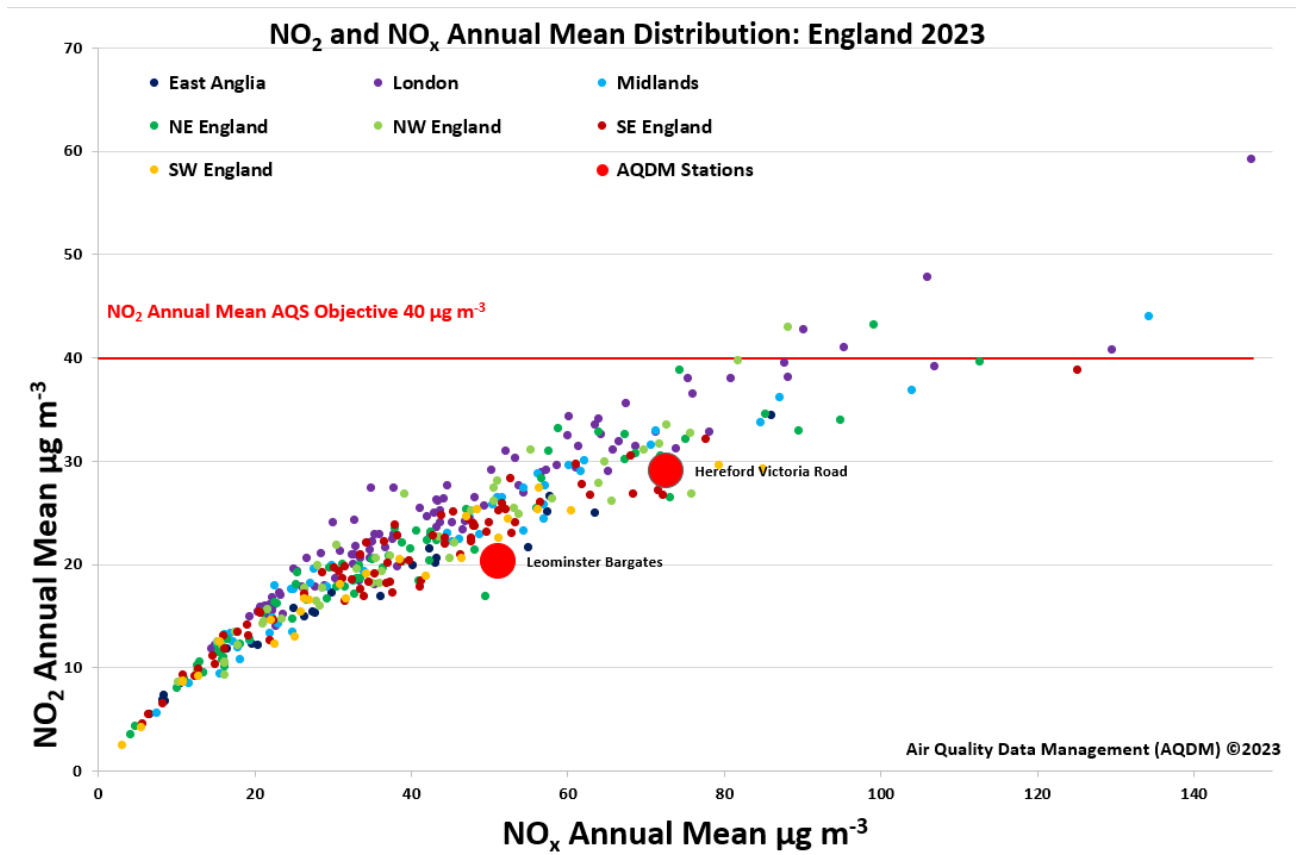
Annual Means Frequency Distribution Plots

These plots show the frequency distribution of the annual means for monitoring stations, including the AURN, during 2023. Most 2023 data are still provisional and subject to change. The distribution begins with low pollution Rural stations near the origin and increases to the Roadside stations with the highest concentrations.

Gravimetric PM$_{10}$ Annual Mean Frequency Distribution: England 2023

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Gravimetric PM$_{2.5}$ Annual Mean Frequency Distribution: England 2023

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