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Sussex Annual Air Quality Monitoring Report 2022

Sussex Air Quality Partnership / East Sussex County Council

August 2023

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Document Control Sheet

Identification	
Client	East Sussex County Council for Sussex Air Quality Partnership
Document Title	Sussex Annual Air Quality Monitoring Report 2022
Bureau Veritas Ref	AIR13115761

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Configuration				
Version	**Date**	**Author**	**Reason for Issue/Summary of Changes**	**Status**
v1	23/6/2023	N Jenkins	First Issue	First Issue
v2	15/08/2023	N Jenkins	Revised and revalidated data	Second issue

	Name	Job Title	Signature
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Executive Summary

Bureau Veritas UK Ltd has been commissioned by East Sussex County Council on behalf of the Sussex local authorities (who collectively form the Sussex Air Quality Partnership), to manage, provide support and report on air quality monitoring data collected from the Sussex Air Quality Network.

This report provides an overview of the monitoring data collected from the Sussex Air Quality Network air quality monitoring stations (AQMS) during 2022. This is the first year of operation under a change of overall management which resulted in Bureau Veritas UK Ltd being appointed in the role of overall management unit following a tender process in 2019.

a) The Network

The Sussex Air Quality Network is made up of local authority (LA) owned AQMS and sites that are Automatic Urban and Rural (AURN) AQMS operated by the Environment Agency on behalf of Defra. There were 12 LA AQMSs in the network and 5 AURN AQMS in the network in 2022. An additional non-AURN Fidas particulate analyser was also integrated into the Storrington site and has provided PM_{10} and $PM_{2.5}$ data to the network since March 2022.

b) Data capture

Overall, the data capture was excellent across the network during 2022; most of the analysers that were in operation for the whole year met the 90% data capture. Two analysers had lower than 90% data capture rates in 2022; Horsham Park Way NOx analyser (78%) and A27 Chichester Bypass PM_{10} analyser (72%). The reasons for lower capture rate at certain sites are discussed in Chapter 2.

c) Compliance with air quality standards

All network sites that achieved the necessary data capture showed results that were compliant with the relevant air quality objectives and standards. These included: particulate matter (PM_{10}) and nitrogen dioxide (NO_2) long term and short term objectives. With regard to the fine particulates ($PM_{2.5}$) (2040 target annual mean) , two sites were above the annual mean 10 µg/m³ limit. However, all sites were compliant with the interim 2028 target of 12 µg/m³.

d) Occurrences of High and Moderate pollution days

As seen each year there were many days of 'Moderate' air pollution measured across the Sussex network AQMS. During 2022 there were 7 days where 'moderate' ozone (O_3) was recorded at one site, up to 3 days where 'moderate' PM_{10} was recorded at three sites and up to 5 days where 'moderate' $PM_{2.5}$ was recorded at six sites. Only one site measured 'High' levels of PM_{10} over 1 day (Hastings Bexhill Rd, Bulverhythe) in 2022. No 'Very High' days were recorded in 2022.

e) Trends in annual means

The annual mean concentrations for NO_2 have showed a general downward trend between 2018 and 2022. Annual mean concentrations of PM_{10}, $PM_{2.5}$ and O_3 across the network have been relatively constant since 2018.

Overall, the network has achieved high data capture rates and data has been disseminated over to the Sussex Air Quality Partnership website (www.sussex-air.net) efficiently over 2022. Monitoring data has been available as "live data" and following the publishing of this report, validated data sets will also be available in convenient formats for the public and professionals to download. These data will be available for all pollutants in 1-hour, 24-hour and 8-hour running average (O_3 only) formats.

1. Air Quality Legislation and Evolving Standards

1.1 Air Quality Strategies and 25 Year Environment Plan

The importance of existing and future air pollutant concentrations can be assessed in relation to the national air quality standards and objectives established by Government. The Air Quality Strategy (AQS)[1] provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations to protect human health.

The Clean Air Strategy 2019[2] provided a more focused strategy on $PM_{2.5}$; linkages with Net Zero goals and a re-focus on other pollutants that remain challenging from a compliance or health perspective. This was followed up by the 25 Year Environment Plan (2023) "*A Green Future: Our 25 Year Plan to Improve the Environment*"[3]. The 25 Year Environment Plan included a 25-year goal of "clean air" amongst other objectives and supporting policies.

1.2 The Environment Act 2021

The Environment Act 2021 established a legally binding duty on Government to set an annual mean target on the level of fine particulate matter ($PM_{2.5}$), in addition to a longer-term target, by 31st October 2022 for England. The Act states:

> "*Whilst the responsibility for meeting the $PM_{2.5}$ targets sits with national government; local authorities have a role to play in delivering reductions in $PM_{2.5}$."*
>
> and
>
> *"Local authorities in England will need to work towards reducing $PM_{2.5}$ in their area. Action to tackle PM_{10}/NOx can be expected to contribute towards this."*

1.3 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 sets the target to ensure that the annual mean concentration of $PM_{2.5}$ in ambient air is equal to or less than 10 micrograms per cubic metre (µg/m^3) by 31st December 2040. Additionally, the Environmental Improvement Plan 2023 for England set interim targets that by January 2028, the annual average of 12 µg/m^3 for $PM_{2.5}$ is not exceeded at any monitoring station.

In support of these national targets local authorities are encouraged to review and assess $PM_{2.5}$ and take actions where possible to reduce the sources and emissions of these particulates. These are national targets and are non-binding targets for local authorities.

Additional to the $PM_{2.5}$ concentration targets set out the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023, there is a population exposure reduction target for $PM_{2.5}$ in England, which requires that there is at least a 35% reduction in concentrations from the baseline year of 2018 to be achieved by 2040.

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[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), Published by Defra in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland.

[2] The Clean Air Strategy 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

[3] A Green Future: Our 25 Year Plan to Improve the Environment https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

Population exposure refers to the average concentration someone in England is exposed to and is based on urban or in some case suburban background measurements which are representative of the type of environment most people live and work.

The Environmental Improvement Plan 2023 for England also set interim targets that by January 2028 for population exposure to $PM_{2.5}$ is at least 22% less than in 2018.

1.4 LAQM Policy and Technical Guidance (LAQM PG(22) and LAQM TG(22))

The updated 2022 LAQM Policy and Technical Guidance provides the latest policy and technical support for the assessment of air quality for local authorities. It also provides further detail on the focus of actions for local authorities to measure and report $PM_{2.5}$.

2. Sussex Air Quality Network

The Sussex Air Quality Network ("network") was established in 1995 to support the local authorities across Sussex in their duties to monitor and report air quality under the Local Air Quality Management (LAQM) framework requirements as set out under Part IV of the Environment Act 1995.

The network was developed by the Sussex Air Quality Partnership ("Sussex-air"), which is made up from the Sussex local authorities and Public Health bodies. The members of Sussex Air Quality Partnership are:

- Adur District Council
- Arun District Council
- Brighton and Hove City Council
- Chichester District Council
- Crawley Borough Council
- Eastbourne Borough Council
- East Sussex County Council
- Hastings Borough Council
- Horsham District Council
- Mid Sussex District Council
- Lewes District Council
- Rother District Council
- Wealden District Council
- West Sussex County Council
- Worthing Borough Council

The Partnership has developed a comprehensive regional monitoring network, which currently (end 2022) has twelve continuous air quality monitoring stations (AQMS) in operation. The network also incorporates data from five national Automatic Urban and Rural Network (AURN) air quality monitoring stations located in Sussex: this enhances the network to a total of seventeen (17) air quality stations across Sussex. Locations of all Sussex AQMS are found in Appendix 3.

The full list of site information and all "live" and historical data is provided on the Sussex-air website: http://www.sussex-air.net.

The Sussex-air website also provides health information and the Sussex-wide air pollution forecasting and alert service to support vulnerable persons and the public and provide pollution alerts direct to the subscriber for "FREE". To see pollution forecasts, go to our homepage and to register for the airAlert service at:

https://sussex-air.net/sussex-air-quality-service-for-sussex/registration/.

Bureau Veritas hosts and supports the Sussex-air website.

3. Sussex Air Quality Network Performance

During 2022, the majority of the Sussex sites achieved high data capture rates, averaging above 90% with the exception of two sites. Complete data capture rates for 2022 are presented in Table 2-3 for each network analyser.

Low data capture rates may be caused by repeated or prolonged analyser or logging system breakdown, on-site communications problems, or interruptions in power supply to the monitoring stations. In addition, data may be lost due to routine maintenance or calibration visits undertaken by local site operators (LSO) or their equipment support unit (ESU)

The following site failed to meet the network target of 90% valid data capture.

Table 3-1: Sussex sites with less than 90% data capture rates (> 75%)

ID	Site name	Pollutant	Data capture	Reason for low data capture
HO2	Horsham Park Way	NO_x,NO,NO_2	78.2%	The NOx analyser had valve fault from 1st Jan to 3rd March. Site power issues also in December 2022.

The following sites failed to meet the minimum network target of 75% data capture.

Table 3-2: Sussex sites with less than 75% data capture rates

ID	Site name	Pollutant	Data capture	Reason for low data capture
CI1	A27 Chichester Bypass	PM_{10}	71.7%	Analyser faults throughout year.

Further site-specific commentary to accompany results shown in Table 3-2 is as follows:

- MS1 London Road, East Grinstead AQMS (NO_x,NO,NO_2, PM_{10}) was a new site and only became operational from August 2022, thus had a 36.5% data capture rate for 2022.
- HO4 Storrington Fidas is a particulate analyser that has been added into the AQMS at Storrington but is not part of the AURN in respect of UK compliance reporting. The analyser did not start operating until March 2022, reflecting a lower data capture rate of 76%.
- LS7 Newhaven AQMS was not operational during 2022 as it had to be removed during 2021.It is anticipated that the site will be re-established in 2023.
- AURN site data are ratified under a separate national network contract. Data capture rates are therefore provided from the data sets available on UK-AIR. The 2022 data was ratified by UK-AIR at the time of this report being published.

3.1 Data capture rates

Table 3-3: Data capture rates (%) per pollutant

Site ID	Site Name	Local Authority/AURN	NOx	NO	NO_2	PM_{10}	$PM_{2.5}$	O_3	SO_2	Avg.
AD1	Adur - Shoreham-by-sea	Adur	91.5	91.5	91.5		94.5			92.3
EB3	AURN – Eastbourne, Holly Place	AURN	81.0	81.0	81.0	97.0	97.0			87.4
LL1	AURN - Lullington Heath	AURN	99.0	96.0	96.0	**58.0**	**58.0**	99.0	**71.0**	82.4
BH0	AURN – Brighton, Preston Park	AURN	99.0	99.0	99.0		94.0			97.8
HO4	AURN - Storrington	AURN	**70.0**	**70.0**	**70.0**					**70.0**
HO4	Storrington (Fidas)					**75.6**	**75.6**			75.6
WT2	AURN - Worthing A27 Grove Lodge	AURN	95.0	95.0	95.0		93.0			94.5
BH10	Brighton - North Street	Brighton and Hove	95.7	95.7	95.7		93.9			95.3
CI1	Chichester - A27 Chichester Bypass	Chichester	96.5	96.5	96.5	**71.7**				90.3
CI5	Chichester - Westhampnett Road	Chichester	98.9	98.9	98.9					98.9
CA2	Crawley - Gatwick Airport	Crawley	92.9	92.9	92.9	94.5	94.5			93.5
EB1	Eastbourne - Devonshire Park	Eastbourne	96.8	96.8	96.8	95.9		97.5		96.8
HT1	Hastings - Bexhill Rd, Bulverhythe	Hastings	99.0	99.0	99.0	99.0				99.0
HO5	Horsham - Cowfold	Horsham	99.5	99.5	99.5					99.5
HO2	Horsham - Park Way, Horsham	Horsham	**78.2**	**78.2**	**78.2**	95.9				82.6
LS8	Lewes – Little East Street, Lewes	Lewes	90.2	90.2	90.2	90.6	90.4			90.3
MS1	Mid Sussex - London Road, East Grinstead	Mid-Sussex	**36.5**	**36.5**	**36.5**	**38.5**				**37.0**
RY2	Rother - De La Warr Road, Bexhill	Rother	99.7	99.7	99.7	99.2				99.6

Excluding the newly joined MS1 site in August 2022, the overall average data capture for the network was 91%.

Table 3-4: Data capture information

Site ID	Site Name	Data capture comments
AD1	Adur - Shoreham-by-sea	$PM_{2.5}$ data invalid: 1/1 to 11/2 plus intermittent issues May – Dec
EB3	AURN – Eastbourne, Holly Place	AURN data capture rates available on UK-AIR (as may change)
LL1	AURN - Lullington Heath	AURN data capture rates available on UK-AIR (as may change)
BH0	AURN – Brighton, Preston Park	AURN data capture rates available on UK-AIR (as may change)
HO4	AURN - Storrington	AURN data capture rates available on UK-AIR (as may change)
HO4	Storrington Fidas	The analyser did not start until March 2022, reflecting a lower data capture rate.
WT2	AURN - Worthing A27 Grove Lodge	AURN data capture rates available on UK-AIR (as may change)
BH10	Brighton - North Street	No major data issues
CI1	Chichester - A27 Chichester Bypass	Invalid PM_{10} data: Intermittent invalid data in March, April and May, then from June to Oct, then all data invalid 3/11 to year end.
CI5	Chichester -Westhampnett Road	No major data issues
CA2	Crawley - Gatwick Airport	NOx data invalid: 21/4 to 12/5, 26/5 to 27/5, 20/7 to 21/7, 10/11 to 16/11, 29/11, 21/12 to 22/12.
EB1	Eastbourne - Devonshire Park	No major data issues
HT1	Hastings - Bexhill Rd, Bulverhythe	No major data issues
HO5	Horsham - Cowfold	No major data issues
HO2	Horsham - Park Way, Horsham	NOx analyser had valve blockage issues from 1st Jan to 3rd March (1480 hours lost). Minor site power issues, December 2022.
LS8	Lewes – Little East Street, Lewes	February 11 start date, resulting in lower data capture
MS1	Mid Sussex - London Road, East Grinstead	Site commenced operation on August 2nd 20:00 hrs.
RY2	Rother - De La Warr Road, Bexhill	No major data issue

3.2 Annual mean data for all Sussex sites

Table 3-4 provides annual mean pollutant concentration results for 2022.

Table 3-4: Annual mean concentrations 2022

Site ID	Site Name	NO_2	PM_{10}	$PM_{2.5}$	O_3	SO_2
AD1	Adur - Shoreham-by-sea	20.5		11.4		
EB3	AURN – Eastbourne, Holly Place	9	15	9		
LL1	AURN - Lullington Heath	7	(11)	6	63	(1)
BH0	AURN – Brighton, Preston Park	13		11	49	
HO4	AURN - Storrington	(19)				
HO4	Storrington Fidas		14	7		
WT2	AURN - Worthing A27 Grove Lodge	25		9		
BH10	Brighton - North Street	23.9		9.8		
CI1	Chichester - A27 Chichester Bypass	22.4	(23.6)			
CI5	Chichester -Westhampnett Road	23.5				
CA2	Crawley - Gatwick Airport	20.8	13.79	8.4		
EB1	Eastbourne - Devonshire Park	13.1	19.3		58.6	
HT1	Hastings - Bexhill Rd, Bulverhythe	12.5	22.9			
HO5	Horsham - Cowfold	21.0				
HO2	Horsham - Park Way, Horsham	17.7	19.3			
LS8	Lewes – Little East Street, Lewes	13.8	15.4	9.5		
MS1	Mid Sussex - London Road, East Grinstead	(23.9)	(18.3)			
RY2	Rother - De La Warr Road, Bexhill	15.0	22.0			

Values shown in (brackets) have less than 75% data capture rate. All units are µg/m^3. Particulate data is corrected to gravimetric equivalent measurement values. All corrections are applied for the instrument type and size fraction measured. No Volatile Correction Method (VCM) was used across Sussex TEOM sites. All AURN data is reported from UK-Air to no decimal places.

4. 2022 Comparison with the Air Quality Strategy (AQS) Objectives and Targets

The following data presented in Tables 4-1 to 4-3 compare Sussex monitoring results with the Government's Air Quality Strategy (AQS) objectives. There is often more than one objective per pollutant reflecting the differing health effects of short and long-term exposure. The AQSs are set out in Appendix 1. Where a site did not achieve a minimum of 75% data capture for the year, the measurements cannot be accurately compared to the AQS objectives and are entered as 'not applicable'.

Nitrogen Dioxide (NO_2)

Table 4-1 – NO_2 Comparison with Air Quality Strategy Objectives – Achieved ('yes') or Exceeded ('no')

Site ID	Site Name	NO_2			
		Annual mean ($\mu g/m^3$)	Achieved ?	**1-hour mean**	Achieved?
	Air Quality Objective	**40**		**200 $\mu g/m^3$ not to be exceeded more than 18 times per year**	
AD1	Adur - Shoreham-by-sea	20.5	Yes	0	Yes
EB3	AURN – Eastbourne, Holly Place	9	Yes	0	Yes
LL1	AURN - Lullington Heath	7	Yes	0	Yes
BH0	AURN – Brighton, Preston Park	13	Yes	0	Yes
HO4	AURN - Storrington	(19)	N/A	0	N/A
WT2	AURN - Worthing A27 Grove Lodge	25	Yes	0	Yes
BH10	Brighton - North Street	23.9	Yes	0	Yes
CI1	Chichester - A27 Chichester Bypass	22.4	Yes	0	Yes
CI5	Chichester - Westhampnett Road	23.5	Yes	0	Yes
CA2	Crawley - Gatwick Airport	20.8	Yes	0	Yes
EB1	Eastbourne - Devonshire Park	13.1	Yes	0	Yes
HT1	Hastings - Bexhill Rd, Bulverhythe	12.5	Yes	0	Yes
HO5	Horsham - Cowfold	21.0	Yes	0	Yes
HO2	Horsham - Park Way, Horsham	17.7	Yes	0	Yes
LS8	Lewes – Little East Street, Lewes	13.8	Yes	0	Yes
MS1	Mid Sussex - London Rd, East Grinstead	(23.9)	N/A	0	N/A
RY2	Rother - De La Warr Road, Bexhill	15.0	Yes	0	Yes

Values shown in (brackets) have less than 75% data capture rate. Sites that are N/A do not comply due to having less than 75% data capture.

Particulates (PM_{10})

Table 4-2 – PM_{10} Comparison with Air Quality Strategy Objectives – Achieved ('yes') or Exceeded ('no')

Site ID		PM_{10}			
		Annual mean ($\mu g/m^3$)	Achieved?	24-hour mean	Achieved?
	Air Quality Objective	40		50 $\mu g/m^3$ not to be exceeded more than 35 times per year	
EB3	AURN – Eastbourne, Holly Place	15	Yes	1	Yes
LL1	AURN - Lullington Heath	(11)	N/A	(0)	N/A
HO4	Storrington Fidas	14	Yes	0	Yes
CI1	Chichester -A27 Chichester Bypass	(23.6)	N/A	(2)	N/A
CA2	Crawley - Gatwick Airport	13.79	Yes	1	Yes
EB1	Eastbourne - Devonshire Park	19.3	Yes	5	Yes
HT1	Hastings - Bexhill Rd, Bulverhythe	22.9	Yes	4	Yes
HO2	Horsham - Park Way, Horsham	19.3	Yes	0	Yes
LS8	Lewes – Little East Street, Lewes	15.4	Yes	0	Yes
MS1	Mid Sussex - London Road, East Grinstead	(18.3)	N/A	(0)	N/A
RY2	Rother - De La Warr Road, Bexhill	22.0	Yes	0	Yes

Values shown in (brackets) have less than 75% data capture rate. Sites that are N/A do not comply due to having less than 75% data capture.

Particulates ($PM_{2.5}$)

Table 4-3 $PM_{2.5}$ Comparison with Air Quality Strategy Target Year (2040) and Interim Year (2028). (Year 2040), provides a comparison to the future target value and the interim target values.

Table 4-3: $PM_{2.5}$ Comparison with Air Quality Strategy Target Year (2040) and Interim Year (2028).

		$PM_{2.5}$	$PM_{2.5}$	
Site ID		Annual mean ($\mu g/m^3$)	Target 2040 Achieved?	Interim 2028 target Achieved?
			10($\mu g/m^3$)	12($\mu g/m^3$)
AD1	Adur - Shoreham-by-sea	11	No	No
EB3	AURN – Eastbourne, Holly Place	9	Yes	Yes
LL1	AURN - Lullington Heath	6	Yes	Yes
BH0	AURN – Brighton, Preston Park	11	No	No
HO4	Storrington Fidas	7	Yes	Yes
WT2	AURN - Worthing A27 Grove Lodge	9	Yes	Yes
BH10	Brighton - North Street	9.8	Yes	Yes
CA2	Crawley - Gatwick Airport	8.4	Yes	Yes
LS8	Lewes – Little East Street, Lewes	9.5	Yes	Yes

Values shown in (brackets) have less than 75% data capture rate. Sites that are N/A do not comply due to having less than 75% data capture.

5. Air Quality and the Daily Air Quality Indices (DAQI)

Air quality is measured for a variety of pollutants and can have a variety of effects on different people in society. The UK Air Quality Banding system is used to inform the public about the levels of pollution that they may be exposed to and are based on health advice approved by the Committee on Medical Effects of Air Pollution Episodes (COMEAP).

The system uses an index divided into four bands to provide more detail about air pollution levels in a simple way; these bandings range from Low, Moderate, High to Very High. The overall air pollution index is calculated from the highest index value of five pollutants: Nitrogen Dioxide, Sulphur Dioxide, Ozone, Carbon Monoxide and Particles < 10µm (PM_{10}). The bandings, pollutant concentrations and periods of exposure are provided in Appendix 2, with Table A2-1 providing the UK Air Quality Bandings: Daily Air Quality Index (DAQI) categories and pollutant thresholds.

The Daily Air Quality Indices (DAQI) are provided to identify where exceedances of health-based thresholds occur across the network.

The following tables and graphs show the number of days where exceedances of “Moderate” (Air Quality Index 4- 6), “High” (Air Quality Index 7-9) and “Very High” (Air Quality Index 10) occurred at the Sussex Air Quality Monitoring Stations (AQMSs) in 2022.

5.1 DAQI data by AQMS

The majority of 2022 saw mainly 'low' air pollution days (Daily Air Quality Index 1 - 3) across the year. The following table identifies the number of days that 'moderate' air pollution (Daily Air Quality Index 4- 6) was measured at each of the Sussex AQMSs.

Table 5-1: Number of days 'moderate' air pollution during 2022 (Daily Air Quality Index 4- 6) 2022

Site ID	Site Name	NO_2	PM_{10}	$PM_{2.5}$	O_3	SO_2
AD1	Adur - Shoreham-by-sea	0	-	5	-	-
EB3	AURN – Eastbourne, Holly Place	0	0	3	-	-
LL1	AURN - Lullington Heath	0	(0)	0	7	(0)
BH0	AURN – Brighton, Preston Park	0	-	2	0	-
HO4	AURN - Storrington	(0)			-	-
HO4	Storrington Fidas		0	0		
WT2	AURN - Worthing A27 Grove Lodge	0	-	0	-	-
BH10	Brighton - North Street	0	-	2	-	-
CI1	Chichester - A27 Chichester Bypass	0	(2)	-	-	-
CI5	Chichester -Westhampnett Road	0	-	-	-	-
CA2	Crawley - Gatwick Airport	0	0	3	-	-
EB1	Eastbourne - Devonshire Park	0	3	-	0	-
HT1	Hastings - Bexhill Rd, Bulverhythe	0	3	-	-	-
HO5	Horsham - Cowfold	0	-	-	-	-
HO2	Horsham - Park Way, Horsham	0	0	-	-	-
LS8	Lewes – Little East Street, Lewes	0	0	2	-	-
MS1	Mid Sussex - London Road, East Grinstead	0	(0)	-	-	-
RY2	Rother - De La Warr Road, Bexhill	0	0	-	-	-

Values shown in (brackets) have less than 75% data capture rate.

The following table identifies the number of days that 'high' air pollution (Daily Air Quality Index 7-9) was measured at each of the Sussex AQMSs.

Table 5-2: Number of days 'high' air pollution during 2022 (Daily Air Quality Index 7-9) 2022

Site ID	Site Name	NO_2	PM_{10}	$PM_{2.5}$	O_3	SO_2
AD1	Adur - Shoreham-by-sea	0	-	0	-	-
EB3	AURN – Eastbourne, Holly Place	0	0	0	-	-
LL1	AURN - Lullington Heath	0	(0)	0	0	(0)
BH0	AURN – Brighton, Preston Park	0	-	0	0	-
HO4	AURN - Storrington	(0)			-	-
HO4	Storrington Fidas		0	0		
WT2	AURN - Worthing A27 Grove Lodge	0	-	0	-	-
BH10	Brighton - North Street	0	-	0	-	-
CI1	Chichester - A27 Chichester Bypass	(0)	(0)	-	-	-
CI5	Chichester - Westhampnett Road	0	-	-	-	-
CA2	Crawley - Gatwick Airport	0	0	0	-	-
EB1	Eastbourne - Devonshire Park	0	0	-	0	-
HT1	Hastings - Bexhill Rd, Bulverhythe	0	1	-	-	-
HO5	Horsham - Cowfold	0	-	-	-	-
HO2	Horsham - Park Way, Horsham	0	0	-	-	-
LS8	Lewes – Little East Street, Lewes	0	0	-	-	-
MS1	Mid Sussex - London Road, East Grinstead	0	0	-	-	-
RY2	Rother - De La Warr Road, Bexhill	0	0	0	-	-

Values shown in (brackets) have less than 75% data capture rate.

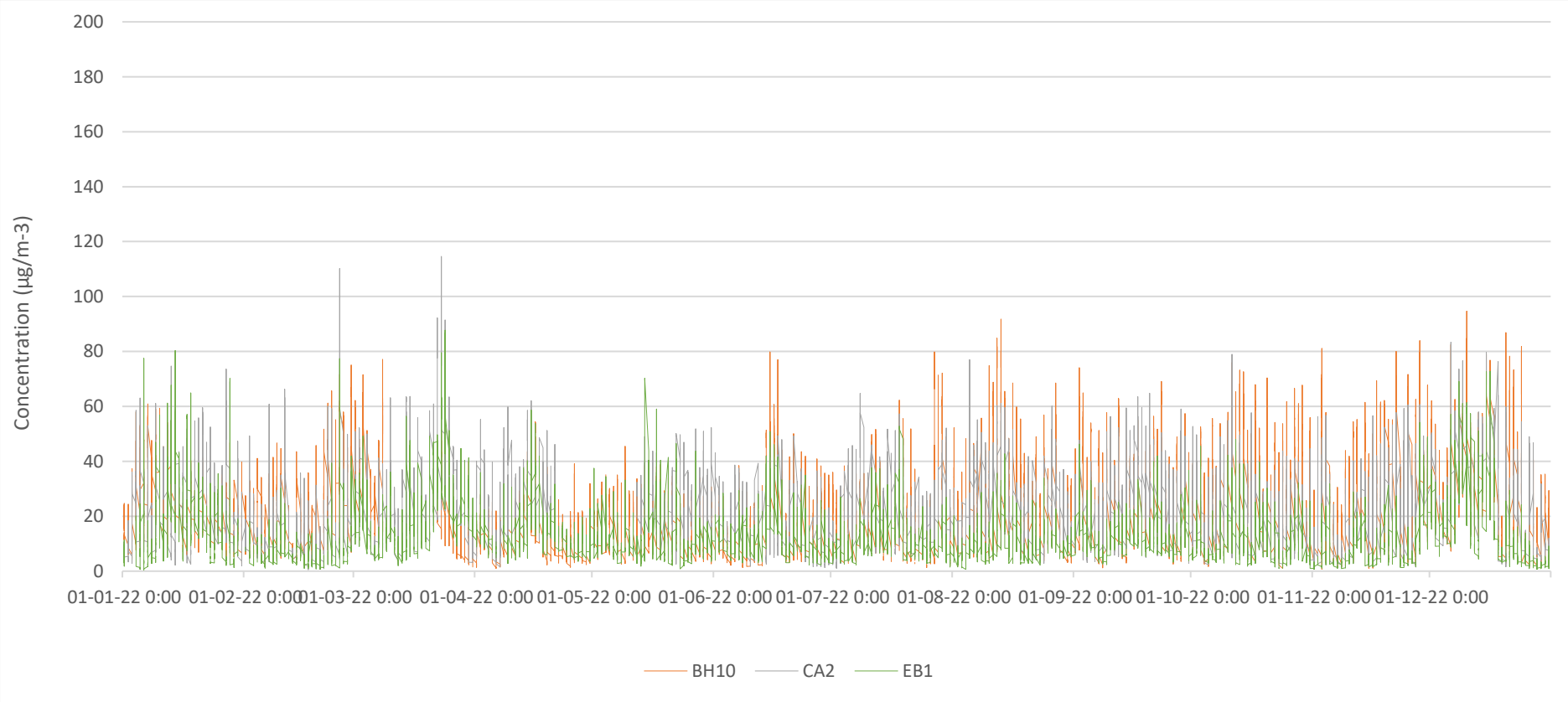
There were no days of 'very high'(Air Quality Index 10) air pollution during 2022.

5.2 DAQI data by pollutant

Nitrogen Dioxide (NO_2)

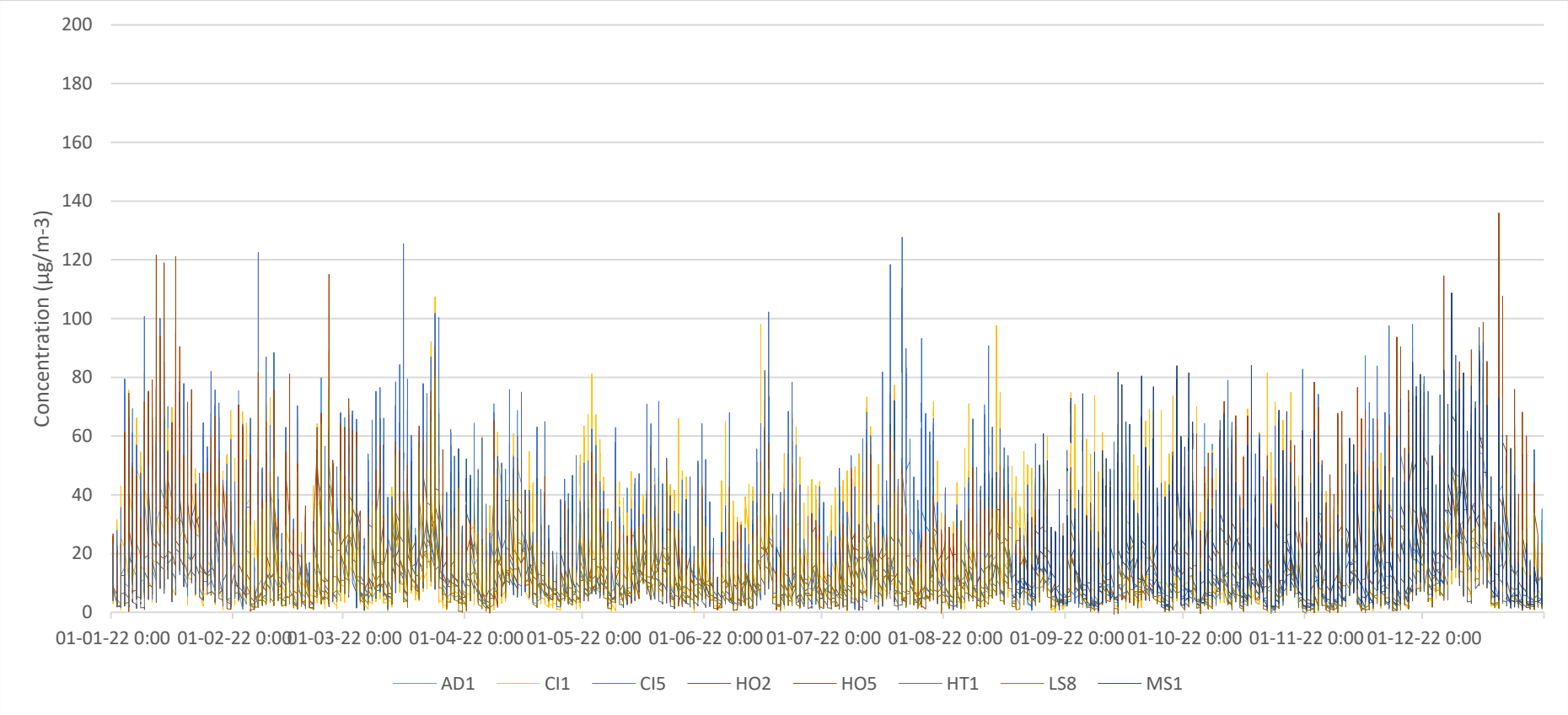
No sites exceeded the 'Moderate' levels (1-hour means >200µg/m^3), the 'High' levels (1-hour means >400µg/m^3) or the 'Very High' levels(1-hour means >600µg/m^3) for NO_2 during 2022. Graphs 4-1 and 4-2 shows the NO_2 hourly mean concentrations at Sussex urban background and urban traffic sites in 2022.

Graph 5-1: NO_2 hourly mean concentrations across 2022 (Sussex Urban background sites)



Note: To present the 1-hour mean data for a site, there are 8760 (365 x 24hr) data points in a full year's data set. This graph is presented to provide an illustration of the data trends and if required these data can be downloaded directly from the Sussex-Air website (www.sussex-air.net).

Graph 5-2: NO_2 hourly mean concentrations across 2022 (Sussex Urban traffic sites)



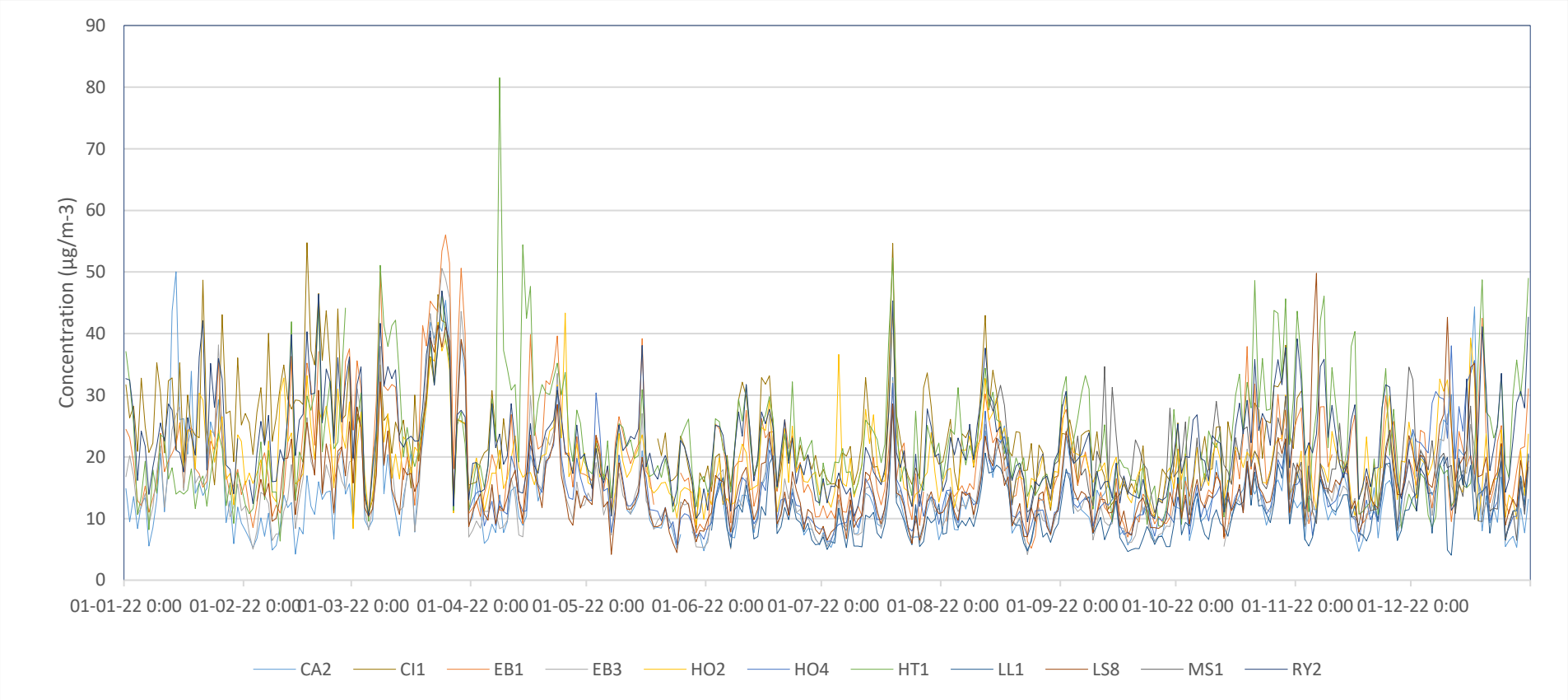
Note: To present the 1-hour mean data for a site, there are 8760 (365 x 24hr) data points in a full year's data set. This graph is presented to provide an illustration of the data trends and if required these data can be downloaded directly from the Sussex-Air website (www.sussex-air.net).

Particulates (PM_{10})

Peak concentrations of PM_{10} tended to occur in the winter. There were no significant events during 2022. However, Hastings (HT1) experienced a short period of higher concentrations of PM_{10} during April 14th to 18th.

'Moderate' PM_{10} levels (24-hour means >51µg/m^3 - 75µg/m^3) were measured at three Sussex network sites during 2022 (Hastings (HT1), Chichester A27 (CI1) and Eastbourne Devonshire Park (EB1). High' PM_{10} levels (24-hour means 76µg/m^3 - 100µg/m^3) were measured at only one site (HT1) during 2022. No sites measured 'Very High' PM_{10} levels (24-hour means >100µg/m^3) during 2022.

Graph 5-3: PM_{10} 24hr mean concentrations across 2022.

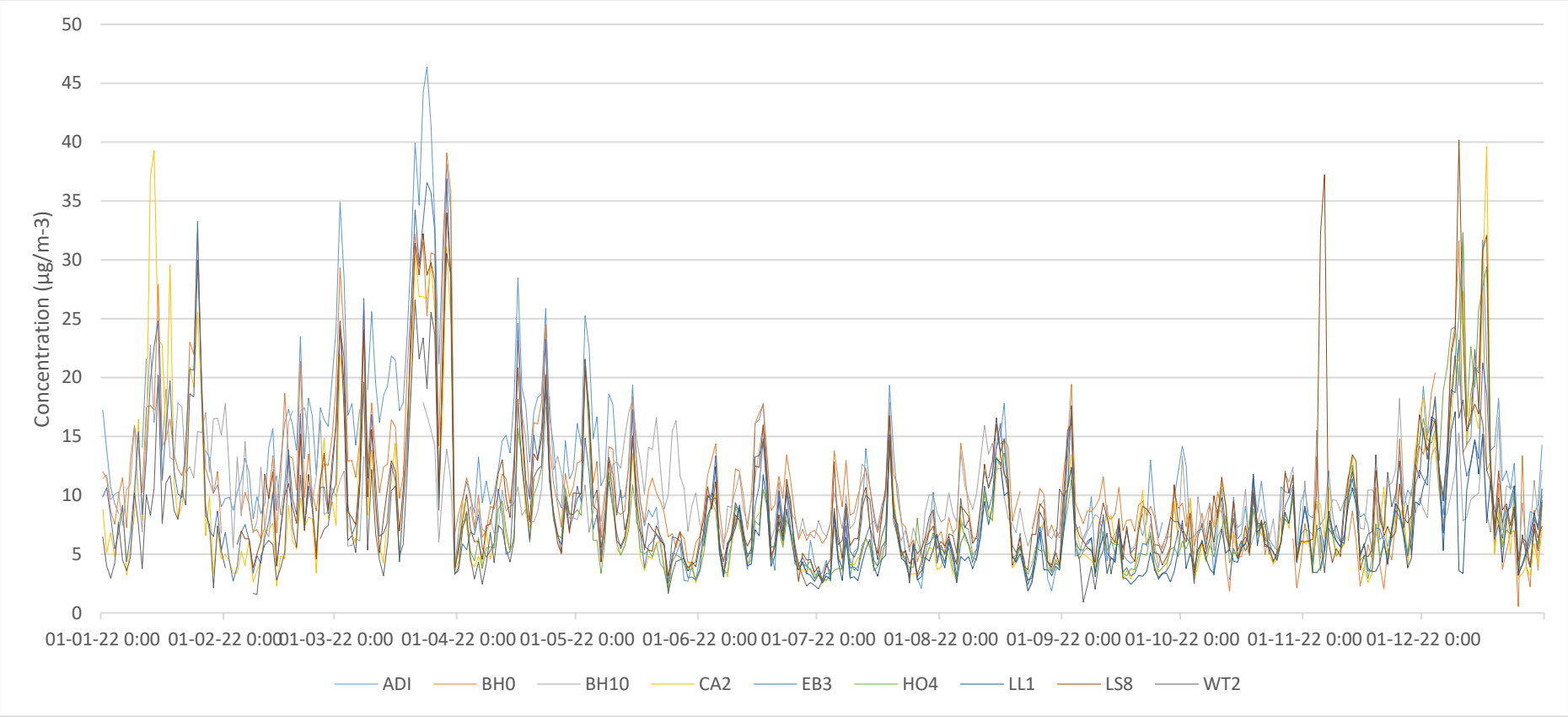


Note: To present the 24-hour mean data for a site, there are 365 data points in a full year's data set. This graph is presented to provide an illustration of the data trends and if required these data can be downloaded directly from the Sussex-Air website (www.sussex-air.net).

Particulates ($PM_{2.5}$)

'Moderate' $PM_{2.5}$ levels (24-hour means >36µg/m^3 - 53 µg/m^3) were measured at five Sussex network sites (Adur - Shoreham-by-sea (AD1), AURN – Brighton, Preston Park (BH0), Crawley - Gatwick Airport (CA2), AURN – Eastbourne, Holly Place (EB3) and Lewes – Little East Street, Lewes (LS8) during 2022.
No exceedances of the 'High' $PM_{2.5}$ levels (24 hour means 54µg/m^3 - 70 µg/m^3) or 'Very High' $PM_{2.5}$ levels (24 hour means >71 µg/m^3) were measured at any Sussex network sites during 2022.

Graph 5-4: $PM_{2.5}$ 24hr mean concentrations across 2022.



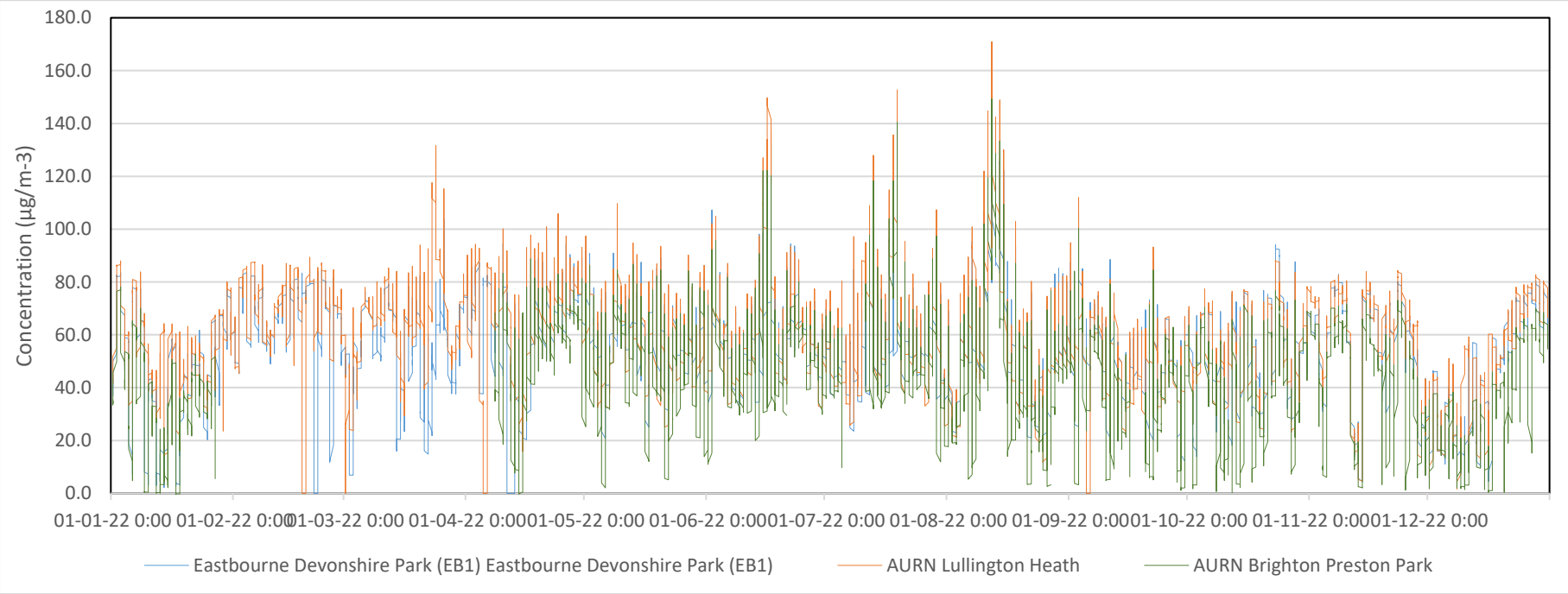
Note: To present the 24-hour mean data for a site, there are 365 data points in a full year's data set. This graph is presented to provide an illustration of the data trends and if required these data can be downloaded directly from the Sussex-Air website (www.sussex-air.net).

Ozone (O_3)

Widespread 'Moderate' O_3 was recorded on a few days at all the network sites monitoring for this pollutant. These episodes occur during the warmer sunnier months due to the photochemical reaction of nitrogen oxides with hydrocarbons. It is also known that a proportion of the O_3 experienced in Sussex is transported from continental Europe under certain meteorological conditions. The O_3 network was reduced significantly in 2022, with only three sites operating (Eastbourne - Devonshire Park, AURN Lullington Heath and AURN Brighton Preston Park), coming down from seven operating in 2021.

'Moderate' O_3 levels (running 8-hour mean >100µg/m^3 - 160 µg/m^3) were measured at the three Sussex sites during 2022.
Lullington Heath was the only site that recorded "High' O_3 levels (running 8-hour mean >160µg/m^3 - 240 µg/m^3) , 7 times in year No sites recorded 'Very High' O_3 levels (running 8-hour mean >240 µg/m^3) across Sussex network sites during 2022.

Graph 5-5: – O_3 8-hour running mean concentrations across 2022.

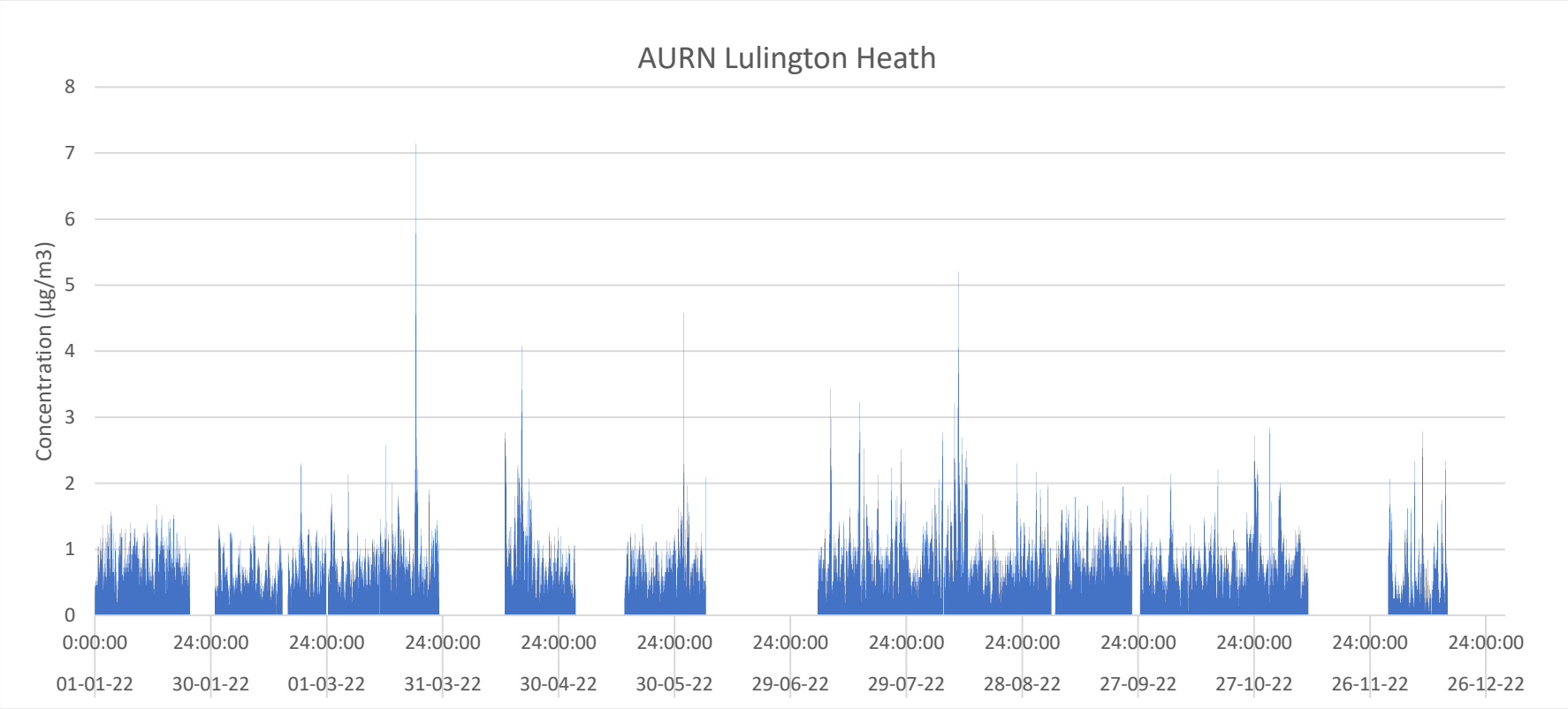


Note: To present the 8-hour running mean data for a site, there are 8760 (365 x 24hr) data points in a full year's data set. This graph is presented to provide an illustration of the data trends and if required these data can be downloaded directly from the Sussex-Air website (www.sussex-air.net).

Sulphur Dioxide (SO_2)

There were no occurrences of 'Moderate' levels (15min mean >266µg/m^3) or above for SO_2 pollution during 2022 at any network sites.

Graph 5-6: SO_2 hourly mean concentrations across 2022.



Note: To present the 15min mean data for a site, there are 35040 (365 x 24hr x4) data points in a full year's data set. This graph is presented to provide an illustration of the data trends and if required these data can be downloaded directly from the Sussex-Air website (www.sussex-air.net).

6. Air Quality Trends (5 years)

Data trends over the last 5 years are provided in the following tables and graphs.

Table 6-1: Annual mean NO_2 2018 - 2022

Site ID	Site Name	2018	2019	2020	2021	2022
AD1	Adur - Shoreham-by-sea	26	26	20	20	21
EB3	AURN – Eastbourne, Holly Place	11	11	10	9	9
LL1	AURN - Lullington Heath	8	7	6		7
BH0	AURN – Brighton, Preston Park	16	15	11	12	13
HO4	AURN - Storrington	23	22	17	20	19
WT2	AURN - Worthing A27 Grove Lodge	37	33	26	28	25
BH10	Brighton - North Street				29	24
CI1	Chichester - A27 Chichester Bypass	29	28	23	24	22
CI5	Chichester - Westhampnett Road		27	19	24	24
CA2	Crawley - Gatwick Airport		25	17	18	21
EB1	Eastbourne - Devonshire Park	14	16	11	13	13
HT1	Hastings - Bexhill Rd, Bulverhythe	16	15	11	11	13
HO5	Horsham - Cowfold	28	24	23	20	21
HO2	Horsham - Park Way, Horsham	25	24	19	21	18
LS7	Lewes - Newhaven			20	24	
LS8	Lewes – Little East Street, Lewes					14
MS1	Mid Sussex - London Road, East Grinstead					24
RY2	Rother - De La Warr Road, Bexhill	20	20	15	14	15

Values shown in (brackets) have less than 75% data capture rate. All units are µg/m^3.

Graph 6-1: Annual mean NO_2 2018 - 2022

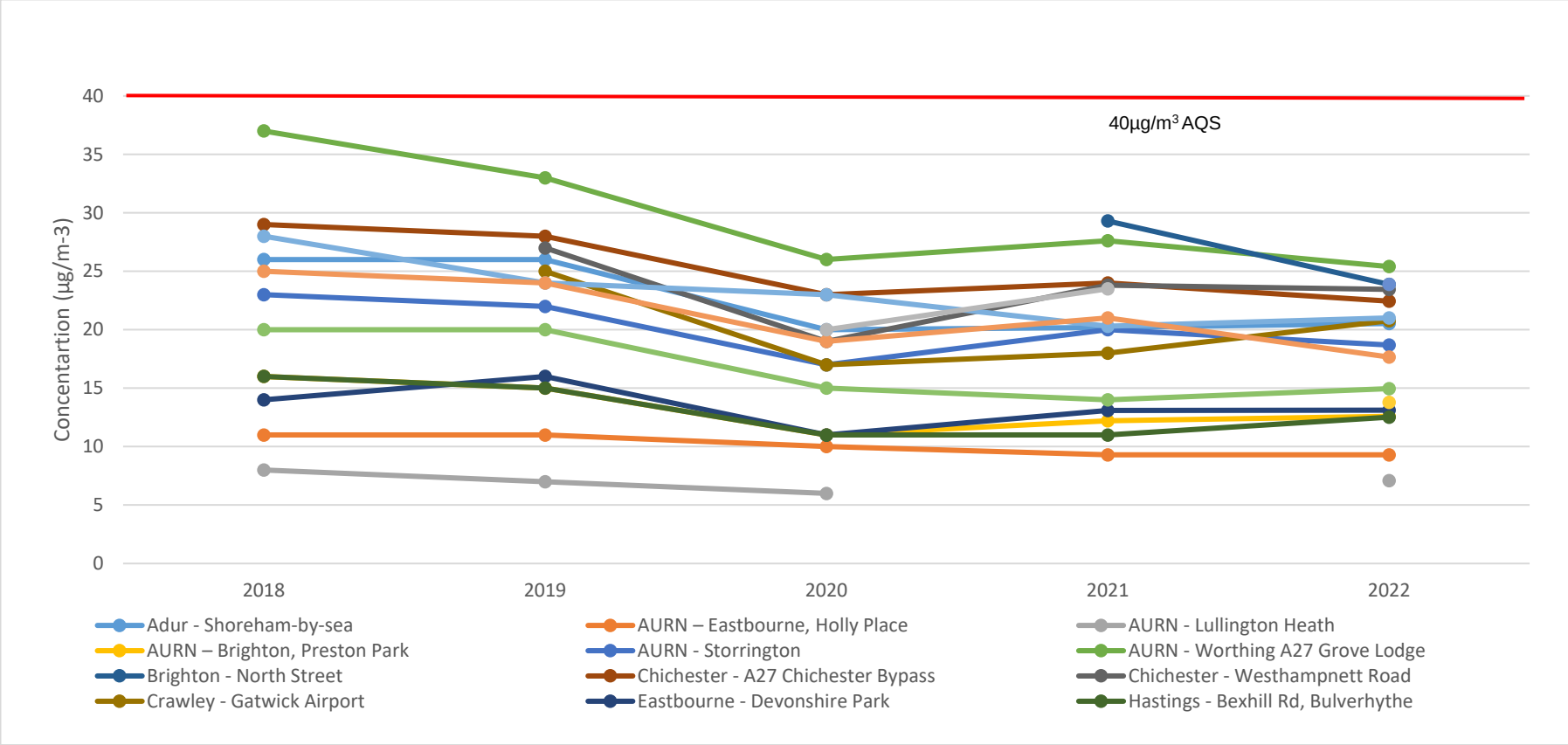


Table 6-2: Annual mean PM_{10} 2018 - 2022

Site ID	Site Name	2018	2019	2020	2021	2022
AD1	Adur - Shoreham-by-sea	23	24	22		
EB3	AURN – Eastbourne, Holly Place		16	14	13	15
LL1	AURN - Lullington Heath					11
WT2	AURN - Worthing A27 Grove Lodge		10			
HO4	Storrington Fidas					14
CI1	Chichester - A27 Chichester Bypass	18	19	18	20	24
CA2	Crawley - Gatwick Airport		17	15	14	14
EB1	Eastbourne - Devonshire Park	19	17	17	17	19
HT1	Hastings - Bexhill Rd, Bulverhythe	23	22	21	20	23
HO2	Horsham - Park Way, Horsham	20	19	16	18	19
LS7	Lewes - Newhaven			23	24	
LS8	Lewes – Little East Street, Lewes					15
MS1	Mid Sussex - London Road, East Grinstead					18
RY2	Rother - De La Warr Road, Bexhill	22	20	20	22	22

Values shown in (brackets) have less than 75% data capture rate. All units are µg/m^3.

Graph 6-2: Annual mean PM_{10} 2018 – 2022

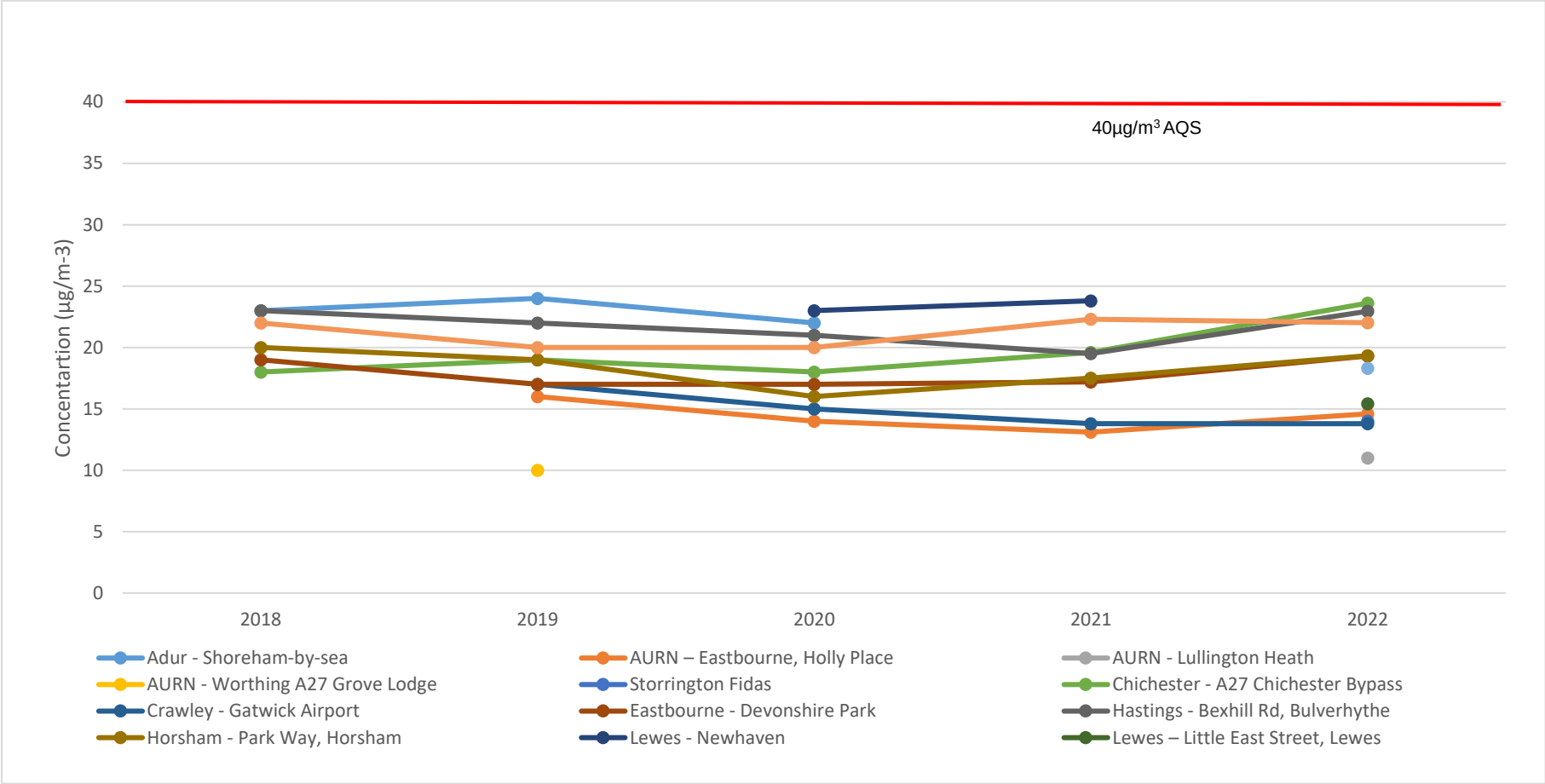


Table 6-3: Annual mean $PM_{2.5}$ 2018 - 2022

Site ID	Site Name	2018	2019	2020	2021	2022
AD1	Adur - Shoreham-by-sea					11
EB3	AURN – Eastbourne, Holly Place	13	10	9	8	9
LL1	AURN - Lullington Heath					6
BH0	AURN – Brighton, Preston Park			9		11
HO4	Storrington Fidas					7
WT2	AURN - Worthing A27 Grove Lodge		10	8	9	9
BH10	Brighton - North Street		9.8		10	10
CA2	Crawley - Gatwick Airport			8	9	8
LS8	Lewes – Little East Street, Lewes					10

Values shown in (brackets) have less than 75% data capture rate. All units are µg/m^3.

Graph 6-3: Annual mean $PM_{2.5}$ 2018 – 2022

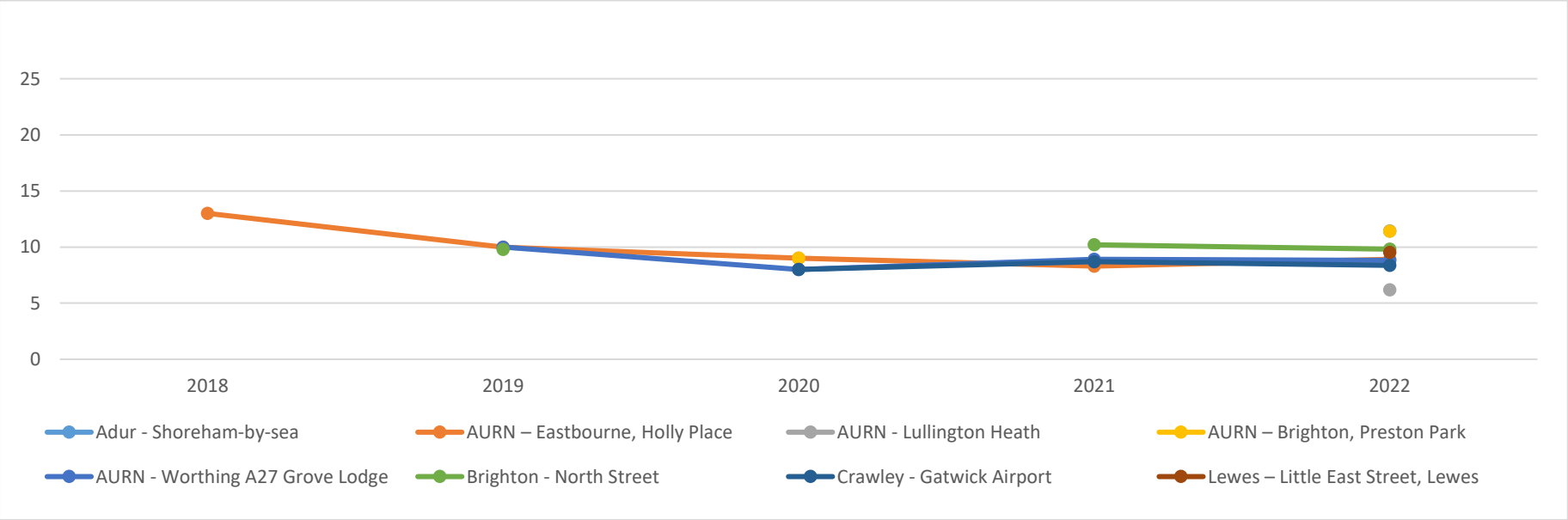


Table 6-4: Annual mean O_3 2018 - 2022

Site ID	Site Name	2018	2019	2020	2021	2022
LL1	AURN - Lullington Heath	61	61	66	58	63
BH0	AURN – Brighton, Preston Park	49	47	56	49	48
EB1	Eastbourne - Devonshire Park	63	57	61	57	59
LS7	Lewes - Newhaven				48.5	

Values shown in (brackets) have less than 75% data capture rate. All units are µg/m^3.

Graph 6-4: Annual means O_3 2018 - 2022

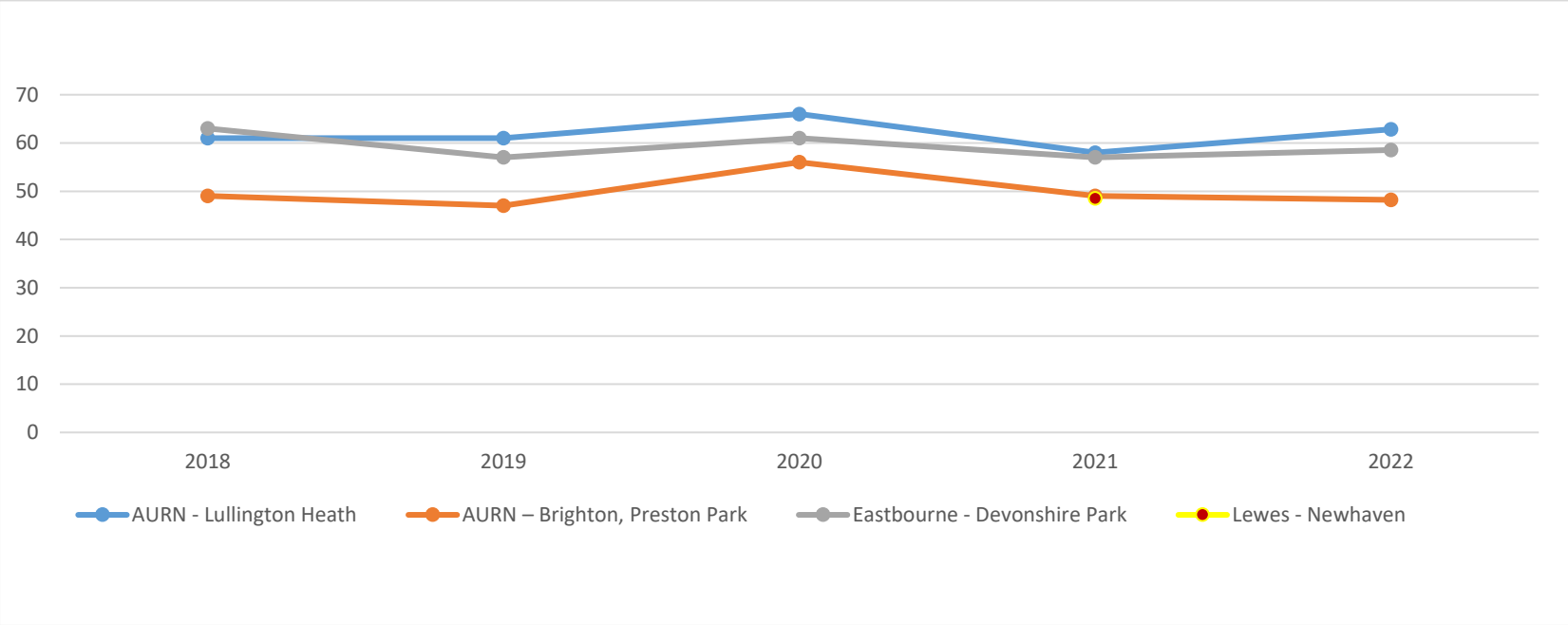


Table 6-5: Annual means SO_2 2018 - 2022

Site ID	Site Name	2018	2019	2020	2021	2022
LL1	AURN - Lullington Heath	1	1.1	1	0	1

Values shown in (brackets) have less than 75% data capture rate. All units are µg/m^3.

Appendices

Appendix 1: Air Quality Objectives

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. Typically, these include residential properties and schools/care homes for long-term (i.e. annual mean) pollutant objectives and high streets for short-term (i.e. 1-hour) pollutant objectives. Table A1 -0-1, taken from LAQM Technical Guidance (LAQM TG(22)), provides an indication of those locations that may or may not be relevant for each averaging period.

Table A1 -0-1: Examples of where the AQS Objectives should apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens or residential properties[1].	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-minute mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

Table A1-2: UK Air Quality Objectives - LAQM

Pollutant	AQS Objective	Concentration Measured as:
Nitrogen Dioxide (NO_2)	200 µg/m³ not to be exceeded more than 18 times per year	**1-hour mean**
	40 µg/m³	**Annual mean**
Particulate Matter (PM_{10})	50 µg/m³ not to be exceeded more than 35 times per year	**24-hour mean**
	40 µg/m³	**Annual mean**
Particulate Matter ($PM_{2.5}$)	*Work towards reducing fine particulate matter 10 µg/m³ ($PM_{2.5}$)	**Annual Mean**
Sulphur dioxide (SO_2)	266 µg/m³ not to be exceeded more than 35 times a year	**15 - minute mean**
	350 µg/m³ not to be exceeded more than 24 times a year	**1-hour mean**
	125µg/m3 not to be exceeded more than 3 times a year	**24-hour mean**

Notes:

***Regulation 4 of the Environmental Targets (Fine Particulate Matter) (England) Regulations 2022 sets the target to ensure that the annual mean concentration of PM2.5 in ambient air is equal to or less than 10 micrograms per cubic metre by 31st December 2040.**

Under the LAQM regime and for the purpose of LAQM reporting, concentrations should be reported to 1 decimal place

Appendix 2: Air Quality Bandings

Table A2 -1: UK Air Quality Bandings: Daily Air Quality Index (DAQI)

Band	Index	Ozone	Nitrogen Dioxide	Sulphur Dioxide	PM2.5 Particles	PM10 Particles
		Running 8 hourly mean	Hourly mean	15 minute mean	24 hour mean	24 hour mean
		µg m-3	µg m-3	µg m-3	µg m-3	µg m-3
Low						
	1	0-33	0-67	0-88	0-11	0-16
	2	34-66	68-134	89-177	12-23	17-33
	3	67-100	135-200	178-266	24-35	34-50
Moderate						
	4	101-120	201-267	267-354	36-41	51-58
	5	121-140	268-334	355-443	42-47	59-66
	6	141-160	335-400	444-532	48-53	67-75
High						
	7	161-187	401-467	533-710	54-58	76-83
	8	188-213	468-534	711-887	59-64	84-91
	9	214-240	535-600	888-1064	65-70	92-100
Very High						
	10	241 or more	601 or more	1065 or more	71 or more	101 or more

Appendix 3: Sussex Network AQMS locations

Figure A3 – 1: Sussex Network AQMS locations