2024 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June, 2024

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Report Reference Number	BHCC-ASR 2024 (up to 2023 annual monitoring data)
Date	June 2024

Executive Summary: Air Quality in Our Area

Monitoring evidence up to the end of the calendar year 2023 suggests that Nitrogen Dioxide (NO_2) continue to improve long-term. The recorded NO_2 concentrations indicate for the first-time compliance with national legislation and UK air quality standards, throughout the city including in the most polluted hotspots. Further improvement is required at roadside to confirm this is the case, beyond all reasonable doubt, and sustained over at least five years. Air Quality Management Area1 and AQMA3 at roadside, require further improvement to meet World Health Organisation interim targets by 2026, that is NO_2, 30 µg/m^3 annual average, set out in the city Air Quality Action Plan (AQAP 2022 to 2027).

Bureau Veritas have produced a complementary report that presents results from the Sussex air automatic monitoring network for Nitrogen Dioxide (NO_2), fine Particulate Matter ($PM_{2.5}$ and PM_{10}), Sulphur Dioxide (SO_2) and Ozone (O_3).

For ten years the City Council's automatic monitoring station (oxides of nitrogen and particles) is located next to North Street and the bus Ultra-Low Emissions Zone (bus-ULEZ). As part of the national air quality monitoring network, automatic analysers monitor oxides of nitrogen, particles, and ozone, in Preston Park, Brighton. The University of Brighton continues to monitor pollutants at Falmer. Brighton & Hove City Council (BHCC) has secured funds for additional gas and particulate monitoring to start 2024. The purpose of improved monitoring is raised awareness, community engagement and to track progress and benefits with the AQAP. Air quality is assessed with a computer-based model verified by local monitoring.

For the 2023 calendar year the city council has submitted to DEFRA results for seventy-three verified Nitrogen Dioxide (NO_2) diffusion tubes. In 2023 air quality was monitored adjacent to bus diversions via Montpelier Road and Upper North Street. 2022/23 also included additional monitoring across the Hanover and Tarner residential area. Results indicated substantially lower concentrations of NO_2, and relatively clean air quality compared to the city's declared AQMAs.

Starting January 2023 Councillors authorised enforcement of vehicle anti-idling; a measure aimed at reducing emissions, vehicle fumes and nuisance. This new AQAP measure activates local authority powers under the Road Traffic (Vehicle Emission) (Fixed Penalty) (England) regulations 2002.

Following completion of the bus retrofit programme, Brighton & Hove buses have continued to modernise the local bus fleet 2023/24. The benefits of cleaner buses achieving ultra-low, and zero emission standards is ongoing and continues to improve annually. All scheduled routes in the city are scheduled to meet bus-ULEZ (Ultra-low Emission Zone 2019 to 2024). That is the euro-VI emission standard by September 2024. Some of the benefits of this milestone, will come after 2023 monitoring results presented in this report. The City Council has been successful with its bid to Department of Transport's Zero Bus Regional Area (ZEBRA).

Air Quality in Brighton & Hove

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung growth, lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Table ES1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from. In practice health impacts will be due to the mixture of gas and particulate pollutants and their concentrations in the environment where people spend their living and sleeping hours. The mix of pollutants locally is an important consideration when considering best value interventions for a healthier environment.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation. Effective hot catalysts are required to mitigate emissions and meet stricter emissions standards for vehicles and fixed heat and power, such as gas boilers. The main health impact of NO_2 is on the respiratory system. Inhalation through childhood can influence lung tissue growth, lifelong lung capacity and lung function. Dose and exposure to NO_2 can increase the risk of respiratory infection. Nitrous oxides can contribute to acid rain and can damage, crops and protected habitats.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive and acidic gas which is predominantly produced from the combustion of coal, crude oil, and kerosene. Exposure to SO_2 may cause irritation to the eyes, nose, throat, and bronchi constriction. Concentrations in the environment are lower than prior to ultralow sulphur petrol and diesel (2007). DEFRA monitors SO_2 at and rural and industrial locations. The council will resume monitoring SO_2 in 2024.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Some hot gas emissions can cool to become airborne particles or contribute to deposition. Particles can come from natural sources such as pollen and sea salt, as well as human made sources such as smoke from fires (domestic and commercial or wildfires), emissions source include agriculture, industry, shipping and aviation and dust from tyres, brakes, demolition, and construction. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres. Typically, combustion or hot processes emit tiny particles and mechanical process produce courser dusts. $PM_{2.5}$ when inhaled is small enough to enter the blood stream. People with underlying health conditions can be more vulnerable to dose and exposure. The pollutant can contribute to the onset of COPD (Chronic

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

	Obstructive Pulmonary Disease) and heart disease.

AQMA and Travel Corridor	Street	Diffusion Tube ID	Site Type	Valid Data Capture 2023 (%)	2023
AQMA1-A270	Lewes Road Elm Grove	A270 E07-2019	Roadside	100.0	38.3
AQMA1-A270	New England Road	A270 C26-2022	Kerbside	100.0	37.5
AQMA1-A23	London Road	A23 C18-2019	Roadside	100.0	36.2
AQMA1-A270	Lewes Road Gyratory	A270 E08-1996	Roadside	100.0	36.2
AQMA1 Bus-ULEZ	North Street	B2066 C11-2012	Kerbside	100.0	35.2
AQMA1 Bus-ULEZ	North Street	B2066 C11-2007	Roadside	82.3	34.8
AQMA1-A270	New England Road	A270 C25-2010	Roadside	84.5	33.8
AQMA1-A23	Cheapside	A23 C17-2012	Roadside	100.0	33.6
AQMA1-A270	New England Road	A270 C24-2015	Roadside	100.0	33.4
AQMA1-A23	London Road	A23 C18-2010	Roadside	62.4	32.7
AQMA1-A23	Grand Parade	A23 E16-2015	Roadside	81.2	32.6
AQMA3-A259	Wellington Road	A259 W17-2009	Roadside	55.9	32.1
AQMA1-A270 + C-Link	Hollingdean Road	C-Link E12-2022	Roadside	100.0	32.1
AQMA1-A23 + C-Link	Edward Street	C-Link E17-2018	Roadside	100.0	31.5
AQMA1-A23	Viaduct Terrace	A23 C21-2005	Roadside	100.0	31.0
AQMA1-A270	Old Shoreham Road East	A270 W05-2006	Roadside	100.0	31.0
AQMA1-A23	Grand Parade	A23 E17-2003	Roadside	66.5	30.4
AQMA1-A23	Grand Parade	A23 E16-1996	Roadside	100.0	29.8
AQMA1-A270	Chatham Place	A2010 W04-2006	Roadside	100.0	28.7
AQMA1 Bus-ULEZ	North Street	B2066 C10-2012	Roadside	100.0	28.7
AQMA5 C-Link	The Drove-South Street	C-Link E02-2012	Roadside	100.0	28.4
AQMA1 Bus-ULEZ	Castle Square	B2066 C04-2010	Roadside	100.0	28.3
AQMA1-A270	Coombe Terrace	A270 E15-2012	Roadside	100.0	28.0
AQMA1-A270	Vogue Gyratory	A270 E10-2015	Roadside	100.0	27.9
AQMA3-A293 + A270	OSR Locks Hill Corner	A270 W20-2021	Roadside	100.0	27.8
AQMA1-A270	Pelham Terrace	A270 E14-2019	Roadside	100.0	27.8
AQMA1-A23	York Place	A23 C16-2013	Roadside	80.4	27.8
close to AQMA1 Bus-ULEZ	Lower Dyke Road	C-Link C13-2014	Roadside	100.0	27.7
AQMA3-A259	Wellington Road	A259 W16-2020	Roadside	74.1	27.7
Close to AQMA1-A270	Lower Elm Grove	LN2-2022	Roadside	82.3	27.5
AQMA1-A2010	Terminus Road	A2010 W03-2006	Roadside	100.0	27.3
AQMA1-A2010	Queen's Road	A2010 C12-2010	Roadside	56.4	27.3
close to AQMA1 Bus-ULEZ	Montpelier Road	WRP1	Roadside	100.0	26.7
Not in AQMA	Egremont Place	LN9-2022	Roadside	100.0	26.4
AQMA3-A293	Trafalgar Road	A259 W19-2009	Roadside	100.0	26.3
AQMA1, North Laine	Frederick St N Laine	B2199 C28-2010	Suburban	92.6	26.2
AQMA5-A23	Preston Road	A23 E02-2009	Roadside	100.0	26.1
AQMA1-A23	Beaconsfield Road	A23 E06-2020	Roadside	100.0	25.6
AQMA1-A270	Marlborough Place	A23 C09-2005	Roadside	100.0	25.4
AQMA1-A23	Oxford Street East	A23 C19-2021	Roadside	83.9	25.3
AQMA4-A2023	Sackville Road	A2023 W21-2010	Roadside	100.0	25.1
AQMA1-A23	Ditchling Road	A23 C20-2005	Roadside	91.6	24.8
AQMA2-A259	Rottingdean	A259 E25-2018	Roadside	100.0	24.7
AQMA1-A23	London Road	A23 C23-2005	Roadside	81.2	24.5
AQMA1-A23	Preston Road	A23 E01-2016	Roadside	89.9	24.4
AQMA1 Bus-ULEZ	Western Road	B2066 W11-2020	Roadside	92.9	24.4
AQMA1-A23 + C-Link	Edward Street	C-Link E17-2022	Roadside	100.0	24.3
AQMA1-A270	Lower Hartington Road	A270 E40-2022	Suburban	100.0	24.3
close to AQMA1 Bus-ULEZ	Old Steine St James's Stree	A23 C02-2022	Roadside	100.0	24.2
AQMA2-B2123	Rottingdean HS	B2123 E22-2009	Roadside	100.0	23.9
close to AQMA1-A23	Richmond Parade	LN12-2022	Roadside	100.0	23.8
close to AQMA1-A23	Lower Southover Street	LN13-2022	Roadside	100.0	23.7
AQMA1-A2010	Queen's Road	A2010 W01-2005	Roadside	92.1	23.7
AQMA2-B2123	Rottingdean HS	B2123 E23-2010	Roadside	91.6	23.6
AQMA2-B2123	Rottingdean HS	B2123 E30-2020	Roadside	92.9	23.1
Not in AQMA	Old Steine Westside	A23 C01-2020	Roadside	100.0	22.1
Not in AQMA	Lower Franklin St	LN1-2022	Suburban	100.0	20.2
Not in AQMA	Egremont Place	LN8-2022	Roadside	100.0	20.0
Not in AQMA	Upper North Street	WRP3	Roadside	100.0	20.0
Not in AQMA	Elm Grove Mid	LN4-2022	Roadside	100.0	19.4
AQMA1 Bus-ULEZ (diversion)	Western Road	B2066 W10-2006	Roadside	48.5	19.3
AQMA6 and C-Link	Eastern Road RSCH	C-Link E18-2021	Roadside	100.0	19.2
Not in AQMA Cycle Lane	Kingsway	A259 Kingsway4	Roadside	92.4	18.7
Not in AQMA	Carlton Hill	LN10-2022	Suburban	100.0	18.6
Not in AQMA	Upper North Street	WRP2	Roadside	100.0	18.2
Not in AQMA	Hanover	LN14-2022	Roadside	100.0	17.5
Not in AQMA Cycle Lane	Kingsway	A259 Kingsway2	Roadside	100.0	16.3
Not in AQMA	Hanover	LN7-2022	Roadside	100.0	14.9
Not in AQMA	Hanover	LN5-2022	Suburban	100.0	14.8
Not in AQMA	Pavilion Gardens	C05-2012	Urban Backgroun	92.1	14.5
Not in AQMA	Hanover	LN11-2022	Suburban	100.0	14.4
Not in AQMA	Vale Park Portslade	A259 W18-2010	Urban Backgroun	100.0	12.3
Not in AQMA	Rottingdean Sea Front	E32-2020	Urban Backgroun	100.0	11.6

Figure 0-1 Rank of BHCC Diffusion Tubes 2023

The Table shows the ranked order of diffusion tube results Brighton & Hove 2023 (highest at the top).

Priorities to improve air quality and achieve compliance in AQMA1:

- *AQMA1 A270 link that is Lewes Road and New England Road.*
- *AQMA1 A23; London Road, Grand Parade and Viaduct Road.*
- *Bus-ULEZ B2166; North Street.*
- *AQMA3 A259 an A293 Portslade. Elsewhere the AQMA5 the Drove west of the railway.*

All AQMAs would benefit from reduced emissions and further improvements in roadside air quality.

This will also help to improve air quality across the suburbs and citywide.

(Results adjusted for relevant receptors and bias in accordance with Technical Guidance (TG22).

Citywide and Background Air Quality

Brighton & Hove is a proactive participant in the Sussex Air Quality Partnership and the Department of Environment (DEFRA) local authority air quality advisory group. Further information on partnership working is outlined on the Council's air quality website[2], including reference to the most recent Air Quality Action Plan (AQAP for the period 2022 to 2027). The most polluted ribbons or hotspots in the city are declared as Air Quality Management Areas (AQMAs). These area maps are published nationally[3].

Local monitoring suggests particulate levels across the city are achieving the government's 2040 national target (10 µg/m^3) as an annual average for $PM_{2.5}$ (airborne particles less than 2.5 microns). There is excellent medical and scientific evidence showing health benefits at lower levels of pollution. A reduction in long term concentrations of particles <10 µg/m^3 will have benefits for individual health and at a population level. Monitoring to date suggests particulate levels are higher in built-up areas compared to the South Downs National Park, but not more concentrated next to local roads.. This suggests a variety of local and distant emission sources contributing to breathable particles (including smoke).

Sulphurous fuels (such as coal and SO_2 due to transport) have diminished substantially compared to historical levels. Road traffic including regional motorways contribute to secondary atmospheric pollution, including nitrate particles. Caution is required when comparing different particulate monitoring methods (such as partisol, BAM, TEOM, FDMS and other sensors[4]). Monitoring to date indicates that local particulate levels have been steady. Further analysers and sensors are being installed (locally and regionally) to determine concentrations, trends, and variability.

Nitrogen Dioxide (NO_2) concentrations are monitored at background sites, including suburbs and parks remote from roads. Citywide NO_2 levels have improved over the past five years. Background NO_2 has been monitored with long term diffusion tubes, at Portslade Vale Park, 8 µg/m^3 reduction over five years, annual average down from 20 to 12 µg/m^3. Automatic analyser, North of the City Centre at Preston Park, improved 5 µg/m^3 over five years down from 16 to 11 µg/m^3. City Centre Pavilion Gardens improved 7 µg/m^3 over five years down from 22 to 15 µg/m^3. Since 2020 monitoring on the sea frontage, Rottingdean also indicates a reduction in NO_2. All background

[2] Brighton & Hove City Council Local Air Quality Management found at: How we manage air quality in the city (brighton-hove.gov.uk)

[3] Department of the Environment Food and Rural Affairs, link to local authority Air Quality Management Areas found at: Air Quality Management Areas (AQMAs) - Defra, UK

[4] Methods for monitoring particulate concentrations found at, chapter 5: Particulate Matter in the United Kingdom (defra.gov.uk)

monitors are remote from road and port emission sources and are outside of the designated AQMAs. Background monitoring represents the air quality situation across the city region. That said the AQAP and cleaner vehicles have a greater positive impact at roadside and kerbside locations. These settings are where air quality has improved the most over the past five and ten years (long-term hardly influenced by variable weather, travel restrictions and one-off events). The following summaries set out **what's new** for air quality monitoring in recent years, including the monitoring surveys carried out, 2022/23.

A270 Old Shoreham Road (OSR Boundary AQMA3)

For considering of a potential cycle lane extension, since 2021 a diffusion tubes survey monitored kerbside and roadside NO_2 has been carried out adjacent with the Old Shoreham Road (OSR A270) in Portslade (western part of the local authority). Where vehicles accelerate eastbound on OSR, from the Lock Hill junction diffusion tubes at the kerbside railings recorded high levels of NO_2. Monitors showed that the kerbside concentrations dissipate within one to eight metres. Monitoring continues near to the boundary of Brackenbury primary school, northern end of AQMA3 and further east close to Sackville Road.

A259 Kingsway (Outside of AQMA) Potential Cycle Lane

Since 2021 a diffusion tubes survey has monitored kerbside and roadside NO_2 next to Kingsway (A259). Results indicate that NO_2 is close to half the national air quality standards and meets the ambitious AQAP target of 30 µg/m^3 or the European target for 20 µg/m^3, NO_2.

Hanover and Tarner Pilot, Liveable Neighbourhood (AQMA1 and upslope)

2022 and 2023 survey results indicate outdoor Nitrogen Dioxide (NO_2) are most concentrated at the base of the slope, and at the frontages of properties adjacent to the A23 (Grand Parade 33 µg/m^3 at tube East16-2015) and A270 (Lewes Road 38 µg/m^3 at East07-2019), both within AQMA1. The A23 and A270 are the main emissions sources influencing air quality in the area.

At the rear side of roadside buildings, recorded NO_2 concentrations drop-off substantially. For this reason, (since 2007) new ground floor flats at roadside are designed to have their ventilation air intakes at the backs of buildings.

Between 2001 and 2008 diffusion tubes monitored NO_2 outside Elm Grove Primary School. The maximum annual average recorded concentration was 38 µg/m^3 in 2004, reducing to 30 µg/m^3 in 2008 and 19 µg/m^3 in 2023. The outdoor concentration complies with the ambitious target of

30 µg/m^3 by 2026 set out in the City Council's 2022 AQAP and provisional 2030 targets recently agreed by the European Parliament, that is 20 µg/m^3 annual mean by 2030[5].

NO_2 at upslope and mid-slope locations in Hanover & Tarner, set back from main roads indicate levels are 14 to 20 µg/m^3. Background concentrations are broadly the same level of NO_2 as Pavilion Gardens. The neighbourhood concentration of NO_2 in outdoor air is less than half (36% to 50%) of the set national air quality standards.

AQMAs

The following sections refer to NO_2 monitors along travel corridors in the Air Quality Management Areas that were declared or amended late-2020. NO_2 concentrations have improved at different rates in various parts of the city. Long term trend charts for NO_2 pollution concentrations in and around the AQMAS are given in the main body of the report. Commentary is also given on traffic counters relevant to the AQMAs.

AQMA1 A2010 Around Brighton Railway Station

The main railway station is an important transport interchange. Automatic traffic counters on Queens Road (south of Brighton railway station) recorded a slight reduction in car and van counts compared with before the pandemic. The monitoring suggests behavioural change (since Q1 of 2020), with less commuting since that time. Daily bus counts have been relatively constant along Queens Road. As travel activity increases, vehicles numbers around the station have recovered compared with 2020/21. Taxi pick-up has moved to the east side of the railway station which would partly explain the reduction in car trips on Queens Road. Further vehicle surveys will seek to determine the proportion of ultra-low and zero vehicles that influences road traffic emissions and roadside air quality. Over the past five years (2018 to 2023) diffusion tubes suggest NO_2 has improved 16 µg/m^3 next to the A2010 road and main railway station, down from 42 to 26 µg/m^3. As Brighton train station is one of the busiest in the UK the improvement in air quality benefits many thousands of people.

AQMA1 North Laine through traffic

Frederick Street-Gloucester Road east of Brighton railway station is an important access route that services residences, independent retail, and the pedestrianised Brighton Laines. Traffic counters since 2018 record a significant decrease in the number of cars using the road link. Over the same period an increase in goods vehicles both vans and lorries suggest a switch to deliveries. In theory

[5] European Parliament adopts revised law to improve air quality (April 2024) found at: Air pollution: Parliament adopts revised law to improve air quality | News | European Parliament (europa.eu)

well used commercial vehicle fleets, will turnover and be replaced by cleaner vehicles sooner than occasionally used cars. Monitoring adjacent to Frederick Place indicates NO_2 has improved 17 µg/m^3 over five years down from 43 to 26 µg/m^3. The evidence suggests the same air quality environment as the train station frontage.

AQMA1 B2066 Bus Ultra-low Emission zone

Weekday bus counts on North Street have been recorded as: **2,741 a day 2018**, 2,367 2020 and **2,519 2023**. With the introduction of zero capable hybrid buses (2018 and 2019) and a higher proportion of ultra-low vehicles, the regular bus fleet is cleaner than before. Further improvements including exhaust upgrades have been delivered in 2023. The regular vehicle fleet that services local bus routes is on schedule to be fully compliant with bus-ULEZ and (Euro-VI) emission standard by September 2024. Except during 2020, lorry counts along North Street have been constant. Car counts on North Street (access from side roads or licenced taxis) have declined since 2019. In the past five years façade NO_2 next to North Street has improved almost 19 µg/m^3, (average of facade diffusion tubes down from 49 to 30 µg/m^3. Since 2018, the recorded kerbside improvement (at diffusion tube C11-2012) is 49 µg/m^3, down from 91 to 42 µg/m^3. For comparison the hourly standard is equivalent to 60 µg/m^3 as an annual average. The kerbside tube indicates compliance with the hourly NO_2 standard, where pedestrians and visitors could be exposed to pollution short-term, and nobody lives for the majority of the year (procedure in accordance with UK, Technical Guidance TG(22)).

AQMA1 A23 Valley Gardens

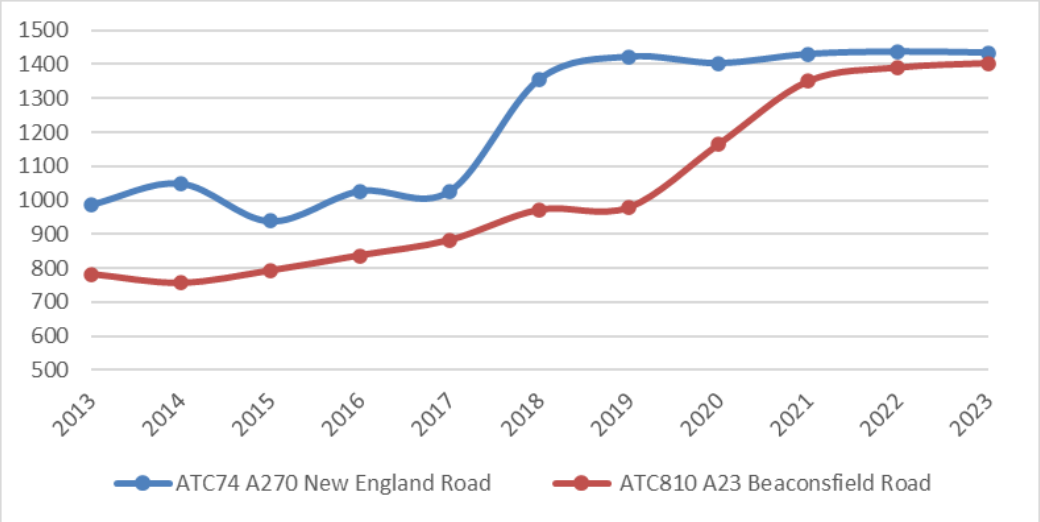
From September 2019 the western side of Valley Gardens has been allocated to buses and taxis and the eastern side to two-way general traffic. This helped to accelerate 15 µg/m^3 of improvement in NO_2 on the west side of Valley Gardens down from 41 µg/m^3 2018 to > 27 µg/m^3 2023. On the east side 12 µg/m^3 of improvement is recorded down from 43 µg/m^3 2018 to 31 µg/m^3 2023 (average of four sites). This change has been more gradual than on the westside. Further improvements are required to meet the interim WHO guideline, a local AQAP target (2026).

AQMA1 A23 / A270 Preston Circus

Monitoring of vehicles along Beaconsfield Road (A23) shows a decade decline in the weekday count of cars from **14,093 per day in 2013** to **11,224 in 2023**. Long term there has been a reduction in the number of daily lorries using the A23 via Preston Circus. Bus numbers are the same as ten years ago. Noticeably the number of vans (light goods vehicles) has increased as follows:

Figure 0-2 Trend in Vans through Preston Circus

A chart showing decade trend in van counts through Preston Circus A270 and A23 in AQMA1.



Over the past five years monitored NO_2 next to Beaconsfield Road, Viaduct Terrace and Ditchling Road (general Brighton incoming traffic) has improved 16 µg/m^3 down from 43 to 27 µg/m^3.

At the same time monitoring indicates on New England Road (mostly used by cars and vans) NO_2 improved 13 µg/m^3 down from 45 to 32 µg/m^3 and London Road area south of Preston Circus (buses and taxis) improved 20 µg/m^3 down from 52 to 32 µg/m^3.

AQMA1 A270 Lewes Road Travel Corridor

The Lewes Road is a key transport link between the city centre, universities, and East Sussex. City Plan Part One sets out the Lewes Road corridor as a designated Development Area. Automatic traffic counters record an increase in motorcycles over the past five years. As this is not happening citywide, the evidence could suggest a sustained increase in food take-away deliveries. Weekday car trips along Lewes Road have increased since 2021 but remain fewer than daily counts recorded 2018 and 2019. Weekday numbers of buses has increased since 2021 and 2022. The bendy buses serving this route, were retired from service late-2022. The daily count of lorries using Lewes Road has increased compared with previous years (2018 to 2022). Comparing with five years ago NO_2 average between Vogue Gyratory an Elm Grove has improved 17 µg/m^3 down from 54 to 37 µg/m^3. For Lewes Road further focus is required to be certain of meeting air quality standards and WHO interim guidelines. From April-2024, this section has been made a parking red route (no stopping outside loading bays). At the same time, a new regulatory standard automatic analyser (oxides of nitrogen and particles PM_{10} and $PM_{2.5}$) has been connected.

Since 2018, diffusion tube monitoring indicates the Lewes Road section along Coombe and Pelham Terrace improved 12 µg/m^3 down from 40 to 28 µg/m^3. Following demolition of buildings adjacent to Hollingdean Road a new regulatory standard monitoring stations has been added for gases (oxides of nitrogen, sulphur dioxide and carbon dioxide). The aim is to monitor ambient air

following development changes. The new monitoring stations have been funded with a combination of the City Council's Carbon Neutral Fund (CNF) and DEFRA air quality grant (2022 to 2024). Results start streaming from 2024, after this reporting cycle. Hollingdean Road is not a bus route, cars and lorries use the locally important road link.

AQMA2 A259 / B2123 Rottingdean

Traffic counts in Rottingdean High Street record a reduction in car numbers, compared to before Covid-19. Counters indicate lorry numbers increased during the period 2020-2022 and fell back in 2023. On the A259 East of Rottingdean village, light duty vehicles have decreased, compared with before Covid-19. With recovery in demand, counts indicate a small increase in heavy vehicles since 2020 (buses and lorries). A yellow box in the historic High Street limits vehicle emissions in the most confined space, where residential is adjacent to the kerb. Since 2018, diffusion tube at Rottingdean façades, indicate NO_2 improved 12 µg/m^3 down from 36 to 24 µg/m^3. NO_2 levels at roadside continue to be more than twice the background level. Real-time sensors are being installed in and around AQMA2. Relatively affluent areas are more likely to replace older vehicles with relatively new ones. Cleaner vehicles in combination with active travel and public transport, can achieve further air quality improvement and WHO air quality guidelines.

AQMA3 A259 / A293 Portslade

Automatic traffic counter monitoring the A259 through AQMA3, Portslade indicates a sustained reduction in daily car, bus and lorry counts compared with prior to Covid-19. Motorcycle and van counts increased 2023, suggesting increased demand for tourism, deliveries, and servicing.

Over the past five years roadside façade tubes indicate NO_2 improved 13 µg/m^3 down from 42 to 29 µg/m^3. The gradual change is like other roadside sites, and half relates to the broader regional improvement. Road traffic emissions relate to acceleration and idling between the Church Road and Boundary Road junctions. Additional monitoring in AQMA3 is being installed during 2024.

AQMA4 Old Shoreham Road / Sackville Road

New traffic counts on Sackville Road will be beneficial to monitor changes with major developments. The long-term diffusion tube indicates NO2 improved 12 µg/m^3 down from 37 to 25 µg/m^3. We will want to ensure that levels remain below 25 µg/m^3 on arms of the road junction in AQMA4. From an air quality viewpoint, it is advisable that future development should seek to open the space surrounding the junction quadrant.

AQMA5 The Drove-South Road

Vans and cars accelerate upslope around a turning bend. From 2024 traffic is to be monitored passing through AQMA5. Since 2018, long term diffusion tubes indicate NO_2 improved 14 µg/m^3 down from 42 to 28 µg/m^3. Further checks are required to confirm if the WHO interim is met for more than one year at roadside.

AQMA6 Eastern Road Royal County Hospital

From 2024 traffic is to be monitored passing through AQMA6. It is believed that construction activities in combination with cars and buses had an influence on emissions outside the hospital. Conditions on the Construction Environment Management plan, ask for ULEZ compliant lorries servicing NHS building projects. Since 2018, long term diffusion tubes indicate NO_2 improved 16 µg/m^3 down from 35 to 19 µg/m^3. Since that time construction activity has increased. Some of the buses passing through AQMA6 operate is zero emission mode.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and especially over the past five years, there are some areas where local action is needed to protect people and the environment from the continued effects of air pollution. Local people have expressed interest in reducing emissions and cleaning the city's air at a faster rate. This can be beneficial for the life course through childhood, learning, working age and retirement.

The Environmental Improvement Plan[6] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. That said locally in designated AQMAs, NO_2 continues to be the most concentrated pollutant. The impact on health is a mixture of pollution in the gas and particulate phases. The Air Quality Strategy[7] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter and nitrates in their areas.

The Road to Zero[8] details the Government's approach to reduce exhaust emissions from road transport through complementary mechanisms, in balance with the needs of the local community. This is important given that diesel vehicles are still popular, and Air Quality Management Areas (AQMAs) are designated due to elevated concentrations, primarily influenced by vehicular diesel emissions, with contributions from gas boilers (operational during the heating season) and fixed diesel generators (intermittent use).

Conclusions and Priorities

AQMAs were first declared in BHCC twenty years ago. The Council monitors inside and outside the AQMAs. In recent years no exceedances have been found outside of the AQMAs. Currently there is no need to declare new areas or revoke the existing ones. Improving long term trends are described in detail above and presented in charts as part of this ASR. The council's AQAP aims to achieve WHO interims by 2026, that are more ambitious than the established air quality standards for England that followed the Environment Act 1995. The European parliament has recently agreed more ambitious targets for 2030.

[6] Defra. Environmental Improvement Plan 2023, January 2023

[7] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

[8] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

In the next few years new developments have the potential to contribute NO_2 to City AQMAs or likely influence the rate of improvement beneficially or adversely with decisions on design, energy, and emissions.

The council has consulted on the Local Transport Plan, Local Cycling and Walking Infrastructure Plan and the Air Quality Action Plan. One of the findings is that three-quarters of respondents (mostly local residence) ranked reducing pollution and improving air quality as one of their highest priorities.

Local Engagement and How to get Involved.

Everyone can do a little bit to help improve local air quality in their city. For example, the travel and heating choices people make have an adverse or beneficial influence on the air everyone breathes:

Healthy Travel Choice Hierarchy

1. Active Travel – walking, cycling and wheeling (roller booting)
2. Battery assisted bicycles
3. Public Transport
4. Electric car or van
5. Battery vehicle with a range extender
6. Petrol-electric hybrid
7. Small Petrol engine
8. Diesel Hybrid
9. Diesel with effective exhaust mitigation
10. Diesel without exhaust mitigation

Healthy Heating and Cooling Hierarchy

1. Renewably generated electricity without combustion with passive house and grid balancing energy storage, bike ride air flow or a dip in the sea to cool down.
2. Opening vents and widows to cool down in summer, insulation, and high energy performance to keep warm in the winter.
3. Electric grid or local microgeneration without emissions to air
4. Biogas Fired Boilers (Ultralow NOx)
5. Natural Gas Fired Boilers (Ultralow NOx)
6. Combined Heat and Power gas combustion (emits NOx and CO_2)
7. Pellet Stoves (that emit low PM & NOx)
8. Log Burning with risk of smoke

9. Diesel Generators that emit smoke and NOx
10. Heavy fuel oil with various emissions
11. Coal with sulphurous emissions (now illegal to sell in England)

Local Responsibilities and Commitment

This ASR was prepared by the Air Quality Officer in City Services at Brighton & Hove City Council with the support and agreement of Public Health. New for 2024, City Services includes Transport, Regulatory Services and Environmental Enforcement. Brighton & Hove recently celebrated its 25th anniversary as a unitary authority. Since May 2023, it has a political majority and has recently changed from a committee to cabinet arrangement for decision making.

The city council is a participating member of the Sussex Air Quality Partnership and often leads on funded projects, including committing loans to support measures set out in the AQAP (2022 to 2027). The AQAP underwent detailed public consultation prior to being approved at committee, November 2022.

If you have any comments on this ASR, or related AQAP, please send them to: Transport.Projects@brighton-hove.gov.uk.

Any comments on vehicle engine idling enforcement please send to: EnvironmentalEnforcement@brighton-hove.gov.uk

Any comments on smoke control please them to: ehl.environmentalprotection@brighton-hove.gov.uk and EnvironmentalEnforcement@brighton-hove.gov.uk.

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1 Local Air Quality Management

This report provides an overview of air quality in Brighton and Hove City Council (BHCC) up to an including 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents. Progressive local authorities such as Oxford, Cambridge, BHCC and London Broughs have pledged to work towards more ambitions air quality guidelines. The justification of a more proactive approach considers current understanding of the health risk of airborne pollution, including medical research evidence published in the thirty years since the Environment Act (1995). At the current time, short term NO_2 > 150 µg/m^3 is unusually high and it is recommended that air alerts update to reflect UK ambient levels, as they are from 2024.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine if the air quality standards and guidelines are likely to be achieved. Where an exceedance of national standards is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is a requirement showing the strategies employed by BHCC to improve air quality and any progress that has been made.

The statutory air quality standards applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, providing dates by which measures will be carried out.

A summary of AQMAs declared by BHCC can be found in Table 2.1. The table presents a description of the number of designated AQMAs are currently designated within BHCC. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean for all six, AQMAs 1 to 6
- NO_2 hourly mean, AQMA1
- There are no local AQMAs for PM_{10} and the local authority does not have a statutory duty to declare and AQMA for $PM_{2.5}$, that it has monitored locally since 2015.

The AQAP (2022 to 2027) sets out commitment to surpass WHO interims guidelines citywide for NO_2 and $PM_{2.5}$ by 2026 to be reported in 2027. Should national policy remain the same we propose to review the six declared AQMAs after 2025/26 monitoring results.

Table 2.1 – Declared Air Quality Management Areas

First declared in 2004, BHCC's AQMAs were amended late 2020. Consultations followed, and the AQAP was approved at committee November 2022. Further information is available on the Council's air quality pages[2]:

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Brighton & Hove AQMA1	2013 Amended November 2020	NO2 Annual Mean	Includes four main arterial routes connecting Brighton & Hove City Centre, that is: B2066-ULEZ and part of the A23, A270, A2010 and adjacent land use.	YES	84.6	38 at diffusion tube E07 Lewes Road, similar levels New England Road, London Road and North Street (upper slope opposite Windsor Street)	Within tolerance of 10% (to be beyond all reasonable doubt). Not compliant with UK standards in all parts of AQMA1.	Brighton & Hove AQAP November 2022	How we manage air quality in the city (brighton-hove.gov.uk)
Brighton & Hove AQMA1	2013, Amended November 2020	NO2 1 Hour Mean	Includes four main arterial routes connecting Brighton & Hove City Centre, that is: B2066 ULEZ and part of the A23, A270, A2010 and adjacent land use.	YES	114.8	42	DT Central 11-12 compared against 60 µg/m3, for the hourly standard. Two years compliant since the pandemic travel restrictions	Brighton & Hove AQAP November 2022	As above. Further monitoring installed for 2024.

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Brighton & Hove AQMA2	2013 Amended November 2020	NO2 Annual Mean	Rottingdean High Street (B2123) from the A259 junction to the T-junction with Vicarage Lane.	YES	47	25	DT E23 three years compliant, excluding 2020 and 2021. Continued improvement required to meet AQMA target.	Brighton & Hove AQAP November 2022	AQMA target: five years compliant with national air quality standards, at relevant exposure (not including pandemic years 2020 and 2021 that were influenced by unusual travel restrictions). AQAP target: World Health Organisation interim guideline of 30µg/$m^{3,}$ like Oxford and Cambridge. Further monitoring installed for 2024.
Brighton & Hove AQMA3	Nov-20	NO2 Annual Mean	South West Portslade including housing surrounding the A259 and A293 haulage route from Shoreham Port Inland. NOx contributions from general traffic, buses, HGV and wharf side industry.	YES	51.1	32	DT West 17 indicates one year compliant, with UK standards. Continued improvement required to meet AQMA target.	Brighton & Hove AQAP November 2022	Further improvement required to work towards WHO guidelines and interims. Further monitoring installed for 2024.

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Brighton & Hove AQMA4	Nov-20	NO2 Annual Mean	Premises adjacent with the Old Shoreham Road (A270) and Sackville Road (A2033) Junction.	YES	47.7	25	DT West 21 suggests compliance for three years.	Brighton & Hove AQAP November 2022	Further monitoring installed for 2024.
Brighton & Hove AQMA5	Nov-20	NO2 Annual Mean	Part of the Drove, South Road Preston Road part of the A23 and adjoining properties.	YES	50.7	28	DT East 2_12 indicates compliance with national standards for two years.	Brighton & Hove AQAP November 2022	Further monitoring installed for 2024.
Brighton & Hove AQMA6	Nov-20	NO2 Annual Mean	Eastern Road outside of the Royal Sussex County Hospital. Mixed road traffic, gas combustion and long term construction.	YES	42.2	19	DT East 18_indicates compliance with UK standard for three years.	Brighton & Hove AQAP November 2022	Further monitoring installed for 2024.

☒ **Brighton & Hove City Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

2.2 Progress and Impact of Measures to address Air Quality in Brighton & Hove

Defra's appraisal of last year's ASR acknowledged six AQMAs and the approved AQAP, noting more stringent air quality targets. DEFRA accepted the 2023 ASR. DEFRA noted the monitoring and exceedances reported and that BHCC had met technical guidance and data quality assurance with their report submission.

The appraisal commented that AQMAs 2 & 6 were compliant with national air quality standards. This included the calendar years 2020 and 2021, that were affected by unusual travel restrictions. AQMA6 is most likely influenced by construction activity, which ceased and has since resumed. As the City plan has identified ambitious developments areas is advisable to retain all AQMAs for at least another year.

In response to 2023 appraisal comments, this year further information is provided on partnership working, including with public health consultants in the Director of Public Health (DPH) team. A joint presentation between the air quality officer and health consultants was given to the Health and Wellbeing Board. The air quality officer participates in Sussex Children and Young People, Asthma Network, and the Health Protection & Screening Forum. Air quality features in the Joint Strategic Need Assessment, citing links between $PM_{2.5}$ and the Public Health Outcomes Framework. The DPH engages with the City Council's Air Programme Board and is familiar with the ASR for air quality.

Brighton & Hove City Council has taken forward direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 58 measures are included within Table 2.2, with the type of measure and the progress BHCC have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans, Local Walking and Cycling Infrastructure Plans (LCWIP)[9], Brighton bike share scheme[10], Cycle Hangars[11], eCargo

[9] Local Cycling and Walking infrastructure Plan found at Brighton & Hove: Local Cycling and Walking Infrastructure Plan (LCWIP) (brighton-hove.gov.uk)

[10] Beryl BTN Bikes found at Brighton & Hove: Beryl BTN Bikes (brighton-hove.gov.uk)

[11] Cycle Hangars, found at Brighton & Hove: Cycle hangars (brighton-hove.gov.uk)

Bike Accelerator Project[12], Better Bus Service Improvement Plan (BSIP)[13], Local Electric Vehicle (EV) charging facilities[14]. Key completed measures are bus retrofits (DEFRA air quality grant Lot 1) and Sustrans school and event engagement and promotional awareness of electric vehicles (DEFRA grant Lot 2).

BHCC expects the new monitoring projects to be operational over the course of the next reporting year (2024). This aims to raise awareness and community engagement on cleaner local air quality (DEFRA grant lot 2). The opening section above discusses focus on the A270, Lewes Road and New England Road and the A23, London Road, Viaduct Road and Grand Parade. BHCC's top three priorities for the coming year are:

- 1a Active travel access
- 2b Ultra-low and zero emission zone for buses and associated improvements
- 2h Fast and rapid electric chargers for vehicles

BHCC worked to implement these measures in partnership with the following stakeholders during 2023 continuing into 2024:

- Neighbouring local authorities and the Sussex Air Quality Partnership
- DEFRA
- Bureau Veritas
- Matts Monitors
- Earthsense
- TES Ltd
- Tag Master UK
- Traffic GB Ltd

The principal challenges and barriers to implementation that BHCC anticipates facing are sufficient staff resources to manage several contractors, ongoing monitoring, and AQAP measures.

Whilst the measures stated above and in Table 2.2 will help to contribute towards continued air quality improvement, BHCC anticipates that further additional measures will be required in

[12] eCargo Bike Accelerator Project found at Brighton & Hove eCargo Bike Accelerator Project (brighton-hove.gov.uk)

[13] Bus Service Improvement Plan, found at Brighton & Hove Brighton & Hove Bus Service Improvement Plan (BSIP) (brighton-hove.gov.uk)

[14] Electric Vehicles (EV) Charging, found at Brighton & Hove Electric vehicle (EV) charging (brighton-hove.gov.uk)

subsequent years to achieve healthier spaces, compliance and enable the revocation of AQMA 1 to 6, should the government keeps NO_2 targets unchanged.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1a	Active Travel Access	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2018	2027	BHCC City Services	Active Travel England (DfT), BHCC	NO	Funded	£1 million - £10 million	Implementation	Estimated 1 to 5 µg/m3 reduction in NO2 long term (measured as an annual mean at roadside)	Increases in walking and cycling levels, reduced collisions /casualties, increased active travel kms.	Local Cycling and Walking Infrastructure Plan approved in 2022. Construction planning for Valley Gardens Phase 3, Review of design for A259 active travel scheme. Design for Phase 1 of A23 active travel scheme finalised.	
1b	Expanded bikeshare scheme and inclusion of e-bikes	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2018	2023	BHCC City Services, Beryl Bikes	DfT, BHCC, Beryl Bikes and sponsor	NO	Funded	£500k - £1 million	Completed	Estimated to be 1µg/m3 based on medium uptake, rising to more with high uptake and encouragement of lasting behavioural and lifestyle change	Increased usage and kms, cross-boundary connectivity Access to push bike and e-bike share scheme, for short journeys with options to ride outside the local authority, connecting with the national cycle network	The BTN Bike share scheme was relaunched on 31 March 2023. In the first twelve months, almost half a million kilometres have been travelled by users. The total fleet is now 780, with 60% being e-bikes and 40% pedal-only bikes. This is an increase of almost 200 more bikes than the previous bike share scheme.	Planned to expand scheme to West Sussex.
1c	On street bike storage	Alternatives to private vehicle use	Other	2018	2027	BHCC City Services	BHCC	NO	Funded	£100k - £500k	Implementation	Estimated to be <1µg/m3 city centre. Assuming a reduction in diesel vehicle trips.	Increased secure bicycle parking facilities. More local trips by active travel.	150 cycle hangars now installed. Hangars provide on-street parking for up to 6 bikes in a covered, secure and accessible facility.	Not every request can be met in the first instance.
1d	Encourage and facilitate home working and remote access to health, services, education	Promoting Travel Alternatives	Encourage / Facilitate home-working	2019	2027	Citywide Businesses and public sector bodies	Various	NO	Funded	£50k - £100k	Implementation	Estimated to be 1µg/m3 to 2µg/m3 NOx as NO2 avoided, depending on the number of diesel trips saved and the timing of peak road demand that risks congestion, if working shift patterns are not spread out.	Less travel overall, reduced number of vehicle trips and kms	Changes in working and commuting patterns continue since Covid-19.	Brighton's 24-hour economy is not limited to one shift pattern. This helps to spread the demand for travel and reduce the risk of road traffic emissions, happening simultaneously.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1e	Lift share and car club /hire	Alternatives to private vehicle use	Car & lift sharing schemes	2018	2027	Citywide Businesses and local communities	Commercial, developers	NO	Funded	£500k - £1 million	Implementation	Car clubs need to increase percentage of zero emission vehicles, to further reduce NO2 and secondary PM nitrates	Increased use of car club vehicles, reduced car ownership.	Positive uptake with SMEs and households	Ongoing and established car club operated by Enterprise, with approx. 90 bays/vehicles
1f	Bus access improvements	Transport Planning and Infrastructure	Bus route improvements	2015	2027	BHCC City Services, Bus Operators, BusWatch	BHCC, BSIP (DfT), Bus Operators	NO	Funded	> £10 million	Implementation	Progress beyond bus-ULEZ to a higher percentage of zero capable is required	Increase passenger numbers, increase bus passenger kms, increase customer satisfaction.	Bus Service Improvement Plan (BSIP) approved in 2021. Enhanced Bus Partnership established between bus operators, BHCC City Transport and BusWatch. Successful £2.9m Tranche 2 Zero Emission Bus Regional Area (ZEBRA2) funding bid submitted in December 2023. Red Routes for Lewes Road and London Road approved in December 2023.	Aim to achieve at least pre-Covid passenger usage levels by 2024/25
1g	Transport Interchanges	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2018	2027	BHCC City Services, Bus Operators, Train operators, Network Rail	BHCC, BSIP (DfT), Bus Operators, Network Rail	NO	Funded	£1 million - £10 million	Implementation	Substantial decreases in NO2 outside Brighton railway station, that is part of AQMA1- A2010.	Increased public transport use, reduced vehicle trips	Brighton railway station bus connections completed. Air quality improved faster than the city and UK average	Achieving pre-Covid usage levels
1h	Low Traffic Neighbourhood	Promoting Travel Alternatives		2022	2023	BHCC City Services	BHCC	NO	Funded	£100k - £500k	Stopped	Unlikely to benefit AQMA where NO2 is most concentrated. Diesel vehicles using main roads are the main emission contribution to residential areas.	Baseline monitoring showed relatively clean air quality in Hanover & Tarner pilot area (LN 14 µg/m3 NO2 annual mean).	Design work ceased following consideration by Transport & Sustainability Committee in October 2023.	Response to consultation showed no overall support for proposals.
1i	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	2018	2027	BHCC City Services, Sussex Partners and Sustrans working with Education providers	BHCC	YES	Partially Funded	£100k - £500k	Implementation	Estimated to be <1µg/m3.	Fewer car trips and emissions, increased active travel journeys	Ongoing	Long term schemes invplving schools, colleges and universities.
1j	Workplace Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2022	2027	BHCC City Services working with Businesses	BHCC and local businesses	NO	Funded	£100k - £500k	Implementation	Estimated to be <1µg/m3.	Fewer car trips and emissions, increased active travel journeys	Ongoing	Helped by flexible working at home since 2019/20, and spreading of journeys to diminish AM PM peak flows.
1k	School Streets	Promoting Travel Alternatives	Workplace Travel Planning	2018	2027	BHCC City Services working with schools and Children, Families & Learning	BHCC	NO	Funded	£100k - £500k	Implementation	Minor benefit where air quality baseline is relatively good	Increased active travel, reduced vehicle trips, improved air quality, reduce d collisions/casualties	Six schemes per year, help to deliver safer and improved environments around schools	Ensure active and ongoing engagement with local communities.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1l	Continue emission-based charges for resident parking permits	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	2022	2027	BHCC City Services, including Parking	BHCC Parking and income	NO	Funded	£100k - £500k	Implementation	Trace levels	Higher number of standard and low emission vehicle permits purchased	Controlled parking zones are focussed on central/busy areas.	Decisions on vehicle type are dependent on behaviour change and financial circumstances.
1m	Explore Park and stride. Park and ride and travel interchange.	Alternatives to private vehicle use	Bus based Park & Ride	2022	2025	City Services including transport planning, air quality and parking, working with planning and bus operators and landowners	BHCC City Services	NO	Partially Funded	£50k - £100k	Planning	Estimated to be 3 to 9µg/m3 NO2 along shuttle routes if diesel vehicles are not used.	Identification of potential sites, reduced vehicle trips and emissions, improved roadside air quality in AQMAs	Feasibility of sites ongoing.	Identifying and establishing suitable site(s).
1n	Explore Workplace Parking Levy	Promoting Travel Alternatives	Workplace Travel Planning	2022	2027	City Services and local businesses	BHCC City Services	NO	Not Funded	£10k - 50k	Planning	Estimated to be <1µg/m3.	Reductions in vehicle commuting to get to work.increase in active travel and public transport usage	None.	
1o	Liveable City Centre (LCC)	Policy Guidance and Development Control	Other policy	2022	2027	BHCC City Services	BHCC City Services & Planning	NO	Partially Funded	£100k - £500k	Planning	Trace levels	Development of design codes to identify requirements for the physical development of a site or area to deliver improved public realm.	Baseline analysis underway	
1p	20-minute or fifteen minute neighbourhoods	Other	Other	2022	2027	BHCC City Services	BHCC City Services & Planning	NO	Partially Funded	£50k - £100k	Planning	Trace levels. Could help manage movement of vehicles and prioritisation of space.	Less vehicle movement and emissions, increased active travel.	Pilot project	
1q	Develop re-wilding and tree planting areas and parklets, reduce fire and smoke risk of the habitat	Other	Other	2022	2027	BHCC City Services	Sustainability and Planning	NO	Funded	£100k - £500k	Planning	Trees and habitats more likely to help mitigate particles and dust than nitrogen dioxide.	Increased tree and vegetation planting, improved natural environment and safer more attractive places for walking and cycling	Valley Gardens, Waterhall rewilding, Carden Hill tree planting and parklets	Trees and ecosystems likely to benefit from clean air. Roadside summer foliage unlikely to mitigate nitrous pollution at roadside where >10,000 vehicles pass a day.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
2a	Working towards a zero-exhaust council fleet for vehicles and machinery	Vehicle Fleet Efficiency	Other	2022	2027	BHCC Fleet Management	BHCC	NO	Funded	£1 million - £10 million	Implementation	Estimated 1 to 2 µg/m3 long term reduction in roadside NO2 along some roads in AQMAs. Exemplar to other operators to explore and implement a cleaner fleet without emissions.	Increased proportion of Zero Emission vehicles in council fleet	Plans for 2023 included 2 additional refuse vehicles, 4 communal bin lorries, 1 toploader and 6 cars. Fleet now includes 72 EVs. EV-lorry won its category on the London to Brighton EV run in 2022.	Further investment required to continue after carbon neutral fund and the 2nd-half of this AQAP timeline (2022 to 2027).
2b	Ultralow and zero emission zone for buses and associated improvements	Vehicle Fleet Efficiency	Other	2019	2027	BHCC City Transport, Public Transport Team, Bus Operators	BSIP (DfT), DEFRA AQ grant, BHCC and bus operators	YES	Funded	£1 million - £10 million	Implementation	Monitored 80µg/m3 reduction in NO2 at North Street kerbside since 2013. 36µg/m3 reduction at façade during the same period. Other factors influencing causality. Estimated at least 25µg/m3 reduction at North Street façade due to ultra-low or zero vehicles (buses and taxis).	Promoting ultralow and zero emission public transport	Last few remaining euro-V buses operated on time-tabled bus routes, scheduled to be retired by September 2024 at the latest. Confirmation required this applies for the bus-ULEZ and citywide. ZEBRA2 funding bid for 16 electric buses was successful.	Buses and coaches not used for time-tabled routes, such as tourist services, rail replacement and driver training could be older and have higher emission rates that do not comply with zero or bus-ULEZ. This is a small proportion compared to the regular 300+ buses used on frequent time-tabled routes.
2c	Exhaust retrofit of middle age buses (oldest vehicles retired first)	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2013	2024	BHCC City Transport, Public Transport Team, Bus Operators	Dft Clean Bus Transport Fund, DEFRA Air Quality grant	YES	Funded	£1 million - £10 million	Completed	Contributory factor in the above measured improvement	Improved air quality, bus-ULEZ compliant bus fleet.	150 double-deck and minibuses retrofitted. Series of projects completed.	Next step is to increase percentage of the fleet (buses and taxis) that are zero emission (without exhaust).
2d	Better aligned wheel tracking	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2022	2027	BHCC City Services and Imperial University of London	University	NO	Partially Funded	£50k - £100k	Planning	1 to 2 µg/m3 PM2.5	Reduced particulate emissions.	Preliminary discussion with bus operator and university	Monitoring benefits cause and effect hard to prove.
2e	Ultralow or zero emission zone for all vehicle types	Promoting Low Emission Transport	Other	2023	2027	BHCC City Services	BHCC	NO	Not Funded	£1 million - £10 million	Planning	Target: 95% compliance with ULEZ Euro emission standard and increasing proportion of zero emission vehicles	Improved air quality, reduced vehicle journeys, increased active travel journeys	Procurement of network of vehicle category cameras to provide robust indication of current and changing pattern of fuel types completed.	Benefit diminishes as a higher proportion of vehicles achieve ULEZ standards without direct intervention
2f	Promoting e-cargo bikes	Freight and Delivery Management	Other	2020	2027	BHCC City Services	BHCC (Carbon Neutral Fund)	NO	Funded	£100k - £500k	Implementation	1 to 2 µg/m3 depending on the number of diesel vehicle trips saved	Reduced vehicle use in AQMAs and increased cycle use	More than thirty businesses switched from petrol and diesel delivery vehicles	Continuation of funding required, as cost and benefit improves.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
2g	Geo-referenced hybrid buses	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2018	2027	BHCC City Services, Bus Operators, Ricardo, University of Sussex	Bus Operators and Innovate UK	NO	Funded	£1 million - £10 million	Completed	Estimated 1 to 7 µg/m3 NO2 saved in areas targeted for hybrid zero capable	AQMA NO2 reduction along bus scheduled bus routes	54 double deck buses zero capable since late 2019. Used in AQMAs except the Lewes Road corridor. Also used on Upper North Street during the 2023 eastbound diversion.	Not available for all of the regular bus fleet about 300 vehicles. Big Lemon Buses have battery-electric vehicles operating without a diesel generator.
2h	Fast and rapid electric chargers for vehicles (taxis, cars and vans)	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2019	2027	BHCC City Services, Parking	Office of Zero Emission Vehicles and City Services, Parking	NO	Funded	£500k - £1 million	Implementation	Estimated 1 to 3 µg/m3 NO2 as the proportion of vehicle trips that are zero increases	Inclusive on-street facilities.	Hundreds of fast chargers on street, in new developments and service stations.	Funding for further charging facilities coming 2024/25.
2i	Zero exhaust emissions for last mile deliveries	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2022	2027	BHCC City Services, Planning	SMEs	NO	Not Funded	£500k - £1 million	Planning	Estimated 1 to 5 µg/m3 where roadside NO2 is high.	Reduced diesel emissions from lorries in AQMAs	Increased use of e-bikes and e-vans for deliveries.	Funded e-cargo bike project helps to facilitate this measure.
2j	Anti-idling	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	2023	2027	BHCC Environmental Enforcement	BHCC Environmental Enforcement	NO	Funded	£50k - £100k	Completed	1 to 2 µg/m3 NO2 long term much more short term	Increased public awareness re: cleaner vehicles and impacts on health	Committee approved enforcement in June 2023 to start January 2024	Barriers to implementation overcome
2k	Explore emissions-based parking charges	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	2022	2027	BHCC City Services, Parking	BHCC City Services, Parking	NO	Partially Funded	£50k - £100k	Planning	1 to 2 µg/m3 NO2 long term	Fewer high NOx vehicle trips in the city	Citywide parking review underway	Requires consideration of Euro emission standards and zero emission capability, rather than be solely based on vehicle taxation band and CO2.
3a	Air quality monitoring and public reports.	Public Information	Via the Internet	2012	2027	BHCC City Services, Air Quality	BHCC City Services (Carbon Neutral Fund), DEFRA AQ grant	YES	Funded	£100k - £500k	Implementation	1 µg/m3 NO2 long term	Increased awareness of air quality and progress in improvements	BHCC Annual Status Reports submitted to DEFRA on time every year and regular communications/messaging issued.	Requires earlier issue of ASR templates than April to start drafting and engaging on reports sooner.
3b	Real-time sensors	Public Information	Via the Internet	2022	2027	BHCC City Services, Air Quality	BHCC City Services, Air Quality	YES	Funded	£100k - £500k	Implementation	1 to 2 µg/m3 PM2.5 long term	Increased awareness of AQ levels and forecasts e.g number of website hits	Procurement completed and first batch of installations underway	Up to 50 sensors to be installed in total. Additional costs of installing sockets on lamp columns/installing new posts and solar panels
3c	Community Engagement at schools and events	Public Information	Other	2019	2024	Sussex Partnership and Sustrans	DEFRA AQ grant and AQ officer	YES	Funded	£50k - £100k	Completed	1 µg/m3 NO2 long term	Improved awareness of children and adults	Engagement with schools and events countywide, final report delivered	No funding to continue. Further engagement relates to measure 3b.
3d	Communication on reducing domestic smoke	Public Information	Via the Internet	2012	2027	BHCC City Services, AQ and communications	BHCC City Services, AQ, Regulatory Services and Communications	NO	Partially Funded	£10k - 50k	Planning	1 µg/m3 PM2.5 long term	Reduced smoke complaints, improved air quality, greater use of cleaner home heating	Seasonal communications and officer training. Clean Air Day promoted - June 2023.	Seek cleaner options without emissions to air.
3e	Public information campaign on air quality and health	Public Information	Via the Internet	2022	2027	BHCC City Services and public health	BHCC City Services, AQ and public health	NO	Funded	£10k - 50k	Implementation	1 µg/m3 PM2.5 long term	Improved awareness of children and adults	Feedback to Sussex asthma network, health protection screening forum and the health and wellbeing board and input to JSNA	
3f	Promote Air-alert	Public Information	Via the Internet	2012	2024	Sussex AQ Partnership	Sussex Air	NO	Funded	< £10k	Completed	relates to avoiding exposure	Number of subscribers	Established	AQ index and colour scheme requires modernisation to align with AQAP targets

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3g	Move for change campaign	Public Information	Other	2019	2027	BHCC City Services, Transport Planning	BHCC City Services, Transport Planning	NO	Funded	£10k - 50k	Implementation	Encourages active travel as an alternative for some journeys	Increased walking, wheeling and cycling	Continued public engagement via the Betterpoints app	Opportunity to tie in with real-time project measure 3b
4a	Ensure development has positive influence on AQ	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2027	BHCC City Services, Air Quality and Planning	BHCC as Local Planning Authority	NO	Partially Funded	£1 million - £10 million	Implementation	1 to 7 µg/m3 NO2	Design that achieves better than negligible impact and avoids emissions	Reduced parking spaces, increased charging points, electric heating systems for communal and domestic developments	Development needs to continue to improve the city's environment
4b	Improve street air flow (ventilation) entrain fresh air and avoid enclosure of emissions	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2027	BHCC City Services, Air Quality and Planning	BHCC as Local Planning Authority	NO	Partially Funded	£1 million - £10 million	Implementation	2 to 5 µg/m3 NO2	Air quality mitigation on developments is standard.	Ensuring good design avoids creating or reinstating street canyons by designing gaps and setbacks	Delivering high density development in constrained locations and providing public amenity space
4c	Construction Environmental Management Plans (CEMPs)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2021	2027	BHCC City Services, Transport & Highway Development and Planning	BHCC as Local Planning Authority and Local Highway Authority	NO	Funded	£100k - £500k	Implementation	1 to 2 µg/m3 PM2.5 and NO2	Reduction of HGV emissions in the AQMA and reduced use of diesel generators	Ensuring use of Euro-VI HGVs, and route plans take account of AQMAs	Ensuring compliance with CEMP requirements
4d	Improved emission standards for Non-Road Mobile Machinery	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2022	2027	BHCC City Services and Planning, Sussex Air	BHCC	NO	Partially Funded	£100k - £500k	Implementation	1 to 4 µg/m3 PM2.5 and NO2	Reduced emissions, reduced complaints	Conditions applied to major planning applications	Funding required to enforce more stringent standards in 2025
4e	Adoption and application of planning policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2027	BHCC City Services, Air Quality and Planning	BHCC as Local Planning Authority and Local Highway Authority	NO	Funded	£50k - £100k	Completed	1 to 3 µg/m3 NO2, especially development areas and special areas	Adoption of City Plan Part 2 and planning polices		Established
4f	Development provides facilities to promote active and zero emission travel	Policy Guidance and Development Control	Other policy	2022	2027	BHCC City Services and Planning, Sussex Air	Developer	NO	Funded	£100k - £500k	Completed	1 to 2 µg/m3 NO2	Reduced emissions, increased active travel journeys	Facilities to mitigate impacts and support active travel are secured on-site or via Section 278 Agreements and CIL for off-site works	
4g	Ensure certain developments produce a travel plan	Policy Guidance and Development Control	Other policy	2022	2027	BHCC City Services and Planning, Sussex Air	Developer	NO	Funded	£100k - £500k	Implementation	1 µg/m3 NO2	Reduced emissions, increased active travel journeys	Travel plans secured as part of planning permissions	Ensuring compliance with planning conditions and monitoring requirements
4h	Ensure development meets Part S of the Building Regulations for electric vehicle charging points	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2027	BHCC City Services and Planning, Sussex Air	Developer	NO	Funded	£100k - £500k	Implementation	1 to 2 µg/m3 NO2, rising to more as uptake of EV increases and diesel diminishes	Reduced emissions, increased uptake of EVs	Conditions applied to planning permissions	Legislation introduced in 2021
4i	Ensure major developments avoid emissions in accordance with energy hierarchy for net carbon and avoid oxide of nitrogen emissions in and around AQMAs	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2027	BHCC City Services, Air Quality, Sustainability and Planning	Developer	NO	Funded	£500k - £1 million	Implementation	1 to 2 µg/m3 NO2	Continued reduction in emissions and air quality indoors and outdoors	Provision secured to ensure cleaner developments for vehicles and energy	Work towards 2025 Future Home Standards
4j	Smoke control, cleaner home heating and waste disposal	Public Information	Via the Internet	2022	2027	BHCC Regulatory Services and Environmental Enforcement	Regulatory Services	NO	Partially Funded	£10k - 50k	Implementation	1 to 4 µg/m3 PM10 short term	Reduced particulate levels, increased awareness of smoke	Discussions with DEFRA. Legal and Trading Standards advice sought	New legislation in 2021, followed by further guidance.

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4k	Better citywide smoke control, training for officers to enforce domestic smoke	Policy Guidance and Development Control	Other policy	2022	2027	BHCC Regulatory Services and Environmental Enforcement	DEFRA for LAs with SCAs	NO	Partially Funded	£10k - 50k	Planning	1 to 4 µg/m3 PM10 short term	Reduced particulate emissions, reduced smoke complaints	Officer participation in DEFRA training.	Limited funds available from 2023 to 2025
4l	Reduce or avoid emissions due to events and street vendors in the city	Environmental Permits	Other	2022	2027	BHCC Event Management	Permit process	NO	Partially Funded	£50k - £100k	Implementation	1 µg/m3 NO2 and 1 to 2 µg/m3 PM2.5 short term	Reduced complaints, reduced lorry and van emissions and firework use	Infrastructure installed in event locations (plugged-in places that do not have emissions to air). Drone displays instead of fireworks (which include smoke and metals)	Resources required for monitoring/enforcement
4m	Alternatives to gas, diesel, biomass, oil, and coal combustion including ultra-low NOx gas boilers. Avoid the impacts of chimneys and flues.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	2027	BHCC City Services, Air Quality and Planning	Development Control	NO	Funded	£50k - £100k	Completed	2 to 5 µg/m3 NO2 citywide (less in the South Downs National Park)	Increased number of ultralow emission boilers and zero emission alternatives such as electric	Seek avoidance of gas, biomass, oil, diesel, coal combustion in and around AQMAs	
4n	Shoreham gas fired power station EPR part-A permit to control emissions	Environmental Permits	Large Combustion Plant Permits and National Plans going beyond BAT	2012	2027	Environment Agency	Permit fee	NO	Funded	£50k - £100k	Completed	1 to 2 µg/m3 NO2 West Portslade	Permit renewed	Established permit process (pre-dates 2012 the earliest date in the DEFRA table)	Permit conditions for NOx
4o	Two Crematorium EPR, part B permits to control emissions	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	2012	2027	BHCC Regulatory Services	Permit fee	NO	Funded	< £10k	Completed	1 µg/m3 NO2 & >1 µg/m3 PM2.5 in the vicinity of Woodvale crematorium	Permit renewed annually. Reduced mercury emissions.	Established annual process	Include contributions in detailed AQ assessment
5a	Partnership Working Internal	Other	Air Quality Planning and Policy Guidance	2022	2027	BHCC Air Quality, Transport, Communications, Education, Regulatory Services, Public Health, Environmental Enforcement	BHCC, Air Quality	NO	Funded	£50k - £100k	Implementation	N/A	Successful collaborative working that achieves the relevant goals in the Council Plan 2023-2027 and reduces emissions.	Continuation of regular meetings of Air Quality Programme Board, and between BHCC Transport, Air Quality and Public Health officers	Availability of resources required to deliver continuous improvement and undertake Air Quality Assessment
5b	Partnership Working External	Other	Via the Internet	2022	2027	BHCC Air Quality, Contractors, Universities, Sussex Air, Bus Operators, Environment Agency, DEFRA, DfT, National Highways, NHS	Sussex AQ Partnership	NO	Funded	£10k - 50k	Implementation	N/A	Regular Sussex Air Quality Partnership meetings, successful DEFRA funding bids	Delivered at a local authority level since the mid-1990s Joint ventures help to support and deliver economies of scale and funded projects	Requires revenue for officer time, to access and manage funding and collaborate with partners
5c	Continue to lobby government to adopt 2021 WHO guidelines for PM2.5 and NO2 or EU interim targets in order to continue progressive improvement in air quality where people	Other	Other	2022	2027	BHCC, Air Quality leading Sussex partners. Working with DEFRA's local authority advisory group on air quality.	BHCC, Air Quality	NO	Funded	< £10k	Implementation	N/A	Adoption of health-based WHO guidelines and health protections by government	Responses to consultations on future air quality standards and reporting processes. Real-time network will provide awareness of most recent concentrations and daily variations.	Requirement for reporting long term air quality to compare against health protections. Exemplar authorities include GLA, Greater Oxford and Cambridge.

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	live.														

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations.

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[15], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Whilst the tiny airborne particles are not defined by composition or toxicology, when inhaled they can be drawn deep into the respiratory tract, crossing over into the blood stream. $PM_{2.5}$ is reffered to in section 6.49 of the Joint Strategic Needs Assessment (JSNA)[i] and is linked with the Public Health Outcomes Framework (PHOF)[ii]. PHOF sets out a vison for public health "to protect the nations health and improve the health of the poorest fastest".

BHCC is taking the following measures to address $PM_{2.5}$:

- Leading the Sussex air quality partnership in upgrading the particulate monitoring network for $PM_{2.5}$ and PM_{10}, and related pollutants and to support real-time nodes across the city. This is a Carbon Neutral Funded project supported by DEFRA, Lot 2 Awareness Raising and community engagement.
- The phasing out of pre-euro-V emission standard buses (registered before October 2008) reduces particulate emissions from the frequent bus fleet. Older buses remain for rail replacement services, driver training or heritage days. City council, taxi and haulage fleets have also made progress in phasing our pre-euro 5 vehicles.
- At the time of 2023 monitoring >85% of regular bus services will surpass the ULEZ, euro-VI emission standard that targets reduction in oxides of nitrogen that are precursors to the formation of nitrate particles in the atmosphere, and also help reduce N2O a potent greenhouse gas
- The Council is in talks with University of London regarding improving true wheel alignment and tyre pressure to reduce tyre and road wear and particulate releases to air
- Construction Environment Management Plans have progressively more stringent emissions standards for Non-Road Mobile Machinery that includes bulldozers, dumpers, and cranes, it recommended going forwards these standards are enforced especially on major projects, development areas, in or near AQMAs.

[15] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

- Static diesel generators are discouraged for building and road work events, especially those in the city centre that are likely to last more than a few days.
- Members have requested that officers research the advantages of Smoke Control Areas (SCA). Parliament approved amendments to the Environment Act (2021) sets out stronger powers for Local Authorities. In 2023 funding is allocated to Brighton & Hove, Environmental Health for enforcement of its existing SCAs. Officer training on smoke control has also been made available in 2023.
- In the interests of communal health, the council issued a series of public statements discouraging indoor and outdoor domestic burning during the Covid-19 pandemic[iii].
- Further press releases on reducing seasonal burning outlining the risks of air pollutants due to bonfires in the city.
- To complement Defra's automatic urban rural monitoring network (site at Preston Park) the City Council has for several years monitored $PM_{2.5}$
- Further guidance is available under the $PM_{2.5}$ and Action Planning section of Technical Guidance LAQM.TG16 (Chapter 2).

At Preston Park and North Street monitoring suggests concentrations more than the WHO daily recommended level of 10 µg/m^3 annual mean, DEFRA's national target to be met by 2040. Further details are given in Table A8. 2021 WHO recommendations and interims have been published since the writing of the 2020 ASR and these have been adopted in the 2022 AQAP.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2023 by BHCC and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

In BHCC automatic (continuous) monitoring was undertaken at two sites during 2023. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. Latest results for particles and gases can be found on the Sussex Air Quality Partnership webpages: Sussex-air :: Promoting better Air Quality in Sussex :: sussex-air.net :: Latest Readings Automatic Urban Rural Monitoring results including Preston Park are available through the UK-Air website .

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

BHCC undertook non- automatic (i.e. passive) monitoring of NO_2 at 73 sites during 2023. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

3.2.2 Particulate Matter (PM_{10})

Since 2015 Brighton & Hove has monitored $PM_{2.5}$ instead of PM_{10}. The relatively course fraction of airborne particulate was more likely to comply with national standards. The preference for $PM_{2.5}$ monitoring aligned more closely with Public Health Outcome Framework. As funding is now available BHCC and Sussex are scheduled from 2024 onwards to monitor both:

- PM_{10} throat and upper respiratory impacts with contributions from local emission sources
- $PM_{2.5}$ influence on the blood stream when inhaled with contributions from local, regional, and international emission sources (direct particles and gases)

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.6 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years. Further improvement is required to certainly surpass 2010 WHO guidelines and work towards 2021 WHO guidelines for annual and daily averages and the interim targets set out in BHCC's AQAP.

3.2.4 Sulphur Dioxide (SO_2)

Sulphur Dioxide levels have been found to comply with national standards and world health guidelines across the Greater Brighton area. Reduced coal burning, ultralow sulphur petrol and diesel (2007) and fewer diesel trains have helped bring down levels of sulphurous gas and particles. The University of Brighton received a £250K research fund for monitoring. Results for SO_2, particles and other pollutants can be found at: Air Quality - last 24 hours (brighton.ac.uk). The monitoring station is in a field at Falmer (south of the A27 road and Brighton to Lewes railway) and included in the summary appendix of Brighton & Hove automatic analysers.

The city council plans to introduce SO_2 monitoring in AQMA1 (City Centre) and AQMA3 (set back from the A259 and harbour). This can monitor progress in the reduction of marine emissions set out in the national air quality strategy and local projects. Results can be compared to the Automatic Rural Network monitor at Lullington Health in the South Downs National Park.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
BH10	North Street 2013	Roadside	530995	104271	NO_2, $PM_{2.5}$	Yes	Chemiluminescent; TEOM	0	6	3
BH0	Preston Park 2012	Urban Background	530526	106218	NO_2, $PM_{2.5}$, O_3	No	Chemiluminescent, BAM	200	180	4

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
A23 C01-2020	Old Steine St James Street Corner	Roadside	531361	104040	NO2	No	0.0	8.0		4.0
A23 C02-2022	Old Steine West	Roadside	531255	104062	NO2	close to AQMA1 Bus-ULEZ	0.0	7.0		2.5
B2066 C04-2010	Castle Square	Roadside	531228	104088	NO2	AQMA1 Bus-ULEZ	0.0	5.7		3.0
C05-2012	Pavilion Gardens	Urban Background	531230	104260	NO2	No	0.0	102.0		2.0
B2066 C10-2012	North Street near Ship Street	Roadside	530995	104271	NO2	AQMA1 Bus-ULEZ	0.0	6.1	Yes	2.5
B2066 C11-2007	North Street Central	Roadside	530947	104284	NO2	AQMA1 Bus-ULEZ	0.0	6.5		3.5
B2066 C11-2012	North Street East of Clock Tower	Kerbside	530890	104302	NO2	AQMA1 Bus-ULEZ	3.0	1.5		4.0
A2010 C12-2010	Queens Road South of Church Street	Roadside	530900	104451	NO2	AQMA1 A2010	0.0	4.2		3.0
A2010 W01-2005	Queens Road North	Roadside	530969	104785	NO2	AQMA1 A2010	0.0	4.2		3.0
C-Link C13-2014	Lower Dyke Road	Roadside	530770	104363	NO2	close to AQMA1 Bus-ULEZ	0.0	4.5		2.5
A23 C09-2005	Marlborough Place	Roadside	531302	104392	NO2	AQMA1-A23	0.0	4.3		3.0
A23 C16-2013	York Place	Roadside	531400	104844	NO2	AQMA1-A23	0.0	4.9		3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
A23 C17-2012	Cheapside	Roadside	531364	104982	NO2	AQMA1-A23	0.0	3.4		3.0
A23 C18-2019	London Road Brunswick Row	Roadside	531369	105042	NO2	AQMA1-A23	2.0	2.0		2.5
A23 C18-2010	Oxford Street London Road	Roadside	531373	105136	NO2	AQMA1-A23	0.0	3.0		2.5
A23 C19-2021	Oxford Street Ditchling Road	Roadside	531472	105161	NO2	AQMA1-A23	0.0	3.3		2.5
A23 C20-2005	Ditchling Road Viaduct Terrace	Roadside	531496	105315	NO2	AQMA1-A23	0.0	4.7		2.5
A23 C21-2005	Viaduct Terrace	Roadside	531451	105356	NO2	AQMA1-A23	0.0	3.6		2.0
A23 C23-2005	London Road Rose Hill Terrace	Roadside	531189	105375	NO2	AQMA1-A23	0.0	5.4		3.0
A270 C24-2015	New England Road Elder Place	Roadside	531101	105443	NO2	AQMA1-A270	0.0	3.6		3.0
A270 C25-2010	New England West of Argyle Road	Roadside	530985	105419	NO2	AQMA1-A270	0.0	3.5		2.5
A270 C26-2022	New England Road under the bridge	Kerbside	530870	105354	NO2	AQMA1-A270	2.5	2.5		2.5
B2199 C28-2010	Frederick Place, North Laine	Suburban	531032	104843	NO2	AQAMA1, North Laine	0.0	2.8		3.5
A23 E01-2016	Preston Road near Preston Circus	Roadside	531101	105498	NO2	AQMA1-A23	0.0	2.5		3.5
A23 E02-2009	Preston Road near Preston Drove	Roadside	530233	106515	NO2	AQMA5-A23	0.0	4.0		2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
C-Link E02-2012	The Drove linked with South Street	Roadside	530063	106368	NO2	AQMA5 C-Link	0.0	2.6		2.0
A23 E06-2020	Beaconsfield Road	Roadside	531107	105595	NO2	AQMA1-A23	0.0	3.8		2.0
A270 E07-2019	Lewes Road north of Elm Grove	Roadside	531838	105349	NO2	AQMA1-A270	0.0	2.9		2.0
A270 E40-2022	Hartington Road near Lewes Road	Suburban	532095	105679	NO2	AQMA1-A270	0.0	5.0		2.0
A270 E08-1996	Lewes Road near Inverness Road	Roadside	532090	105752	NO2	AQMA1-A270	0.0	4.4		2.5
A270 E10-2015	Vogue Gyratory Island	Roadside	532126	105838	NO2	AQMA1-A270	0.0	3.0		2.5
C-Link E12-2022	Hollingdean Road	Roadside	532064	105939	NO2	AQMA1-A270 + C-Link	0.0	4.5		2.5
A270 E14-2019	Lewes Road on Pelham Terrace	Roadside	532377	106314	NO2	AQMA1-A270	0.0	3.4		2.5
A270 E15-2012	Lewes Road on Coombe Terrace	Roadside	532300	106159	NO2	AQMA1-A270	0.0	3.7		2.5
A23 E16-1996	Grand Parade North	Roadside	531465	104629	NO2	AQMA1-A23	0.0	4.4		2.5
A23 E16-2015	Grand Parade Middle	Roadside	531426	104514	NO2	AQMA1-A23	0.0	3.6		2.5
A23 E17-2003	Grand Parade South	Roadside	531394	104338	NO2	AQMA1-A23	0.0	5.0		2.5
C-Link E17-2018	Edward Street South Side	Roadside	531408	104233	NO2	AQAMA1-A23 + C-Link	0.0	1.6		3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
C-Link E17-2022	Edward Street North Side	Roadside	531430	104247	NO2	AQAMA1-A23 + C-Link	0.0	5.0		2.0
C-Link E18-2021	Eastern Road near Sudley Place	Roadside	532759	103810	NO2	AQMA6 and C-Link	0.0	2.4		2.0
B2123 E22-2009	Rottingdean High Street East	Roadside	536970	102280	NO2	AQMA2-B2123	0.0	0.2		2.0
B2123 E23-2010	Rottingdean High Street West	Roadside	536966	102273	NO2	AQMA2-B2123	0.0	0.2		2.0
A259 E25-2018	Rottingdean Marine Drive	Roadside	537014	102238	NO2	AQMA2-A259	0.0	2.7		2.5
B2123 E30-2020	Rottingdean High Street Mid	Roadside	536947	102341	NO2	AQMA2-B2123	0.0	1.8		2.5
E32-2020	Rottingdean Sea Front	Urban Background	537011	102099	NO2	no	0.0	112.0		2.0
A2010 W03-2006	Terminus Road Terrace and Hill	Roadside	530963	104994	NO2	AQMA1-A2010	0.0	3.5		3.5
A2010 W04-2006	Chatham Place	Roadside	530808	105340	NO2	AQMA1-A270	0.0	3.4		3.0
A270 W05-2006	Old Shoreham Road Terrace and Hill	Roadside	530778	105362	NO2	AQMA1-A270	0.0	3.6		3.5
B2066 W10-2006	Western Road near Sillwood Road	Roadside	530302	104415	NO2	AQMA1 Bus-ULEZ	0.0	4.5		3.0
B2066 W11-2020	Western Road	Roadside	530154	104444	NO2	AQMA1 Bus-ULEZ	0.0	4.0		3.5
A259 W16-2020	Wellington Road East	Roadside	526233	104860	NO2	AQMA3-A259	0.0	3.0		2.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
A259 W17-2009	Wellington Road Church Road	Roadside	525931	104961	NO2	AQMA3-A259	0.0	3.0		2.5
A259 W18-2010	Vale Park	Urban Background	525970	105230	NO2	No	0.0	97.0		3.0
A259 W19-2009	Trafalgar Road Portslade	Roadside	525658	105695	NO2	AQMA3-A293	0.0	3.9		3.0
A270 OSR13 W20-2021	Old Shoreham Road Brackenbury	Roadside	525698	105872	NO2	AQMA3-A293 + A270	2.0	2.5		3.4
A2023 W21-2010	Sackville Road Hove Park Tavern	Roadside	528388	105936	NO2	AQMA4-A2023	0.0	3.4		2.5
LN1-2022	Lower Franklin Road	Suburban	532039	105541	NO2	No	2.5	2.0		2.5
LN2-2022	Lower Elm Grove near Lewes Road	Roadside	531823	105287	NO2	Close to AQMA1-A270	0.0	2.5		2.5
LN4-2022	Roadside Elm Grove Primary School	Roadside	532278	105233	NO2	No	2.5	1.5		2.5
LN5-2022	Upper Islingword Road	Suburban	532124	104850	NO2	No	0.0	1.0		2.5
LN7-2022	Orchard Nursery Queen Park Road	Roadside	531987	104575	NO2	No	0.0	2.0		2.5
LN8-2022	Egremont Place Top	Roadside	531910	104322	NO2	No	2.5	1.5		2.5
LN9-2022	Egremont Place Middle	Roadside	531880	104243	NO2	No	2.5	1.0		2.5
LN10-2022	Carlton Hill next to school	Suburban	531642	104366	NO2	No	0.0	2.0		2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LN11-2022	Morley Street	Suburban	531457	104546	NO2	No	0.0	2.0		2.5
LN12-2022	Richmond Parade	Roadside	531505	104698	NO2	close to AQAM1-A23	0.0	3.0		2.5
LN13-2022	Lower Southover Street	Roadside	531654	105072	NO2	close to AQAM1-A23	0.0	2.5		2.5
LN14-2022	Middle Southover Street	Roadside	531725	105005	NO2	No	0.0	1.0		2.5
A259 Kingsway2	Kingsway Sugar dough	Roadside	528602	104416	NO2	No AQMA Potential Cycle Lane	0.0	3.0		2.5
A259 Kingsway4	Kingsway Traffic Light	Roadside	528601	104420	NO2	No AQMA Potential Cycle Lane	2.5	1.0		2.5
WRP1	Lamppost Lower Montpelier Road	Roadside	530201	104468	NO2	close to AQMA1 ULEZ	5.0	2.4		2.5
WRP2	Lamppost Façade Upper North Street	Roadside	530597	104480	NO2	No AQMA Temporary Bus diversion Bus-ULEZ	0.0	1.5		2.5
WRP3	Upper North Street Regent Hill Corner	Roadside	530648	104466	NO2	No AQMA Temporary Bus diversion Bus-ULEZ	0.0	1.5		2.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
BH10	530995	104271	Roadside	99.7	99.7	**45.7**	32.6	29.3	**N/A**	26.9
BH0	530526	106218	Urban Background	98.4	98.4	15.2	10.9	12.3	12.3	11

☒ **Annualisation has not been considered and is not required as all sites have >75% data capture.**

☒ **Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction.**

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
A23 C01-2020	531361	104040	Roadside	100	100.0		25.1	26.0	25.6	22.1
A23 C02-2022	531255	104062	Roadside	100	100.0				28.9	24.2
B2066 C04-2010	531228	104088	Roadside	100	100.0	**43.5**	33.6	30.6	31.9	28.3
C05-2012	531230	104260	Urban Background	92	92.1	21.0	16.9	16.3	17.0	14.5
B2066 C10-2012	530995	104271	Roadside	82	100.0	**41.3**	32.3	29.9	31.2	28.7
B2066 C11-2007	530947	104284	Roadside	100	82.3	**48.5**	35.0	35.8	37.9	34.8
B2066 C11-2012	530890	104302	Kerbside	56	100.0	**77.4**	**51.2**	**47.6**	**49.4**	**41.7**
A2010 C12-2010	530900	104451	Roadside	92	56.4		30.4	29.1	31.8	27.3
A2010 W01-2005	530969	104785	Roadside	100	92.1	34.0	25.8	28.3	31.8	23.7
C-Link C13-2014	530770	104363	Roadside	100	100.0	36.6	31.2	29.1	29.4	27.7
A23 C09-2005	531302	104392	Roadside	80	100.0	**41.1**	27.5	28.1	26.8	25.4
A23 C16-2013	531400	104844	Roadside	100	80.4	37.7	26.6	28.5	29.8	27.8
A23 C17-2012	531364	104982	Roadside	100	100.0	**49.0**	37.5	35.0	34.4	33.6
A23 C18-2019	531369	105042	Roadside	62	100.0	**61.8**	**44.8**	39.1	37.5	36.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
A23 C18-2010	531373	105136	Roadside	84	62.4	**52.6**	39.7	36.6	39.1	35.1
A23 C19-2021	531472	105161	Roadside	92	83.9	36.5	29.0	31.2	29.9	25.3
A23 C20-2005	531496	105315	Roadside	100	91.6	36.8	31.0	29.9	30.5	24.8
A23 C21-2005	531451	105356	Roadside	81	100.0	**44.6**	36.5	36.3	34.3	31.0
A23 C23-2005	531189	105375	Roadside	100	81.2	39.5	30.6	28.3	28.5	24.5
A270 C24-2015	531101	105443	Roadside	84	100.0	**44.0**	38.3	37.5	36.9	33.4
A270 C25-2010	530985	105419	Roadside	100	84.5	**42.7**	38.6	37.5	37.9	33.8
A270 C26-2022	530870	105354	Kerbside	93	100.0				**43.8**	**43.0**
B2199 C28-2010	531032	104843	Suburban	90	92.6	37.7	33.5	33.1	30.4	26.2
A23 E01-2016	531101	105498	Roadside	100	89.9	34.3	30.2	28.9	27.8	24.4
A23 E02-2009	530233	106515	Roadside	100	100.0	34.7	31.4	28.3	28.6	26.1
C-Link E02-2012	530063	106368	Roadside	100	100.0	39.2	35.7	34.4	32.8	28.4
A23 E06-2020	531107	105595	Roadside	100	100.0		27.5	27.0	28.4	25.6
A270 E07-2019	531838	105349	Roadside	100	100.0	**51.0**	**46.5**	**45.8**	**42.3**	38.3
A270 E40-2022	532095	105679	Suburban	100	100.0				26.3	24.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
A270 E08-1996	532090	105752	Roadside	100	100.0	**48.7**	**42.5**	**41.1**	39.9	36.2
A270 E10-2015	532126	105838	Roadside	100	100.0	38.0	33.5	31.3	30.0	27.9
C-Link E12-2022	532064	105939	Roadside	100	100.0				32.6	32.1
A270 E14-2019	532377	106314	Roadside	100	100.0	35.0	31.7	28.6	30.3	27.8
A270 E15-2012	532300	106159	Roadside	100	100.0	37.4	34.0	29.2	27.3	28.0
A23 E16-1996	531465	104629	Roadside	81	100.0	**42.3**	37.4	35.3	34.6	29.8
A23 E16-2015	531426	104514	Roadside	66	81.2	**42.3**	**41.4**	38.3	37.2	32.6
A23 E17-2003	531394	104338	Roadside	100	66.5	**43.8**	34.0	33.2	33.6	30.4
C-Link E17-2018	531408	104233	Roadside	100	100.0		36.2	33.8	31.7	31.5
C-Link E17-2022	531430	104247	Roadside	100	100.0				28.1	24.3
C-Link E18-2021	532759	103810	Roadside	100	100.0			23.6	23.0	19.2
B2123 E22-2009	536970	102280	Roadside	92	100.0	32.7	28.4	26.6	26.9	23.9
B2123 E23-2010	536966	102273	Roadside	100	91.6	35.2	31.7	27.8	27.6	23.6
A259 E25-2018	537014	102238	Roadside	93	100.0	31.7	27.2	27.5	27.1	24.7
B2123 E30-2020	536947	102341	Roadside	100	92.9		26.0	25.8	26.3	23.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
E32-2020	537011	102099	Urban Background	100	100.0		13.5	12.2	13.3	11.6
A2010 W03-2006	530963	104994	Roadside	100	100.0	37.5	31.4	31.7	31.2	27.3
A2010 W04-2006	530808	105340	Roadside	100	100.0	39.0	31.8	28.6	31.5	28.7
A270 W05-2006	530778	105362	Roadside	78	100.0	38.1	34.0	34.0	34.7	31.0
B2066 W10-2006	530302	104415	Roadside	93	48.5	38.0	28.0	24.5	24.9	19.3
B2066 W11-2020	530154	104444	Roadside	74	92.9		26.7	26.6	27.0	24.4
A259 W16-2020	526233	104860	Roadside	56	74.1		35.9	30.6	32.5	27.7
A259 W17-2009	525931	104961	Roadside	100	55.9	39.2	35.4	34.2	36.4	32.1
A259 W18-2010	525970	105230	Urban Background	100	100.0	18.4	17.0	15.0	14.9	12.3
A259 W19-2009	525658	105695	Roadside	100	100.0	39.9	34.4	31.7	30.5	26.3
A270 OSR13 W20-2021	525698	105872	Roadside	100	100.0			31.8	33.3	27.8
A2023 W21-2010	528388	105936	Roadside	100	100.0	34.6		28.3	30.0	25.1
LN1-2022	532039	105541	Suburban	82	100.0				24.3	20.2
LN2-2022	531823	105287	Roadside	100	82.3				38.4	27.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
LN4-2022	532278	105233	Roadside	100	100.0				23.5	19.4
LN5-2022	532124	104850	Suburban	100	100.0				18.0	14.8
LN7-2022	531987	104575	Roadside	100	100.0				19.1	14.9
LN8-2022	531910	104322	Roadside	100	100.0				25.7	20.0
LN9-2022	531880	104243	Roadside	100	100.0				28.9	26.4
LN10-2022	531642	104366	Suburban	100	100.0				19.5	18.6
LN11-2022	531457	104546	Suburban	100	100.0				18.7	14.4
LN12-2022	531505	104698	Roadside	100	100.0				31.3	23.8
LN13-2022	531654	105072	Roadside	100	100.0				28.7	23.7
LN14-2022	531725	105005	Roadside	100	100.0				21.6	17.5
A259 Kingsway2	528602	104416	Roadside	92	100.0			19.5	19.7	16.3
A259 Kingsway4	528601	104420	Roadside	100	92.4			19.9	20.9	18.7
WRP1	530201	104468	Roadside	100	100.0					26.7
WRP2	530597	104480	Roadside	100	100.0					18.2
WRP3	530648	104466	Roadside	100	100.0					20.0

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **Diffusion tube data has been bias adjusted.**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

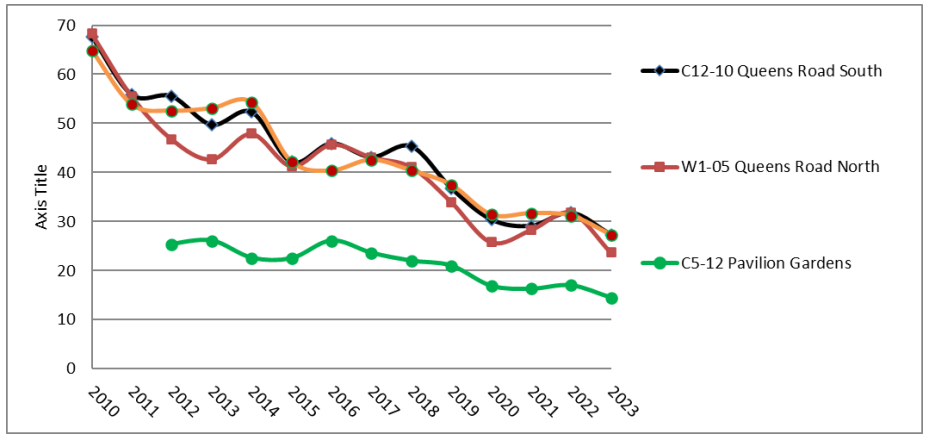
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

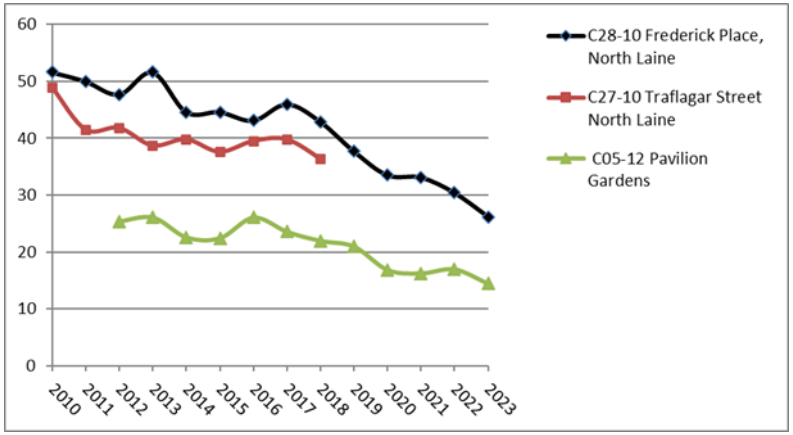
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

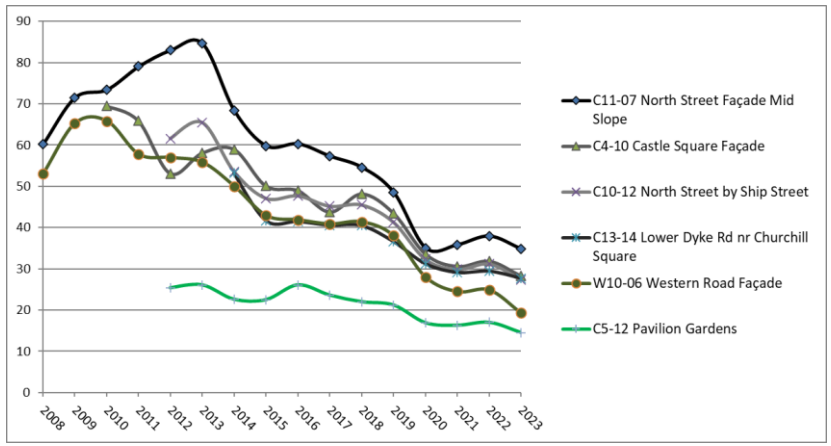
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

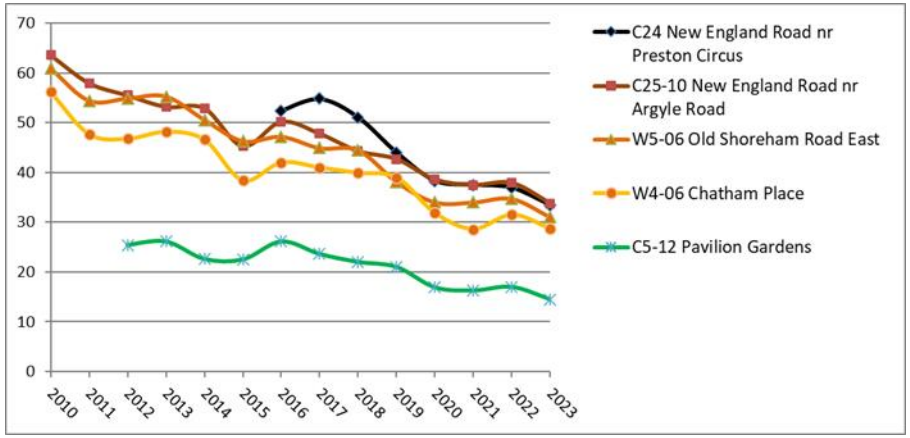
Trend graph in Nitrogen Dioxide in the vicinity of Brighton railway station indicates a substantial improvement between 2010 and 2020 (variation in the rate of pollution reduction). Levelling since 2020 and improvement in 2023. Emission reductions are required to keep pollutant levels (NO_2) below the AQAP target of 30 µg/m^3. Results compared to background.



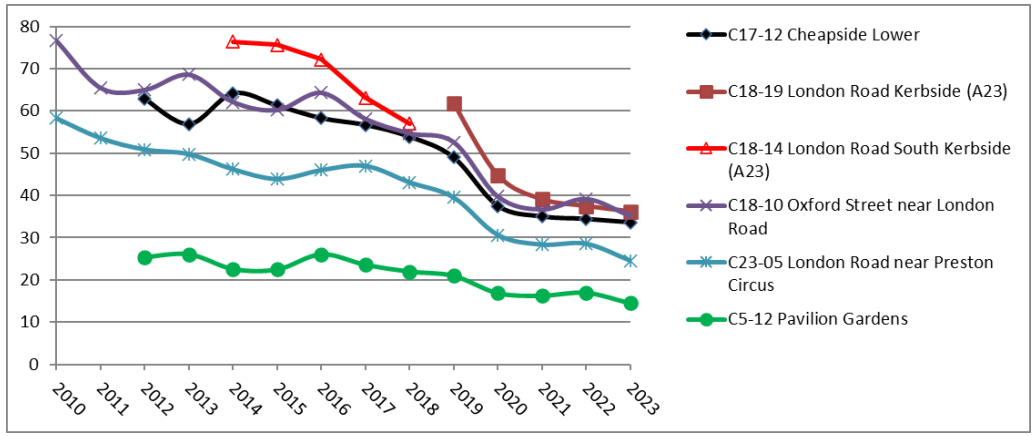


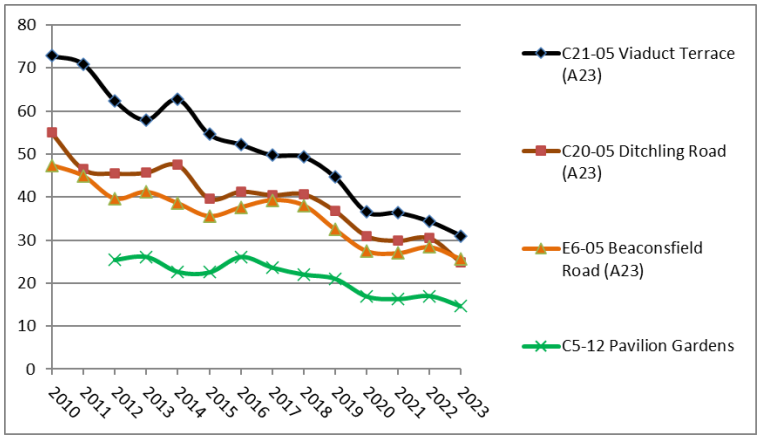
Trend chart in Nitrogen Dioxide in the bus-ULEZ and New England Road showing substantial improvement since 2013. Levelling since 2020 and improvement in 2023. Emission reductions are required to keep pollutant levels (NO_2) below the national standard and AQAP target of 30 µg/m^3. Results compared to background.



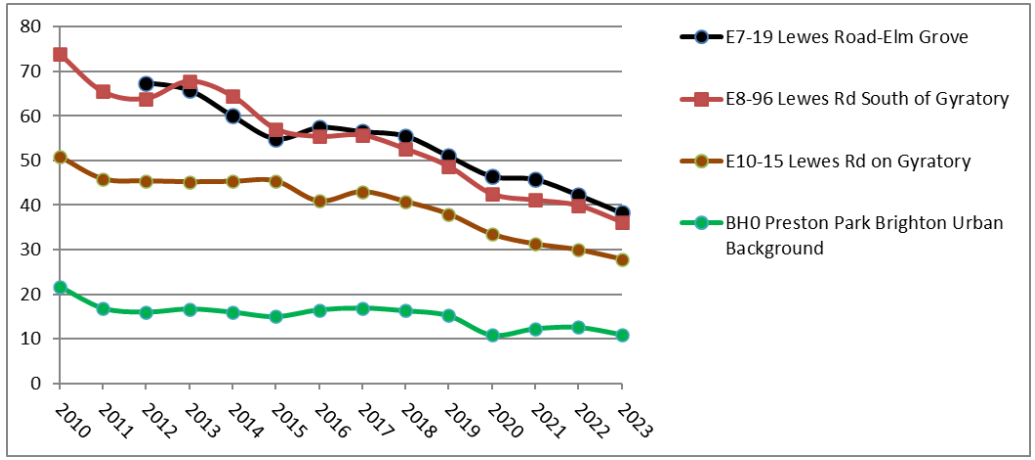


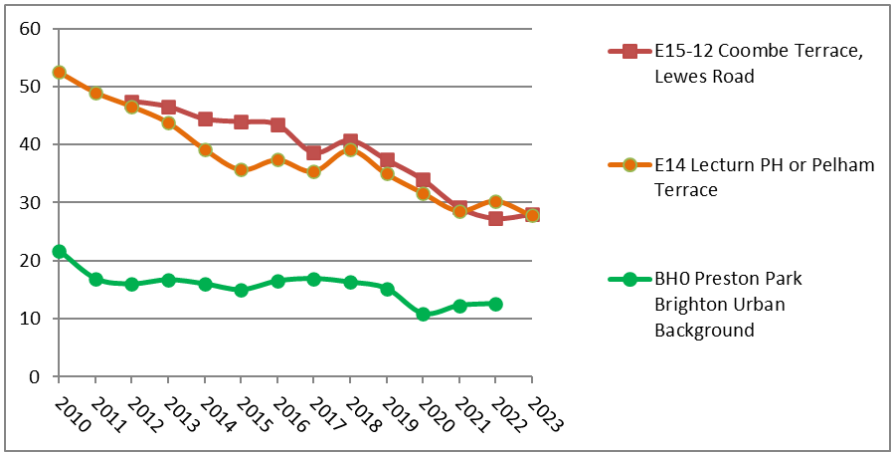
Trend graphs in Nitrogen Dioxide A23 London Road and Viaduct Road areas, showing long term improvement since 2014. Levelling since 2020 & improving again 2023. Emission reductions are required to keep pollutant levels (NO_2) below English standards and AQAP target of 30 µg/m^3. Roadside compared with background.



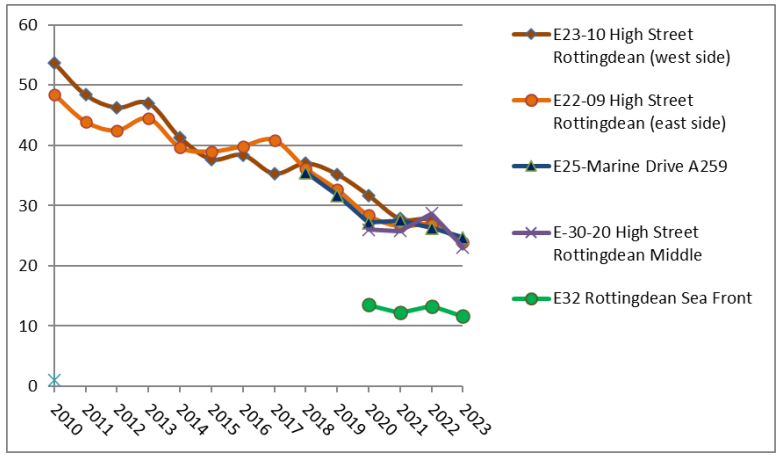


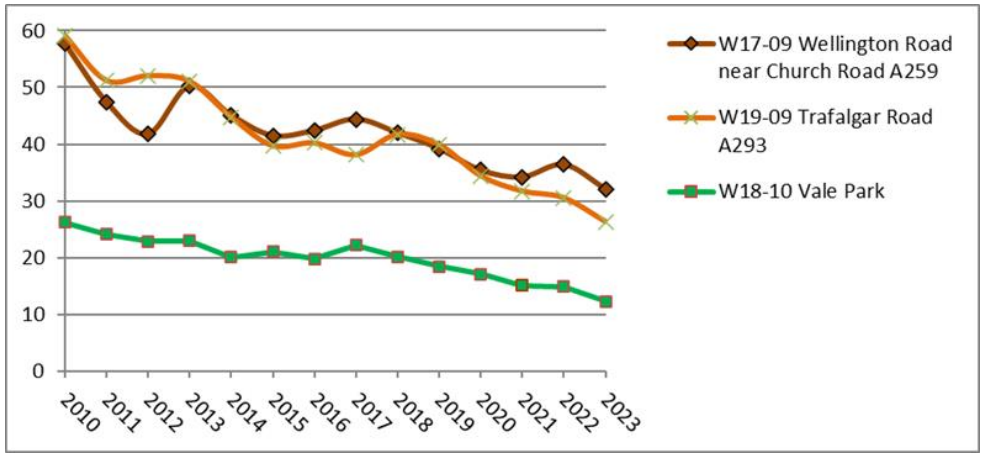
Trend graphs in Nitrogen Dioxide A270 Lewes Road area, showing long term improvement since 2018. Levelling since 2020 & improving again recently. Emission reductions are required to keep pollutant levels (NO_2) below English standards and AQAP target of 30 µg/m3. Roadside compared with background.



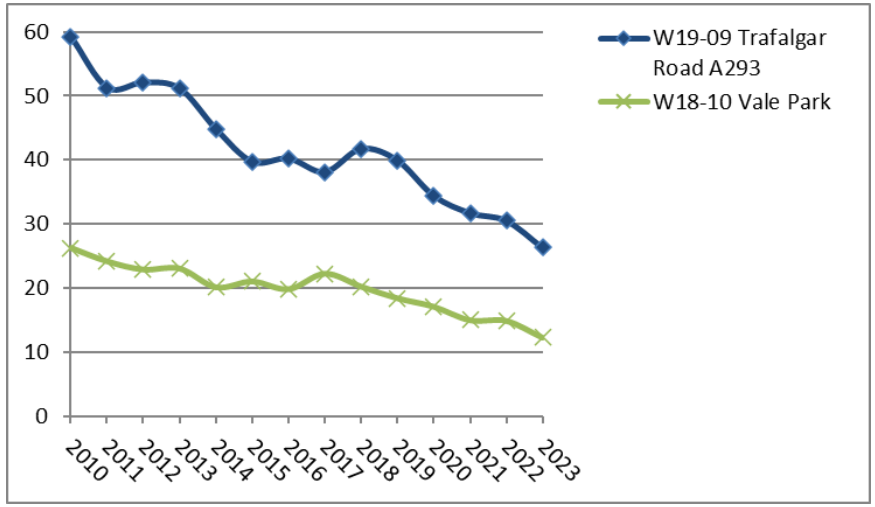


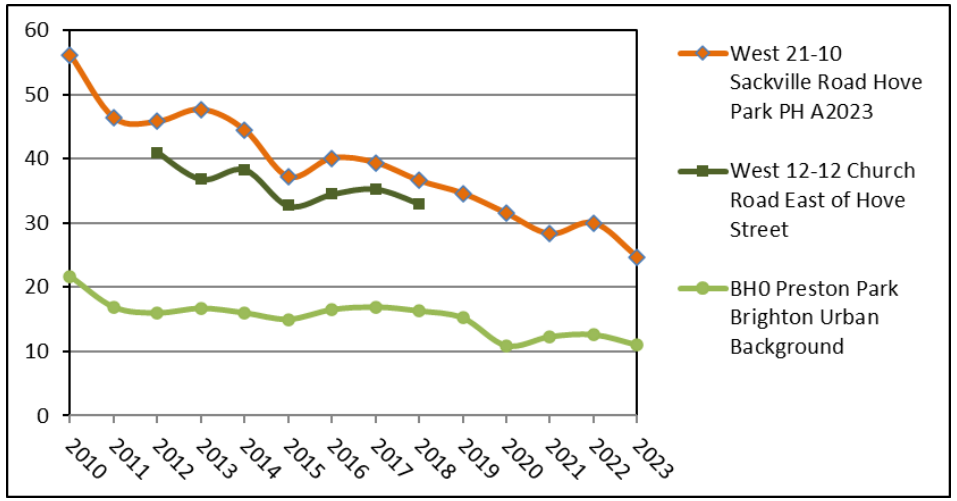
Trend graphs in Nitrogen Dioxide AQMA2, Rottingdean and AQMA3, Portslade showing gradual improvement long term. Emission reductions are required for sustained pollutant levels (NO_2) below English standards and the AQAP target of 30 µg/m3. Roadside compared with background.



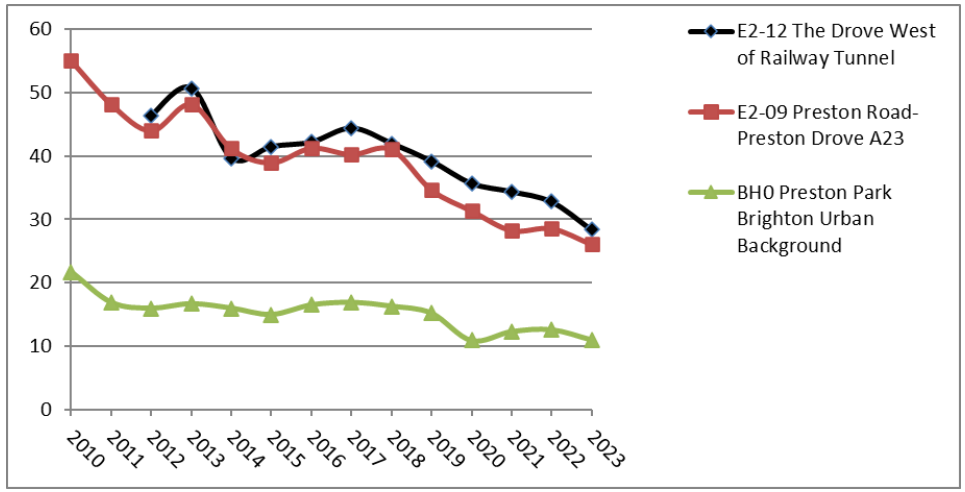


Trend graphs in Nitrogen Dioxide AQMA3, Portslade and AQMA4, Sackville Road showing gradual improvement long term. Emission reductions are required to keep pollutant levels (NO_2) below English standards and AQAP target of 30 µg/m3. Roadside compared with background.





Trend graphs in Nitrogen Dioxide AQMA5, South Road (The Drove) and AQMA6 Eastern Road (RSC Hospital) showing improvement long term and recently. Emission reductions are required to keep pollutant levels (NO_2) below European targets 20 µg/m3. Roadside compared with background.



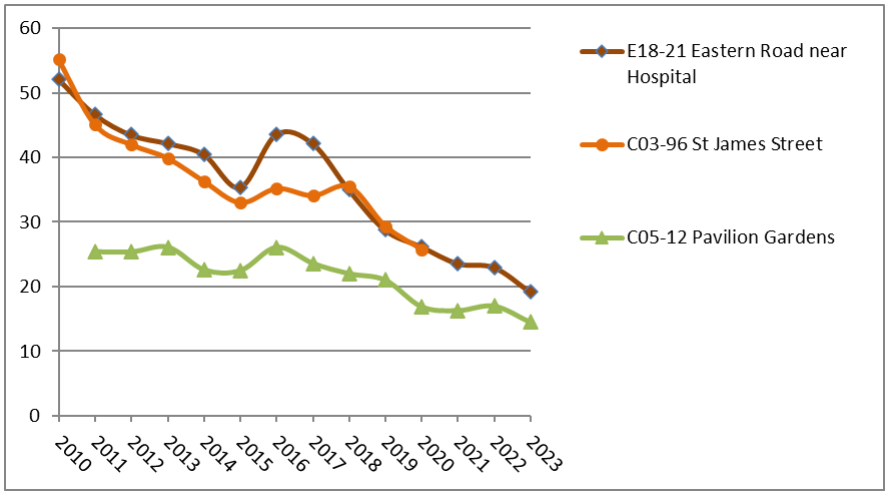


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
BH10	530995	104271	Roadside	99.7	99.7	0	0	0	0	0
BH0	530526	106218	Urban Background	98.4	98.4	0	0	0	0	0

Notes:

At automatic analysers there were not recorded exceedances of the hourly standard since 2017/18.

Since the last ASR, Bureau Veritas updated previously reported data from the North Street analyser for 2022.

The WHO recommends daily targets for NO_2.

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
BH10	530995	104271	Roadside	97.9	97.9	9.8	8.4	10.2	9.4	9
BH0 Partisol	530526	106218	Urban Background	replaced with BAM method		9.2				
BH0 BAM	530526	106218	Urban Background	91	91		9.6	9.9	11.1	9

☒ **Annualisation was considered and not required because data capture for PM2.5 automatic analysers in BHCC, 2023 was >75%**

Notes:

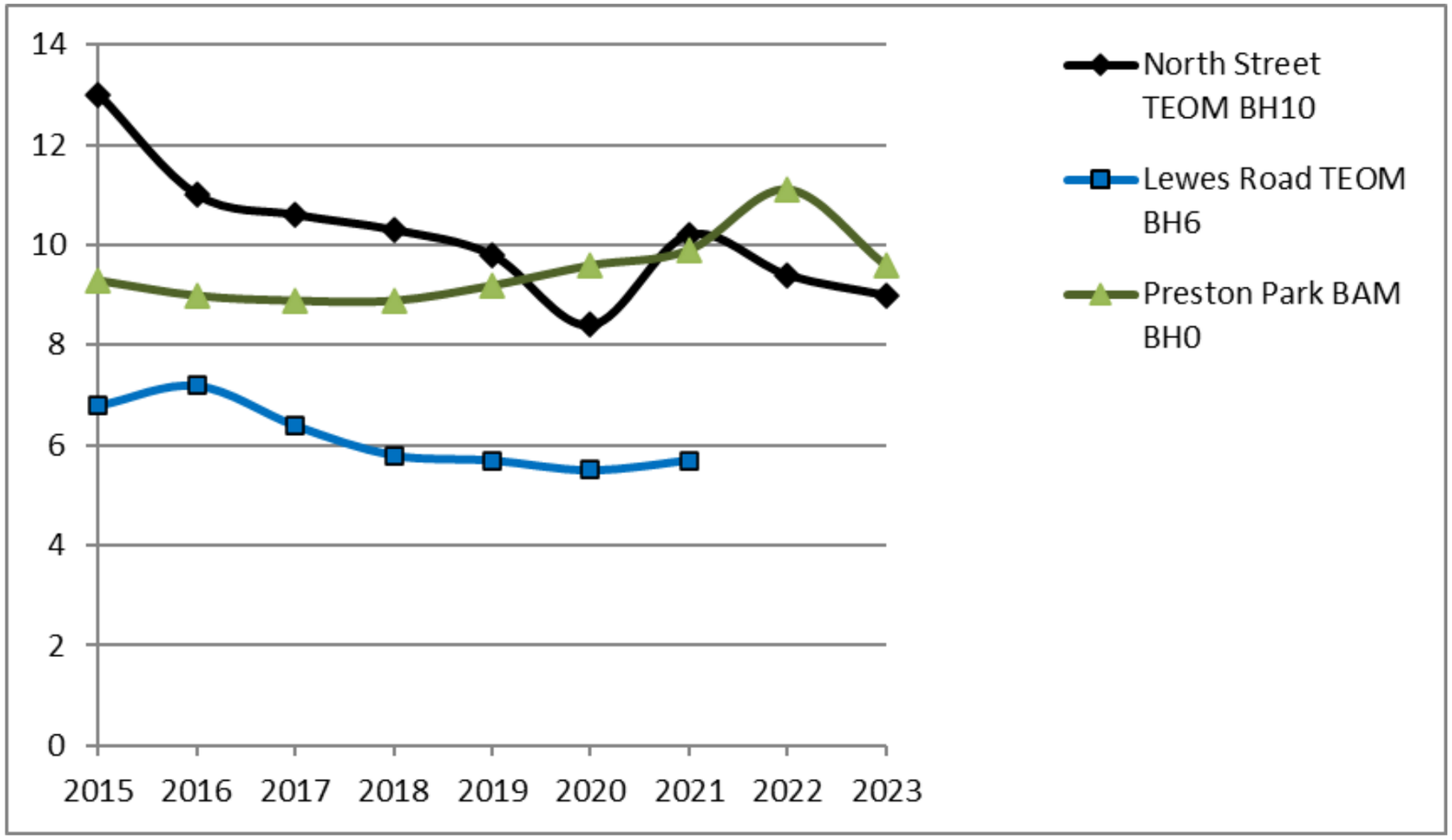
The annual mean concentrations are presented as µg/m^3.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.2 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.81	Annual Mean: Distance Corrected to Nearest Exposure
A23 C01-2020	531361	104040	31.1	33.8	25.4	29.7	26.9	28.9	23.0	23.3	28.4	23.6	33.4	20.4	27.3	22.1	-
A23 C02-2022	531255	104062	37.4	37.1	27.8	31.3	26.8	28.2	23.3	25.2	26.9	28.4	37.2	29.4	29.9	24.2	-
B2066 C04-2010	531228	104088	38.1	41.0	34.6	35.7	28.4	35.6	32.3	34.4	36.4	32.3	37.7	33.3	35.0	28.3	-
C05-2012	531230	104260	23.6	25.3	18.1	18.2	14.0		13.2	12.7	16.3	16.1	24.1	16.7	17.9	14.5	-
B2066 C10-2012	530995	104271	34.8	47.3	34.6	37.8	30.8	36.3	33.3	32.6	35.9	32.2	37.6	32.3	35.4	28.7	-
B2066 C11-2007	530947	104284	50.0		43.9	48.0	33.8	46.2	43.8	40.7		38.7	45.0	39.5	43.0	34.8	-
B2066 C11-2012	530890	104302	55.8	58.1	53.7	55.4	42.0	52.2	50.4	50.7	51.0	45.1	54.5	50.7	51.5	**41.7**	35.2
A2010 C12-2010	530900	104451	44.4	40.2	34.6	38.9	30.7	38.5						26.6	36.6	27.3	-
A2010 W01-2005	530969	104785	32.6		31.7	32.4	25.9	30.2	27.4	28.2	30.9	26.0	31.4	24.7	29.2	23.7	-
C-Link C13-2014	530770	104363	37.4	38.6	33.5	33.4	29.0	33.8	30.6	33.8	34.1	32.6	42.8	32.5	34.2	27.7	-
A23 C09-2005	531302	104392	35.9	39.4	30.9	28.9	28.5	30.7	26.5	27.4	32.6	31.6	36.6	27.5	31.4	25.4	-
A23 C16-2013	531400	104844	39.4	41.2	32.4	33.1	33.3	32.7	26.0		34.0		43.2	27.6	34.3	27.8	-
A23 C17-2012	531364	104982	51.1	47.5	46.6	41.3	33.7	42.3	41.4	37.9	41.8	37.1	41.2	36.4	41.4	33.6	-
A23 C18-2019	531369	105042	46.5	45.5	42.1	47.6	40.8	50.1	43.7	42.2	47.3	41.2	45.9	42.6	44.6	36.2	32.7
A23 C18-2010	531373	105136		51.0		46.9	34.9	40.6	39.4	39.0			48.9	37.6	42.5	35.1	-
A23 C19-2021	531472	105161		40.6	32.5	32.6		33.0	27.7	27.0	21.5	29.9	40.0	30.9	31.2	25.3	-
A23 C20-2005	531496	105315		38.9	31.7	35.7	28.3	32.0	25.7	28.0	30.7	27.1	34.5	24.6	30.7	24.8	-
A23 C21-2005	531451	105356	41.6	44.6	42.5	43.0	30.4	40.2	39.9	41.1	42.6	27.0	38.4	31.5	38.3	31.0	-
A23 C23-2005	531189	105375	35.5	36.3	32.1	29.5	20.2	28.7	29.2	28.6	31.2			30.6	30.3	24.5	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.81	Annual Mean: Distance Corrected to Nearest Exposure
A270 C24-2015	531101	105443	44.5	50.8	39.6	41.5	35.3	40.5	35.0	37.8	43.7	39.5	48.5	38.3	41.3	33.4	-
A270 C25-2010	530985	105419	42.2		39.5	43.2		42.3	39.5	39.6	44.6	41.5	45.2	38.2	41.7	33.8	-
A270 C26-2022	530870	105354	49.2	46.4	56.3	54.1	41.1	52.2	61.4	58.8	63.4	53.5	51.3	46.6	53.1	**43.0**	37.5
B2199 C28-2010	531032	104843	37.7	36.2	34.1	32.3	25.6	28.0		30.0	31.2	33.6	36.7	30.2	32.4	26.2	-
A23 E01-2016	531101	105498	35.2	39.9	32.6		34.4	32.2	22.1	23.9	31.4	26.2	33.9	20.2	30.1	24.4	-
A23 E02-2009	530233	106515	38.2	40.5	36.0	31.2	22.8	29.0	28.8	30.5	33.6	30.8	34.6	29.9	32.2	26.1	-
C-Link E02-2012	530063	106368	37.0	43.6	40.0	35.7	28.3	35.7	33.9	31.2	36.5	33.2	35.6	29.4	35.0	28.4	-
A23 E06-2020	531107	105595	35.4	41.5	33.2	31.7	24.3	29.0	28.2	28.8	33.5	29.7	37.1	26.4	31.6	25.6	-
A270 E07-2019	531838	105349	58.3	60.0	45.0	44.3	48.9	47.4	43.4	40.7	42.5	43.4	53.9	43.2	47.3	38.3	-
A270 E40-2022	532095	105679	35.3	38.6	31.9	28.7	30.0	30.0	23.5	25.7	29.0	28.0	35.1	24.9	30.0	24.3	-
A270 E08-1996	532090	105752	51.1	54.0	46.3	42.6	43.4	45.3	40.2	38.7	42.1	44.1	48.6	39.8	44.6	36.2	-
A270 E10-2015	532126	105838	39.5	40.2	37.6	33.7	29.6	33.3	29.6	32.8	34.7	33.7	36.3	32.9	34.5	27.9	-
C-Link E12-2022	532064	105939	38.7	40.4	35.2	37.0	25.6	38.8	44.0	40.9	43.3	44.4	45.2	39.3	39.6	32.1	-
A270 E14-2019	532377	106314	35.5	42.9	37.7	37.8	32.8	38.0	30.1	28.7	35.2	32.1	34.2	25.4	34.3	27.8	-
A270 E15-2012	532300	106159	36.5	42.4	37.7	36.8	32.2	35.4	26.7	27.8	36.2	34.4	37.7	29.6	34.6	28.0	-
A23 E16-1996	531465	104629	34.7	46.4	40.2	41.6	37.2	43.1	28.1	33.3	41.6	32.2	35.7	25.4	36.8	29.8	-
A23 E16-2015	531426	104514	34.7	51.4	41.1	45.7	44.0	44.8	34.0	34.9	40.9			28.3	40.3	32.6	-
A23 E17-2003	531394	104338		44.1				44.7	33.1	33.4	39.3	31.6	34.8	25.1	35.8	30.4	-
C-Link E17-2018	531408	104233	42.3	46.6	38.7	37.9	32.5	40.4	40.8	37.4	39.3	37.1	38.1	35.0	38.8	31.5	-
C-Link E17-2022	531430	104247	35.5	42.9	27.4	28.4	34.9	32.0	23.5	24.8	29.6	26.4	34.3	22.0	30.0	24.3	-
C-Link E18-2021	532759	103810	27.8	30.5	23.6	24.0	21.6	24.3	21.8	19.3	26.6	17.4	30.2	19.1	23.7	19.2	-
B2123 E22-2009	536970	102280	29.4	38.8	29.8	33.0	27.4	36.4	24.2	25.0	32.0	25.0	32.0	20.7	29.5	23.9	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.81	Annual Mean: Distance Corrected to Nearest Exposure
B2123 E23-2010	536966	102273		39.8	32.1	29.4	22.8	31.8	27.1	26.2	32.0	25.4	29.9	23.9	29.1	23.6	-
A259 E25-2018	537014	102238	41.1	34.4	32.2	37.8	33.1	35.6	21.2	23.6	30.3	23.7	32.5	19.4	30.5	24.7	-
B2123 E30-2020	536947	102341	28.0	46.3	27.5	31.9	27.9	34.2	19.9	19.6	28.8	20.8	30.4		28.5	23.1	-
E32-2020	537011	102099	16.6	19.5	14.7	15.3	9.6	14.0	11.3	11.4	13.3	12.5	18.2	16.0	14.3	11.6	-
A2010 W03-2006	530963	104994	34.6	39.4	35.1	35.3	27.5	33.9	32.5	33.4	34.3	32.0	36.9	30.1	33.7	27.3	-
A2010 W04-2006	530808	105340	41.0	43.4	32.6	33.7	34.1	34.5	30.5	32.0	35.7	36.3	39.4	30.9	35.4	28.7	-
A270 W05-2006	530778	105362	40.9	46.9	34.4	40.3	40.2	39.6	34.6	35.2	38.7	36.6	41.9	28.2	38.2	31.0	-
B2066 W10-2006	530302	104415	28.7	28.5	24.4	25.4	16.7							36.6	26.6	19.3	-
B2066 W11-2020	530154	104444	31.5	38.8	29.8	32.6	25.2	30.1	27.3	25.3	32.3	26.8	31.4		30.1	24.4	-
A259 W16-2020	526233	104860	40.2	39.3	32.9	35.7	26.7	34.8	30.3	30.5	35.6				34.2	27.7	-
A259 W17-2009	525931	104961	45.3	52.4			41.8		32.2	32.5	39.7			28.8	39.3	32.1	-
A259 W18-2010	525970	105230	21.3	21.8	17.8	15.7	10.0	12.9	12.9	11.3	14.5	8.0	21.7	17.9	15.1	12.3	-
A259 W19-2009	525658	105695	38.7	40.9	33.1	30.6	27.0	31.7	29.1	28.6	34.5	30.2	36.4	28.6	32.4	26.3	-
A270 OSR13 W20-2021	525698	105872	33.1	41.9	35.8	36.6	31.9	39.0	30.8	30.6	34.9	34.3	33.3	28.6	34.4	27.8	-
A2023 W21-2010	528388	105936	36.1	39.4	31.7	30.3	25.3	30.5	28.0	27.8	32.4	27.9	36.0	27.9	31.0	25.1	-
LN1-2022	532039	105541	42.3	34.7	24.7	22.5	20.2	19.9	19.8	18.6	22.2	22.3	31.0	23.0	25.0	20.2	-
LN2-2022	531823	105287	28.1	49.0	34.6			34.9	25.9	26.7	32.3	34.1	42.9	32.4	34.0	27.5	-
LN4-2022	532278	105233	28.2	32.4	24.4	25.3	20.3	23.7	21.6	21.2	22.0	21.1	27.5	20.0	23.9	19.4	-
LN5-2022	532124	104850	23.2	24.8	19.2	18.4	13.7	15.9	14.0	13.9	17.6	17.7	26.5	15.0	18.3	14.8	-
LN7-2022	531987	104575	23.3	24.4	15.0	17.3	14.0	18.1	16.2	15.4	18.5	17.0	25.6	16.0	18.3	14.9	-
LN8-2022	531910	104322	28.4	28.6	24.7	22.3	17.3	23.5	25.5	21.4	24.7	25.1	30.8	24.7	24.7	20.0	-
LN9-2022	531880	104243	35.7	36.4	32.2	30.0	27.8	33.7	33.5	31.4	32.8	31.3	36.9	30.3	32.6	26.4	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.81	Annual Mean: Distance Corrected to Nearest Exposure
LN10-2022	531642	104366	29.5	31.5	24.2	23.7	17.0	19.9	18.2	20.5	22.2	20.1	31.8	17.6	22.9	18.6	-
LN11-2022	531457	104546	22.6	25.2	18.0	17.1	13.4	15.2	14.2	13.5	17.4	18.1	25.0	14.1	17.8	14.4	-
LN12-2022	531505	104698	49.6	35.0	30.6	26.8	22.3	25.9	24.8	24.9	26.7	27.7	33.9	24.9	29.4	23.8	-
LN13-2022	531654	105072	39.2	31.0	33.6	21.8	27.2	27.6	27.7	26.9	29.4	30.2	29.5	28.3	29.3	23.7	-
LN14-2022	531725	105005	28.5	31.1	20.0	21.1	17.0	18.6	17.5	17.1	21.1	19.7	28.8	18.9	21.6	17.5	-
A259 Kingsway 2	528602	104416	27.5	26.5	20.5	21.4	16.9	19.6	14.3	15.1	19.1	18.6	23.8	17.4	20.1	16.3	-
A259 Kingsway 4	528601	104420	28.5	28.4	22.9	22.6	17..9	23.5	18.1	18.5	23.4	22.0	25.1	20.1	23.0	18.7	-
WRP1	530201	104468	43.3	39.4	34.5	32.3	31.2	35.4	30.3	32.9	29.8	27.9	35.4	25.5	33.0	26.7	-
WRP2	530597	104480	33.6	37.3	27.7	19.7	12.2	15.6	16.0	19.7	24.1	20.5	26.7	17.1	22.5	18.2	-
WRP3	530648	104466	34.8	35.6	26.4	26.4	18.3	23.5	18.4	19.9	25.0	21.6	28.5	17.1	24.7	20.0	-

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **National bias adjustment factor used of 0.81 used 2023 and 0.85, 2022**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

☒ **Confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New or Changed Sources Identified Within BHCC During 2023

In AQMA1 new developments have been completed next to Hollligdean Road, Lewes Road and London Road. For the reporting year, new developments around AQMA2 and in the adjacent local authority that is Lewes District Council. Around AQMA3, new development completed around Shoreham Port and next to the A259. In AQMA4 some progression with the associated development area around Hove Station that requires further monitoring. No discernible changes in AQMA5. In AQMA6 the Royal Sussex County Hospital has new gas boilers, a new phase of construction and new building arrangements (ongoing 2023/24) and parallel with Eastern Road. Some of the buses are geo-references for zero emissions when travelling through the majority of AQMAs, this has not yet happened along the Lewes Road corridor.

Additional Air Quality Works Undertaken by BHCC During 2023

Completion of engagement with schools and events on active travel and air quality. Completion of bus retrofit programme to upgrade from euro-V to euro-VI on frequent Brighton & Hove buses used across the region, including services that start and finish at Churchill Square, Central Brighton & Hove bus-ULEZ.

QA/QC of Diffusion Tube Monitoring

- Gradko International diffusion tubes have been consistently used for many years by Sussex Local Authorities using the 20% TEA in water (method). This continued throughout 2023.
- Gradko participates in accreditation scheme AIR PT including annual field inter field comparison exercise,
- 2023 diffusion tube monitoring covered twelve periods for the calendar year. Exposure periods typically alternated between four- and five-weeks and showed good agreement with the 2023 Diffusion Tube Monitoring Calendar, performance improved compared to previous years.
- Annualisation has been carried out for tubes monitoring sites with between three and nine months data

Diffusion Tube Annualisation

6 out of 73 of 2023 BHCC diffusion tubes had less than 75% data capture and the annulisation adjustment is set out below in accordance with technical guidance.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID + Year Started	Annualisation Factor AURN BH0 Preston Park	Annualisation Factor AURN Preston Park	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
A2010 C12-2010	0.9510	0.8902	0.9206	36.6	33.7
A23 C18-2010	1.0322	1.0069	1.0195	42.5	43.3
A23 E17-2003	1.0236	1.0749	1.0493	35.8	37.5
B2066 W10-2006	0.9148	0.8732	0.8940	26.6	23.8
A259 W16-2020	0.9935	0.9413	0.9674	34.2	-
A259 W17-2009	1.0007	1.0158	1.0082	39.3	39.6

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2024 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analysers. LAQM.TG22 provides guidance about the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. The national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

BHCC have applied a national bias adjustment factor of 0.81 to all 2023 diffusion tube data. Bureau Veritas updated 2022 results for the North Street NO_2 monitor after submission of the 2023 ASR. Revised automatic analyser result is changed in this ASR and the 2022 raw data adjusted by 0.85 in accordance with national adjustment. This correction shows closer agreement with long term trends in NO_2. A summary of bias adjustment factors used by BHCC over the past five years is presented in

Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	Local	03/24	0.81
2022	National	09/23	0.85
2021	National	03/21	0.84
2020	National	06/20	0.92
2019	National	06/19	0.93

Notes:

A single local bias adjustment factor *0.81 has been used to bias adjust the 2023 diffusion tube results. This is derived from the Gradko laboratory co-location studies for 2023.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

Table C.3 – Non-Automatic NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
B2066 C11-2012	1.5	4.5	41.7	14.6	35.2	*To test hourly standard*
A23 C18-2019	2.0	4.0	36.2	14.6	32.7	*To test hourly standard*
A270 C26-2022	2.5	5.0	43.0	10.9	*37.5*	*Predicted concentration at Receptor within 10% of AQS standard.*

QA/QC of Automatic Monitoring

Data management of automatic analyser is carried out by Bureau Veritas. Equipment support and local service operation during 2023 at North Street was carried out by Matt's Monitors. Data presented in the report is ratified.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

Particulate (PM2.5) monitoring data provided by Bureau Veritas to the Sussex Air Quality Network includes appropriate correction factors.

Automatic Monitoring Annualisation

The North Street monitoring site reported for 2023 has at least >90% data capture for NOx and NO_2 and $PM_{2.5}$.

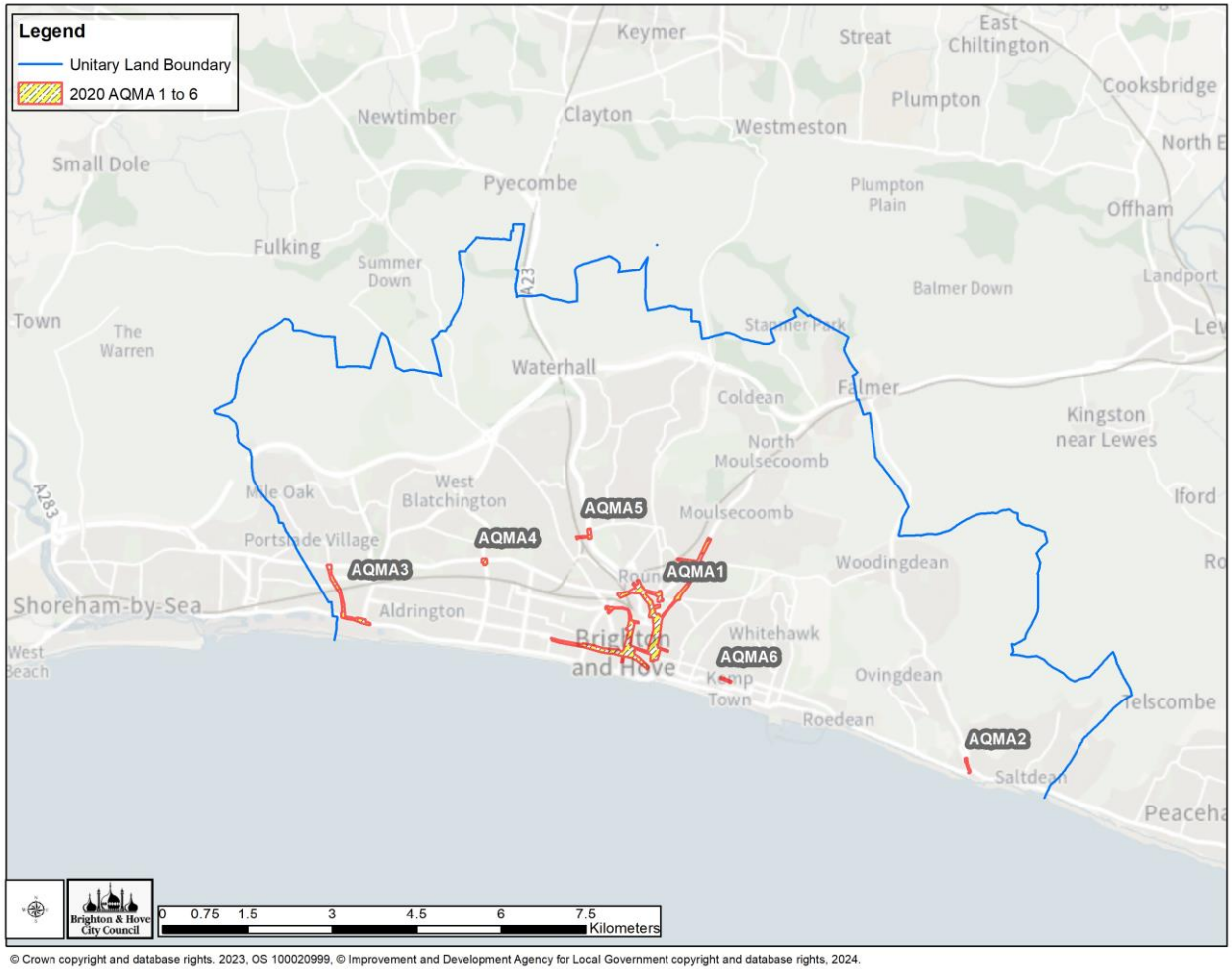
NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Brighton & Hove require distance correction during 2023. Wherever possible, monitoring locations are representative of exposure.

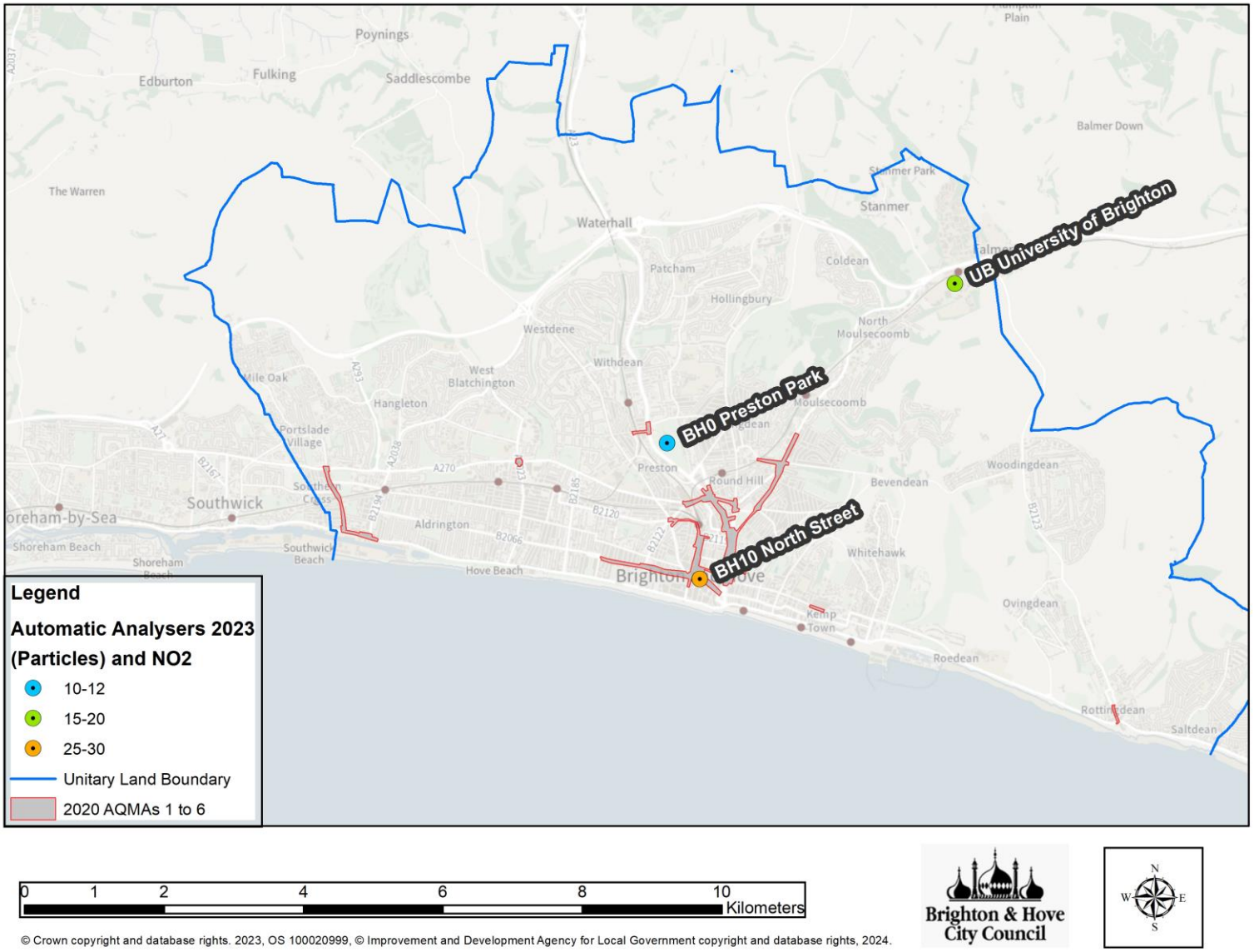
Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Sites

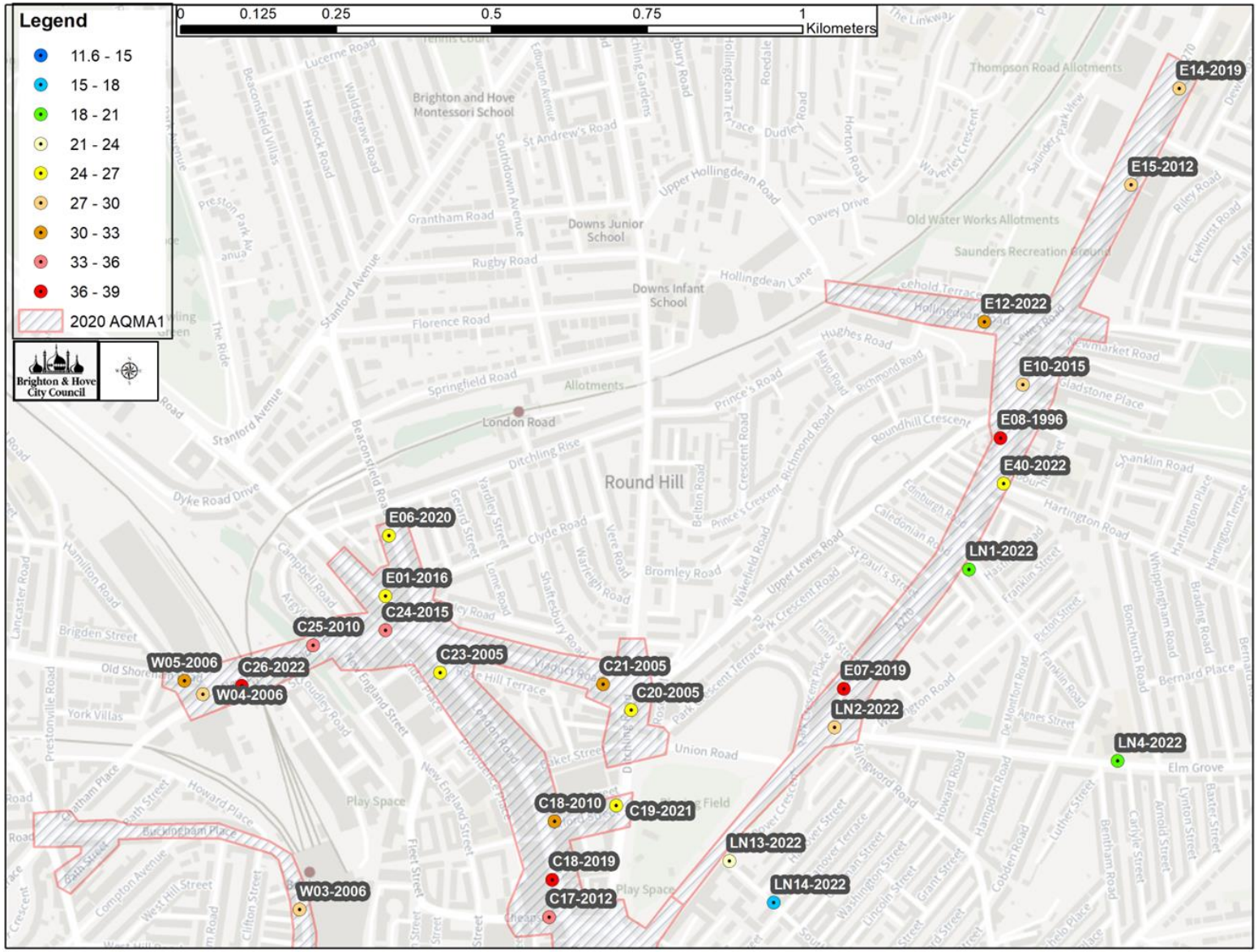
Brighton & Hove map showing Air Quality Management Areas (declared for NO_2) and the Local Authority Boundary



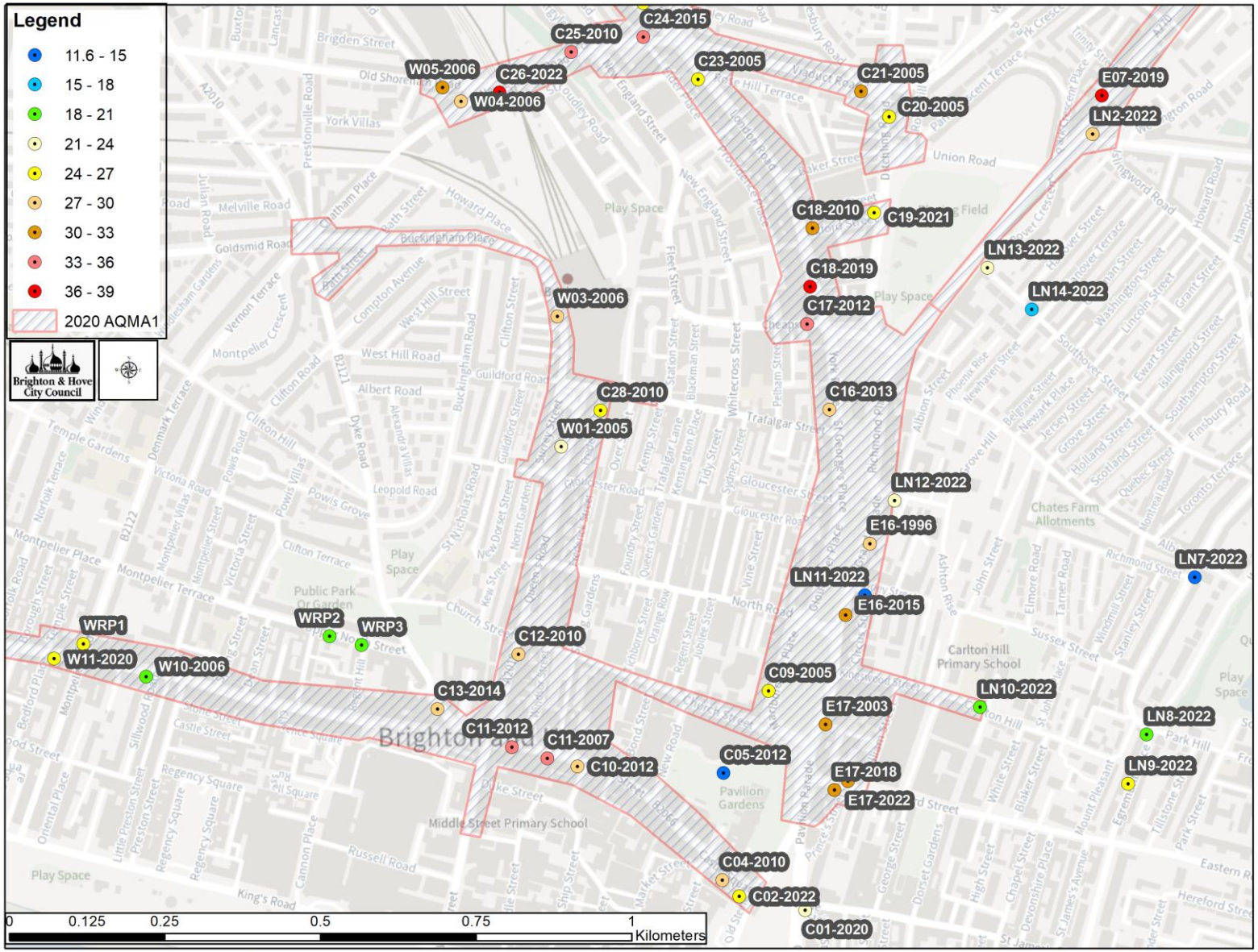
Brighton & Hove 2023 Automatic Analysers NO_2 and particles (colour coded by NO_2) and the current AQMAs



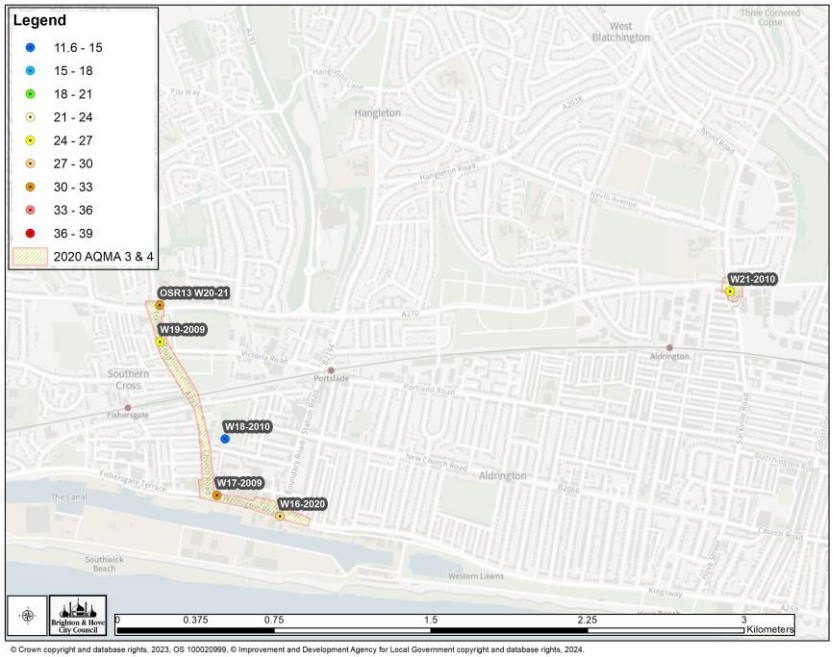
AQMA1 North and Diffusion Tubes (colour coded by 2023 concentration)

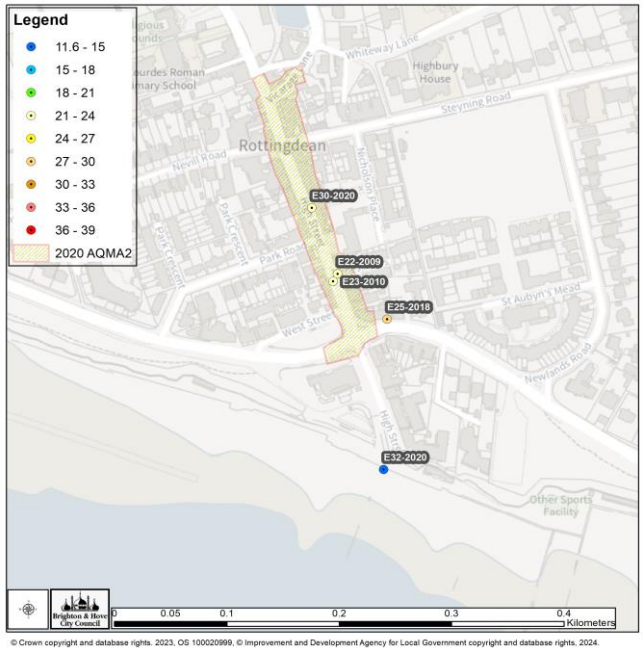


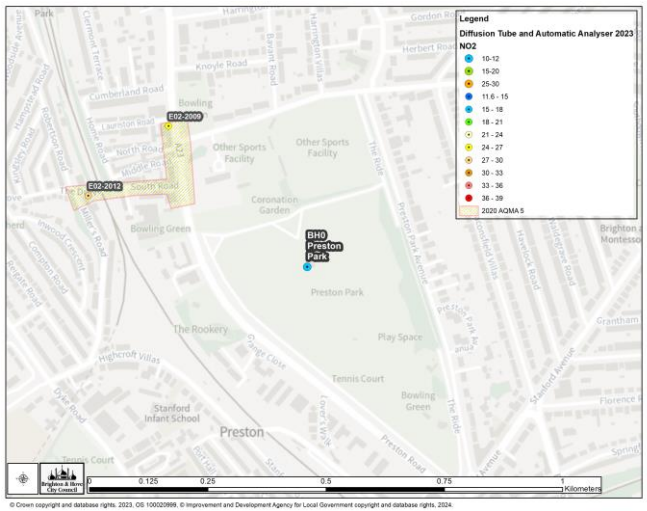
AQMA1 South and Diffusion Tubes (colour coded by 2023 concentration)

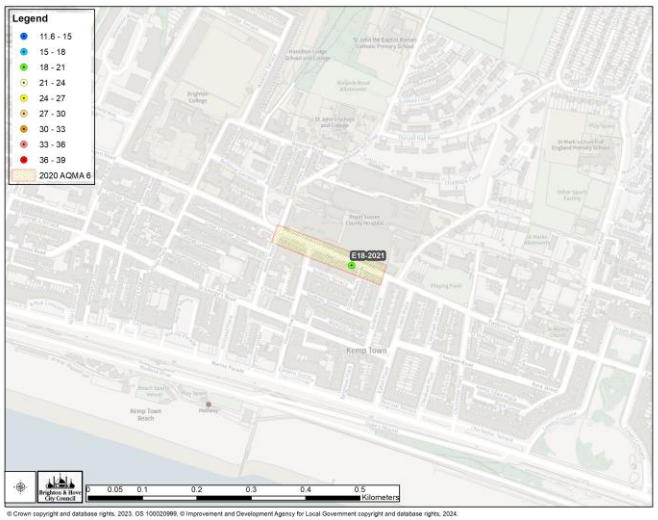


AQMAs 2 to 6 and Diffusion Tubes (colour coded by 2023 concentration)









Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[16]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[16] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
ADMS-Urban	Atmospheric Dispersion Model System
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air Quality Annual Status Report
ATC	Automatic Traffic Counter
AURN	UK Automatic Urban Rural Air Monitoring Network
CAZ	Clean Air Zone
CEMP	Construction Environment Management Plans
COMEAP	Committee on the Medical Effects of Air Pollutants
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EFT	Emission Factor Toolkit
EMIT	Atmospheric Emissions Inventory Toolkit
EU	European Union
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
LAQM (TG)16	LAQM Technical Guidance 2016
LAQM (PG)16	LAQM Policy Guidance 2016
LGV	Light Goods Vehicle
NRMM	Non Road Mobile Machinery
NAEI	National Atmospheric Emissions Inventory
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen usually an emission rather than an outdoor concentration
NPL	National Physical Laboratory

PHE	Public Health England
PHOF	Public Health Outcomes Framework
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SCA	Smoke Control Zone
Section 106	Section 106 Planning Agreement Under Town and Country Planning Act
SO_2	Sulphur Dioxide
ULEZ	Ultralow Emissions Zone

References

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- Defra. Environmental Improvement Plan 2023, January 2023
- Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023
- DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018
- Local Cycling and Walking infrastructure Plan found at Brighton & Hove: Local Cycling and Walking Infrastructure Plan (LCWIP) (brighton-hove.gov.uk)
- Beryl BTN Bikes found at Brighton & Hove: Beryl BTN Bikes (brighton-hove.gov.uk)
- Cycle Hangars, found at Brighton & Hove: Cycle hangars (brighton-hove.gov.uk)
- eCargo Bike Accelerator Project found at Brighton & Hove eCargo Bike Accelerator Project (brighton-hove.gov.uk)
- Bus Service Improvement Plan, found at Brighton & Hove Brighton & Hove Bus Service Improvement Plan (BSIP) (brighton-hove.gov.uk)
- Electric Vehicles (EV) Charging, found at Brighton & Hove Electric vehicle (EV) charging (brighton-hove.gov.uk)
- Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023
  The units are in microgrammes of pollutant per cubic metre of air (µg/m3).