Havant
BOROUGH COUNCIL

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: September, 2024

Information	Havant Borough Council Details
Local Authority Officer	Jonathan Driver
Department	Environmental Health
Address	Public Service Plaza, Civic Centre Road, Havant, Hampshire, PO9 2AX
Telephone	023 9244 6670
E-mail	EHealth@havant.gov.uk
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Executive Summary: Air Quality in Our Area

This report presents Havant Borough Council's (HBC) 2023 monitoring results and forms part of the review and assessment of air quality in Havant Borough. The report has been prepared by reference to Government's published Policy Guidance LAQM.PG(22) and in accordance with the Technical Guidance LAQM.TG(22).

Air Quality in Havant Borough

Air pollution is associated with a number of adverse health impacts. Breathing in polluted air affects our health and costs both the NHS and our society more generally billions of pounds each year, both the in direct costs of treating health conditions and in the indirect costs of lost productivity that arise from illness and absence from the workplace (for example). 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 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. Additionally, people living in less affluent areas are commonly the most exposed to dangerous levels of air pollution[2].

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

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

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

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, energy generation, or cooking & heating processes (domestic & commercial).
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or heavy fuel oil (e.g. in commercial shipping).
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen & sea spray, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles with a diameter under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles with a diameter under 2.5 micrometres.

Screening assessments for the Havant area have consistently suggested that Nitrogen Dioxide (NO_2) was the only pollutant likely to challenge compliance with its respective air quality objective.

NO_2 has consistently proven to be principal pollutant of concern nationwide, with the primary source in most locations being from the conventionally fuelled motor vehicles. 87% of AQMA's nationwide have been declared solely to control NO_2, 12% for PM_{10}, and 1% for SO_2. No AQMA's are currently in place nationwide specifically for $PM_{2.5}$. For these reasons, emphasis has been placed on consideration of NO_2 through both the active monitoring programme, and within the main body of this report.

However, following introduction of the Environment Act 2021 and the publishing of the Environmental Improvement plan 2023, there is now a both an Air Quality Target level and exposure reduction Target to be met by 2040, alongside interim targets due to be met in 2028.

This Annual Status Report shows that the statutory air quality objectives are likely to be achieved for NO_2 at all relevant locations throughout the borough, with many residential areas likely to enjoy excellent air quality. However, the statutory objective is not risk free, and comparisons with the WHO epidemiological summary data suggest that around 2% of all non-accidental deaths within the borough might be attributable to long term exposure to

Nitrogen Dioxide[16], with peak risks[13] at the worst affected locations being equivalent to around 11%.

There is a general shallow decreasing trend in annual mean NO_2 concentrations over the past five years, with the strongest declines being noted at kerbside monitoring sites. Figures are either broadly equivalent to-, or slightly below- those recorded during the pandemic restrictions; indicating a durable impact upon emissions – likely through changes to working and travel practices.

A detailed consideration of $PM_{2.5}$ levels is presented in this report, based upon surrogate data from AURN continuous monitoring locations within 40 miles of Havant Borough. This assessment has shown that the modelled year-on-year reductions expected have been outpaced (bettered) by real-world emissions. A strong declining trend was shown across all monitoring sites & all environment types examined.

The maximum ambient $PM_{2.5}$ concentration (on a square-kilometre basis) is expected to be <12 µg/m^3, with the average exposure concentration in the Borough being around 9 µg/m^3. The worst affected locations are all in the Leigh Park area, with domestic sources thought to be important contributors. Concentrations here are however already compliant with the 2028 interim target. The health impacts of exposures at these levels translate to an attributable contribution to total mortality[16] of around 6% within Leigh Park, and around 4.7% on average across the Borough.

Cumulative exposure to short periods of elevated $PM_{2.5}$ concentrations is expected to add less than +2% to mortality.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, the non-threshold nature of the health impacts mean that any actions which contribute to reductions in atmospheric concentrations of common air pollutants are likely to translate into a direct health benefit.

The Environmental Improvement Plan[3] 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. The Air

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

Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Levels of Air Pollution within the Borough are fully compliant with the current statutory objectives & limits, are very likely to be compliant with the interim targets, and are on track to meet the future statutory targets. It is however recognised that the statutory air quality targets do not represent a 'zero harm' level. Rather, the targets represent the level of public health harm that is considered to be acceptable, after the costs and other negative impacts of achieving better standards have been accounted for.

Achieving further improvements to Air Pollution levels beyond the statutory requirements would translate into improved health outcomes, but having regard to the reasons why the statutory Air Pollution standards differ from the epidemiological advice; significant investment in measures specifically & exclusively seeking to achieve further reductions is not currently considered to be justified within the Borough.

For this reason, efforts to achieve further improvements in local air quality generally take the form of qualitative (unquantified-) measures, e.g. by ensuring that air pollution effects are an important ancillary consideration when exercising other routine Council functions – in particular, in transport, planning & climate change.

Hampshire County Council plays a significant role in preventing, reducing, and mitigating emissions from road transport through its devolved Local Highways and Public Health functions, alongside its influence on the delivery of educational services. There are opportunities for the Borough and County Councils to support each other, with the planning functions of HBC representing a key opportunity to support these goals.

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

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

The Council also recognises the parallels between air pollution and climate goals, and the need for holistic thinking to secure an improvement to local air quality as a co-benefit of pursuing the primary goal of both combating-, and adapting to-, anthropogenic climate change. For example, actions taken to improve sustainability and reduce energy demand might serve to avoid the emissions associated with power generation, especially from local Short-Term-Operating-Reserve (STOR) generators (which often use fossil fuels).

Micro-scale projects can make a valuable contribution to these goals. Each small-scale reduction in either emissions or energy use will in turn reduce local concentrations of pollutants, and so also the pollutant-loading of the air moving to down-wind locations. The aggregate of all micro-scale interventions could sum up to a significant overall effect; both by reducing the peak concentrations on high pollution days, and by applying downward pressure on ambient average background exposures.

Reliance on qualitative measures and aggregated small contribution does however mean that the success of efforts made to improve local air quality is not readily demonstrated by empirical means on an 'intervention-by-intervention' level, necessitating reliance upon the expected effects from well understood processes, or upon a simple logic-based conceptual model in each case.

The approach that Havant Borough Council takes to improving local air quality largely consists of a strategy of seeking to achieve modest incremental improvements and mitigations through the effective & diligent application of planning policy to secure:

1. Sustainable development with low energy demand, and a reduced need for local (within borough) combustion of fuels
2. The implementation of travel plans & securing of local infrastructure which supports and encourages modal-shift from travel by private motor vehicles to more sustainable and active forms of transport
3. High quality development in sustainable locations which reduce the need to travel and revitalises town centres where possible, and;
4. Innovative developments which support new vehicle technology, new vehicle access models, Low- or Zero- Carbon (LZC) energy or heating solutions, and landscape features which assist with the interception and destruction of air pollutants.

Effective forward-planning through the local development framework and strategic land allocation also contributes to achieving air quality objectives, as does the deployment of funds acquired though planning gain (both s106 and s278 agreements and the Community Infrastructure Levy, CIL), where possible allocating these to local infrastructure

improvements that aim to facilitate and encourage active travel choices, and so to achieve both emissions reductions and overall public health gains.

Conclusions and Priorities

Air Quality within the Borough is expected to be fully compliant with all current statutory air quality standards, as well as the 2028 interim targets. Trends suggest that the future statutory targets will be met well ahead of the 2040 compliance date. It is thought that the socio-economic factors resulting from pandemic restrictions may still be influencing current trends, and that a degree of 'rebound' may still occur in the coming years which could undermine progress towards these future targets.

Current levels of air pollution do not meet that latest epidemiological recommendations, and so further improvements to health outcomes could be achieved by seeking further improvements in local air quality. There is broad equivalence between Nitrogen Dioxide & Fine Particulate Matter by share of contribution to excess mortality risk[13] within the respective areas of the Borough worst affected by these pollutants. As averaged exposures, Fine Particulate Matter contributes more to the overall non-accidental mortality burden than does Nitrogen Dioxide (5.2% & 2.2% for $PM_{2.5}$ & NO_2 respectively[16]).

Specific actions to improve local air quality are not currently required, but it is recognised that there are areas where additional policy drivers exist through which additional and proportionate co-benefits for local air quality could be sought.

Priorities for the coming year include:

1. To deliver an adopted Local Plan that is fit for purpose and fully accounts for the principles and policy embodied by the revised NPPF, the national air-quality strategy, and any further Regulations / Statutory Guidance made under the Environment Act 2021 to which local authorities must have regard;
2. To continue seeking material enhancements to development proposals brought forward, making effective use of adopted national policy, and
3. To produce and publish a 'light touch' air quality strategy which is proportionate to the health risks within the borough, but which also ensures that air quality is an integral consideration in the exercise of the Council's wider duties.

Local Engagement and How to get Involved

In other sections, we provide information on the current state of air quality within the borough and the actions that the Council is taking to achieve incremental reductions in local emissions. In this section we look at how residents and businesses can get involved.

Dealing with air pollution is not something that any single organisation or individual can resolve, and many contributors to local air pollution fall outside the operational reach of the Local Authority to directly influence. It will require the combined efforts of everyone to ensure that pollutant concentrations remain well below objective limits. There are many ways individuals can contribute to reducing air pollution and so improve air quality. Appendix F includes some ideas and tips on how to reduce personal exposure to air pollutants, and how you or your business might contribute to reductions in local emissions.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Havant Borough Council.

This ASR has been approved by:

- Cllr Grainne Rason; Cabinet Lead for Climate & the Environment
- Alex Robinson; Executive Head of Place (incorporating Planning & Environmental Health)

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Jonathan Driver at:

Environmental Health
Public Service Plaza,
Civic Centre Road,
Havant, Hants,
PO9 2AX

Tel (Team Admin): 023 9244 6670
Email (Team Admin): Ehealth@havant.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Havant Borough Council during 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.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance 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 in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Havant Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives 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, and provide dates by which measures will be carried out.

Havant Borough Council currently does not have any declared AQMA's.

Havant Borough Council recognises the expectation that it should develop and publish a local Air Quality Strategy, but at the time of writing no local Air Quality Strategy is currently in place.

2.2 Progress and Impact of Measures to address Air Quality in Havant Borough Council

Defra's appraisal of last year's ASR concluded that the report was well structured and provided the information specified in the Guidance. It's conclusions were accepted for all sources and pollutants. Principle notes within the commentary were that;

- Table 2.1 should include funding status of measures. *Response; given the consistent general compliance with LAQM air quality guideline values, many measures are not implemented specifically for the purpose or delivering air quality benefits. As such, funding is often from a mix of business-as-usual resources alongside a combination of other sources (CIL, s106, etc.), and consequently cost estimates are not always available.*

- Explanation should be give to why 19B was decommissioned following consistently measured exceedances up to 2019. It remains possible that NO_2 is being exceeded at this location. *Response; this was covered in section 3.2.4 of ASR-1910/v1, which concluded that position 19B was not representitive of emissions from the principal road link. Results from Position 19B (alongside related evaluation locations 19D & 19E) have been omitted from ASR reports since 2020.*

- Appendix C should provide additional clarity about the application of fall-off with distance corrections. *Response; Appendix B (Tables B.1 & B.2 make clear where distance correction has been undertaken. Distance correction should ideally be undertaken for all monitoring positions not directly representitive of relevant exposure, however the move toward increasingly standardised ASR submissions discourages deviation of central reporting approach. Appendix C text will be amended in this, and all future ASR reports to make clear that the centrally issued template dictates the approach.*

Havant Borough Council has taken forward a number of indirect measures during the current reporting year of 2023 to support continued downward trends in the ambient concentrations of local air pollutants.

Details of all measures completed, in progress or planned are set out in Table 2.1. Eleven measures are summarised within Table 2.1, this is a slimmed down list from that reported in 2023 omitting measures for which there has been no material progress (e.g. investment in public rapid charging network), or which have no tangible prospect of being brought forward in the foreseeable future, beyond the policy environment to safeguard the possibility of future implementation (e.g. the district heat network).

The majority of measures relate to actions and initiatives that have Air Quality benefits, but Air Quality is generally not primary the driver for implementation. As such, there are generally no air-quality-specific strategy or action-planning documents available to provide additional detail.

More detail on such measures can be found (e.g.) on the Havant Borough Council's Planning Policy web pages[6], and the draft Havant Borough Council Local Cycling and Walking Infrastructure Plan (LCWIP)[7], and the refreshed County Level Local Transport Plan (LTP4)[8]. The withdrawn Local Plan is still in development, aiming to provide updated and more localised relevant policies. The Partnership for Urban South Hampshire have chosen not to pursue a specific regional Low Emission Strategy, but is working on supplementary planning guidance.

[6] Havant Borough Council. Adopted Local Development Framework, March 2011/2014; Withdrawn Submission Local Plan 2019, Position statements, Emerging Local Plan and evidence-base, available from: Local plan | Havant Borough Council

[7] Havant Borough Council and Hampshire County Council. Havant Walking and Cycling Improvements: Cycling and walking infrastructure plan | Havant Borough Council
Search transport improvement schemes | Transport and roads | Hampshire County Council (hants.gov.uk)

[8] Hampshire County Council Local Transport Plan 4: Draft Local Transport Plan 4 (hants.gov.uk)

Key completed measures are:

1. Local Cycling and Walking infrastructure improvements along Elmleigh Road, improving links between Havant Railway Station (and the nearby Bus hub) and the Havant & South Downs College, including the first Sparrow Crossing in Hampshire, designed in line with the most recent iteration of the Highway Code and the latest design guidance. (completed Nov 2023)

2. Road Widening project on Park Road South for multi-user benefits; to improve junction efficiency & to reduce local emissions, improving facilities, reliability & reduce journey times for bus services, improving pedestrian access to Bosmere junior school to support local park & stride schemes, and a reduced speed limit to improve safety for vulnerable road users – supporting active travel choices. (Completed Dec 2023)

3. Bedhampton Road Bus Priority Scheme, improving reliability of services between Havant and Portsmouth/Southsea (principal works completed February 2023, works ongoing)

4. The adoption of a local Climate Change & Environment Strategy[9], appointment of a dedicated climate change coordinator

5. Adaptations underway to support more efficient use of the Civic Campus, maximising efficiency of use of the Council's office estate and minimising staff travel emissions.

The principal challenges and barriers to implementation that HBC anticipates facing are:

1. The Current Air Quality Standards not being aligned with revised WHO recommendations, creating tension between aspirations to improve local air quality and securing the resourcing required to achieve any material benefits; especially where both local authorities and the local business community are subject to increasing cost pressures.

2. The provisions of the National Planning Policy[10], and specifically the wording of the key principle of 'presumption in favour of sustainable development' (para. 11 d) ii, NPPF 2023), and the weight given to the economic and social limbs of 'sustainable development', being typically disproportionate to the environmental limb; and

[9]Havant Borough Council Climate Change and Environment Strategy 2021-2026, available here: https://www.havant.gov.uk/media/8715/download?inline

[10] MHCLG (2021). National Planning Policy Framework.

3. The Local Plan Approvals Process, which has undermined opportunity to secure policy objectives. Whilst withdrawal was recommended on grounds of insufficiently strong evidence to demonstrate the sustainability of the allocations contained within the plan, the result has been a significant increase in speculative applications seeking to secure the principle of development under the presumption in favour. Such sites are often at unfavourable locations which are not sustainable in terms of access by active modes travel or public transport.

The previous 2021-2022 ASR outlined several priorities for following years. However, progress on the following measures has been slower than expected due to delays in:

1. *Improving digital content and information provision for residents*, *to improve engagement and awareness of Local Air Quality and Sustainability issues*. Principally due to service capacity issues.

2. *Delivering an adopted Local Plan that is fit for purpose and fully accounts for the principles and policy embodied by the revised NPPF and other air-quality-relevant government strategies*[11],[12]. This has arisen due to difficulty in identifying sufficient land to meet the objectively assessed housing need. The withdrawn LP2036 included comprehensive and proactive AQ-relevant policy, and that suite has survived largely unchanged within the new version of the emerging local plan. Nevertheless, the Inspector's recommendation to withdraw the plan pending further assessment work undermines the immediate policy basis for taking proactive action for applications coming forward, both over the past year, and for the forthcoming reporting period. Planning reform is central to the new Government's manifesto priorities, which adds additional uncertainty as to the support for driving forward positive change – it is unclear at this stage whether the effect is likely to be positive or negative.

3. *Finding opportunity to provide positive support for strategic developments that would justify national trunk road infrastructure improvements that are expected to alleviate traffic pressure on Havant and Emsworth town centres (e.g. proposed new A27 junction, East of Emsworth exit).* This is principally related to the LP2036 status & timetable for resubmission.

[11] HM government Environmental Improvement Plan 2023; https://assets.publishing.service.gov.uk/media/64a6d9c1c531eb000c64fffa/environmental-improvement-plan-2023.pdf

[12] Air quality strategy: framework for local authority delivery (HTML Only); Air quality strategy: framework for local authority delivery - GOV.UK (www.gov.uk)

4. *Exercising both environmental and sustainability policies to capitalise upon opportunities to secure mitigation of new local emissions, and forms of development which support a shift in the proportion of trips made by conventionally fuelled private motor vehicles to more sustainable and active means of travel.* Attempts to drive forward schemes which support delivery of the County-level active travel strategies and to implement policies to achieve a range of air quality objective were made within the constraints of the withdrawn status of the LP2036, under the provisions of the adopted National Planning Policy Framework. Detailed arguments advocating for air-quality-positive features have been made at every opportunity, however the ability to secure design enhancements within development schemes is substantially limited by the weight which may be given to emerging policy under the provisions of the NPPF '23 para. 48]. Such efforts are subject to frequent and effective challenge, and struggle to achieve genuine additionality. Limited material impact has been achieved as a result, especially in terms of building emissions. Recent adoption of the County level LTP4 has however enabled more robust responses to proposals in respect of sustainable transport, providing greater opportunity to secure air-quality-positive enhancements in schemes brought forward, if only in the sphere of transportation. The ability to mitigate emissions from buildings is dependent upon the adoption of the local plan and the development of regional Air Quality planning guidance &/or reform of the approach to damage-cost appraisal. The ability to provide an integrated air quality response to proposals is not expected to arise within the next reporting period.

Havant Borough Council anticipates that the measures stated above and in Table 2.1 will support the evident downward trend in NO_2 concentrations. More significant & targeted interventions are not currently justified given the state of local air quality when benchmarked against the extant statutory limits and objectives.

It is anticipated that additional measures not yet prescribed may be required in subsequent years to achieve compliance with the long term statutory objectives for $PM_{2.5}$ (35% exposure reduction, and 10 µg/m^3 2040 annual exposure limit), given that the regional context of the borough makes it more vulnerable to external sources which will tend to keep background levels high.

Table 2.1 – 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
1	Air Quality Policy - Securing Development that's fit for the future	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017	2025	HBC	HBC	No	Not Funded	Not Calculated	Implementation	None	1) Secure adoption of a Local Plan 2) Ensure the local plan embodies a policy framework that empowers the Local Authority to seek high quality development that recognises Air Quality and Emissions reduction to be critical contributors of sustainable development.	• Policy suite included in submission local plan LP2036 • Policy basis & wording reaffirmed and refreshed under the renewed 'Building a Better Future' Plan, following the voluntary withdrawal of the LP2036.	• Central Government priority to implement further plannning reforms, creating additional uncertainty (Timeline for adoption & content)
2	Emissions reduction & Offsetting in new development	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	2025 - 2036	HBC	HBC, Developer	No	Not Funded	Not Calculated	Implementation	Low	1) Secure material enhancements to specific development proposals which will lead to tangible emissions reduction, or intrinsic air pollution benefits. 2) Assist in securing direct delivery of specific sustainable & active travel intrastructure enhancements that are compliant with the aims of County Policy LTP4/TG10, and in accordance with DfT's LTN1/20. 3) Assist in securing funding via s106 agreements for Highways to deliver a coherent & contiguous network of Walking & Cycling Infrastrucutre in furtherance of the strategic plan.	• Exercise of policy in planning decisions 2019-2023, according to the weight allowable in accordance with plan status • Exercise of adopted NPPF policy in accordance with the principles of draft local policy where consents rely upon the presumption in favour of sustainable development (NPPF '23 para. 11) • Limited success to date in achieving tangible improvements directly attributable to Air Quality Policies • Sucess in adding weight to other policy areas, e.g. transport	• Local Plan withdrawal & 'under development' status. • Policy Framework Uncertainty as above. • Developer Resistance • Dominance of approaches aimed at Climate and Transport Policy objectives
3	Local Air Quality Strategy	Other	Other	2023	2025	HBC, HCC, and Partners	HBC	No	Not Funded	Not Calculated	Planning	Low	1) Produce and Publish a local Air Quality Strategy	• None	• Mis-match between statutory Air Quality Limit & Objective values and WHO health-based recommended Guideline Levels • Experience from other policy areas (e.g. permitting, planning) where priority is given to Legal Compliance over Epidemiology
4	Havant Borough Cycling and Walking Infrastructure Plan (LCWIP): Cycling	Transport Planning and Infrastructure	Cycle network	2018/19	2025 - 2036	HBC, HCC, and Partners	s106, s278 agreements, CIL, HBC, HCC	No	Partially Funded	Not Calculated	Implementation	Low	1) Produce and Publish a local LCWIP 2) Publish a 'network legibility improvement plan' 3) Use adopted plans to help secure s106 and s278 funding to support implementation of secondary and feeder routes not covered by the Transforming Cities Bid. 4) Development of local and National Cycle network, in accordance with the Hayling Island improvement feasibility report, and as identified during the course of the County Cycling Strategy (2015-25)	• 4 Transforming Cities schemes within HBC district completed & one furher project funded and in progress (see: https://www.hants.gov.uk/transport/transportschemes?Q=havant&search=yes&page=1) • Several other projects brought forward, including the delivery of the first sparrow crossing in Hampshire on Elmleigh Road, enhancing active travel links between Havant College and the Havant railway station footbridge • Several projects are in the planning stages, including a 'future vision' for College Road, and a plan for an LTN1/20 compliant cycleway enhancements between Solent Road & Harts Farm Way	• Policy Framework Uncertainty as above.

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
5	Climate Change & Environment Strategy	Other	Other	2021	2026	HBC	HBC	No	Funded	Not Calculated	Implementation	Low	1) Develop & Adopt a local Climate Change & Environment Strategy 2) Appoint a Climate Change Coordinator 3) Exercise adopted policies to address emissions from a) HBC's own estate b) emissions from partners & contractors working with HBC 4) Engage positively with local businesses, residents & the communicty to achieve direct & indirect reductions in emissions of CO2 & other air pollutants 5) Publish performance metrics in an annual report	• Strategy Adopted (See: https://www.havant.gov.uk/media/8715/download?inline) • Climate Change Coordinator Appointed Spring 2024	-
6	HBC Home & Flexible working, traffic management	Other	Other	2023	2025	HBC, HCC, and Partners	HBC, PfSH	No	Funded	Not Calculated	Implementation	Low	1) Renew IT Service Provider Contract 2) Progressive Rollout of ICT arrangements to HBC Staff 3) Phased implementation of the 'A to B' project, consolidating office space and coordinating officer attendance at the Civic Campus to optimise travel demand & maximise efficiency in the utilisation of a public building	• adaptation works underway to support 1st phase of team relocations • 4 teams on schedule to relocate July 2024	-
7	Local Cycling and Walking Infrastructure Plan (LCWIP): Walking	Promoting Travel Alternatives	Promotion of walking	2018/19	2025-2036	HBC, HCC and Partners	s106, s278 agreements, HBC, HCC	No	Part-Secured	Not Calculated	Implementation	Low	1) KPI's as 3 for Walking Infrastructure enhancements delivered as shared surface-active travel links or secured via s106 and s278 agreements 2) Actively Promote Walking; Active Travel / Public Health schemes and walking as a leisure activity.	• Revised Plan published 2023, establishing the strategic framework for guiding works • Plans developed for an 'Active Travel Corridor; between Waterlooville & Denmead - Summary of Current Walking Projects can be found here; https://www.havant.gov.uk/transport-projects/walking-and-cycling-projects • Local Walking actively promoted on the Council's website, though the Get Up & Go project and Wellbeing Walks Scheme.	-
8	Development of SE Hampshire Integrated Rapid Transit Network	Transport Planning and Infrastructure	Bus route improvements	2015-2019	Ongoing	PCC, HCC, and Partners (HBC, as member SEHRT Board). DfT Funding	PCC, HCC, and Partners (HBC, as member SEHRT Board). DfT Funding (TCF)	No	Secured	£1 million - £10 million	Implementation	Low	1) Improve sustainable travel offering for commuter trips between HBC and PCC Areas 2) Reduce the commuter mode share of private motor car 3) Secure fare reductions to incentivise public transport 4) Reduction in Journey Times between urban centres 5) Deliver complementary active travel routes to widen SEHRT network catchment.	• Real-Time Information (RTI) and audio announcement system provided at 40 bus stops across Havant & Waterlooville • Leigh Park Bus stop Improvements funded & completed as part of the 'transforming cities' bid. • Bedhampton Hill Junction Improvements funded & completed	-

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
9	PfSH Area Air Quality Assessment	Policy Guidance and Development Control	Other policy	2016-2017	Autumn 2018	HBC Led, for PUSH/PfSH	PfSH	No	Funded	Not Calculated	Planning	Low	1) Complete Assessment: Secure funding, agree scope, commission report, review draft, consult PUSH authorities, agree final draft. 2) Use assessment to support the sustainable delivery of the objectively assessed level of housing need in the Havant area. 3) Consider need for a coherent regional low emissions strategy	• 1)-2) Complete, 3) Pending • Low Emission Strategy has not been included in the 2021-25 Business Plan • PfSH has committed to developing an Air Quality Supplementary Planning Document • Measure concluded	• Assessment Risks being viewed to be out of date for supporting policies put forward in 2024/25 • May require update to support the revised 'Building a Better Future' Local Plan
10	PfSH Area Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2018-2019	2019-2020	PfSH (HBC Member)	Not Confirmed	No	Not Secured	Not Calculated	At Inception	Low	1) Agree the need for a LES at the sub-regional level and draft a supporting business case 2) Achieve political support for a sub-regional LES 3) Agree common framework and benchmarks 4) Adopt the sub-regional framework at Borough Level and adapt to local context. 5) Implement changes in line with Local LES 6) Report on key performance indicators as required by the adopted LES 7) Continued compliance with air quality objectives	• Low Emission Strategy has not been included in the 2021-25 Business Plan • PfSH has committed to developing an Air Quality Supplementary Planning Document	• Nutrient Neutrality & Water Quality remains an overriding priority for PfSH
11	Strategic Road Transport Assessment (SRTM)	Transport Planning and Infrastructure	Other	2017-2020	2020/21	HBC, HCC	HBC, HCC	No	Secured, Released	Not Calculated	Complete	Low	1) Define Scope of assessment and commission, consult internally and with Highway Authority, agree final draft 2) Publication of a Mainland Transport Assessment 3) Publication of a Hayling Island Transport Assessment	• Mainland SRTM Report Published Feb '19 • Hayling Island Transport Assessment (HITA) Published Jan '19, Addendum published Nov '19, • Response to inspectors' findings (relating to HITA) published Dec '21 • County Level Strategy Local Transport Plan LTP4 published February 2024	• Local studies Risk being viewed to be out of date for supporting policies put forward in 2024/25 • May require update to support the revised 'Building a Better Future' Local Plan

2.3 $PM_{2.5}$ – Environmental Targets

The National Emission Ceilings Regulations 2018 (SI 2018/129) introduced the first binding obligation in respect of fine particulate matter ($PM_{2.5}$), requiring that the Secretary of State (SoS) ensue that total man-made $PM_{2.5}$ emitted within the UK does not exceed a specified percentage of those emitted in the base year of 2005.

The emissions ceiling is a limit, and does not refer to year-on-year reductions. It also only relates to man-made emissions, which differ from 'ambient air quality' (or 'concentration of an air pollutant') in that the definition excludes all natural and unallocated sources.

Between 2020 & 2029 National emissions ceiling level is 70% of 2005 emissions (i.e. a 30% reduction), and from 2030 the ceiling falls to 46% (a 54% reduction relative to 2005).

The emissions ceiling regulations pre-dated the 2021 publication of revised WHO guidelines for ambient air quality. The 2021 guidelines represented a substantial downwards revision of previous recommendations. The updated advice is based upon the latest available epidemiological evidence, but is made without regard for either the practicality or the cost of achieving the guideline levels. Consequently, while they are informative for assessing health impacts, they are not legally binding.

The UK government recognised the emphasis the WHO places on the non-threshold nature of the health impacts associated with exposure to air pollutants, where no clear 'safe' exposure level has been identified for $PM_{2.5}$. It also recognised the need for action to be taken to manage the transition from the statutory 2020-29 emissions ceiling (which has been met), to the more challenging 2030 level.

In response, The Environment Act 2021 created an obligation upon the Secretary of State to make regulations to set at least one environmental target for fine particulate matter ($PM_{2.5}$).

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2003/96) fulfilled this requirement, setting both a long-term exposure-, and exposure reduction- target, both with statutory status. 'Target' status is distinct from 'Limit', 'Objective', and 'Ceiling' values set for other pollutants under SI 2000/928, 2010/1001 & 2018/2019 (respectively), being subject to differences in the body responsible for their delivery, and in how compliance with the standard is to be judged. Interim targets have been laid out in the Environmental Improvement Plan 2023[11].

The Air Quality standards and emission reduction metrics for $PM_{2.5}$ are summarised in Table 2.2.

Table 2.2 – Standards & Emissions Metrics for Fine Particulate Matter (PM2.5)

Value	Averaging Period	Measured as / Note	Origin	Type	Status (& Responsible Body)
-30%	Annual	Reduction in man-made Emissions relative to baseline emissions in 2005. To be met for every year between 2020 & 2029.	EU	Emissions Ceiling	Statutory (SoS)
5 µg/m^3	Annual	Ambient concentration at a location of relevant exposure. Applies from 2021. Represents +4% excess mortality risk[13]	WHO	Guideline	Non-Statutory (-)
10 µg/m^3	Annual	Ambient, as Guideline. Applies from 2021. Represents +8% excess mortality risk[13]	WHO	Interim Guideline	Non-Statutory (-)
15 µg/m^3 [25 µg/m^3]	24 hr	99th percentile of 24hour exposures (no more than 4 exceedances per annum) at a location of relevant exposure. Applies from 2021. Represents +1% excess mortality risk[13] [Previous guideline, 2005-2021]	WHO	Guideline	Non-Statutory (-)
12 µg/m^3	Annual	Compliance calculated as UK annual 2040 Target. To be met by January 2028	UK	Interim Target	Non-Statutory (SoS)
-22%	Annual	Compliance calculated as UK 2040 reduction Target. To be met by January 2028	UK	Interim Target	Non-Statutory (SoS)
-46%	Annual	Reduction in Anthropogenic Emissions relative to baseline emissions in 2005. To be met in 2030 & all subsequent years.	EU	Emissions Ceiling	Statutory (SoS)
10 µg/m^3	Annual	Annual Mean of ratified periodic measurements at relevant monitoring stations. To be met by end of 2040.	UK	Target	Statutory (SoS)
-35%	Annual	Cumulative total change at qualifying monitoring stations, as % of the baseline (2016-2018 average). To be met by end of 2040.	UK	Target	Statutory (SoS)

[13] Excess Mortality risk as 'Hazard Ratio' (HR), which is not equivalent to an 'Attributable Fraction' (AF)

2.3.1 Fine Particulate Matter in Havant Borough

$PM_{2.5}$ is derived from both natural sources and man-made sources. Natural sources (sea salt in particular) may be particularly important within Havant Borough due to the proximity of urban areas to coastal waters. Nationally, around 5% of atmospheric $PM_{2.5}$ is thought to derive from this source on average, but within Havant a minimum of 16%, and up to 30% of total exposure is expected to derive from salt & residual sources.

Recent studies have shown as much as 40% of direct local emissions in the UK may derive from domestic solid fuel combustion, with industrial and transport contributions comprising 17% and 13% respectively, according to figures recognised by the UK government. Averaged contributions across the borough are 15.7%, 1.6%, 1.9% (domestic, total road & industry sources, respectively).

Within the worst affected locations Havant, total domestic sources of $PM_{2.5}$ are expected to have contributed <35% to total ambient exposures, with total road emissions contributing <6%, and Industrial emissions <3%.

These contributions compare favourably to the worst affected locations within the wider South East region, where domestic sources are expected to account for >43%, road contributions around 11%, and industrial emissions around 30% of total ambient exposure.

Comparisons of average contributions within Havant and across the South East are less favourable, probably due to the compact and generally densely-populated nature of Borough, contrasting with the comparatively greater proportion of sparsely-populated rural areas in the wider South East region which are more distant from man-made sources.

European transboundary emissions contribute as much as 20-30% towards the total atmospheric $PM_{2.5}$ within the UK. Of this, Sulphate and Nitrate aerosol together make up around 75% of imported $PM_{2.5}$. The greatest import of $PM_{2.5}$ from Mainland Europe has been shown to occur in Southern England, and due to its location, ambient concentrations in Havant are expected to be significantly influenced by transboundary anthropogenic emissions.

Shipping emissions also contribute significantly to concentrations in Southern England, estimated at around 5-10% of the total $PM_{2.5}$ within the region. Being located Northeast (down-prevailing-wind) of both Portsmouth Docks and the busy Isle of Wight shipping routes, $PM_{2.5}$ concentrations in the Havant area are likely to be significantly influenced by this source.

The Energy from Waste (municipal waste incineration) facility at Portsmouth is also likely to contribute to local emissions peaks in the area, although the likely extent is unclear as particulate emissions from the facility are reported as PM_{10} & the Particle-size-distribution is not known/reported. It is however notable that the grid square within the district that is

most affected by 'out-of-square' industrial sources of $PM_{2.5}$ is located at the Southwestern-most boundary of the borough, broadly down-prevailing wind of Portsmouth & just 3.4km from the facility.

Notwithstanding the contributions of the sources describes above, the most significant source of $PM_{2.5}$ within the borough is from secondary formation in the atmosphere from gaseous precursor pollutants. This source is expected to account for around 58% on average.

Havant Borough Council does not undertake monitoring of $PM_{2.5}$ within the borough, necessitating reliance upon nationally modelled air quality data for the making of an assessment. Such data are produced by Defra on a UK-wide 1km x 1km grid. The most recent release of the background maps uses 2018 as the reference year for meteorology & emission factors, and provides projections of background concentrations of $PM_{2.5}$ from 2018 to 2030.

Based upon these data, average estimated background $PM_{2.5}$ concentration in Havant for 2023 is 9.08 µg/m^3, with a maximum of 11.76 µg/m^3. Notably, the maximum modelled concentration already meets the 2028 interim ambient annual exposure target (Table 2.2).

2.3.2 Trends & Changes in Source Apportionment; 2019-2023

In Havant, averaged overall trends in the modelled data for the 5-year period to 2023 are characterised by shallow, but consistently declining year-on-year concentrations. A little over two-thirds of the variance in Ambient Annual $PM_{2.5}$ is explained by the model assumptions for changes in emissions over time during the period, indicating reasonable confidence in the trend.

When calculated for only the grid square with the greatest predicted Ambient $PM_{2.5}$ concentration, the strength of association is much greater, with 99% explained variance – probably due to the stronger influences of sources that are better characterised by the model assumptions.

Combustion-derived primary emissions of $PM_{2.5}$ from road transport are expected to have reduced over the period across all road types, by -44% on average in absolute terms, reducing the overall share of ambient concentration by -0.19%. This is probably driven by assumptions about an increasing proportion of vehicles on the roads with improved vehicle emissions standards, resulting from European market product regulations.

Conversely, non-combustion road transport emissions are expected to have increased over the same period, by +4.4% (absolute), increasing the overall contribution to total exposure by +0.13%. This probably reflects an assumption of a continued trend in consumer preference for larger, heavier, and more powerful conventionally fuelled road vehicles (e.g.

SUV's), and/or reflecting a growing proportion of electric/hybrid electric vehicles within the road fleet.

Whilst fine particulates originating from industrial & domestic sources are expected to have reduced in absolute terms (total industry -4%, domestic -0.8%), their relative combined contribution to overall exposure is still expected to have increased by +0.9% as a share of total ambient concentrations (due to greater falls in other source sectors).

In comparison to the wider South East region, the reduction in non-combustion road-transport derived $PM_{2.5}$ within Havant Borough is broadly in line with the regional average.

Proportional increases in non-combustion road sources within the borough are above those typical for the South East region, both on average (from a larger base in terms of proportional contribution), and at the worst affected grid square (from a lower base). This may reflect the length of the strategic road network present within the borough's relatively small geographic area.

Reductions in Domestic emissions within the borough are also smaller than are expected across the wider South East region on an averaged basis (from a larger proportional base), with similar trends when comparing across the worst affected grid squares. The assumptions underlying this trend are unclear, but may be related to socio-economic factors.

2.3.3 Trends & Changes in Source Apportionment; 2024-2028

Projecting trends in Ambient Annual $PM_{2.5}$ over the 2024-2028 period, trends remain shallow/declining (as in the preceding 5-year period, 2019-2023) but the predictive power is weaker – around 55% (compared with over 70% in the preceding 5-year period). The strongest association is now apparent across the averages, following a significant reduction in explained variance across the grid squares with maximum concentrations (99% in the preceding period, falling to 54% in the projected 5-year period).

This is interpreted as being likely to be due to a 'shallowing' of the slope (an expected reduction in the magnitude of concentration-change over time), as emissions reductions become more difficult from combustion-derived sources, and as consequential increases in non-combustion-derived sources become more important. Similarly, as the overall ambient concentrations reduce, the relative importance-, and therefore the relative influence- of secondary, natural & unallocated sources of $PM_{2.5}$, increases. These sources are likely to be less well represented by the model assumption, leading to wider spatial variability.

Across the wider South East Region, these local trends appear likely to be amplified by the variability of the context of the built environment within the region. Across the grid squares with maximum concentrations, associations are poor (explained variance <15%). When averaged, the explained variance falls below 50%.

As might be expected from modelled data, most of the relative sector contributions are broadly consistent with the preceding 5-year period in absolute terms, with some exceptions – notably including some expected local increases in industrial emissions.

Locally, relative increases in proportional contribution from non-combustion road-transport and domestic emissions are also expected, marginally outpacing similar changes in the wider South East region.

2.3.4 Certainty in Trends

The concentrations, comparisons and trends discussed in sections 2.3.2 & 2.3.3 are derived from modelled data, projected from a base year of 2018.

As Havant Borough Council does not monitor for $PM_{2.5}$, it is not possible using local data to verify how representitive these expected trends are of the Borough of Havant.

To assess the credibility of the modelled trends in ambient concentration of $PM_{2.5}$, a comparison was instead made between modelled trend data published by Defra and measurements from 6 AURN monitoring stations located within the Southern Region.

There are some differences between years and between different AURN sites in terms of the analyser type and the levels of data capture, however, in all cases the method used is considered by Defra to have met the requirements to be regarded as sufficiently equivalent to the reference-method so as to be able to be used in regulatory assessment without adjustment. The data used are from a range of environmental contexts, and are considered to represent a reasonable proxy for the purpose of testing the general trend within the region, to serve a guide to interpreting the credibility of the locally modelled trends.

It is notable that from 2019 the measured results only exceeded modelled background concentrations in the Bournemouth Area (at both Urban Traffic & Urban Background Monitoring Stations). At all other locations, measured concentrations fell below those predicted, and this held across a variety of environment types, including Urban Traffic, Urban & Rural Background locations.

In 2019, measured data falling below the modelled concentrations was generally within -10% of the modelled values. Data from Portsmouth was however more than -25% of the modelled concentration. This has the appearance of an outlier and may represent a systematic measurement bias, modelling bias*, or a genuine local environmental factor associated with the monitoring position which undermines it's representativeness of the wider region (*- e.g. model assumptions not accurately representing the Portsmouth area, leading to an over-prediction in this region). Data capture from Portsmouth is sufficient, and the result is valid, but is treated with caution.

In 2023, measured results generally showed greater deviation from the modelled values (relative to 2019 comparisons). Where measured values fell below the expected background concentrations, deviations were at least -10%, up to more than -26%. Where measured concentrations exceeded the modelled values (in the Bournemouth area), the deviations between modelled and measured averages were much less pronounced in 2023 – being broadly equivalent at the Urban Background Site and around +15% at the Urban Traffic location – down from a deviation of +54% in 2019.

At the 6 AURN sites examined, measured tends were steeper than those derived from modelled data (as indicated increased negative slope values, Table 2.3); suggesting both a greater real-world performance in achieving air quality improvements than would is expected from the baseline modelling, and that an increasing deviation may be expected over time.

It might generally be expected that modelled concentrations would become less accurate with longer projection periods. Based upon these comparisons, it would appear that this may be the case, and that the underlying model may now need to be re-based.

It is not entirely clear why progress with emissions-reduction has been so strong in recent years. It is possible that it is related to shifts in working patterns & influences on the economy that were triggered by the SARS-CoV-2 pandemic and which were unforeseen & therefore not accounted-for within the 2018 model assumptions. Such changes are not without political, social, and economic counter-pressures, and it is not yet clear that these trends are sufficiently entrenched as to represent a 'new normal' upon which future trends may be reliably judged. This may be especially so with a new government in power that is prioritising productivity and economic growth as a policy centrepiece. There remains a possibility of at least a partial reversal of such trends in future years.

Similarly, notwithstanding the apparently broad compliance with even the 10µg/m^3 2040 annual exposure target, it is noted that performance against short-term guideline values is not so assured. Even at the best performing site examined, at the rural background monitoring AURN site at Chilbolton, the 2021 WHO short term exposure guideline was still exceeded on +14 days of 2023 over & above the recommended limit (of 4 days/annum).

This is down from 44 exceedance days in 2019, and this pattern of reduction is typical across all sites examined. The poorest performing site is Portsmouth, experiencing a reduction of less than half that achieved at the next worst (5th ranked) site examined (Southampton). This may be in part a product of the qualitative outlying results at Portsmouth in 2019, with results being much more consistent between 2019 & 2023 at this this location, when compared with other AURN datasets.

A summary of comparison metrics are presented in Tables

Table 2.3 – Regional AURN Sites, Comparison of Measured Data with Defra Modelled Background (PM2.5)

AURN Site	Modelled			Measured			Comparison		
	Annual Mean		Slope	Annual Mean		Slope	Trend	Measured as % of Modelled	
	2019	2023		2019	2023		Measured [Modelled]	2019	2023
	µg/m³	µg/m³		µg/m³	µg/m³			%	%
Chilbolton	8.41	7.85	-0.14	8.06	6.43	-0.15	Declining [Declining]	96%	82%
Southampton Centre	10.46	9.87	-0.19	9.78	8.26	-0.50		93%	84%
Portsmouth	12.19	11.55	-0.08	8.91	8.49	-0.49		73%	74%
Worthing A27	10.44	9.83	-0.03	10.07	8.64	-0.48		96%	88%
Christchurch Barrak Rd.	8.27	7.73	-0.11	12.77	8.92	-0.61		154%	115%
Bournemouth	9.27	8.71	-0.14	10.81	8.74	-0.29		117%	100%

Table 2.4 – Regional AURN Sites, Peak 24hr Means & Guideline Exceedance Days (PM2.5)

AURN Site	Site Environment Type	2019				2023			
		Max 24hr Mean	No. Days >15 µm/m³	No. Days >25 µm/m³	Capture	Max 24hr Mean	No. Days >15 µm/m³	No. Days >25 µm/m³	Capture
		µg/m³	Count		%	µg/m³	Count		%
Chilbolton	Rural Background	43.98	44	14	100%	26.88	18	1	100%
Southampton Centre	Urban Background	45.84	57	23	99%	33.44	34	8	100%
Portsmouth	Urban Background	47.89	45	14	94%	36.43	36	6	100%
Worthing A27	Urban Traffic	45.71	54	15	99%	29.33	9	1	50%
Christchurch Barrak Rd.	Urban Traffic	52.25	83	32	96%	30.83	30	5	88%
Bournemouth	Urban Background	44.71	60	18	98%	33.33	26	6	96%

2.3.5 Public Health Outcomes

Natural sources of $PM_{2.5}$ are generally thought likely to cause negligible harm relative to the serious harm that can be caused by organic compounds associated with combustion (e.g. black carbon). Combustion-derived organic's are typically fat-soluble, chemically persistent, and bioactive; capable of accumulating within body tissues and causing both short-term harm (e.g. inflammatory immune response) and long-term harms (e.g. affecting foetal development or contributing to the development of cancer).

The Public Health Outcomes Framework[14] indicator D01 *'fraction of mortality attributable to particulate air pollution'* represents the mortality burden associated with long-term exposures to $PM_{2.5}$ as a percentage of the annual deaths from all causes in those aged 30+. The indicator does not differentiate between cumulative sporadic short-term exposures to high daily average concentrations, and consistent exposure to moderate concentrations – it's focus is the latter, but the effects will include elements of the former, as illustrated by Table 2.4 above.

Public Health England's 'Estimating Local Mortality Burdens associated with Particulate Air Pollution'[15] provides guidance on calculating the number of deaths locally attributable to particulate matter pollution.

Relative risk (RR) is calculated as:

$$RR = 1 + (0.06 * \frac{\chi}{10})$$

Where χ is the $PM_{2.5}$ concentration representing typical annual average ambient exposures for a geographic area (as measured, or derived from modelling data for a specific location).

The attributable fraction (AF) of mortality is then calculated using the derived RR value:

$$AF = \frac{RR - 1}{RR}$$

Given that the regional trend comparisons show an average measured:modelled concentration ratio of 0.90 across all environment types, it is reasonable to reduce the local modelled values accordingly to adjust for the probable real-world concentrations.

[14] OHID (2021). Public Health Outcomes Framework.

[15] Public Health England (2014). Estimating Local Mortality Burdens associated with Particulate Air Pollution.

Table 2.5 – Local Deaths Attributable to fine Particulate Pollution

Metric used for X (Modelled, Annual Average)	X (µg/m^3)	Relative Risk (RR)	Attributable Fraction (AF)	Local Deaths Attributable to fine Particulate Pollution
For Comparison with 2023 ASR	**X = X**	**1+(0.06*x/10)**	**(RR-1)/RR**	**AF as %**
Borough Average	9.08	1.054	0.0516	5.16 %
2040 Exposure Target / WHO Interim Guideline	10.00	1.060	0.0566	5.66 %
2021 WHO exposure Guideline	5.00	1.030	0.0291	2.91 %
Discounted	**X = (X*0.9)**	**1+(0.06*x/10)**	**(RR-1)/RR**	**AF as %**
Maximum Grid Square Concentration	10.58	1.064	0.0597	5.97 %
Minimum Grid Square Concentration	6.62	1.040	0.0382	3.82 %
Borough Average	8.17	1.049	0.0467	4.67 %
Leigh Park Average	10.12	1.060	0.0572	5.72 %

The 2024 comparison rate of 5.17% of deaths in Havant were caused by particulate pollution represents a 0.07% decrease on the 2023 ASR estimate, reversing an increasing trend, but not entirely eliminating the 0.2% increase previously noted.

However, the discounted values are considered to be more representitive, and to remain conservative based upon real-world regional trends. These values represent a borough average of 4.47% attributable deaths, increasing to 5.97% at the location which modelling suggests is likely to experience the highest average exposures.

All of the top 4 ranked grid squares for $PM_{2.5}$ exposure are located in the Leigh Park residential area. This area is expected to experience an average of +2.8% additional mortality burden[16] relative to exposures at the WHO guideline (or +0.1% relative to the statutory 2040 target level16).

[16] As Attributable Fraction (AF)

Short-term exposures also contribute to the adverse health outcomes, and in turn, to the fraction of excess mortality that is attributable to air pollution. Similar to the statutory objectives, limits and targets; the WHO guideline values do not represent zero harm. This means that even where air quality is compliant with the 2021 guideline values, there is a baseline level of excess mortality that is acknowledged, but which is considered acceptably-low provided that the absolute concentrations on exceedance days are not excessive, and the number of exceedance days does not exceed around 1% of the year. Each additional exceedance day beyond this will contribute to undesirable cumulative harms arising from repeated short-term exposure, even where the annual averages are otherwise compliant with statutory limits.

Of the AURN sites examined as an indication of regional trends, Chilbolton is the best-performing location, with short term exposure adding <+0.65% excess mortality[13] in 2023, additional to the guideline level (<+1.6% total/gross). At the worst performing Urban Traffic oriented locations, excess mortality risk arising from short-term exposures was between 0.65% & <+1.46% above guideline (<+2.44% total/gross).

In 2019, excess mortality risk[13] was between 2.44% & <3.25% gross at all locations examined (including the best performing rural background location at Chilbolton), which serves to illustrate the rate of progress made in recent years, but also the magnitude of health impacts that might be expected if a reversal of recent emissions trends arises in future as a result of economic recovery policy (as discussed in 2.3.4 above). While relatively modest, the potential additional contribution is non-negligible; underscoring the importance of taking proportionate steps to support progress toward the -35% exposure reduction target.

2.3.6 Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[12], local authorities are expected to contribute to the Secretary of State's population exposure reduction target(s) by considering fine particulate matter ($PM_{2.5}$) emissions / concentrations when exercising their routine administrative functions. Local Authorities are obliged to have regard to the guidance and the strategy as provided by s81A & s88 of 1995 c.25[17].

Chapter 2 of the Policy Guidance establishes a requirement for Local Authorities which are not obliged to designate a an AQMA to instead draw up a local Air Quality Strategy from

[17] Environment Act 1995 c.25 Part IV

2023. There is no set format or objective for the local Air Quality Strategy, no strict requirement that it must specifically address $PM_{2.5}$, and no requirement that the outcomes of any actions detailed within the strategy must be quantified and measurable so as to allow empirical tracking of local progress between LAQM reporting years.

Similarly, there is no express requirement that the strategy take the form of a stand-alone document, nor that progress in it's implementation be separately reported – it is implicit that any progress is expected to be reported as an integral part of the LAQM ASR process, albeit with no specific performance expectations.

This notwithstanding, Chapter 8 of PG22 (fine particulate matter) provides that Local Authorities should proactively identify existing actions which contribute toward reductions in $PM_{2.5}$ and where applicable, identify new proactive measures to tackle $PM_{2.5}$.

As outlined in the sections 2.3.4 & 2.3.5 above, even in the areas with the highest concentrations, $PM_{2.5}$ levels are already compliant with the 2028 target levels, and are on a trend trajectory to fall below the 2040 target levels well ahead the target date.

In this context, additional priority measures are unlikely to be required.

Havant Borough Council has not yet adopted an air quality strategy, but this has now been added to Table 2.1 as a priority action for 2024-25.

It is expected that a local strategy for Havant would be limited in scope, codifying overarching general measures to apply downward pressure on local emissions, without requiring measures to be subject to full cost accounting, specific emissions reductions estimates, or performance monitoring; generally in accordance with the other voluntary measures outlined in Table 2.1.

The principal reasons for this may be summarised as;

1) the widespread compliance with statutory targets having been demonstrated to be likely across the borough as a whole,
2) the anticipated measures being likely to deliver relatively intangible benefits in terms of quantifiable reductions of $PM_{2.5}$, not lending themselves to performance monitoring (e.g. demonstrating $PM_{2.5}$ reductions as a direct result of residential or workplace travel plans, due to poor survey return rates) and,
3) the costs of implementation of anticipated measures often fall to various parties and will be difficult to accurately quantify (e.g. developer-delivered active transport infrastructure)

Whilst there are no measures currently being implemented, or which are currently planned to specifically target reductions of $PM_{2.5}$ concentrations within Havant Borough, it is nevertheless expected that the combination of direct investments in sustainable travel infrastructure, policy measures and actions described in Table 2.1 will contribute to reductions in both direct emissions & secondary formation of $PM_{2.5}$.

It is expected that these measures will provide proportionate support to the existing reducing trends in ambient atmospheric concentrations, sufficient to meet the policy obligations.

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

This section sets out the monitoring undertaken within 2023 by Havant Borough Council 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

Havant Borough Council did not undertake automatic (continuous) monitoring during 2023.

3.1.2 Non-Automatic Monitoring Sites

Havant Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 25 locations during 2023. Table A.1 in Appendix A presents the details of the non-automatic sites.

Havant Borough Council keeps it's monitoring strategy under review, proactively amending monitoring locations to ensure resources are deployed effectively. The following recent changes have been made:

1. TRL Sites 36296_1 & 36296_2 triplicate exposure sites were commissioned in July 2022, as part of a regional assessment of emissions from the strategic trunk road network (While HBC commissioned and managed the site, results are sent directly to TRL and were not available to Havant Borough Council in time for ASR 2023 reporting)
2. TRL Sites 36296_1 & 36296_2 were de-commissioned in December 2023 at the request of TRL (Results from July-December 2023 were not available to the Council at the time of writing the ASR 2024)
3. TRL Site 36296_3 was commissioned as a triplicate exposure site in January 2024, positioned approximately 15m closer to the carriageway in a down-wind direction.
4. Site 25 was relocated after May 2023, due to a withdrawal of permission to manage vegetation adjacent to the tube position. A new equivalent location was selected and

established in October 2023. The tube position retains it's site number, but has gained a 'B' position suffix.

5. Sites 29 & 36 were decommissioned in January 2024, following their December 2023 exposures. It was considered that these locations had delivered achievable value, and that resources should be deployed elsewhere to generate empirical data on different a road link.
6. Sites 37 & 38 were established on Southleigh Road, at positions north & south of a railway level crossing, to assess the impact of engine idling at the crossing, and the impact of school run traffic on both local residents and pupils of the local Warblington secondary school.

Maps showing the location of the monitoring sites are provided in Appendix D.

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 (NO2)

Table A.2 in Appendix A compares the measured NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. 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).

The full 2023 dataset of diffusion tube 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 (see footnotes to Table B.1).

Of 246 individual measurements taken during 2023, just 10 (4%) came within 10% of the objective value, and only 4 (1.6%) exceeded it. Individual measurements exceeding 40 µg/m^3 were identified at two separate locations, with all such measurements being taken in the winter season.

No monitoring location exceeded the annual mean NO_2 obejctive during 2023. The maximum recorded 'point of measurement' annual mean concentration was 28.0 µg/m^3, at

site 28. This represents a concentration of around 30µg/m^3 at the nearest point of relevant exposure – 20% less than the objective value.

This maximum estimated relevant annual mean exposure is around half of the 60 µg/m^3 annual mean threshold value which is generally taken to represent a risk of exceeding the short term exposure objective of 200µg/m^3 (hourly, with more than 18 exceedances per annum).

On this basis, the risk of an exceedance of the short term objective having occurrred at any relevant location within the Borough of Havant during 2023 is consdiered to be negligible.

19 out of the 25 monitoring locations have 5 years of available monitoring data. Of these, all 19 demonstrated an overall downward trend between 2019 and 2023.

Between 2022 and 2023, the NO_2 concentrations at most sites remained very similar, with around 20% of locations recording a marginal year on year increase, and 80% a year-on-year decrease. Those representing an increase were clustered around links to A27 at the Havant junction, suggesting a link with traffic sources.

Figures Figure A.2 & Figure A.3 show recent trends in NO_2 concentrations at the local diffusion tube monitoring locations, reported by Environment Type & averaged over the past 5 years. The monitoring data shows an overall stable or slight decreasing trend between 2019 and 2023. The minimum recorded values correspond with the imposition of SARS-CoV2 controls in the Late-Winter & Spring/Summer of 2020. This notwithstanding, averaged concentrations in 2023 were at or below the SARS-CoV2-suppressed 2020 levels across all represented environment types, with Kerbside locations recording the strongest declining trend.

The current UK objective level for NO_2 is equivalent to the WHO 2021 Interim target 1, representing +9% in excess respiratory mortality risk[13] over & above the 2021 WHO Guideline level (+12% gross/total). At the maximum recorded annual average level within the Borough (Park Road South, Havant), the contribution of NO_2 exposures to respiratory mortality risk is approximately +9% (gross/total). The risk at all other locations within the borough is likely to fall well below this level, with average background exposures accounting for around +3.5% gross/total excess respiratory mortality[13] (or approximately +2.2% on an ‘all non-accidental deaths’ basis[13]).

Appendix A: Monitoring Results

Table A.1 – 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) (3)	Distance to kerb of nearest road (m) (2) (3)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
2	Rectory Road	Suburban	471742	105794	NO_2	No	-3.4	11.0	No	2.8
3	Havant Road, Hayling Island	Kerbside	472198	102048	NO_2	No	0.8	1.0	No	2.6
4	New Brighton Road	Suburban	474850	106504	NO_2	No	6.2	2.5	No	2.7
7B	Brockhampton Lane	Urban Centre	471180	106064	NO_2	No	-5.3	8.0	No	2.7
8	London Rd Purbrook	Roadside	467364	107981	NO_2	No	-0.4	2.5	No	2.7
10	Ramblers Way	Suburban	470028	110044	NO_2	No	-15.5	43.5	No	2.7
12	Xyratex	Roadside	471613	105672	NO_2	No	3.3	2.8	No	2.5
14	Elm Park Road	Suburban	471783	106794	NO_2	No	5.0	1.8	No	2.7
18	Waterlooville Precinct	Urban Background	468264	109400	NO_2	No	0.0	120.0	No	2.5
19C	Langstone Road East (Woodbury)	Roadside	471637	105687	NO_2	No	1.0	3.8	No	2.6
20	Bosmere Junior School	Urban Centre	471706	105933	NO_2	No	-17.1	35.0	No	2.4
22	Park Road South (Bulbeck Jctn)	Roadside	471573	106199	NO_2	No	7.0	2.0	No	3.1
25	Stakes Hill Road	Roadside	468478	107725	NO_2	No	1.0	4.5	No	2.6
27	Havant Precinct	Urban Background	471654	106287	NO_2	No	0.0	82.0	No	2.5
28	Park Road South (West Street)	Roadside	471577	106280	NO_2	No	-2.3	4.8	No	2.8
29	Orchard Road	Suburban	472019	105800	NO_2	No	-13.1	31.0	No	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) (3)	Distance to kerb of nearest road (m) (2) (3)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
30	St. Peters Square, Emsworth	Urban Centre	474957	105731	NO_2	No	0.0	2.8	No	2.7
31	Emsworth Rd. North	Roadside	472882	106088	NO_2	No	-1.6	5.1	No	2.5
33	A3 Maurepas Way, Waterlooville	Roadside	467966	109243	NO_2	No	0.9	2.6	No	2.8
34	Swiss Road	Urban Centre	468040	109199	NO_2	No	-13.3	20.0	No	2.8
35	Milton Road	Kerbside	467736	110085	NO_2	No	3.3	0.9	No	2.8
36	Apsley Lodge	Urban Centre	468294	109573	NO_2	No	-16.0	25.0	No	2.1
W10	Compton Court (New Road)	Roadside	471368	106805	NO_2	No	0.0	12.5	No	2.4
36296_1	TRL Pook Lane S of A27 (Triplicate)	Suburban	472551	105752	NO_2	No	-20.0	28.0	No	2.4
36296_2	TRL Pook Lane N of A27 (Triplicate)	Suburban	472593	105859	NO_2	No	-21.0	30.0	No	2.3

Notes:

Locations have been omitted where no new data has been collected in 2021 or 2022. Data may be available for other locations from 2018-2020. See earlier reports.

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

Negative Values indicate that the receptor is closer to the principal road link (target source) than is the point of measurement.

Distances represent the relative difference between the point of measurement and the relevant exposure located closest to the kerbside of the road segment for which the measurement is considered to be representitive. Distances are measured perpendicular to carriageway kerb at their respective positions on the road link. The receptor may be some distance from the measurement location where traffic conditions on the road link are considered conceptually equivalent (in terms of traffic volume, flow conditions and local topographic character)

(2) Nearest busy road link. This value does not represent the distance to the nearest carriageway, whether adopted highway or private.

(3) Earlier reports may list closest actual (point-to-point) distance and 'conceptual distance from link' separately, and/or may list values as absolute distances from the kerbside of the road link, rather than the relative distance. Distances reported may therefore differ from previous reports even where neither the monitoring position nor the worst-case building line has changed.

Table A.2 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m3)

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
2	471742	105794	Suburban	100	99.7	22.3	18.2	20.1	18.5	18.5
3	472198	102048	Kerbside	100	99.7	28.8	22.7	24.7	25.0	23.1
4	474850	106504	Suburban	64.8	74.6	18.6	14.4	15.4	15.4	15.5
7B	471180	106064	Urban Centre	100	99.7	24.5	19.5	21.0	20.2	19.4
8	467364	107981	Roadside	91.8	91.8	26.9	18.8	22.2	20.9	18.9
10	470028	110044	Suburban	100	99.7	20.0	15.0	16.6	16.2	14.4
12	471613	105672	Roadside	100	99.7	25.4	20.6	23.9	22.6	22.3
14	471783	106794	Suburban	91.8	91.8	17.9	15.8	15.9	14.7	13.7
18	468264	109400	Urban Background	100	99.7	17.6	13.3	15.1	14.1	13.0
19C	471637	105687	Roadside	92.1	92.1	33.9	27.7	29.9	28.4	26.7
20	471706	105933	Urban Centre	100	99.7	25.7	19.9	20.2	19.1	19.8
22	471573	106199	Roadside	91.8	91.8	30.7	23.7	25.9	26.7	25.4
25	468478	107725	Roadside	57.4	57.4	24.1	18.3	18.5	17.9	16.4
27	471654	106287	Urban Background	91.8	91.8	20.9	19.7	19.9	19.2	18.8
28	471577	106280	Roadside	100	99.7	33.4	25.1	28.6	28.9	28.0
29	472019	105800	Suburban	91.8	91.8	21.6	16.3	17.8	16.5	16.6
30	474957	105731	Urban Centre	100	99.7	16.2	12.2	13.9	12.8	12.3
31	472882	106088	Roadside	100	99.7	29.6	23.4	25.5	21.4	20.9
33	467966	109243	Roadside	91.8	91.8	-	19.9	22.6	21.6	19.4
34	468040	109199	Urban Centre	100	99.7	-	17.2	18.3	17.8	16.5
35	467736	110085	Kerbside	100	99.7	-	25.0	27.1	26.7	24.4
36	468294	109573	Urban Centre	91.8	91.8	-	14.4	16.6	17.0	14.7

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
W10	471368	106805	Roadside	100	99.7	26.7	21.4	24.8	23.8	21.2
36296_1 (Averaged)	472551	105752	Suburban	100	49.7	-	-	-	-	20.9
36296_2 (Averaged)	472593	105859	Suburban	100	49.7	-	-	-	-	17.1

☒ **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: Supporting Technical Information / Air Quality Monitoring Data QA/QC 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 – Annual Pattern of Monthly Mean NO_2: Average Year 2013-2023

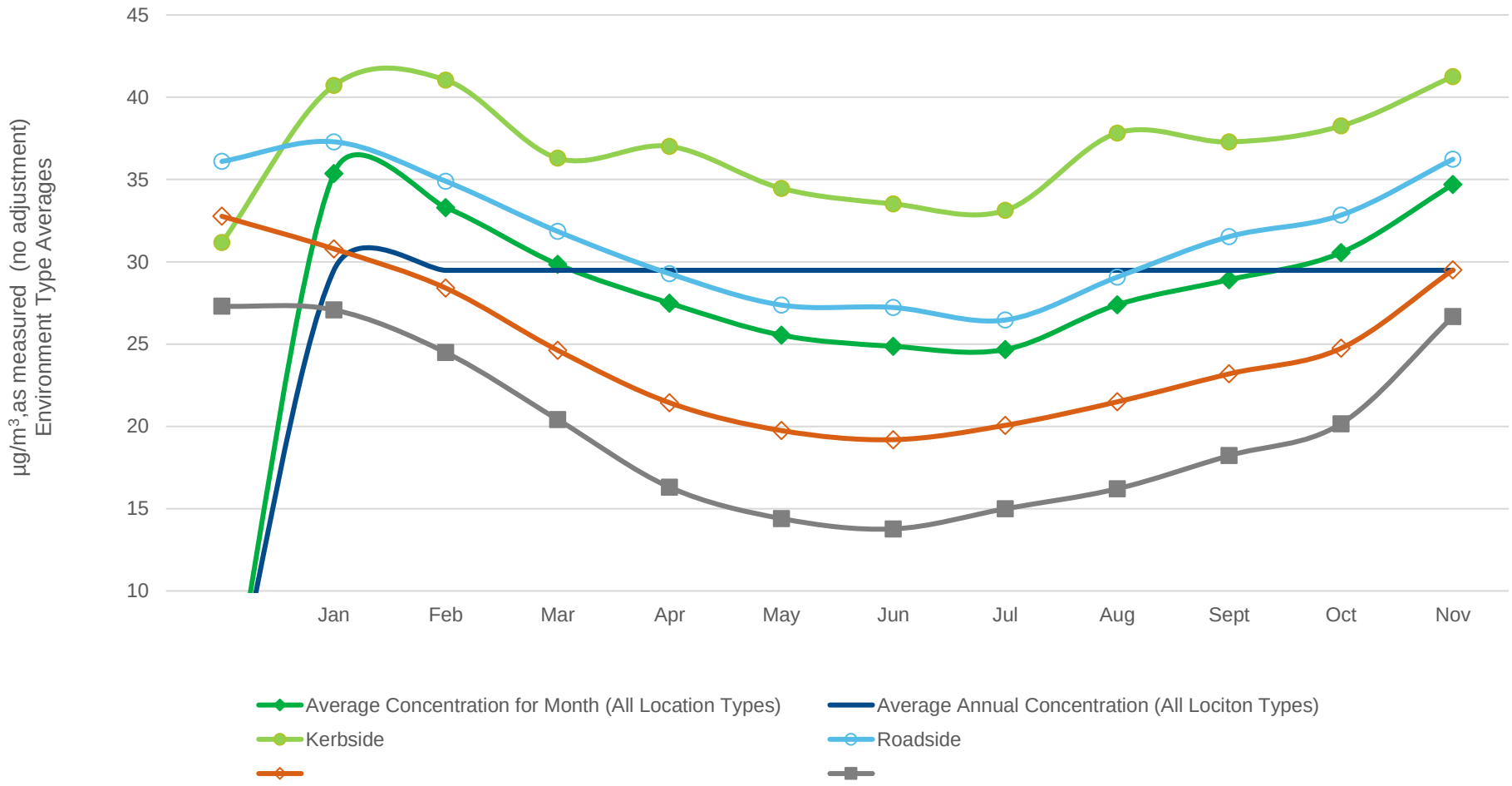


Figure A.2 – Trends in Annual Mean NO_2 Concentrations: Roadside & Urban Centre Averages, 2019-2023

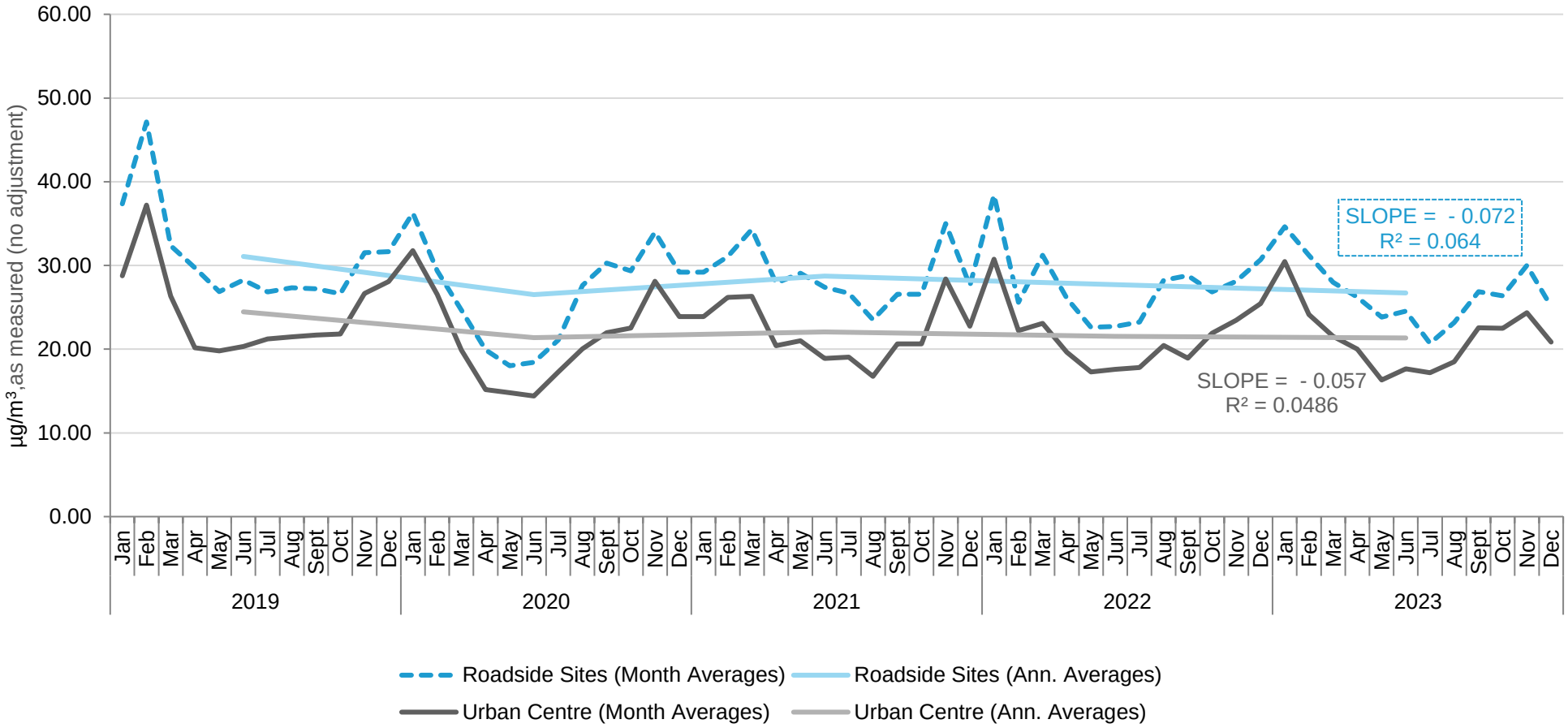
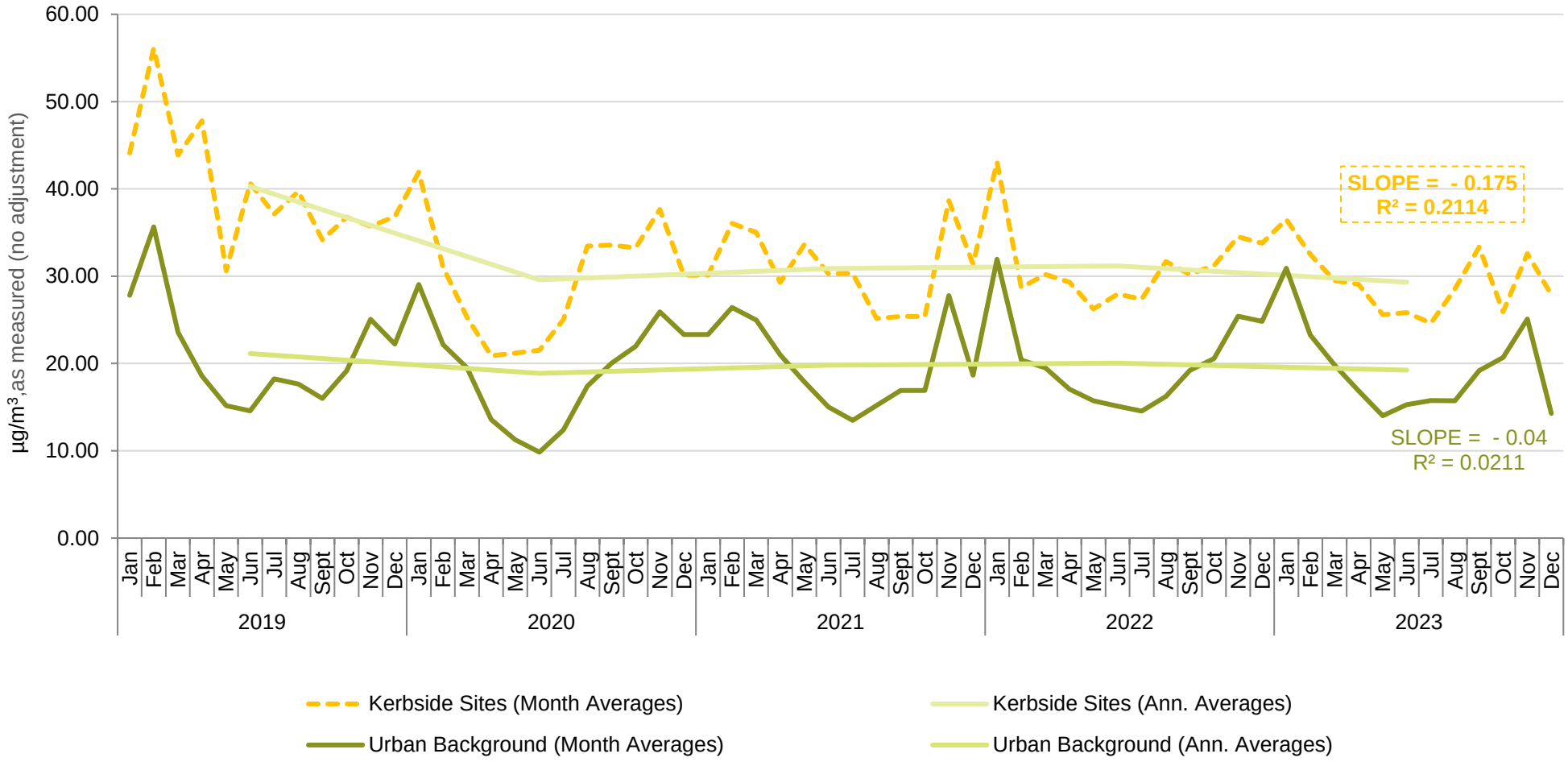


Figure A.3 – Trends in Annual Mean NO_2 Concentrations: Kerbside & Urban Background Averages, 2019-2023



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO2 2023 Diffusion Tube Results (µg/m3)

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 (1)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
2	471742	105794	34.8	29.7	17.2	22.1	18.9	19.3	17.1	21.0	20.9	22.9	28.5	21.4	22.8	18.5	18.6	
3	472198	102048	37.9	29.5	27.1	27.7	22.5	24.6	22.0	30.5	31.7	29.1	32.7	26.6	28.5	23.1	-	
4	474850	106504		21.4	17.2		14.0	15.7	13.5	14.1	28.2	17.9	20.5		18.1	15.5	-	
7B	471180	106064	32.4	27.2	26.2	21.9	16.9	18.8	21.3	21.0	23.6	26.8	27.3	23.3	23.9	19.4	20.8	
8	467364	107981	29.0	27.8	28.8	23.6	19.3	20.8	18.7	19.6	18.2	25.7	25.2		23.3	18.9	19.1	
10	470028	110044	25.0	20.6	17.7	18.6	14.5	16.0	11.7	14.9	21.0	19.2	19.1	15.1	17.8	14.4	15.2	Monitor is > 10m from kerb than monitor.
12	471613	105672	37.6	34.5	32.8	27.5	27.2	24.8	17.5	23.0	27.8	25.1	30.6	22.0	27.5	22.3	-	
14	471783	106794	26.6	18.6	19.4	13.3	11.7	12.3	14.1	13.2	17.3	19.2	21.0		17.0	13.7	-	
18	468264	109400	26.4	19.8	16.1	14.6	12.3	12.3	10.0	12.0	15.5	16.7	22.2	14.3	16.0	13.0	-	
19C	471637	105687	49.5	41.4	25.0	31.0	31.3	29.6	27.0	28.7		31.9	37.2	30.5	33.0	26.7	-	
20	471706	105933	33.7	24.9	26.1	21.5	15.4	19.8	25.0	22.5	26.2	26.2	25.4	26.8	24.5	19.8	20.9	Monitor is > 10m from kerb than monitor.
22	471573	106199	37.1	34.9	34.0	30.5	28.3	27.6	27.1	27.4	34.8	33.4	30.0		31.4	25.4	-	
25	468478	107725	28.4	22.7	20.0	18.7	14.5					26.0	26.3		22.4	16.4	-	
27	471654	106287	35.4	26.7	23.6	19.2	15.7	18.3	21.5	19.5	22.9	24.7	28.0		23.2	18.8	-	
28	471577	106280	43.4	40.4	37.1	33.9	34.3	32.4	30.0	31.3	37.1	34.6	34.6	25.8	34.6	28.0	30.4	
29	472019	105800	29.7	21.8	22.5	18.4	13.0	16.6	17.0	17.1	20.1	22.7	26.0		20.4	16.6	17.7	Monitor is > 10m from kerb than monitor.
30	474957	105731	24.6	18.1	13.3	14.2	12.7	12.4	10.7	12.0	14.1	15.2	20.1	14.6	15.2	12.3	-	
31	472882	106088	32.8	29.4	27.7	24.4	20.3	21.8	20.0	23.3	28.0	30.4	27.7	24.0	25.8	20.9	21.8	
33	467966	109243	29.5	30.5	24.1	26.2	23.7	22.6	13.4	16.0	25.2	22.5	29.3		23.9	19.4	-	
34	468040	109199	30.5	23.5	20.4	17.7	15.2	15.4	14.4	20.7	18.6	22.6	26.4	19.0	20.4	16.5	18.8	Monitor is > 10m from kerb than monitor.
35	467736	110085	35.1	35.5	31.9	30.4	28.7	27.0	27.2	26.6	35.0	22.8	32.5	29.1	30.1	24.4	-	
36	468294	109573	24.0	19.4	19.9	18.4	12.9	15.7	14.1	15.6	21.0	19.9	18.9		18.2	14.7	16.1	Monitor is > 10m from kerb than monitor.
W10	471368	106805	33.0	28.4	31.4	28.0	26.2	24.6	21.1	24.2	27.3	15.5	30.1	23.9	26.1	21.2		

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 (2)	Annual Mean: Distance Corrected to Nearest Exposure (3)	Comment
36296_1 A	472551	105752	35.5	28.5	17.8	21.4	24.9	19.4							24.9	20.9	26.9	Triplicate Site - Annual data provided for aggregated results only. Monitor is >10m further from Kerb than the Receptor
B	472551	105752	35.5	31.6	17.8	21.0	24.7	20.8										
C	472551	105752	34.6	31.9	17.6	19.7	24.2	21.3										
36296_2 A	472593	105859	24.3	24.4	23.0	19.9	13.8	17.2							20.4	17.1	20.1	Triplicate Site - Annual data provided for aggregated results only Monitor is >10m further from Kerb than the Receptor
B	472593	105859	26.7	22.5	23.2	18.9	14.3	16.7										
C	472593	105859	24.7	22.7	24.0	18.6	14.7	16.8										

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

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

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used (1), (2)**

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

☒ **Havant Borough Council 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.

(1) Bias adjustment factor of 0.81 applied to tube analysed by Staffordshire Scientific Services (36296_1 A-C & _3 A-C)
(2) Bias adjustment factor of 0.86 applied to tube analysed by Gradko International Ltd. (2-36 & W10)
(3) Distance correction for relevant exposure is required where the receptor is closer to the target road link than is the monitor, and where bias adjusted data falls within -10% of the Air Quality Objective Value (i.e. where adjusted result >36 ug/m3)

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

C.1 New or Changed Sources Identified Within Havant Borough Council in 2023

An industrial unit in Marples Way, Havant is subject to a retrospective application for operation of a dust extraction system (presently operating). This represents a primary source of $PM_{2.5}$ capable of affecting air quality at the nearest residences. This has been subject to emissions monitoring and an air quality assessment, and a scheme of proportionate mitigation to reduce the magnitude of it's impact is being sought. No air quality standards are considered likely to be breached – the basis for seeking mitigation is under NPPF health-focussed policy, with assessments referring to WHO guidelines, not to statutory objectives, limits or targets.

C.2 Additional Air Quality Works Undertaken by Havant Borough Council in 2023

HBC has not completed any additional works in 2023.

C.3 QA/QC of Diffusion Tube Monitoring

HBC's NO_2 diffusion tubes are supplied and analysed by Gradko International Ltd., using the 20% TEA in Water preparation.

TRL's NO_2 diffusion tubes (Managed by Havant Borough Council) are supplied and analysed by Staffordshire Scientific Services Ltd..

Both Laboratories supply Tubes with the 20% TEA in Water preparation, which conforms to the guidelines set out in Defra's Practical Guidance[18] document.

Satisfactory Laboratory performance is assured via the AIR NO_2 PT scheme. This scheme forms an integral part of the UK NO_2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM).

[18] AEA Energy & Environment, Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance for Laboratories and Users. ED48673043 Iss. 1a. 2008

Both suppliers participate in the AIR NO_2 PT scheme, achieving 100% in all reported rounds in 2023. (AIR055, 056 & 058; Jan–Feb, May-Jun & July-Aug 2023, respectively)

Diffusion tubes in 2023 were deployed largely in adherence to the Defra Diffusion Tube Monitoring Calendar +/- the standard 2 day allowance. Exposures between January & March differed by a maximum of 7 days (on a 4 week exposure). Data has been processed using the Defra Issued diffusion tube data processing tool, which automatically applies a time-weighted average for deviating exposures.

3.2.2 Diffusion Tube Annualisation

Annualisation is valid to correct for any data capture rate falling between 25% & 100%, but is only strictly required where data capture falls below 75%. Any sites with a data capture below 25% are not considered to be eligible for annualisation for regulatory purposes, with any results calculated having 'indicative' status only.

Less than 9 months (i.e. <75%) data was either collected-, or was available for reporting at the time of writing-, at Diffusion Tube locations identified as site 4, site 25(/25B), and TRL triplicate locations 36296_1 & 36296_2.

Annualisation has been calculated for these locations. Results are summarised in Table C.1.

Table C.1 – Annualisation Summary (concentrations presented in µg/m3)

Site ID	Annualisation Factor					Raw Data Annual Mean	Annualised Annual Mean
	Ports (Cntr.) UKA00421	Ports (Anglesey) UKA00651	Soton (Cntr.) UKA00235	Soton (A33) UKA00613	Average Ann. Factor		
4	1.0752	1.0424	1.0778	1.0435	1.0597	18.1	19.1
25	0.8787	0.9166	0.9163	0.9181	0.9074	22.4	20.3
36296_1 A	0.9427	0.9638	1.0407	0.9648	0.9780	24.9	24.4
36296_1 B	0.9427	0.9638	1.0407	0.9648	0.9780		
36296_1 C	0.9427	0.9638	1.0407	0.9648	0.9780		
36296_2 A	0.9427	0.9638	1.0407	0.9648	0.9780	20.4	19.9
36296_2 B	0.9427	0.9638	1.0407	0.9648	0.9780		
36296_2 C	0.9427	0.9638	1.0407	0.9648	0.9780		

3.2.3 Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 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 analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Where Local Authorities operate an AURN monitoring site, 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. Havant Borough Council does not operate a continuous monitor, so it is not possible to calculate a local factor.

A national database of all diffusion tube co-location surveys is maintained, and this can be used to provide an averaged bias factor for the relevant laboratory and preparation method.

Havant Borough Council have applied bias adjustment factors derived from the national database, 0.81 & 0.86 for samples analysed in 2023 by Gradko & Staffordshire Scientific Laboratories respectively. A summary of bias adjustment factors used by Havant Borough Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factors Used 2019-2023

Monitoring Year	Local or National	If National, Version of National Spreadsheet	NO. of Available Studies	Adjustment Factor
Gradko International Ltd. – 20% TEA in Water				
2023	National	06/24	27	0.81
2022	National	03/23	33	0.83
2021	National	03/23	34	0.84
2020	National	09/21	27	0.81
2019	National	09/21	31	0.91
Staffordshire Scientific Ltd. – 20% TEA in Water				
2023	National	06/24	12	0.86
2022	National	06/24	13	0.86
2019-2021	(Not Required – Lab not used during period)			

3.2.4 NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations should be representative of ambient exposures that are not unduly influenced by highly localised point sources or influences on the targeted emission source. Busy road junctions, crossings or other obstructions should be avoided, and positions should adhere with the other principles of microscale siting criteria given in Schedule 1 SI1001/2010[19] so as to avoid any unrepresentative bias in local measurements.

Where it is not possible to meet all of these criteria, NO_2 may be measured at a location which will derive accurate measurements which are representitive of ambient air quality in the area. The measurement can then be used to estimate concentrations at the nearest conceptual location of relevant for exposure, using well established principles of dispersion & dilution from the point of emission. This works particularly well for Nitrogen Dioxide emitted from linear sources – e.g. emitted by conventionally fuelled road vehicles on busy roads.

Distance correction is valid for any measurement not directly representitive of relevant exposure, but the estimate is subject to some additional uncertainty. Defra's Diffusion Tube Data Processing Tool applies a rule which requires distance correction where either or both of the following criteria apply;

- The closest receptor to the targeted source (usually a road link) is closer to the source than is the point of measurement, or;
- In all other cases, where bias-adjusted measured data falls within -10% of the long-term objective (i.e. where >36µg/m^3)

Table B.1 includes distance correction for 12 monitoring locations. In all cases, this is because there is relevant exposure closer to the target road link than the monitoring position. Affected locations are summarised in Table C.3 .

1 [19] The Air Quality Standards Regulations 2010 SI 1001/2010

Table C.3 – Diffusion Tube Distance Corrections 2023

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
2	11.0	-3.4	18.5	17.55	18.6	
7B	8.0	-5.3	19.4	15.50	20.8	
8	2.5	-0.4	18.9	14.92	19.1	
10	43.5	-15.5	14.4	12.32	15.2	Monitor >10m further from kerb than receptor.
20	35.0	-17.1	22.3	17.55	20.9	
28	4.8	-2.3	19.8	15.50	30.4	
29	31.0	-13.1	16.6	13.24	17.7	Monitor >10m further from kerb than receptor.
31	5.1	-1.6	20.9	12.44	21.8	
34	20.0	-13.3	16.5	12.43	18.8	Monitor >10m further from kerb than receptor.
36	25.0	-16.0	14.7	12.43	16.1	
36296_1	28.0	-20.0	24.4	13.24	26.9	
36296_2	30.0	-21.0	19.9	13.24	20.1	

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

Figure D.1 – Map of Non-Automatic Monitoring Sites at the A27 / A3023 / B2149 Junction: Monitoring Sites 2, 12, 19C and 20

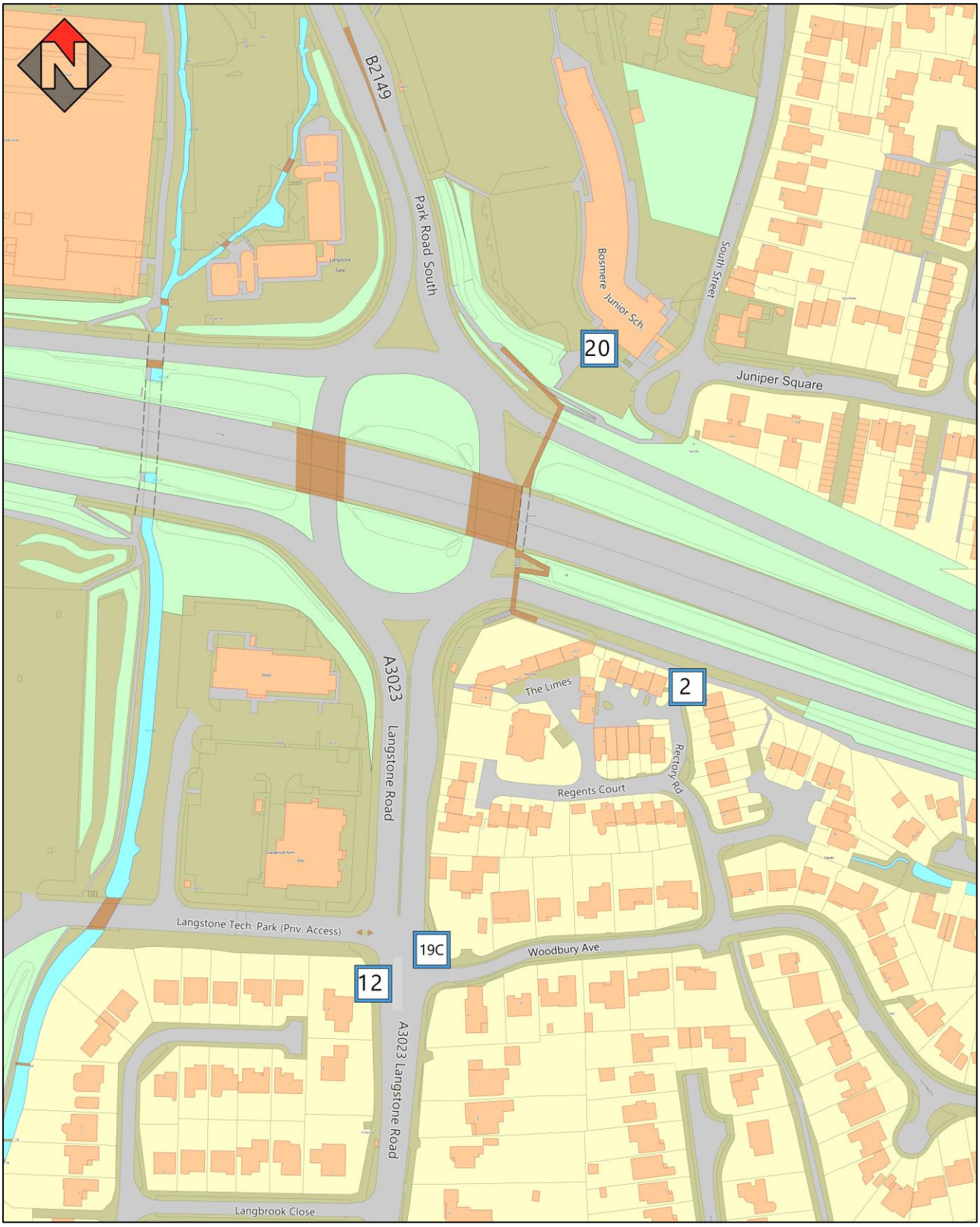


Figure D.2 – Map of Non-Automatic Monitoring Sites at the A27 Havant Bypass: Monitoring Site 2 and 29

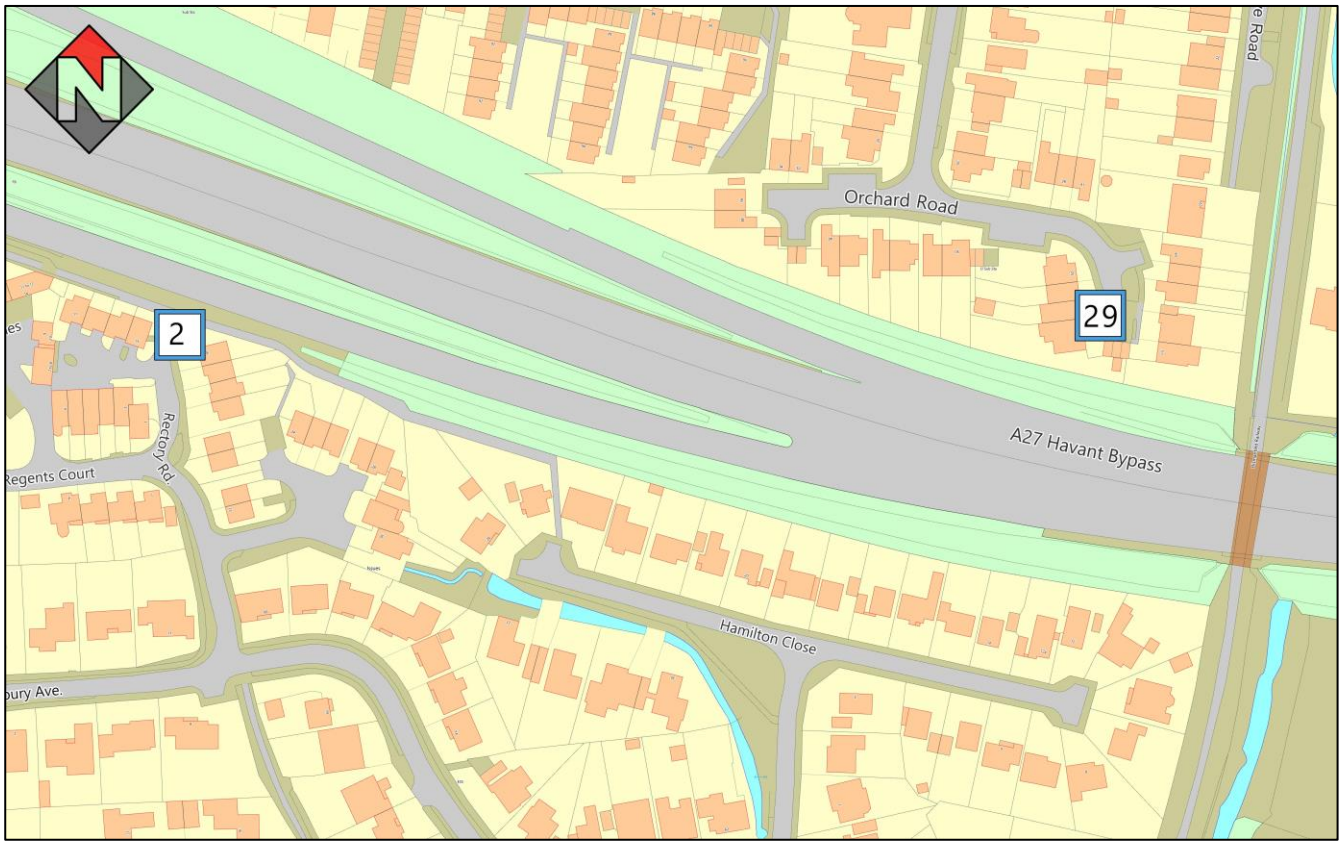


Figure D.3 – Map of Non-Automatic Monitoring Sites at A3023 (Hayling Island): Monitoring Site 3

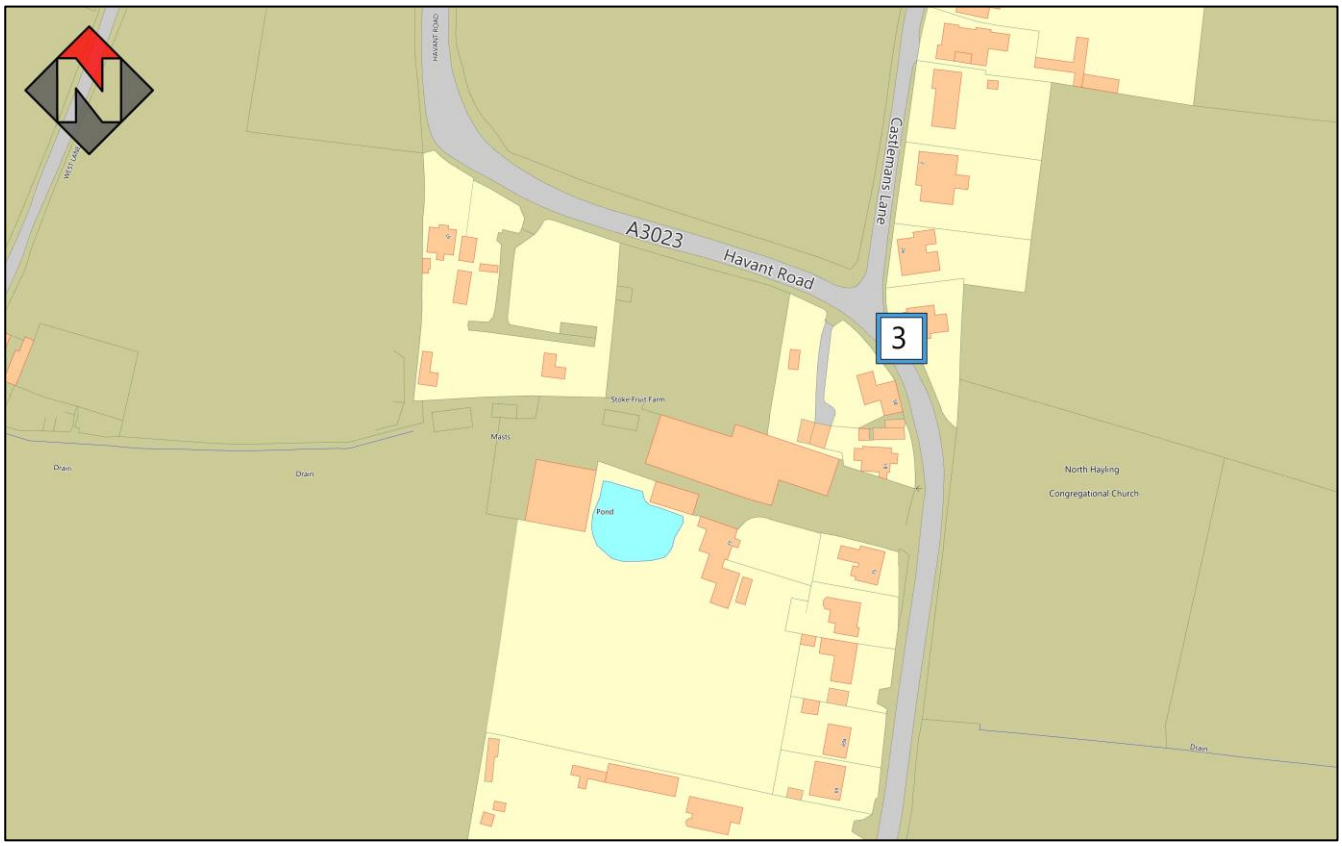


Figure D.4 – Map of Non-Automatic Monitoring Sites at Havant Bypass: Monitoring Site 4

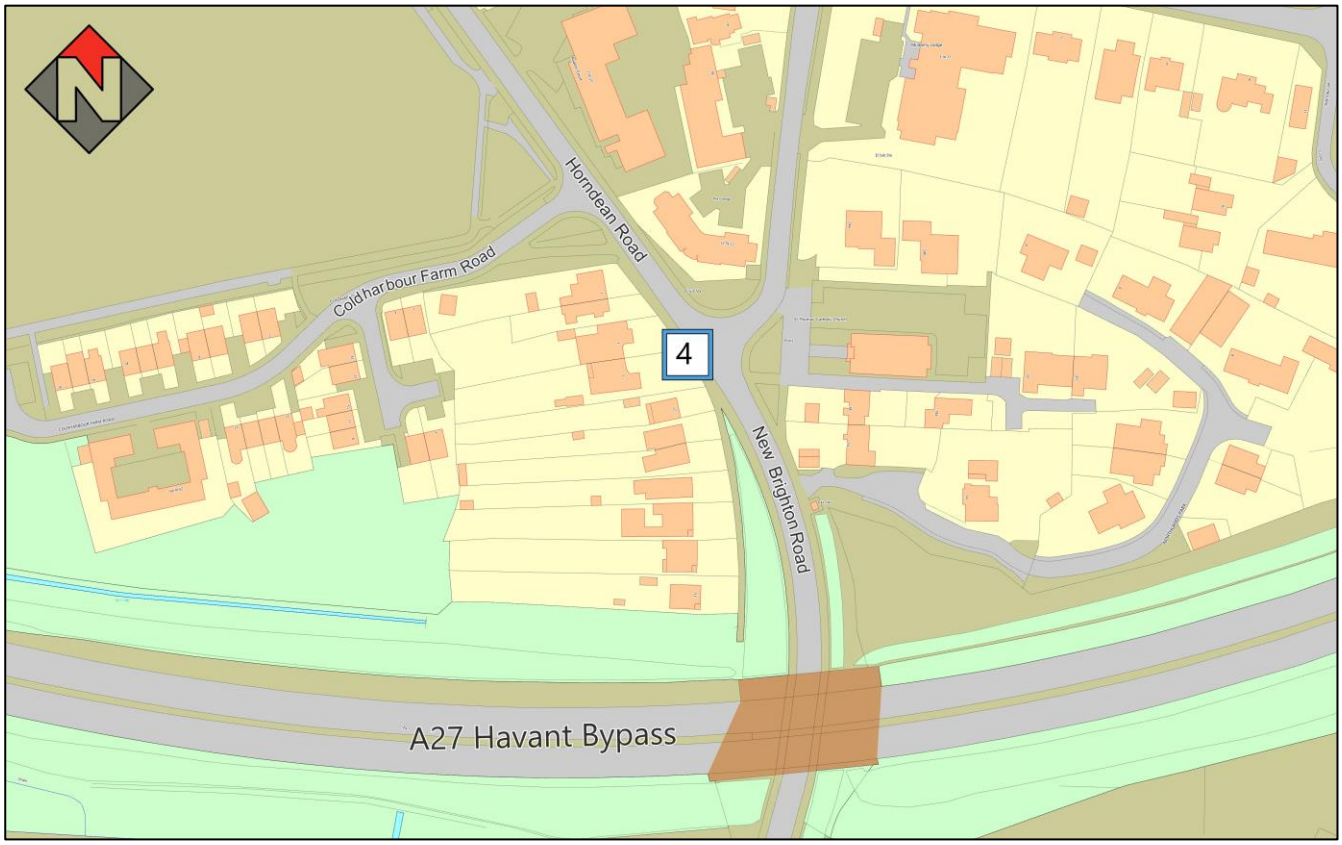


Figure D.5 – Map of Non-Automatic Monitoring Sites at Havant Centre (Solent Road Area): Monitoring Site 7B

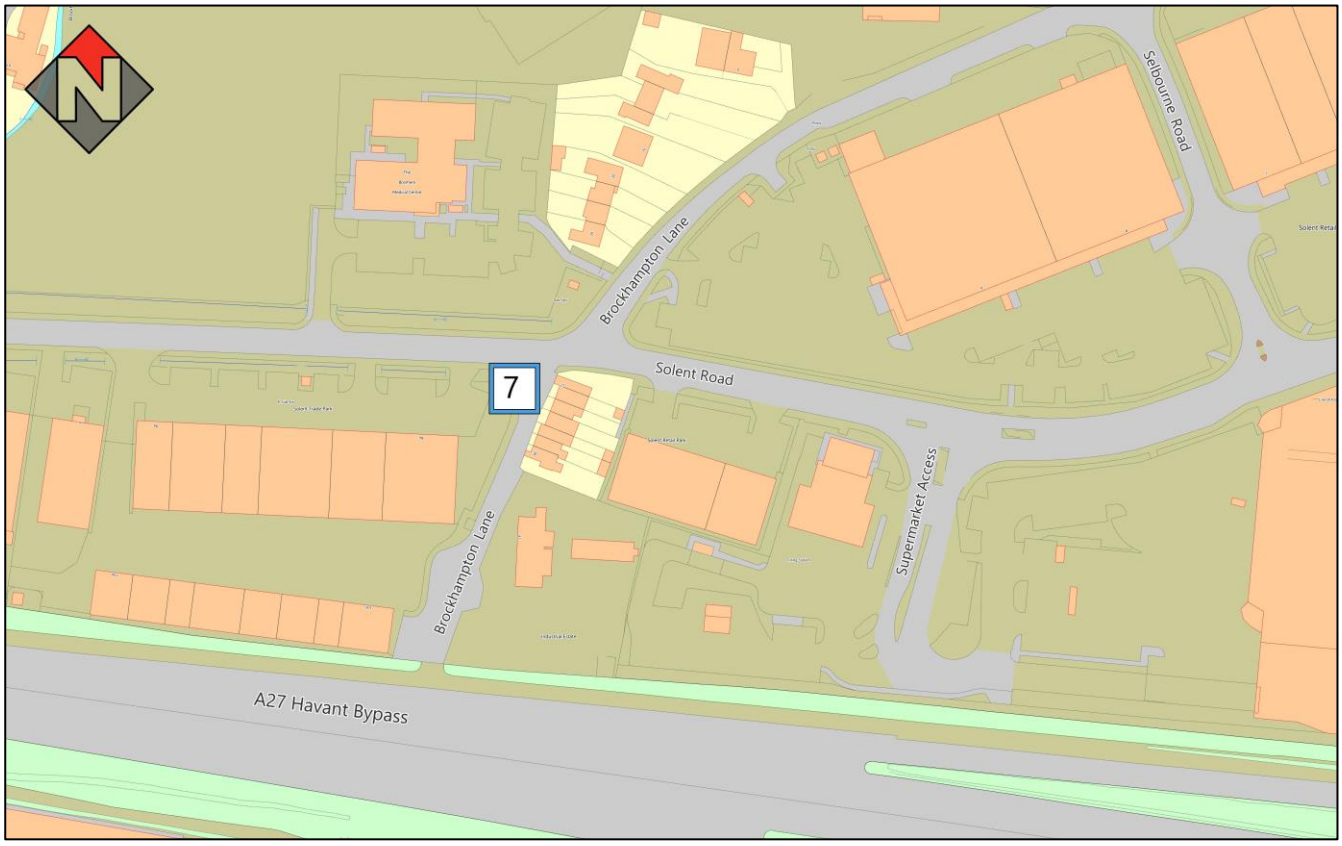


Figure D.6 – Map of Non-Automatic Monitoring Sites at A3 (Purbrook): Monitoring Site 8

Figure D.7 – Map of Non-Automatic Monitoring Sites at A3(M) Trunk Road (Waterlooville): Monitoring Site 10

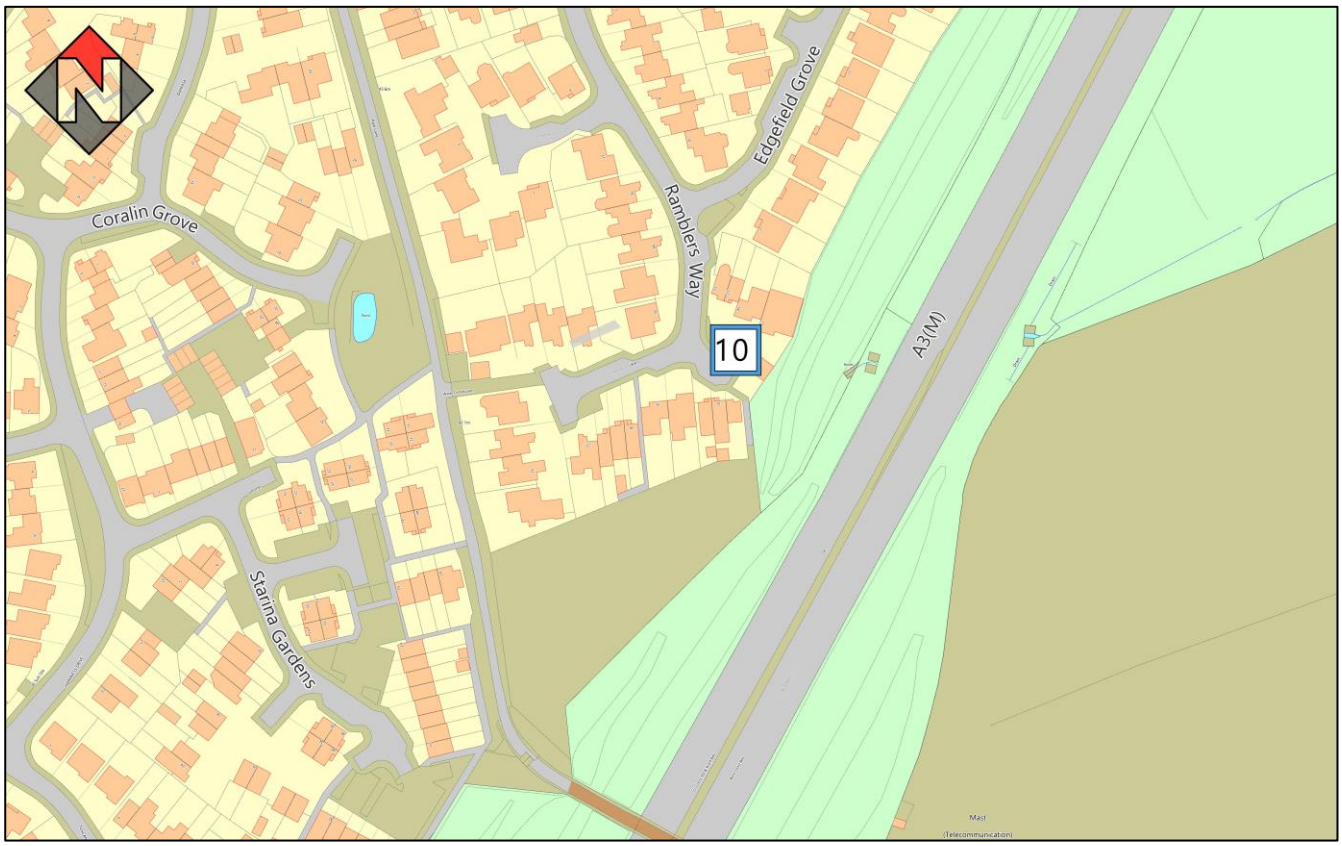


Figure D.8 – Map of Non-Automatic Monitoring Sites at Havant Centre (Civic Campus Area): Monitoring Site 14

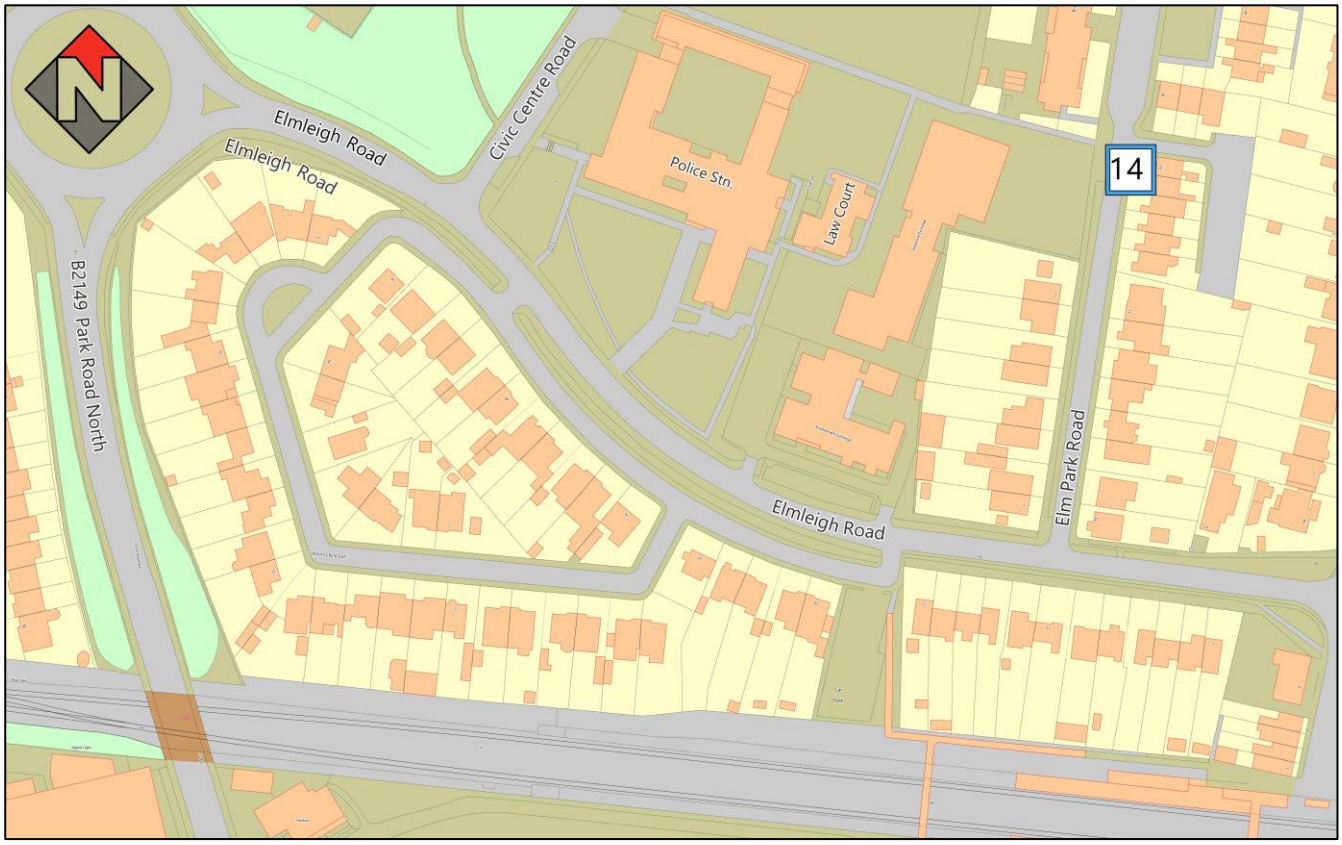


Figure D.9 – Map of Non-Automatic Monitoring Sites at Waterlooville Centre: Monitoring Sites 18 and 36

Figure D.10 – Map of Non-Automatic Monitoring Sites at Crookhorn: Monitoring Site 25[A] (Decommissioned) & Replacement Location 25B

Figure D.11 – Map of Non-Automatic Monitoring Sites at Havant Centre: Monitoring Sites 22, 27, 28

Figure D.12 – Map of Non-Automatic Monitoring Sites at Emsworth Centre: Monitoring Site 30

Figure D.13 – Map of Non-Automatic Monitoring Sites at East Havant: Monitoring Site 31

Figure D.14 – Map of Non-Automatic Monitoring Sites at Waterlooville Centre: Monitoring Sites 33 and 34

Figure D.15 – Map of Non-Automatic Monitoring Sites at Waterlooville Centre: Monitoring Site 35

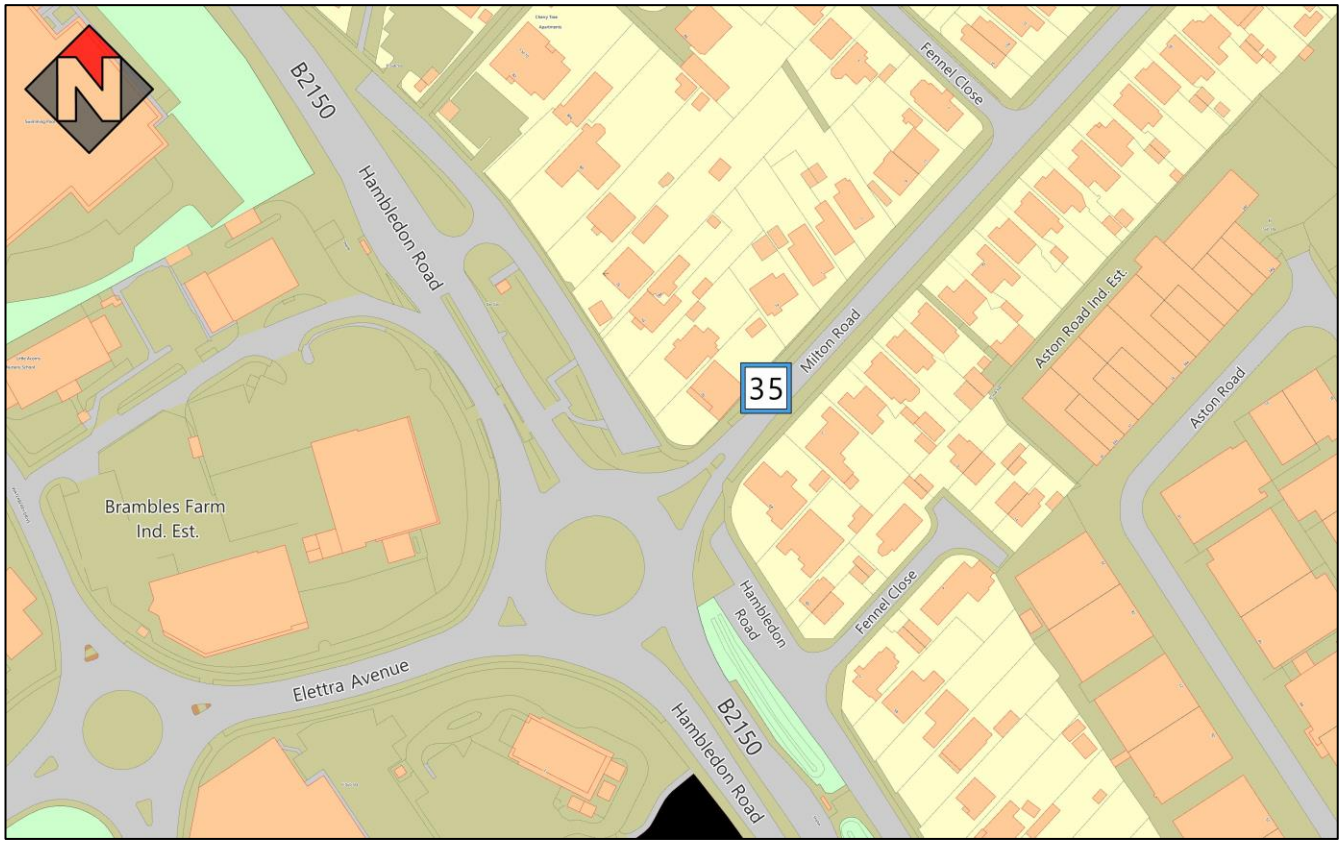


Figure D.16 – Map of Non-Automatic Monitoring Sites at Havant Centre B2149 (Civic Campus Area): Monitoring Site W10

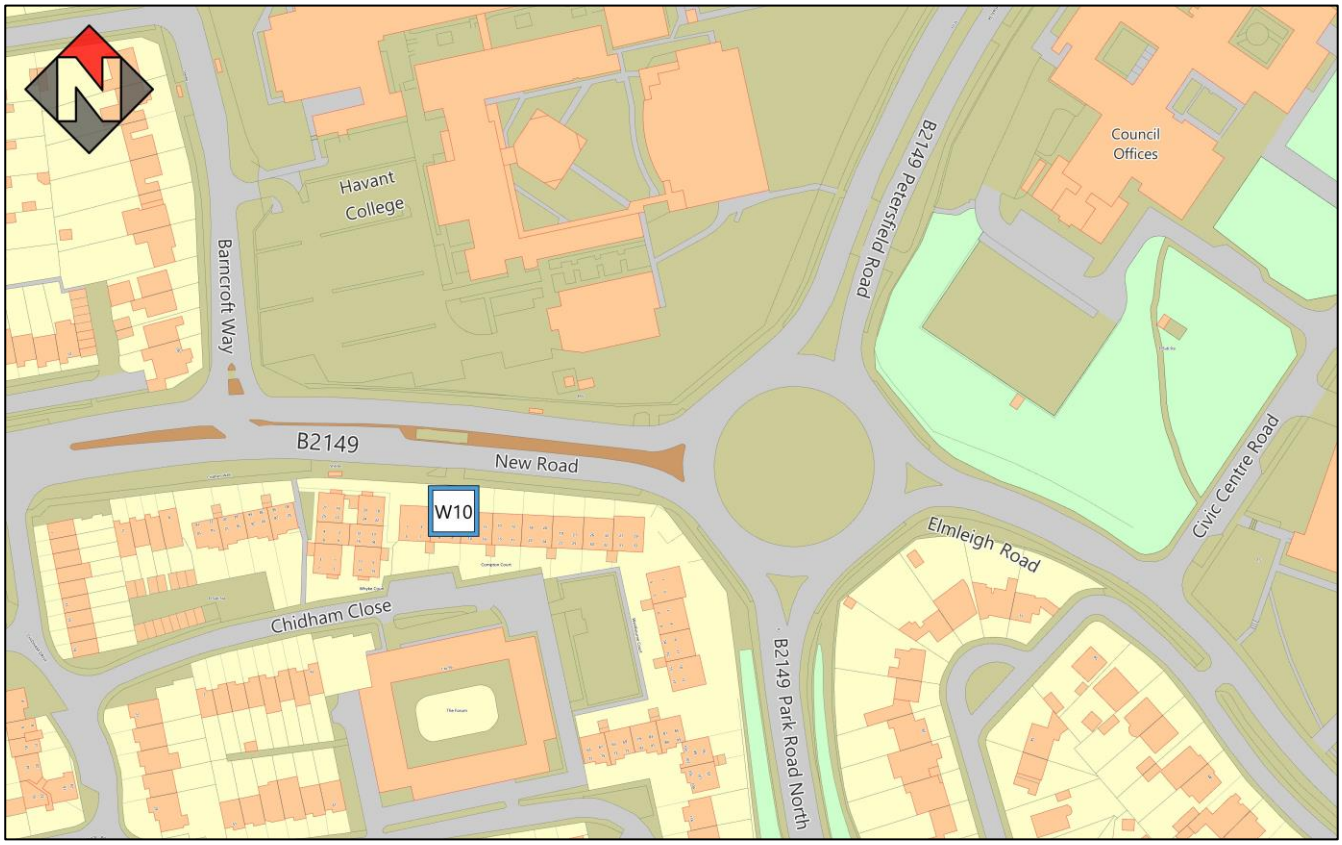


Figure D.17 – Map of TRL Triplicate Non-Automatic Monitoring Sites A27 SRN; Pook Lane

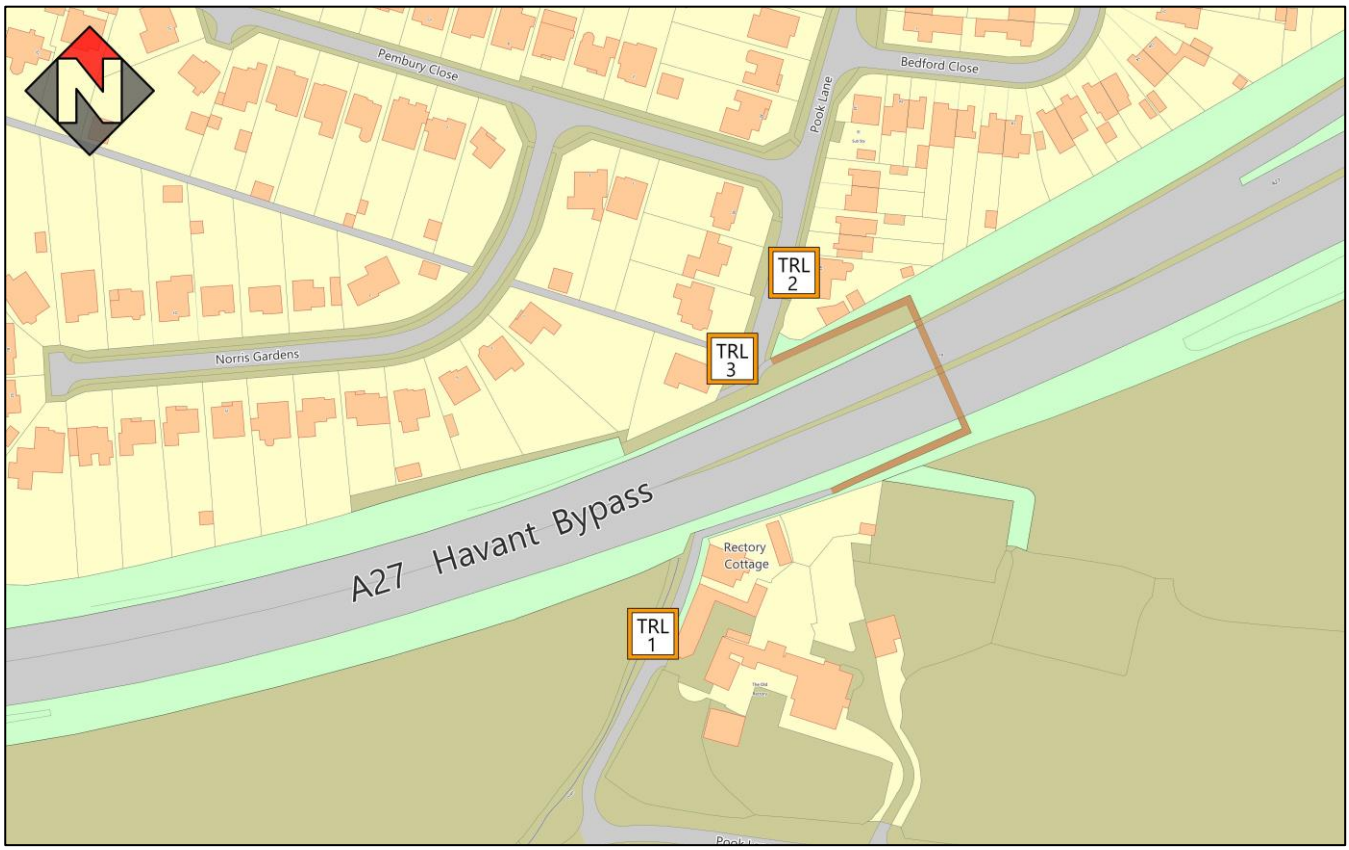


Figure D.18 – Map of Non-Automatic Monitoring Sites at Warblington School: Monitoring Sites 37 & 38

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[20]

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

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

Appendix F: Further Information on Local Engagement and How to Get Involved

Businesses

Business organisations can do a great deal to reduce emissions of NO_2 and particulate matter emissions (PM_{10} and $PM_{2.5}$). Businesses may have significant control over their own direct emissions from buildings, energy use, fixed equipment, or processes.

Similarly, even where business doesn't have latitude to optimize the type of vehicles used for transportation of goods, optimal route selection for those vehicles could have a substantial influence on local air quality either by reducing unnecessary miles driven, or by avoiding areas where residents are particularly close to transport routes. Route optimization will have the biggest impact between the 'home base' of those vehicles or the warehousing stock which they regularly collect for transport and access to the strategic road network.

Businesses also have a huge influence over the transportation choices of staff, customers, and partners, as well as the environmental credentials of organisations that they choose to do business with.

Consideration of travel and logistics planning can be particularly effective for service industries with high levels of staffing, and for waste or distribution industries which generate a large number of HGV trips. Businesses of all sizes can take steps to work toward reducing emissions of air pollutants, and there is an abundance of guidance and advice available to support organisations who wish to be more sustainable. Some ideas are presented below for inspiration;

1. **Introduce working arrangements that reduce the need to travel**: Information and Communications Technology is providing a wealth of solutions to enable businesses to cut travel demand – e.g.:
    a. Flexible working solutions: Secure access to business systems and files can be achieved from anywhere with a broadband connection, enabling businesses to introduce working practices that incorporate occasional or regular home working. This can reduce employees need to travel – with co-

benefits to cost of work, emissions and wellbeing. The Chartered Institute of Personnel and Development provides advice and information about this[21].

b. Tele- and Video- conferencing: Enabling colleagues and partners meet face-to-face from anywhere – minimizing travel expenditure, helping to maintain business culture and increasing productivity where teams work across a variety of different locations.
c. Webinar streaming services: Used to deliver or attend training, can reduce or even eliminate the need for delegates to travel.
d. Cloud tools and services: Enable colleagues at different locations to work collaboratively on projects and provides access to communications and documents for mobile staff, reducing the need to return to the office, minimizing work mileage and the associated emissions. Cloud services can also minimise the need to travel for face-to-face meetings, and E-signature technology can be used to reduce the need to rely upon traditional courier services to transfer physical copies between signatories and intermediaries (agents or legal representatives), helping minimise the number of delivery vehicles on the roads.

2. **Adopt a corporate ethos of environmental responsibility**: a number of environmental certification schemes are available as a banner for the green credentials your organisation, ranging from international corporate accreditation under ISO14001 or EMAS schemes, to smaller schemes run by charitable and not-for-profit organisations[22][23][24]. Accreditation can be important for business reputation and can help to broaden marketing appeal and strengthen bidding and tendering opportunities, for example where customers operate a sustainable procurement policy.
3. **Make sustainability a key consideration in procurement decisions**: there are opportunities to reduce local emissions through the selection of clean fuels and low emission equipment, for example low-NOx Boilers and Furnaces (Gas or Oil), or

[21] Chartered Institute of Personnel and Development. Flexible Working Task Force, 2022. Available at: https://www.cipd.co.uk/news-views/policy-engagement/flexible-working

[22] Institute of Environmental Management. Skills, 2022. Available at: https://www.iema.net/skills

[23] Green Mark, 2022. Available at: https://greenmark.co.uk/

[24] Investors in the Environment, 2022. Available at: https://www.iie.uk.com/

electrical alternatives for space heating or industrial applications. These considerations may be more pertinent in the coming years depending on the scope of the anticipated updated Clean Air Legislation. Low Emission or Ultra Low Emission (LEV or ULEV) models can be specified as alternatives to fleet vehicles; this could be particularly cost effective for businesses operating within a low-emission or congestion charging zone, as ULEVs are often exempt from charges and access restrictions. Grants for workplace and private electric vehicles are available from the central government to help businesses wishing to invest in a sustainable vehicle fleet[25].

4. **Run an effective maintenance programme**: particularly with fuel-consuming plant and equipment, running a tight ship on maintenance not only reduces the risk of delays and costs associated with an unplanned breakdown, but it can also maximise efficiency, reducing fuel consumption, running costs, and plant emissions.
5. **Introduce a workplace travel plan**: a travel plan is a package of measures aiming to discourage single occupancy vehicle journeys and incentivise the adoption of sustainable travel choices such as walking, cycling, public transport (bus / rail, including park and ride schemes) or shared car journeys. Plans can be particularly effective where business have a large number of employees at a small portfolio of premises. The concentration of staff makes internal lift-share schemes particularly effective.

   Travel plans help deliver important benefits through a reduction of the impact of car travel on the local highway network, helping to improve network efficiency (reducing delays and improving journey times) for highway users, and to reduce road transport emissions. If active modes of travel are effectively encouraged, there are health, wellbeing, and productivity benefits to be gained too.

   Travel planning also plays a significant role in ensuring that there is a healthy demand for sustainable public transport services, providing the customer base to support existing services, and the demand necessary to improve the quality, frequency and reach of the services offered by providers.

   Good planning can contribute to the achievement of a range of benefits for the business, including assisting attainment of carbon reduction targets, and contributing

[25] Department for Transport. Low-emission vehicles eligible for a plug-in grant, 2022. Available at: https://www.gov.uk/plug-in-car-van-grants/what-youll-get

toward the requirements of any environmental / sustainability business accreditation schemes which the organisation is signed up to. Travel plans aim to deliver direct benefits for both staff and customers and contribute to benefits for the community within which the business is located.

Hampshire County Council publishes information and advice about travel plans, and has a wealth of contacts and resources to assist businesses in setting up an effective workplace travel plan[26].

6. **Sign up to a sustainable travel incentive scheme**; Going hand-in-hand with workplace travel planning, employers can subscribe to a scheme such as that offered by Easit[27] to secure access for both the business and for employees to a range of travel discounts and benefits, including:

    a. Discounts on rail travel: currently 15% off South West Trains for journeys within the Portsmouth Area.
    b. Discount on Electric vehicles (EVs): in partnership with Nissan, discounts are offered on the purchase of new ultra-low emission vehicles (ULEV); and additional discounts are available on top of government administered grants for the installation of EV chargers from EO charging.
    c. Free Membership to Car Clubs: in partnership with Enterprise, and Co-Wheels, a range of low-emission, hybrid and electric vehicles are available to hire on a ‘pay-as-you-go’ basis.
    d. Access to a Carbon Reduction Car Benefit Scheme: eligible employees can access a new low-emission vehicle (LEV) or ULEV on a ‘just-add-fuel’ basis for a mixed monthly amount taken direct from salary. Employees earn credit for their employers based on the carbon emissions saving, which employers can use to contribute to a sustainability project.
    e. Access to a range of Cycle schemes: including local retailer and electric cycle discounts, access to loan bicycles and tax-efficient salary sacrifice purchase schemes.
    f. Green the workplace: there is growing evidence of the benefits of natural planting and air quality. Plants in leaf intercept particulate pollutants, and

[26] Hampshire County Council. Travel Plans, 2022. Available at: https://www.hants.gov.uk/transport/developers/travelplans

[27] easitNETWORK. Available at: https://www.easit.org.uk/

absorb gaseous pollutants, producing oxygen and materially improving air quality. Green boundary treatments can be extremely effective in reducing exposure to pollutants from adjacent roads, and indoor planting can help improve indoor air quality. Presence of plants is also said to significantly reduce stress levels and to improve productivity; a win-win.

g. Consider Microgeneration: commercial premises are often well placed to exploit the benefits of microgeneration of electricity using photovoltaic solar. Roofing of industrial buildings often feature a large surface area at shallow pitch, and buildings are tall, suffering little overshadowing. If roof surface orientation is favourable, installations can be very productive. Unlike residential installations, the energy demand of business is aligned with peak generation hours, maximising achievable savings by ensuring the generated power is used locally. Significant additional gains can be achieved by utilising sun-tracking mounting options (particularly well suited to flat roof installations). Solar can be particularly cost-effective where the business fleet includes electric road or warehouse vehicles, where charging arrangements can be made to ensure surplus energy from a local PV array always has a useful destination at the point of generation.

Residents and Individuals

There is growing concern among the public about air pollution, and the media message has largely focused on the national impact of air pollution and the aggregate effect that it has on public health. Whilst most articles quote the national air quality standards as the benchmark by which air quality is judged to be either ‘good’ or ‘harmful’, it is rarely emphasised that the standards only apply to certain locations, or that most personal exposure occurs at locations where the national air quality standards do not apply; for example, at work, during travel, or within your own home.

The Building Research Establishment (BRE) estimates[28] that Europeans spend at least 90% of their time indoors, so a person’s exposure depends largely on indoor exposure. The range of potential indoor air pollutants includes many that are not encompassed by the National Air Quality Strategy (NAQS) but does also include Nitrogen Oxides and Particulate Matter.

[28] Defra Air Quality Expert Group Indoor Air Quality 2022

Potential sources of Particulate Matter within the home include cooking, tobacco smoke, candles, scented oils and incense, aerosols, and the use of wood burners, whilst gas cooking, gas fires, and wood burners are all sources of Nitrogen Oxides (both NO and NO_2). Properly installed gas central heating does not release pollutants within the home; however, it might represent a significant source of NO_2 to an immediate neighbour.

Often, little information is presented on what individuals can do to reduce their own emissions, to avoid or minimise exposure to harmful air pollution, or indeed to help intercept transport emissions for the benefit of both themselves and their local area.

The websites for the National Clean Air Day[29] and #WeShareAir Campaign[30] provides lots of practical information and advice on both reducing and avoiding air pollution, as well as how to get involved and help ensure that clean air stays on the agenda. Some of their ideas are reproduced in the sections below, along with a few of our own.

1. Avoid harmful air pollution:
    a. Use quieter streets: avoiding the busiest roads could reduce your exposure to air pollution by more than 20%. Drivers can be exposed to almost double the pollution levels that pedestrians and cyclists are exposed to on the same road, so this will help reduce exposure no matter what mode of transport you are using.
    b. Get out of your car: this has multiple benefits – i) you create less pollution, ii) you'll breathe in less pollution - pedestrians and cyclists are typically exposed up to half the air pollution of car drivers on the same journey, and iii) using self-propelled travel benefits for your health and fitness, reducing your risk of developing a medical condition that could be exacerbated by exposure to air pollution.
    c. Avoid strenuous activity when pollution is high: for almost everybody, the benefits of exercise outweigh the risks from exposure to air pollution; but strenuous activity can increase the intake of air pollution so avoiding it would normally help you get the most out of the exercise you do. Avoid going jogging busy roadsides or streets during the rush hours (usually 7am-9am, 3pm-6pm),

[29] Action for Clean Air. Clean Air Day, 2024. Available at: https://www.actionforcleanair.org.uk/campaigns/clean-air-day

[30] HUBBUB #AirWeShare. Available at: https://hubbub.org.uk/what-to-do-about-air-pollution

or in any urban areas on days where the pollution index is high (you can check todays air pollution level on the UK Air Website[31]). Air pollution levels are usually much lower in parks and woodlands, so make use of your local green spaces and off-road walking / cycle routes.

d. Shut out pollution: blocking out air pollution can dramatically reduce your exposure. If you live or work close to a busy road, reduce your exposure by ventilating the property using windows furthest away from the traffic, keeping those closest to the carriageway closed. Take advantage of the 'stack effect', and open one low window (for example at the rear of the property, away from the road) and open one high up; air taken from the façade of the property furthest from the road will be cleaner, and the slight difference in air pressure will create a natural draw of air up through the building. If you are constructing new property or undertaking renovation work on a building close to a busy road, you could consider installing mechanical ventilation with heat recovery (MVHR) to achieve cost effective and super energy efficient whole-building ventilation without the need to open windows. If an MVHR system draws intake air from high up, and as far away from the road as is practical, you will achieve a huge improvement in indoor air quality in comparison to using vents or windows on the roadside of the building. For really busy locations, filters can be incorporated to capture particulates, or even absorb NO_2 and Organic Hydrocarbon pollutants.
e. Take a "walk on the inside": in most cases, pollution from road vehicles dissipates very rapidly from its source (the road); the effect is greatest closest to the source, so walking on the inside of the pavement as far away from the kerb as you can, will significantly reduce your exposure. It is well known that (for a variety of reasons), children are more sensitive to air pollution; if walking with children when the roads are busy (e.g. travelling to school), keep them on the inside away from the kerb to reduce their exposure.
f. Minimise your exposure when driving: pollution exposure can be high for drivers, and pollutant levels are highest when the roads are busiest. Where possible, travelling at quieter times of day can help reduce your in-car exposure to air pollutants. If you are stuck in heavy traffic, close the windows

[31] Defra. UK Air, 2022. Available at: https://uk-air.defra.gov.uk/

and turn your ventilation to recirculation until the traffic starts flowing freely again to avoid the build-up of exhaust emissions within the cabin of your vehicle.

2. Reduce your transport emissions:

    a. Make sustainable travel choices: whether you choose to travel by train or bus, to lift share, use the park and ride, or to use any other active form of transportation (walking, cycling, or by skateboard, roller skates or unicycle…); by leaving your car at home, outside the town centre, or sharing the journey with someone else who would have otherwise driven by themselves - you will cut the amount of pollution you create. Active travel is ideal, as it comes with health benefits that make you less susceptible to negative impacts of exposure to air pollution.
    b. Switch your engine off when stationary: by turning your engine off when you find yourself in stationary traffic you will help make the air cleaner for you, your fellow road users, pedestrians, and local residents. You will make both fuel and emission savings by turning your engine off when you are likely to be stationary for around 30 seconds or more. If you are in stop/start traffic and your vehicle doesn't have stop-start technology, take care not to stop/restart more than 4 or 5 times or you may deplete your battery.
    c. Remove vehicle accessories when you don't need them: roof bars, cycle carriers, and trailers can affect your fuel efficiency by more than 10%, unnecessarily inflating your fuel costs and increasing your engine emissions.
    d. Choose an appropriate vehicle for your needs: with the dizzying array of propulsion options entering the market, this has never been more important. If you are changing your vehicle, consider the size, type, and emissions of the car you choose. Manufacturers quoted emissions rates and fuel economy are only part of the story – the real-world performance will depend on how you use the vehicle.

        Estimates vary, but the increased purchase and servicing costs of diesel vehicles are thought not to be offset even for a used vehicle unless you would cover at least 10,000 miles per annum on average. Diesel particulate filters and SCR systems tend to perform poorly where short distance urban driving is common and engines don't reach optimal temperatures; so even though petrol vehicles can be over 30% less fuel efficient than diesels, petrol may still

be the right choice if you expect low annual mileage or mostly travel short distances.

If buying new, consider a low emission option – LPG, hybrid, or plug-in electric options are now readily available. All fuel types have their advantages and disadvantages, so it is important to research your options carefully to select a fuel option that works for your needs.

The weight and shape of your vehicle will also make a big difference – SUVs are both heavy and tall, and it takes energy to carry that weight and overcome the additional wind resistance – whether it's electric, LPG, hybrid, petrol, or diesel; energy is fuel, which is both unnecessary cost and unnecessary pollution if you don't need a vehicle of that size.

Research your MPG: as a rule of thumb, a high MPG tends to mean low 'per-mile' emissions. This can be a little more complicated for Hybrid vehicles however, where calculations may ignore the initial battery energy whilst at the same time assuming that the vehicle will be on a drive cycle where that energy will be utilised. Figures may also ignore the fuel or energy demand required to replenish the battery of a self-charging or plug-in hybrid, and the figures will refer to the vehicle 'as new' and won't account for deterioration in battery performance with age or in sub-optimal weather conditions (which can impact the per-charge-energy-yield of the battery).

Several sources now publish handy 'true mpg' figures[32][33][34] to help you translate the manufacturers lab-test fuel efficiency figures to 'real world' driving conditions.

e. Adopt a smooth driving style: your driving style could make a substantial difference to your fuel costs and your pollutant emissions – and if your insurer offers a 'black-box' telematics device (and you are comfortable with their data policy) it could save you money on your insurance too. Smooth driving, without harsh acceleration and braking will maximise fuel efficiency and minimise emissions - maintaining a constant speed of around 60mph when travelling on national trunk roads tends to be most fuel efficient and least polluting for

[32] WhatCar?. True MPG Calculator. Available at: https://www.whatcar.com/truempg/mpg-calculator

[33] HonestJohn. Rea MPG. Available at: https://www.honestjohn.co.uk/real-mpg/

[34] The MPG. Available at: http://www.thempg.co.uk/

conventional vehicles. By contrast, driving aggressively or at excessive speed will dramatically increase your emissions, and could cut your fuel efficiency by more than half whether you are driving an electric or conventionally fuelled vehicle.

f. Give your car a holiday: if you can, working from home just one day a week will cut your commuting emissions by 20%, no matter what car you drive. Swapping face-to face meetings with video conferencing and online enabled collaborative working will further reduce the need for work related travel and will reduce the associated emissions.

g. Maintain your vehicle: keep your tyres inflated, and your vehicle serviced to ensure that it runs as efficiently and cleanly as possible. This applies to electric vehicles and conventionally fuelled vehicles alike. Fuel and Oil additives are available to help keep combustion engines free of carbon deposits, particulate filters clean, and reduce consumption of oil through unwanted combustion.

h. Share the School Run: chat to other parents at the school gates about setting up a car-share or a walking bus to make the air cleaner for every child at school. Find out how you can cut traffic by 30% with the WOW Challenge from Living Streets[35], or talk to your school about setting up a 'Park and Stride' scheme[36] to reduce school gate congestion and unnecessary emissions where children may be exposed to significant levels of pollutants.

3. In the home:

    a. Save your log-burner for the bleak midwinter: wood burners are very popular, and it is not difficult to understand why, they are very cosy, and timber is natural and renewable carbon neutral fuel which when used well produces very little smoke and ash. However, wood burning can produce a lot of air pollutants. Minimise your contribution to air pollution by ensuring you have a properly installed flue that is in good condition and kept clean and clear. Make sure that your cowl doesn't overly restrict air flow. Choose a Defra approved

[35] Living Streets. WOW – The Walk to School Challenge, 2022. Available at: https://www.livingstreets.org.uk/products-and-services/projects/wow

[36] Living Streets. Tackling Congestion with Park And Stride, 2022. Available at: https://www.livingstreets.org.uk/about-us/our-work-in-action/tackling-congestion-with-park-and-stride

stove if you can, learn how to manage your fire for efficient combustion, and burn an appropriate fuel (properly seasoned hardwood with a moisture content <18%, or a Defra approved low smoke fuel[37]). Do not burn manufactured timber boards (chipboard, MDF, OSB or ply) or any painted, tarred or exterior treated timber, and only light it when you need it. There's great advice and supplier lists on the Defra supported 'Ready to Burn' scheme[38], and an excellent short tutorial video, alongside great advice on fuel selection and pollution reduction on the BurnRight industry website[39].

b. Avoid use of flueless gas fires in closed rooms or for excessive periods. Health and Safety Executive research[40] has shown that use of a flueless gas fire over a period of just 2 hours (in a small room with poor ventilation) can result in a Nitrogen Dioxide concentration of more than 2000 µg/m^3, ten times the hourly exposure limit for ambient air. The average NO_2 concentration under test conditions for a large, ventilated room was 533 µg/m^3, which is still more than double the ambient hourly limit.

c. Use the extractor hood when cooking using gas: as for flueless gas fires, gas ovens and gas hobs are flueless combustion appliances. During cooking, gas combustion produces NO_2 and releases it into the home, estimated to increase your average weekly exposure by between 25% and 39%, depending on the season. If you have a cooker hood that vents to the outside, use this whenever you cook to extract the emissions to external air. If you have a re-circulation hood, or do not have an extractor, make sure that you ventilate the room while you are cooking (e.g. by opening a window). Cooking food in general (even with electric) can release particulate hydrocarbons from cooking oil smoke and as food chars, so if you have an externally vented extractor, use it.

d. Check your boiler flue; modern condensing gas boilers produce as much as 24,000µg total nitrogen oxides (NOx) per kWh. Around 5% of this represents

[37] Defra. Authorised/Certified Fuels, 2022. Available at: https://smokecontrol.defra.gov.uk/fuels.php

[38] Ready to Burn. Available at: https://www.readytoburn.org/

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[40] Advantica Technologies Limited. Flueless gas fires – concentration of carbon monoxide, carbon dioxide, and nitrogen dioxide, and particulate level produced in use, 2003. Health and Safety Executive. Available at: https://www.hse.gov.uk/research/rrpdf/rr023.pdf

a direct emission of nitrogen dioxide (NO_2), which can equate to an emission of over 26,400 µg/hr (for a 33KW unit). Flues installed in full compliance with the applicable building regulations could still cause an exceedance of the 200 µg/m^3 NO_2 hourly limit at neighbouring, or even at your own- property if the boiler is flued to a relatively confined space (e.g. a gated side access). There is a risk of exposure to this pollution if there are opening windows or have ventilation inlets which open to the same space. If you think this may be a risk, you could consider fitting a flue extension, diverter, or re-siting the flue for your appliance to a location where dispersion will be more effective.

e. Save the Bonfires for the 5th November: burning your garden waste and scrap timber contributes to local air pollution (particulates, nitrogen oxides, and sulphur) as well as causing nuisance to neighbours. Your local household waste recycling centre (HWRC) will accept both green and household waste (including timber) free of charge; check the County Council web pages[41] for your nearest site. HBC also offers a green waste collection service from just £42/yr[42], saving you the trips to your local HWRC.

f. Go electric: electric vehicles are getting a lot of press at the moment, but your car is not the only item you can swap for an electrical alternative. All electrical appliances are "zero-emission at point of use" (unless generated from a renewable resource or nuclear, the energy generation creates emissions of air pollutants elsewhere).

   If you are changing your cooking appliances, consider selecting an electric oven and hob (convection, ceramic or induction) to reduce your own exposure to indoor air pollution and to minimise your contribution to local NO_2 pollution. Swap your gas fire for electric to reduce your local emissions. If you swap a flueless unit you will also reduce your exposure to indoor air pollution too.

   If your property is suitable and you have both the opportunity and ability to invest; consider choosing electrical water heating, a heat pump system for space heating, or a heat recovery ventilation system (MVHR).

[41] Hampshire County Council. Household Waste Recycling Centres (HWRCs). Available at: https://www.hants.gov.uk/wasteandrecycling/recyclingcentres

[42] Havant Borough Council. Garden Waste. Available at: https://www.havant.gov.uk/garden-waste

Installing Solar vacuum-tube ('Direct Solar') hot water or photovoltaic solar power generation will not only cut your carbon footprint but will also minimise your pollution emissions. Combining this with a thermal store could maximise your local benefit; for example, by storing the energy produced while you are not at home as heat that you can use later, avoiding the need to use your conventional gas boiler).

g. "Power Down before you Power Up": often the most cost-effective emissions reduction measures are to avoid using the energy in the first place. Before considering a micro-generation installation (e.g. a solar array) to help meet your energy demand, consider improving the insulation in your property, increasing air tightness to minimise unwanted ventilation and heat loss, and consider low-cost energy saving such as use of LED lamps. There are lots of things you can do to conserve energy (and lower your bills), The Energy Saving Trust[43] has some great advice on cutting your energy bills, and remember, lower bills = lower pollution.

h. Use Less, Produce Less; Solid fuel, oil, gas, and electricity are all significant contributors to air pollution. Different fuels create different emissions – Solid Fuel may produce more fumes or ash when burned than does oil and gas, but it can be a sustainable carbon neutral alternative to the 'cleaner combustion' fossil fuel alternatives which are (by contrast) net emitters of Carbon to atmosphere. Electricity is zero emission at point of use, making it ideal for minimising local emissions from homes or vehicles – however electricity produced by power stations burning fossil fuels has the same result as using fossil fuels directly, and contributes substantially to national emissions, and may cause a local air pollution problem near the point of generation. This is one reason plug-in electric vehicles and electrically powered home cooking and heating appliances are only part of the solution to the air pollution problem. The less energy you use, the less pollution is produced. Even if the energy source is renewable, if you don't waste it then that clean capacity is available for use where it is needed, reducing the need to make up the shortfall with 'dirty' fossil fuel alternatives or 'pollution legacy' options such as nuclear.

[43] The Energy Saving Trust. Quick tips to save energy, December 2021. Available at: https://energysavingtrust.org.uk/hub/quick-tips-to-save-energy/

i. Choose a renewable energy tariff: choose renewable energy tariffs for your home supply to reduce the pollution produced by power stations. Your choice of tariff sends a message to generators and will contribute to their strategic investment decisions. In terms of air pollution, nuclear power is clean, however it is not a renewable source. Spent nuclear fuel needs careful management until it can be safely reprocessed – this could take anywhere from over 100 to many 1000's of years and could result in a significant legacy of pollution and contamination. Investment in truly renewable sources is needed to adequately address both carbon and pollution issues. This won't happen without consumer demand.

j. Support sustainable power generation projects: official government statistics[44] show that public support for renewable energy generation is high, at 79%. Despite this, deployment has been slow and opposition at the planning stage is still prevalent when local schemes come forward. Voicing your support could improve the chances of a scheme achieving permission and contributing to our rates of clean and green energy generation.

k. Go 'green': plants are very effective at intercepting air pollution – they absorb and utilise nitrogen oxides (NOx and NO_2), and trap particulate matter (PM_{10} and $PM_{2.5}$) on leaf surfaces. Particulates intercepted that are not absorbed by the plant are washed to the soil by rainfall, where they are naturally broken down by soil bacteria. Plants don't have to be close to the pollutant source to contribute to clean air in your local area, but the closer they are to the source of pollution the more effective they will be. If you live on a busy road, consider planting a hedge at the boundary closest to the road to intercept pollution. If you are building or renovating, green walls are very effective at stripping pollutants from the air, and green roofs can also make a positive contribution.

4. Raising awareness:

a. "Talk the Talk": if you're "walking the walk" (have made changes to reduce your emissions, minimise your exposure, or taken steps to improve the air quality in your local area) - shout about it. Use the power of social media to

[44] Department for Business, Energy and Industrial Strategy. Energy and Climate Change Public Attitudes Tracker: Wave 21, May 2017. Available at: https://www.gov.uk/government/statistics/energy-and-climate-change-public-attitude-tracking-survey-wave-21

share your experience and to help educate others on the positive steps they can take to reduce pollution or reduce their exposure to it.

b. Contact your local councillors or MPs: if you are concerned about air pollution or if you have a great idea for reducing emissions – contact your local representatives to let them know. You can find out how to contact them by putting your hometown in the search box at https://www.writetothem.com/. Politicians help shape a wide range of policy that is relevant to air pollution, and locally, could influence which projects are given support, or opposed. Keeping air quality on the agenda will make sure that air pollution is considered as an integral part of those policy, investment, and planning decisions.
c. Don't be afraid to ask: find out what your children's school, or your employer is doing to make our air cleaner – if they don't know, you can share some of the ideas in this report.
d. Get involved: a number of campaign groups are actively involved in air pollution, green energy and sustainability issues. Friends of the Earth are active locally to Havant, there's some good information available on their website from their 'Clean Air Campaign' pages[45], including the results of the member air pollutant monitoring. Greenpeace[46] are also getting involved in UK air pollution issues. These organisations, and others, will provide wide range of opportunities to learn about air pollution or to get involved in local campaigning, national and international lobbying – so you can get as involved as you like, from keeping your 'finger on the pulse' to joining the campaign in a very practical way.

[45] Friends of the Earth. Air Pollution and the Campaign for Clean Air. Available at: https://friendsoftheearth.uk/clean-air

[46] Greenpeace. Air Pollution. Available at: https://www.greenpeace.org.uk/challenges/air-pollution/

Glossary of Terms

Abbreviation	Description
AIR PT	An independent analytical proficiency-testing (PT) scheme
AD	Attributable Deaths. An estimate of the number deaths attributable to long-term exposure to air pollution in a local area derived by multiplying the attributable fraction (AF) by the total number of annual deaths in the local area. Subject to the same caveats as described under AF.
AF	Attributable Fraction. An estimate of the proportion of local deaths attributable to long-term exposure to anthropogenic air pollution. Based upon morbidities to which air pollution is a contributory factor, but which may have other significant- (or even dominant-) causes. Represents a fractional share of this broader group, expressed as a percentage (%) of total deaths. Total deaths is usually defined on an 'all causes-' or 'all non-accidental-' basis, but where specified AF may represent a proportion of a more specific sub-group.
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'
AQEG	Air Quality Expert Group
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	Annual Status Report
AURN	Automatic Urban and Rural Network
BRE	Building Research Establishment
CIL	Community Infrastructure Levy
DECC	Department of Energy and Climate Change
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
EMAS	Eco-Management and Audit Scheme
EU	European Union
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HCC	Hampshire County Council
HGV	Heavy Goods Vehicle

Abbreviation	Description
HITA	Hayling Island Transport Assessment
HR	Hazard Ratio; The chance of an event (e.g. death) occurring in an exposed group, relative to that of a theoretical unexposed group, as determined by comparison of instantaneous hazard risk rate between the assessed groups. In it's simplest form, HR is equivalent to Relative Risk (RR)
HWRC	Household Waste Recycling Centre
ICT	Information and communications technology
kWh	Kilowatt hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
LED	Light-emitting diode
LES	Low Emission Strategy
LEV	Low Emission Vehicle
LPG	Liquified Petroleum Gas
LZC	Low or Zero Carbon
MDF	Medium-density fibreboard
MPG	Miles per gallon
MHCLG	Ministry of Housing, Communities and Local Government
MVHR	Mechanical Ventilation with Heat Recovery
NAQS	National Air Quality Strategy
NGO	Non-governmental organization
NHS	National Health Service
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework
OSB	Oriented strand board
PCC	Portsmouth City Council
PfSH/PUSH	Partnership for Urban South Hampshire
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control

Abbreviation	Description
RR	Relative Risk; Sometimes referred to as risk ratio. The incidence rate of an event (e.g. death) occurring in an exposed group, relative to that occurring within an theoretical unexposed group. Similar to Hazard Ratio (can be identical). Where RR = 1, exposure has no adverse or beneficial effect. An RR >1 indicates that the risk of the outcome is increased by the exposure, a "risk factor"
SCR	Selective Catalytic Reduction
SEHRT	South East Hampshire Bus Rapid Transit
SO_2	Sulphur Dioxide
SPD	Supplementary Planning Documents
SRTM	Sub Regional Transport Model
TCF	Transforming Cities Fund
TRL	Transport Research Laboratory
ULEV	Ultra-Low Emission Vehicle
UKHSA	UK Health Security Agency
WHO	World Health Organisation

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