Havant
BOROUGH COUNCIL

2018 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

March 2019

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Table of Contents

List of Tables

List of Figures

Executive Summary: Air Quality in Our Area

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Air Quality in Havant Borough

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Poor air quality particularly affects the most vulnerable in society: children and older people, and those with pre-existing heart and lung conditions. There is also often a strong correlation with equalities issues due to a variety of social and economic factors. These factors may vary by location to a degree, but there are also some issues which are likely to be common nationwide.

For example, pre-existing health conditions which can be exacerbated by air pollution include those which are related to low levels of physical activity, poor diet & obesity, smoking, and poor housing conditions. There is also some evidence to suggest that the impact of individual pollutants is greater when exposure occurs in combination with other pollutants, which might include occupational exposures associated with low-skilled manual work, skilled trades and manufacturing, or with domestic exposure associated with the use of low grade solid fuels for domestic space heating. These factors tend to be associated more strongly with less affluent social groups[3,4].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[5].

Previous screening assessments for the Havant Area have consistently suggested that Nitrogen Dioxide was the only pollutant likely to challenge compliance with it's respective air quality objective. It is also recognised that few significant air quality problems are reported nationwide that are independent of problems with Nitrogen Dioxide. For these reasons, emphasis has been placed on consideration of this pollutant through both the active monitoring programme, and within the main body of this report.

Air quality within the Havant Area is generally very good. This Annual Status Report shows that the air quality objectives are likely to be achieved for all pollutants at relevant locations throughout The Borough, with many residential areas likely to enjoy excellent air quality where local pollutant concentrations less than 50% of current air pollution objectives. However, concentrations may be locally elevated in areas close to congested road junctions, or where topographic features adversely affects dispersion.

Transport networks are very constrained within the Borough, as a result of both the historic town centre layouts, and the presence of landscape features such as roads, railways and watercourses which have a limited number of crossing points.

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These factors tend to concentrate road traffic at key junctions and bridges, or at road links with relatively narrow streets and tall buildings on both sides. The national trunk road network (A3, A27) and the 'West Coastway' & 'Portsmouth Direct' railway lines represent particular barriers to free movement, with only a relatively limited number of permanently available crossing points.

Marginal exceedances of annual average ambient standards for Nitrogen Dioxide have been identified at the kerbside at some the busiest transport routes. Whilst the air quality objectives have not been derived to apply to such locations, these are places where the public may be regularly present. Kerbside exposure may contribute significantly to the total overall personal exposure of some individuals, and some may benefit from taking some simple steps to reduce the time they spend at such locations during the busiest periods.

The 2017 ASR identified one Nitrogen Dioxide monitoring position as having the potential to represent a breach of the annual mean air quality objective (2016 data). A more detailed assessment showed that there were problems with siting of the monitoring point which meant that the result was likely to be unduly influenced by a direct emissions source; leading the Council to concluded that the position was unlikely to be representative of ambient conditions. The 2016 result was dismissed, and it was resolved to decommission the monitoring position.

In the interests of transparency, monitoring has continued concurrently alongside a range of alternative positions which are being evaluated with a view to identifying the most representative location at which local pollution associated with this transport link may be monitored. It is significant that the position shown to be exceeding objectives in 2016 has proven to be compliant in 2017. This could suggest a step-change in road transport emissions due to increased number of vehicles on Euro V engines emissions standards, and an increase in the number of electric & hybrid vehicles on the roads.

Alternatively, and perhaps more realistically at this stage, this result may indicate that the weather conditions over 2017 did not favour secondary production of Nitrogen Dioxide (from Nitrogen Oxide, and ground Level Ozone). This might serve as a caution against an overly-optimistic interpretation of results & trends, and highlights that whilst overall trends tend toward a long-term decline in levels of pollution results, it cannot be expected that a result from a future year will necessarily be lower than for a previous year.

Key transport links remain vulnerable to local exceedances during years where prevailing weather conditions favour secondary production of Nitrogen Dioxide, or where other local factors adversely influence either the volume of traffic or it's flow on the local highway network. The B2149 / A3023 transport link between Havant Town Centre and Hayling Island is considered to remain a location where the annual mean objective for Nitrogen Dioxide risks being breached. This route is currently subject to a high-density monitoring effort to better understand how specific locations are influenced by traffic conditions. This notwithstanding, air quality objectives for Nitrogen Dioxide continue to be met.

More generally; concentrations are either broadly stable or reducing across the district, with no increasing trends identified. Perhaps most notable are the statistically significant trends for declining pollutant levels (improving air quality) at the kerbside of the A3023 Havant Road on Hayling Island, and at a suburban monitoring location in Havant Town. Improvements at Suburban locations away from strong transport influences suggest that real improvements in air quality are taking hold, and that background levels of pollution are

reducing. These improvements may be small (estimated to be around -2.9% per annum on average at this location), but the trend does appear significant over a meaningful period. Tests also indicate that there has not been any significant deviation from the long-term trends over recent years.

This report also considers the requirement for reducing exposure to fine particulate ($PM_{2.5}$). $PM_{2.5}$ is an aggregate term representing a broad range of potential pollutants, grouped by physical size being less than 2.5 microns (µm).

The National Average Exposure Indicator (AEI) for $PM_{2.5}$ was 11 µg/m^3 in 2016, and the Portsmouth Urban Agglomeration, within which parts of Havant, Widley & Bedhampton fall; was assessed to comply with both the Stage 1 (25 µg/m^3, from 2015) and Stage 2 (20 µg/m^3, by 2020) limit values. These figures also show that the UK has already met it's 2020 National Exposure Reduction Target (NERT) of 15% (from a baseline of 13 µg/m^3).

Based upon the area characteristics (density of industry & dwellings, and volumes of traffic carried on the local road network), the "worst case" particulate $PM_{2.5}$ levels in the Havant area are considered likely to broadly correspond to the urban background levels measured at the Portsmouth AURN site. It is considered likely that the emissions reduction obligation is likely to have been met within the Havant Area, and as such no specific measures are being pursued which specifically aim to reduce ambient concentrations of Particulates.

Havant Borough Council has not committed to specific actions to tackle $PM_{2.5}$ concentrations, but is seeking the implementation of more general Air Quality (Planning) policy which will support this overall aim, alongside reducing local emissions & concentrations of PM_{10} & NO_2. Policy measures are also expected to serve to support efforts to reduce carbon emissions and climate change adaptation goals.

Air Quality has been a high-profile media topic over the past 12 months, with a focus of discussion being the adoption of the WHO recommended annual mean & daily limits. This report acknowledges the NGO & Local Authority Partnership Charter for Clean Air, and provides an initial review, providing both local & general context to the proposed actions. This should serve as a starting point for any future consideration of adopting the charter, or alternatively, policy and actions which support it's aims.

Actions to Improve Air Quality

Havant Borough Council does not work alone in the role of managing air quality. It works with neighbouring districts and Boroughs in Hampshire to establish best practice and to develop regional-scale strategic planning which seeks appropriate development to minimise emissions growth, and where possible delivers local and regional reductions in air pollutants. Over the past year, Havant Borough Council acted as technical lead in the commissioning a Sub-Regional air quality modelling study which covered an area of South Hampshire Spanning the New Forest to Emsworth, and North to Winchester and parts of East Hampshire District. This study represented a major piece of work, commissioned with a view to holistically assessing the anticipated aggregate impact of the regional development demand on local air quality, and the degree to which committed and potential additional highways improvement schemes might help to mitigate that impact.

The output from this partnership project will be used to inform and shape the local plans and the suite of local policy to be adopted by all contributing authorities within the study

area. It will also serve to inform & guide local infrastructure spending, enabling schemes to be prioritised which not only serve to support the required level of local development, but also to alleviate existing congestion and air pollution hotspots. By underpinning these layers of strategic planning, this piece of work could ultimately lead to significant reductions in local emissions, and thus improvements in air quality.

Hampshire County Council also plays a significant role in preventing, reducing & mitigating emissions from road transport though it's devolved Local Highways, and Public Health functions, and through it's influence in the delivery of educational services. There are opportunities for the Borough and County Councils to support each other – with the planning functions of the Borough Council being a key opportunity to support these goals.

Wholistic thinking is required to tackle air quality, and to achieve the co-benefits of general environmental sustainability and combating anthropogenic climate change through carbon emissions reductions. These areas tend to be synergistic, where (for example) actions taken to improve sustainability and reduce energy demand will serve to avoid emissions somewhere. Such actions may directly lead to local air quality improvements, or may contribute to general air quality improvements either at a non-local locations, or at the regional scale; through reducing demand from traditional power stations, and contributing to reductions in national aggregate emissions (net). The Council recognises that even micro-scale projects make a valuable contribution to these goals, with the overall effect being the product of aggregated small-scale reductions in emissions or energy use, influencing local emissions and/or regional ambient background concentrations.

In this way, preserving and improving the air quality depends upon both the wide participation of partner organisations, and the personal choices of residents. There are many ways that individuals can contribute to reducing air pollution and so improve air quality. See the 'how to get involved' section below for Ideas & tips to reduce personal exposure to air pollutants, and to contribute to reductions in local emissions.

Topographic factors described in the section above ('Air Quality in Havant Borough') mean that bold & direct local intervention to address local air quality is often not feasible, and is often not within the direct sphere of influence of the Local Authority.

As a result, actions to improve local air quality largely consist of a strategy of seeking to achieve incremental improvements & mitigations through the formulation of effective of planning policy, and its diligent application to secure;

- Sustainable development with low energy demand, and a reduced need for local (within borough) combustion of fuels,
- The implementation of travel plans which target modal shift from 'use of the private motor car' to sustainable and active forms of transport,
- Seeking high quality development in sustainable locations which reduce the need to travel & revitalises town centres, and where possible;
- innovative developments which support new vehicle technology, new vehicle access models, and incorporates 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 allocations also contributes to achieving air quality objectives, as does the deployment of

funds acquired though planning gain (s106 & s278 agreements) to fund local infrastructure improvements which aim to facilitate & encourage active travel choices, and so achieve overall public health gains.

Where significant new developments have been proposed these have been accompanied by air quality assessments and where required, the Council has sought to exercise both local & national policy appropriately in order to secure the mitigation of new relevant exposures, and the mitigation or offsetting of any significant development related increases in local emissions. This report does not present a list of such sites, nor does it (as has been reported in previous years) present a summary of air quality assessments & outcomes. The focus of this report is the policy context as a vehicle for change, and not it's specific application at individual development sites.

Other actions taken include;

- Contributing to & providing support for a Hampshire County Education and Transport Planning project aiming to raise awareness of air quality issues in local schools and aiming to encourage active modes of travel to & from schools through the 'Mode Shift Stars' Scheme.
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- Participation in the commissioning of a sub-regional scale air quality modelling exercise with PUSH[6] authority partners to place air quality considerations at the heart of a strategic regional planning exercise
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Conclusions and Priorities

Conclusions;

- Point of measurement exceedances of the annual mean objective for Nitrogen Dioxide were recorded at roadside sites adjacent to the East Side of B2149 Park Road South (Havant), A3023 Langstone Road, and A3 Maurepas Way / London Road (Waterlooville).
- Despite point of measurement exceedances, no breaches of the Nitrogen Dioxide objective value were recorded at a point of relevant exposure.
- Long term trends in Nitrogen Dioxide are either broadly static, or declining – with no increasing trends identified at any monitored location.
- The proportion of HGV traffic on both local and national trunk roads is not generally increasing, with only one location identified where there is an increasing trend both in within the past 5 years and in the longer term (15 years), and an overall proportional increase since the year 2000 (A3023, West of A3(M)).
- Traffic growth in terms of daily flows appears to be broadly neutral at around a third of sites over the past 17 years, but over the shorter term (7 years), around two-thirds of sites have seen a qualitatively increasing trend. Growth in traffic appears to be most significant on roads associated with the A3(M), and access to it. Less than 50% of monitored links have shown an absolute increase in the average daily traffic carried between 2000 & 2017. Available data do not suggest that traffic growth on the local classified road network is either strong, nor unsustainable.
- Trends in measured Nitrogen Dioxide concentrations do not reflect recent trends in road traffic growth, suggesting that Community, National, and Local measures to mitigate the impact of traffic emissions are achieving meaningful reductions in real-world 'per-vehicle-kilometre' emissions.
- There is no need to consider any areas as potential new AQMA's
- No specific need has been identified to take steps to reduce local primary sources of $PM_{2.5}$.

Priorities;

- Monitoring: To review results from additional monitoring at the East side of the A3023 Langstone Road to verify previous conclusions & to select a long-term monitoring location which is generally representative of emissions at the 100m street segment of the A3023 in the vicinity of no's 9-11 Regents Court.
- To redeploy available monitoring resources in general accordance with the proposed principles, in order to broaden the Councils knowledge of local air quality across the Borough, particularly in areas not previously the subject of monitoring campaigns.
- To improve the availability of air pollution information on the Councils Web Pages
- To fully account for the revised NPPF & other air-quality-relevant government policies and strategies in the Havant Local Plan 2036.
- To pursue measures that have scope to alleviate traffic pressure on Havant and Emsworth town centres, through positive support for strategic developments which would justify national trunk road infrastructure improvements (e.g. the proposed new junction on the A27, East of Emsworth exit).

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 Councils are 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 everyone continues to breathe good quality air.

Business

Business organisations can do a great deal to reduce emissions of Nitrogen Dioxide and Particulate Hydrocarbon emissions (PM_{10} & $PM_{2.5}$). 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 & 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;

- ***Introduce working arrangements that reduce the need to travel*;** Information & Communications Technology is providing a wealth of solutions to enable businesses to cut travel demand – e.g.;
  - *Flexible working solutions:* Secure access to business systems & 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[7].
  - *Tele- & Video- conferencing:* Enabling colleagues & partners meet face-to-face from anywhere – minimizing travel expenditure, helping to maintain business culture & increasing productivity where teams work across a variety of different locations.

[7] https://www.cipd.co.uk/news-views/policy-engagement/flexible-working

- *Webinar streaming services:* Used to deliver or attend training, can reduce or even eliminate the need for delegates to travel.
- *Cloud tools & 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 & intermediaries (agents or legal representatives), helping minimise the number of delivery vehicles on the roads

- ***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 & not-for-profit organisations[8]. Accreditation can be important for business reputation and can help to broaden marketing appeal and strengthen bidding & tendering opportunities, for example where customers operate a sustainable procurement policy.
- ***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-NO_x Boilers & Furnaces (Gas or Oil), or 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 - is could be particularly cost effective for businesses operating within a low-emission or congestion charging zone, as ULEV's are often exempt from charges & access restrictions. Grants[9] for workplace and private electric vehicles are available from central government at the time of publishing this report to help businesses wishing to invest in a sustainable vehicle fleet.
- ***Run an effective maintenance programme;*** Particularly with fuel-consuming plant & equipment, running a tight ship on maintenance not only reduces the risk of delays & costs associated with an unplanned breakdown, it can also maximise efficiency, reducing fuel consumption, running costs, and plant emissions.
- ***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 & 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 & 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 toward the

[8] http://ems.iema.net/emas; http://www.greenmark.co.uk/; https://www.iie.uk.com/
[9] https://www.gov.uk/plug-in-car-van-grants/what-youll-get

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 & 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 & resources to assist businesses in setting up an effective workplace travel plan[10]

- ***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[11] to secure access for both the business & for employees to a range of travel discounts and benefits, including:
  - *Discounts on rail travel:* Currently 15% off South West Trains for journeys within the Portsmouth Area.
  - *Discount on Electric vehicles (EV's):* 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.
  - *Free Membership to Car Clubs;* in partnership with Enterprise, and Co-Wheels, a range of low-emission, hybrid & electric vehicles are available to hire on a 'pay-as-you-go' basis.
  - *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.
  - *Access to a range of Cycle schemes:* Including local retailer & electric cycle discounts, access to loan bicycles & tax-efficient salary sacrifice purchase schemes.
- ***Green the workplace;*** There is growing evidence of the benefits of natural planting and air quality. Plants in leaf intercept particulate pollutants, and 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.
- ***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.

[10] https://www.hants.gov.uk/transport/developers/travelplans
[11] https://www.easit.org.uk/

Residents & 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 BRE estimate[12] 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 & Particulate Matter.

Potential sources of Particulate Matter (typically hydrocarbons, as $PM_{2.5}$ & PM_{10}) within the home include cooking, tobacco smoke, candles, scented oils & incense, aerosols, and the use of wood burners; whilst gas cooking, gas fires & wood burners are all sources of Nitrogen Oxides (both NO & NO_2). Properly installed gas central heating does not release pollutants within the home, however it might represent a significant source of Nitrogen Dioxide 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 Website for the National Clean Air Day[13] provides lots of practical information and advice on both reducing & 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.

- ***Avoid harmful air pollution;***

  - *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
  - *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 & fitness, reducing your risk of developing a medical condition that could be exacerbated by exposure to air pollution.
  - *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), 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[14]). 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.

[12] https://www.bre.co.uk/page.jsp?id=720
[13] 15th June; https://www.cleanairday.org.uk/
[14] https://uk-air.defra.gov.uk/

- *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 & 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 road side of the building. For really busy locations, filters can be incorporated to capture particulates, or even absorb Nitrogen Dioxide and Organic Hydrocarbon pollutants.
- *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.
- *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 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.

➢ ***Reduce your transport emissions;***

- *Make sustainable travel choices;* Whether you choose to travel by train or bus, to lift-share, use the park & 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.
- *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 & 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.
- *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.
- *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 & 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 & disadvantages, so it is important to research your options carefully to select a fuel option that works for your needs.
  - The weight & shape of your vehicle will also make a big difference – SUV's are both heavy & 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)
  - WhatCar? Publish a handy 'true mpg' database[15] to help you translate the manufacturer's lab-test fuel efficiency figures to 'real world' driving conditions.

- *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 & 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 & least polluting for 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.
- *Give your car a holiday;* if you are able to, 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.
- *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 & Oil additives are available to help

[15] https://www.whatcar.com/truempg/mpg-calculator

keep combustion engines free of carbon deposits, particulate filters clean, and reduce consumption of oil through unwanted combustion.

- *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[16], or talk to your school about setting up a 'Park & Stride' scheme[17] to reduce school gate congestion & unnecessary emissions where children may be exposed to significant levels of pollutants.

In the home;

- *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 & renewable carbon neutral fuel which when used well produces very little smoke & ash. However, wood burning can produce a lot of air pollutants. Minimise your contribution to air pollution by ensuring you have an properly installed flue that is in good condition and kept clean & clear. Make sure that your cowl doesn't overly restrict air flow. Choose a DEFRA approved 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[18]). 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[19], and an excellent short tutorial video, alongside great advice on fuel selection and pollution reduction on the BurnRight industry website[20]
- *Avoid use of flueless gas fires in closed rooms or for excessive periods.* HSE research[21] 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.
- *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 in to the home – estimated to increase your average weekly exposure by between 25% & 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 & as food chars, so if you have an externally vented extractor – use it.
- *Use a HEPA Air Purifier;* Home air purifier units are effective for removing pollen, bacteria, PM_{10} and even $PM_{2.5}$. Typical filtration rates are over 90% according to consumer tests[22]. Some units also include activated carbon filters to remove harmful gases from the air in addition to the filtration of fine particulates.

[16] https://www.livingstreets.org.uk/
[17] https://www.livingstreets.org.uk/media/2035/park-and-stride-print.pdf
[18] https://smokecontrol.defra.gov.uk/fuels.php
[19] https://www.readytoburn.org/defra-wood-burning-guide/
[20] https://burnright.co.uk/
[21] Research Report 23, ISBN 0 7176 2567 2 (2003); Flueless gas fires – concentration of carbon monoxide, carbon dioxide, and nitrogen dioxide, and particulate level produced in use
[22] https://www.quora.com/Do-air-purifiers-remove-PM2-5

- *Check your boiler flue;* modern condensing gas boilers produce as much as 24,000µg total Nitrogen Oxides (NO_x) per KWH. Around 5% of this represents 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.
- *Save the Bonfires for the 5th of November;* Burning your garden waste & 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 & household waste (including timber) free of charge – check the County Council web pages[23] for your nearest site. Havant Borough Council also offers a green waste collection service from just £42/yr.[24], saving you the trips to your local HWRC.
- *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 Nitrogen Dioxide 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 & ability to invest; consider choosing electrical water heating, a heat pump system for space heating, or a heat recovery ventilation system (MVHR)
    - 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)
- *"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[25] has some great advice on cutting your energy bills, and remember, lower bills = lower pollution.
- *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 & gas, but it can be a

[23] https://www.hants.gov.uk/wasteandrecycling/recyclingcentres
[24] https://www.havant.gov.uk/garden-waste
[25] https://www.energysavingtrust.org.uk/home-energy-efficiency/energy-saving-quick-wins

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 & electrically powered home cooking & 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.

- *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 & contamination. Investment in truly renewable sources is needed to adequately address both carbon & pollution issues. This won't happen without consumer demand.
- *Support sustainable power generation projects;* Official government statistics[26] 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 & green energy generation.
- *Go 'green';* Plants are very effective at intercepting air pollution – they absorb & utilise nitrogen oxides (NO_x & NO_2), and trap particulate matter (PM_{10} & $PM_{2.5}$) 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.

➢ ***Raising awareness:***

- *"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 share your experience and to help educate others on the positive steps they can take to reduce pollution or reduce their exposure to it.
- *Contact your local councillors or MP's;* 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 home town in the search box at https://www.writetothem.com/. Politicians help shape a wide

[26] https://www.gov.uk/government/statistics/energy-and-climate-change-public-attitude-tracking-survey-wave-21

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.

- *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.
- *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[27], including the results of the member air pollutant monitoring. Greenpeace[28] are also getting involved in UK air pollution issues, and 10:10 is a climate action group[29] which campaigns for the renewable energy needed to support the technologies needed to tackle air quality 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.

[27] https://friendsoftheearth.uk/clean-air
[28] https://www.greenpeace.org.uk/what-we-do/climate/airpollution/
[29] https://1010uk.org/

1 Local Air Quality Management

This report provides an overview of air quality in Havant Borough during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 pursuit of the objectives. 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 can be found in Table E.1 in Appendix E.

1.1.1 Timing of Report

The reporting timetable requires the submission of the ASR by the 30th June of the year following the reporting period calendar year.

The purpose of the ASR is not only to report on the current state of Air Quality within the Borough, but also to report on actions taken to safeguard-, or where possible to improve-, local air quality. It follows that the Local Authority is expected to be proactive in seeking emissions reductions, and in securing high quality developments & landscapes which contribute to the aggregate enhancement of the public realm through incremental change.

A broad range of Local Authority services are involved in areas which affect air quality, but in general air quality is ancillary to the primary functions of those services. For example, Council services may be primarily concerned with economic development, or with public transportation, parking enforcement, encouraging uptake of low carbon technologies, safeguarding public health and protected areas (ecological or landscape), or in securing high quality and desirable uses of land to the benefit of the Borough as a whole. All of these services have potential to influence local emissions & by extension, local air quality. That potential could be positive or negative, and so the delivery of these services represents opportunities for achieving mutual co-benefits as well as competing priorities which are antagonistic to public health and air quality goals.

Relatively few resources are available for the co-ordination of these functions to ensure that Air Quality forms a material consideration for all these otherwise disparate & discrete Public Service areas. Environmental Health currently provides this resource in an internal advisory capacity as a non-statutory consultee. The resources available within Environmental Health are however equally shared among the breadth of related-but-discrete functions of the service, and in addition, must serve both the ‘reporting’ and ‘proactive’ LAQM functions.

The current regulatory & funding environment is challenging. There has been a period of sustained evolution of environmental and development policy since the election of the Coalition Government in 2010, resulting in a number of emerging, new & amended Statutory Instruments, Bills, and Policy documents in recent years. The pace of this evolution has not abated during this latest reporting period, and could be argued to have intensified - driven substantially by the heightened awareness of Air Quality as a public health issue, by the EU’s

referral of the UK to the ECJ in 2017 for failing to meet the obligations of 2008/50/EC, and by pressure exerted on the UK Government to maintain standards of environmental regulation as an integral part of the UK's withdrawal from the European Union.

The 2017-2018 Period has seen the publication of the National Air Quality Plan for Nitrogen Dioxide[30], the Draft Environment (Principles & governance) Bill[31], the Clean Growth Strategy[32], the UK Clean Air Strategy[33], the Road Zero Strategy[34] and consultations on Domestic Solid Fuel Burning[35] and the Future Framework for Heat in Buildings[36]. NICE was also run a consultation on it's Draft Quality Standard for Air Quality[37], the HSE has published a series of Air Pollution Factsheets, and the Royal Town Planning Institute has published it's guide for Local Authorities on Planning for Climate Change[38] which recognises the interaction between air quality and climate-altering emissions, and the role of planning in effecting change.

A revised National Planning Policy Framework (NPPF) was also published during 2018[39]. The publication of the NPPF coincided with the undertaking of a comprehensive review of local policies at Havant, integral to the making of the Councils' Local Plan (2036). This process was at an advanced stage at the time of NPPF publication, and it was necessary to consider the implications of the national direction on the approach taken in deriving local policy.

The media attention given to Air Quality & Public Health issues in 2017/18 was both substantial & sustained, and to some extent likely shaped both the Government policy embodied within the 2018 NPPF and it's directions to Local Authorities. The result was an NPPF with enhanced provision for sustainability and the environment, including in particular Air Quality.

Whilst there had been no amendment of legislation governing the LAQM regime, the Government strategies, policy and programme of legislative reform represent a direction to Local Authorities to shift the approach to LAQM from the assessment of air quality against a threshold standard (a limit or objective), to an approach where incremental improvements are sought in support of wider public health goals irrespective of the current state of air quality relative to these standards.

Local resources were already being invested in a strategic regional scale assessment of Air Quality to support the Local Plan making process, and irrespective of whether the Council chose to offer formal comments to the consultations described above, it was nevertheless necessary to understand the implications of the proposed strategies, policy, and legislative change; if only to inform the emerging local policies.

In order to avoid the adoption an 18-year local plan which failed to respond to the objectives embodied within the collection of Government Strategies and Programme of Legislative reform emerging over the 2017/18 period, the Council recognised that priority needed to be given to responding to the signalled change in approach to local air quality.

[30] Air quality plan for nitrogen dioxide (NO2) in UK (July 2017); https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017
[31] https://www.gov.uk/government/publications/draft-environment-principles-and-governance-bill-2018
[32] The Clean Growth Strategy Leading the way to a low carbon future (Oct 2017); https://www.gov.uk/government/publications/clean-growth-strategy
[33] https://consult.defra.gov.uk/environmental-quality/clean-air-strategy-consultation/user_uploads/clean-air-strategy-2018-consultation.pdf
[34] Reducing Emissions from Road Transport: Road to Zero Strategy (July 2018); https://www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zero-strategy
[35] Consultation on cleaner domestic burning of solid fuels and wood (Aug 2018); https://consult.defra.gov.uk/airquality/domestic-solid-fuel-regulations/
[36] A Future Framework for Heat in Buildings (Call for Evidence) (Mar 2018); https://www.gov.uk/government/consultations/a-future-framework-for-heat-in-buildings-call-for-evidence
[37] Air Pollution: Outdoor air quality and health. NICE quality standard (Sept 2018); https://www.nice.org.uk/guidance/GID-QS10067/documents/draft-quality-standard
[38] Planning For Climate Change (A Guide for Local Authorities) (May 2018) https://www.rtpi.org.uk/media/3152143/Rising%20to%20the%20Climate%20Crisis.pdf
[39] https://www.gov.uk/government/collections/revised-national-planning-policy-framework

Given finite resources available, this need was in direct competition with the requirements to continue to implement and exercise it's existing policies (to achieve air local emissions reductions), to continue monitoring and assessing Air Quality, and to report upon it's work in line with the ASR reporting calendar.

Given these competing demands, and given the finite window of opportunity to set the direction of local policy in the medium term (to 2036); the Council chose to prioritise actions which aim to secure improvements in local air quality, at the expense of meeting the timetable of reporting on that work.

This has resulted in the delay to the submission and publication of the 2018 ASR.

1.1.2 What do we mean by Ambient Air Quality?

The term 'Air Quality' is a synonym for the whole body of Regulation & Guidance made under the European Communities[40] & Environment[41] Acts pursuant to the transposition & implementation of 96/62/EC[42], it's daughter directives and 2008/50/EC[43]. The meaning of the term will vary slightly depending upon context.

Within this report, the Term 'Air Quality' refers to the LAQM regime under the Environment Act 1995, it's current Technical Guidance (LAQM.TG(16)[44]), and the Air Quality Objectives under the Air Quality (England) Regulations 2000 (SI 928[45]); when measured in accordance with Schedule 1 to the Air Quality Standards Regulations 2010, (SI 1001).

References to air quality standards in this report will typically be to NAQS 'objectives' (reflecting language used within SI 928, which apply to the LAQM regime). Any references to NAQS 'limits' or 'limit values' will refer to standards under SI 1001, which apply to national assessment of compliance with 2008/50/EC which is a duty of the Secretary of State. Whilst the relevant averaging areas under SI 928 & SI1001 differ, in most cases the volumetric concentrations and averaging periods are the same.

Air quality is directly related to the emission of pollutants, but differs in that it is considered within a defined framework (referenced above). That framework accounts for both the location of exposure, and the average concentration over specific durations.

Personal exposures to air pollutants occur at places where the standards apply ('locations of representative relevant exposure'), and locations where they do not.

The personal health impact of an hour of exposure to poor air quality at a location where the ambient air quality standards do not apply would be equivalent to that arising from exposure at a relevant location; the distinction between 'relevant' and 'non-relevant' locations is not explicitly based upon a 'risk of harm' judgement.

Considering the balance of average durations and intensities of personal exposures at relevant and non-relevant locations, the public health impact of exposure at 'non-relevant' locations is likely to approximate-, and is arguably likely to exceed- that which arises from exposure at locations where the current air quality standards apply. In this way, the LAQM

[40] European Communities Act 1972 c.68
[41] Environment Act 1995 c.25
[42] Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management (repealed by 2008/50/EC)
[43] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[44] Local Air Quality Management Technical Guidance (TG 16), DEFRA, April 2016. https://laqm.defra.gov.uk/technical-guidance/index.html
[45] The Air Quality (England) Regulations 2000 SI 928

regime cannot in isolation serve to reduce personal exposures below thresholds of harm, as LAQM disregards a significant portion of the aggregate total personal exposure.

Achieving full national compliance with ambient standards would therefore not eliminate the occurrence of adverse air-pollution-related health outcomes, due to personal exposure acquired at non-relevant locations-, or to emissions arising from non-relevant sources-; for example:

- **When Travelling** – exposures occurring at at/on footways, cycleways, at the kerbside, within the carriageway (e.g. cyclists on roads), or within the cabin of any vehicle (whether road or rail, private or public) are not considered relevant in terms of the current air quality standards.
- **At Work** – workplace exposure limits apply at work, whether the employment is within an industrial setting or at an office or service sector location, and so these locations are exempt from any need to meet ambient air quality standards.
- **When accessing Services** – exposures occurring at commercial locations (where any volunteers work, or staff are employed and where workplace exposure standards apply) are not considered relevant to NAQS objective values, even for customers or visitors. There are some exceptions (e.g. accessing medical or education services), but standards to not apply at the majority of public service, retail and leisure premises.
- **Within the Public Realm** – public spaces, for example play areas, parks or pedestrianised shopping areas etc. are not considered relevant to annual limits (hourly limits do apply).
- **From industrial, commercial or domestic point sources** – Concentrations at locations relevant to the current ambient air quality standards (e.g. residential, educational or clinical) may still exceed those standards where concentrations only exceed the standard as a direct result of a localised emission source. For example, a commercial kitchen extract, woodburner or gas boiler flue close to the window of a residential dwelling may cause the air quality at that dwelling to exceed the ambient standard, without representing a breach of that standard.
- **From sources within the Home** – Exposure to pollutants that are emitted from a source within the home are not considered relevant to the current air quality standards. Exposures within the home can exceed permissible ambient exposures by many times as a result of the using of common household products and appliances.

In order to eliminate harm caused by NAQS pollutants it would be necessary to address exposures falling outside the current framework for maintaining compliance with NAQS objectives & limits (i.e. those listed above).

Addressing such exposures would be administratively and politically complex; as it would necessitate encroachment upon personal choice – choices such as where to work, which products to purchase or use, how to heat or use your home, or what methods are chosen for cooking of food.

The ambient air quality standards implicitly accept that average personal exposures may significantly exceed the air quality limits as a direct result of exposure at locations listed above. The objective of the ambient standards is specifically to address the contribution of average, background air pollution (whether avoidable or not) to the overall aggregate personal exposures.

The air quality standards are not intended to represent a threshold between ‘harmful’ and ‘safe’ concentrations considered against an acute or short-term exposure. Even where short term (e.g. hourly) standards are defined, these apply to permissible *regular* hourly peak

exposures over a minimum period of 12 months. Peak hourly exposures must be considered within & alongside the over-arching annual average limit, which serves as a 'ceiling' to the frequency of occurrence of concentrations close to, but not exceeding the hourly limit. In this way, hourly limits for air quality do not represent a threshold of harm for an ad-hoc (e.g. one off) exposure to an emission, even where the ad hoc exposure occurs at an equivalent concentration, over an equivalent time-period.

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 at a representative relevant location. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Havant Borough Council currently does not have any AQMAs. For reference, maps showing the current monitoring locations maintained by Havant Borough Council is available in Appendix D.

2.1.1 Local Air Quality Strategies

DEFRA PG16 recommends that authorities should consider having a local air quality strategy where local air quality in areas within the administrative district is close to the NAQS objectives.

With the exception of some localised sections on the main route between Havant Town Centre and Hayling Island, comprising the B2149 Park Road South & A3023 Langstone Road (the 'Park Road Corridor'); Havant Borough Council does not have any areas where levels of ambient air pollution are thought to be approaching the air quality objectives.

A significant proportion of traffic using the Park Road Corridor is 'through' traffic whose destination is not the Town Centre. This is exacerbated by several other factors, for example;

- An access point to the strategic road network exists just South of Havant Town Centre, at a mid-point in the B2149 to A3023 route.
- One of only two permanently-passable rail crossings on the local road network is located immediately North of Havant Town Centre,
- The historic town centre layout, characterized by the pedestrianised shopping frontage of West Street (East of Park Road South) and narrow streets (e.g. North, South, East & West Streets), constrains local routing options, and
- The A27 Havant Bypass junction is located on the axis of a strongly tidal North/South traffic flow associated with commuter trips from residential areas of Hayling Island to mainland employment. This route is also heavily used for Hayling Island residents to access retail and services not available on the island, and avoidance of this junction is only possible for motor vehicles by routing via the Langstone Technology Park (not a public route), or for pedestrians / cyclists via the Hayling Billy footpath.

Considered alongside the poor routing options to destinations North of the A27 Emsworth Junction, these factors mean that the A27 Havant Junction represents a natural exit/entry point to the Strategic Road Network for both local & out-of-district journeys whose destination (or origin) is north of the A27, where the trip origin (or destination) is sufficiently east of the A3(M) as to render the Havant exit closer.

Havant Borough Council sees little opportunity to address such fundamental issues short of substantial investment in strategic road network improvements, or in new road links,

junctions, or rail crossings which provide alternative routing options. Every opportunity to address these issues is being explored where it arises, however under the current & foreseeable funding environment opportunities to secure such investment are only likely to arise in connection with large scale local development.

For these reasons, Havant Borough Council has not to date resolved to pursue a voluntary and proactive local air quality strategy.

However, the PUSH area detailed air quality modelling report authors made a notable recommendation that consideration should be given to the adoption of a broader, regional-scale Low Emission Strategy. It was suggested that such a strategy could be modelled on an exemplar strategy already adopted in West Yorkshire in 2016[46], and could serve as a 'link' between otherwise disparate strategies which are critical to the achievement of air quality goals, but principally concern separate priorities. These might include Economic Development Strategies, Strategic Transport Planning, plans for meeting Energy needs and Climate Change & Sustainability goals, and strategies for effective adoption of new technologies to assist in meeting these strategic aims.

A regional Electric Vehicle Strategy is identified as having the potential to be a particularly fruitful area for exploration, with several policy suggestions made in relation to investment in- and/or the promotion or facilitation of- a comprehensive regional infrastructure to provide practical support for the use ULEV's.

The final draft of the PUSH area study was only issued in September 2018, so partner authorities need some time to review the results and recommendations. There has however been some preliminary discussion on the merits of a regional clean air strategy following the review of an earlier draft, and the Partnership has expressed some appetite to explore the merits of implementing such a strategy.

Given the structural constraints described above around the 'Park Road Corridor' in Havant, it is considered that providing support for a more rapid change in the nature of vehicles using the local road network (e.g. seeking to increase the proportion of vehicles using 'zero NO_x propulsion' whilst travelling on the 'Park Road Corridor'), would represent a realistic prospect of improving local NO_2 compliance from a status of 'borderline, stable' to 'comfortably complaint (negligible risk of future exceedance)'. Only a small sustained shift is likely to be necessary to achieve this.

It is considered that such a strategy would have a significantly increased chance of success if implemented more widely than a 'Borough-only' basis. Strategic local partners for a sub-regional implementation would be those which represent a significant commuter draw for Havant residents – particularly Portsmouth, which represents either the source or destination of around 78% of the 24,000 daily commuter trips between Havant and nearby urban centres.

Consideration of adoption of such a strategy is at present at the very early stages, but there is significant 'in principle' support at officer level across Strategic Planning, Health, and Transport functions within partner authorities.

Adoption of such a regional strategy would require a degree of support from the political leadership of partner organisations.

[46] West Yorkshire Low Emissions Strategy 2016-2021, December 2016 (https://www.bradford.gov.uk/media/3590/west-yorkshire-low-emissions-strategy.pdf)

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

2.2.1 Responding to the 2017 ASR

The 2017 ASR identified a measured exceedance at the kerbside of Langstone Road, but concluded that it was likely to be influenced by a local point source (adjacent local bus stop) and was therefore unlikely to representative of ambient Air Quality, and therefore was not appropriate to compare the result to the NAQS objective. The report recommended additional measurements be undertaken in the locality to confirm whether the anomalous measurement could be substantiated as unrepresentative (or not). DEFRA's appraisal of the report agreed that the dismissal of the result was justifiable, and recommended that monitoring at the position in question (19B) cease, and that the tube be redeployed to a position as close as possible to relevant exposure to this location.

The 2017 ASR also proposed to review all current monitoring positions to assess their representativeness. DEFRA expected this to be taken forward as a priority, to avoid confusion in future reporting.

Some other minor technical comments were also made during the critical appraisal. Table J.1, Appendix J provides a brief summary of the review commentary and Council's response to those comments.

The Council has completed a full review of it's current monitoring locations. Appendix F presents the detailed appraisal of each monitoring location, and provides an outline monitoring strategy which aims to be more reactive, representative, and informative. As a result of this review, some monitoring locations have been decommissioned, and the monitoring resources redeployed.

The Council acknowledges the recommendation made by Defra during it's critical appraisal to decommission position 19B. The Council has however elected to maintain this position for concurrent monitoring alongside a series of temporary new monitoring positions in the vicinity. The aim is to establish which position is likely to be most representative of ambient air quality on the Eastern side of the A3023 Langstone Road, in order that a single representative 'worst-case' position may be monitored in future. The decision to maintain the position during this temporary period of concurrent monitoring was also taken in the interests of maintaining transparency, and also to provide useful contemporary information to inform the assessment of the results from each of the temporary positions.

Section 3.1.2 presents details of changes to the local monitoring network.

2.2.2 Seeking incremental emissions reductions and improvements in local ambient air quality

Despite not having any air quality management areas, Havant Borough Council and Hampshire County Council have continued to take forward a number of general measures during the 2017/18 reporting year that aim to positively & incrementally improve local air quality within the borough in a direct way; or to inform policy, projects & investment

decisions which are capable of contributing towards this same goal. Details of all measures completed, in progress or planned are set out in Table 2.1.

Key actions taken / milestones reached this period:

- Together with our PUSH area Authority Partners, Havant Borough Council has taken lead role in the commissioning and project management for the sub-regional scale air quality assessment, and provided technical input to ensure that the results meet the project brief, and the modelling uncertainties are well understood. This report considers source emissions from the entire sub-regional classified road network, accounting for all allocated development within the respective Local Authority Local Plans. Whilst experiencing some production delays, the project is now complete, and a final draft is now available[47]. Some follow up work has been identified as a result of that report, but this is largely in connection with sensitive ecological sites. Results are discussed in more detail in the sections below.
- Work has commenced on the roll out of a network of 50KW+ Electric Vehicle Charge point infrastructure, which will be available to the public at Council owned regulated Car parks in Emsworth, Leigh Park, Havant & Waterlooville[48]. These will be installed in partnership with Chargepoint Services, and chargers will be capable of charging all EV types currently on the market.
- Havant Council has begun the procurement process to replace 3 no. diesel powered vans currently in use for community and animal welfare services with modern, clean electric vehicles. A 22kw charging station is planned at the Public Service Plaza to support these vehicles, though this will be an operational service, and will not be made available to the public. The first vehicle is expected to be on the road by December 2018.
- Hampshire County Council has worked with Portsmouth City Council on a joint bid for 'Transforming Cities' funding for the city region, for the development of a rapid transit network linking Portsmouth to Fareham, Gosport, Havant and Waterlooville[49]. The bid is based- and hopes to build- upon the success of the existing 'Eclipse' and 'Star' routes run by First Bus from Gosport to Fareham and Portsmouth to Waterlooville respectively. The South East Hants Rapid Transit (SEHRT) Board comprises the Local Transport Authorities (county & unitary), and public transport operators First, and Stagecoach. Havant Council has not (therefore) been able to take a lead on this project, but has lent operational and political support to the project where possible. Both the leader of the Council and the local MP have submitted formal letters of support for the application. At this initial stage the bid requirement is a "Call for Proposals", to describe the key transport challenges across the city region, but the proposals underpinning the bid are at an advanced stage, having benefitted from investment in proactive development by SEHRT members over a number of years.

[47] Partnership for Urban South Hampshire: Air Quality Impact Assessment Ref: ED 10415100
[48] https://www.havant.gov.uk/electric-vehicles
[49] https://www.hants.gov.uk/transport/strategies/fundingbids (Jun 2018)

Havant Borough Council expects the following measures to be completed over the course of the next reporting year:

- Completion of the Langstone Road Cycle Link to Hayling Billy off-road cycle route, linking the Northern end of Langstone Road with National Cycle Network Route 22
- Completion of the Emsworth to Rowlands Castle off-road cycle route, providing a short-cut between National Cycle Network Route no. 2 (Emsworth) and 22 (Rowlands Castle). Working with local authority and community partners in West Sussex, work is already underway to deliver this scheme.
- The installation of all four planned 50kW public charge points to be in operation and available to the public.
- The purchase and commissioning of all 3 planned electric vehicles, with these vehicles meeting the full travel requirements of the Community and Animal Welfare Teams without the need to contingency measures to maintain operational standards.
- The installation of a 22kw charging station at the Public Service Plaza to support the Council's burgeoning electric vehicle fleet
- Publication of the Final Draft of the Air Quality Impact Assessment Ref: ED 10415100, alongside monitoring data to quantify real-world Nitrogen Dioxide levels in areas which the report identifies as being at risk of exceedance of NAQS objectives.

Havant Borough Council's priorities for the coming year are:

- To deliver an adopted Local Plan that is fit for purpose and for the first time includes a specific policy for air quality, aiming to ensure that all new major development contributes proportionately to the mitigation of local emissions.
- To exercise environmental & sustainability policies to capitalise upon opportunities to secure improvement of key infrastructure that is critical in supporting a shift in the proportion of trips made by conventionally-fuelled private motor car to more sustainable and active means of travel.
- Subject to favourable feasibility assessment, to progress delivery of the core infrastructure for the district Heat Network and Combined Heat & Power
- To continue to drive forward schemes to support delivery of the active travel strategy, especially those already underway, and those on Hayling Island where funding sources have already been identified.
- To improve digital content & information provision for residents, to improve engagement & awareness of Local Air Quality & Sustainability issues.
- To ensure that developers continue to optimise the design & specification of buildings to minimise energy consumption and incorporate low emission technologies; particularly those which replace a local combustion appliance with a 'zero emission at point of use' alternative.
- To ensure protections are secured for the occupants of new residential conversions within town centre locations adjacent to busy transportation routes, or where monitoring suggests pollutant concentrations are within 5% of NAQS objective values.

The ability to progress Council-led capital projects such as the District Heat & CHP will be subject to both the prevailing funding conditions, and to a significant extent the prevailing economic outlook. Economic conditions could affect both the costs & feasibility of borrowing to deliver such projects, as well as influencing the scale of rewards from implementation (e.g. the operational costs, achievable income from exporting energy, and the local demand). In this way, projects of this type could be subject to a certain degree

of 'fluidity' in feasibility, which could make the difference between choosing to progress, or to wait for more favourable economic conditions.

Funding has been identified to support the active travel projects identified above, for progression to a detailed design phase, and scheduling for completion over the next 1-2 years. Opportunities to secure delivery of additional highway & transport infrastructure schemes are similarly tied to the economic outlook, as these are often heavily dependent on developer contributions, or are development led. Local developments, especially flagship developments such as the Market Parade tower or Hambledon Road Build-to-Rent 'regeneration catalyst' schemes, are extremely sensitive to the economic outlook over the next 2-3 years, and to a large extent are outside of the control of Havant Borough Council to secure delivery once consents have been granted.

Havant Borough Council anticipates that the measures stated above and in Table 2.1 will achieve sustained compliance within the Park Road Corridor, and elsewhere within the Borough.

- The Council Responded to the consultation on Domestic Solid Fuel Burning. A copy of the response is provided at Appendix I.
- The Council Responded to the National Institute for Health and Care Excellence (NICE) consultation on it's draft Quality Standard for Air Pollution: Outdoor Air Quality and Health. A copy of the response is provided at Appendix I.
- Havant has completed it's Heat Network Development Unit (HNDU) funded Havant 'Civic Campus' Feasibility Study, with the final draft now publicly available[50]. The study concluded that a Civic Campus and New Lane heat network is viable in principle but is dependent upon funding for implementation. The availability of funds is likely to be tied to the Councils long term vision for the Civic Campus, which is at an early stage of consideration. The feasibility study is a material consideration in the development of the Havant Borough Local Plan 2036[51] and it has led to the inclusion of draft policy text at E8 e) (Low Carbon Design), which aims to support a Civic Campus project when the Council is able to implement or facilitate it, or to support a similar scheme at one of the other sites where heat mapping masterplanning[52] has identified potential.
- Havant Borough Council has contributed towards a Hampshire County Council Education & Transport Planning project aiming to raise awareness of air quality issues at local schools. The project aims to encourage active modes of travel for journeys to & from schools through the 'Mode Shift Stars' Scheme, getting pupils involved in producing their own air quality campaigns & local air quality action plans. 2017 participants were Barncroft Primary, Bosmere, Trosnant & Hart Plain Junior Schools. Indicative results are presented in Appendix G**,** alongside an example Air Quality Campaign Plan.
- The ambitious strategic development area between Denvilles & Emsworth has progressed to a formal allocation within the pre-submission local plan under policy KS5. The proposed new access for the A27 (East of the Emsworth exit) is provided for at KS5(x), but is made subject to the outcome of a technical assessment of the cumulative transport impact of providing over 2000 new homes in this location. KS5(xi – xv) also seeks to secure additional infrastructure improvements, including reducing queuing at congested local road junctions, the provision of new bus services to serve the development, and the delivery of strategic cycling & pedestrian facilities designed to ensure that active travel choices are supported for journeys to key leisure, employment

[50] https://www.havant.gov.uk/sustainability-and-energy
[51] Draft Havant Borough Local Plan 2036 (Jan 2018), available to view at http://www.havant.gov.uk/localplan
[52] Havant Borough heat demand mapping and energy masterplanning, Havant Borough Council (2016)

and service destinations. Together, these schemes are considered to have considerable scope to mitigate travel demand of this development, and could potentially reduce traffic flows within Havant Town Centre against current levels (resulting in net improvement in air quality).

2.2.3 PUSH low emission strategy

In order to materially improve air quality, it is necessary to address issues at all levels; from the highly local to the macro-scale.

National and international governments are well placed to manage the legislative and regulatory environment governing permissible emissions from industry, vehicles, plant & appliances (in terms of aggregate total mass, and/or in terms of emissions rates).

Local government (Borough & County) is well placed to manage highly localised issues at air pollution 'hot-spots', particularly those relating to traffic flow at individual junctions, and the avoidance of problems associated with introducing sensitive relevant landuses at locations with poor air quality.

Falling between the macro-scale and micro-scale issues described above is a range of contributors to the local 'background' concentrations air pollutants, and an equally diverse range of opportunities to intercept and remove air pollutants from the atmosphere, which have to date received relatively little attention in the absence of any relevant exceedance of NAQS objectives.

It is increasingly recognised that strategies aiming to improve local air quality need to look beyond the specific area where NAQS objectives are being breached, to measures which seek to;

- manage aggregate emissions from all sources, particularly those associated with new development, new transport demand, new energy demand & combustion activity, and;
- maximise interception and deposition (to vegetation, land and surface waters) of air pollutants already released to atmosphere, especially where these may be sustainably 'fixed' without adverse impact upon sensitive habitats, and;
- minimise the trans-administrative-boundary effects of new emissions sources within the region, particularly in urban centres which attract significant visitation from adjacent areas to access retail, leisure or employment destinations.

Supported by robust & complementary local policy, a sub-regional strategy could serve to plug the gap between government efforts to regulate primary emissions, and local efforts to tackle air pollution hot-spots. A regional strategy would be uniquely placed to seek to mitigate growth of emissions through co-ordination of transport planning & strategic infrastructure development, and potentially allowing deployment of funds across boundaries so that developer contributions sought to mitigate the impacts of travel demand can be most effectively utilised.

Consideration of the need for a sub-regional low emission strategy is at an early stage, but individual authorities within the PUSH group are already independently producing local strategies which might be adapted to a framework strategy which can be agreed across the PUSH region.

Progress will be reported in future ASR's.

Table 2.1 – Summary of Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
UK0012-HBC_3	MATiSSE smarter working project	Other	Other	HBC, HCC, & Partners	2006	Ongoing	1) Rollout of ICT arrangements to HBC Staff 2) Progressive Rollout to Hampshire Public Services	Not Set	• Initial Phases Completed. • Ongoing Provision Interrupted at HBC Regressed	2007-	See Table 2.2
UK0012-HBC_4	Havant Borough Active Travel Strategy: Encourage zero emissions transport	Promoting Travel Alternatives	Promotion of walking	HBC, HCC, & Partners	2011, 2017	2016, 2020	1) Promotion of Walking (Media) 2) Support & Signpost My-Journey Hampshire 3) Delivery of Public Realm Enhancements listed in the Solent Area Transport Strategy 4) Delivery of Other Public Realm Enhancements Identified during course of strategy	Not Set	• 1) & 2) Complete • Schemes identified at 3) & 4) Completed where funding secured • Achieved, in Delivery / Maintenance Phase	2025	See Table 2.2
UK0012-HBC_5	Havant Borough Active Travel Strategy: Encourage zero emissions transport	Promoting Travel Alternatives	Promotion of cycling	HBC, HCC, & Partners	2011, 2017	2016, 2020	1) Promotion of Cycling (Media), 2) Publication & Regular Update of Local Cycle Route Map 3) Support & Signpost My-Journey Hampshire 4) Development of local & 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)	Not Set	• 1), 2) & 3) Complete • Ongoing programme in respect of 4) • Achieved, in Delivery / Maintenance Phase • Aspirational 2036 Cycle Network Map Published	2025-36	See Table 2.2

Table 2.1 Continued…											
UK0012-HBC_12	Transportation Assessment and seeking developer contributions for traffic impact mitigation (Policy)	Policy Guidance and Development Control	Low Emissions Strategy	HBC	2011	Ongoing	1) Adopt policy framework which: • Secures assessment of the transport impacts of all new major development • Requires efficient use of existing infrastructure • Requires effective mitigation 2) Exercise local policy to achieve effective change	Not Set	• Completed for 2010 plan-making phase • Delivery maintained to date • Comprehensive review completed for 2018 plan-making phase • Policies Updated 2017/18, at pre-submission draft stage.	Ongoing	See Table 2.2
UK0012-HBC_13	Forward Planning	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	HBC	2011	Ongoing	1) Adopt policy framework which: • Encourages development in sustainable locations • Minimises the need for travel • Facilitates sustainable and active travel choices • Promotes linked trips • Provides for parking allocation to respond to local context & provision of alternative transport options. 2) Exercise local policy to achieve effective change.	Not Set	• As UK0012-HBC_12	Ongoing	See Table 2.2
UK0012-HBC_14	Seek mitigation of emissions associated with new development on an 'all-sources' basis	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	HBC	2018	2018-36	1) Adopt policy framework which seeks: • mitigation of development emissions at source, • promotes interception & deposition of air pollutants, and • provides for off-site mitigation where appropriate 2) Exercise local policy to achieve effective change.	Not Set	• Draft policy wording agreed for 2018 plan-making phase • Policy retained within 2017/18 pre-submission draft.		See Table 2.2
UK0012-HBC_15	Supporting Local Shopping	Policy Guidance and Development Control	Low Emissions Strategy	HBC	2010	Ongoing	1) Adopt policy framework which discourages restrictive private (e.g. retail) parking policies that discourage linked trips. 2) Discourage restrictive private parking policy through: • Economic development & regeneration • Planning System	Not Set	• As UK0012-HBC_12 • Indirect Enhancement to previous provision	Ongoing	See Table 2.2

Table 2.1 Continued…

UK0012-HBC_16	Parking Service Policy	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	HBC	2010	Ongoing	1) Manage Parking Provision 2) Reduce the demand for parking 3) Set appropriate charges	Not Set	• 1) -3) Complete. • Achieved, in Delivery / Maintenance Phase	Ongoing	See Table 2.2
UK0012-HBC_17	Development of SE Hampshire Integrated Rapid Transit Network	Transport Planning and Infrastructure	Bus route improvements	PCC, HCC, & Partners (HBC, as member SEHRT Board). DfT Funding	2015-2019	2019-27	1) Improve sustainable travel offering for commuter trips between HBC & 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.	Not Set	• 1)-5) are project objectives, achievement of which are subject to securing funding. • Independent investment has supported development of proposals to an advanced sage • Funding Bids in Progress	Ongoing	See Table 2.2
UK0012-HBC_18	PUSH Area Air Quality Assessment	Policy Guidance and Development Control	Other policy	HBC Lead, for PUSH	2016-2017	2017-18	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	Not Set	• 1) Complete. Draft Report Issued. Final draft due 2018 • Draft results & conclusions have informed the Local Plan 2036 • Assessment supports UK0012-HBC_19	Autumn 2018	See Table 2.2
UK0012-HBC_19	PUSH Area Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	PUSH (HBC Member)	2018-2019	TBC	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	TBC	• Early Stage - 1) under discussion.	2019-2020	See Table 2.2

Table 2.1 Continued…

UK0012-HBC_20	Safer Routes to School; School Travel Planning	Promoting Travel Alternatives	School Travel Plans	HBC, HCC	2017	2019 (-TBC)	1) Provide proportionate support for HCC Schools AQ 2) Engagement of minimum 3 no. schools in AQ monitoring, and local campaign planning (during 2017/18) 3) Production of a school travel & air quality action plan at each participating school. 4) Participating schools achieving a new 'mode-shift stars' award, an upgraded award standard, or maintain a 'gold level' award.	Not Set	• Phase 1 Confirmed. • Further Phases subject to HCC Funding for continuation • HBC has agreed to support further phases.	2019	See Table 2.2
UK0012-HBC_21	Strategic Road Transport Assessment	Transport Planning and Infrastructure	Other	HBC, HCC	2017-2020	TBC	1) Define Scope of assessment & commission, consult internally & with Highway Authority, agree final draft 2) Publication of a Mainland Transport Assessment 3) Publication of a Hayling Island Transport Assessment	TBC	• Hampshire Services commissioned to deliver the Mainland Assessment (2017) • Campbell-Reith & Systra commissioned to deliver Hayling Island Assessment (2017) • Publication Delayed	2019	See Table 2.2
UK0012-HBC_22	New A27 Access & Link Road	Transport Planning and Infrastructure	Other	HBC, HCC, Highways England	2017-20	TBC	1) Adopt policy framework which: • Supports assessment of need • Requires assessment of air quality impact of scheme, • Safeguards land required, and co-ordination of strategic local development to avoid prejudicing delivery. 2) Derive conceptual design options 3) Model function and impact of leading design options 4) Seek & obtain funding 5) Deliver preferred scheme	TBC	• Policy Framework included in Local Plan 2036 pre-submission draft • Two Layout Options Derived • Highway Impact Testing in Progress	TBC	See Table 2.2
UK0012-HBC_23	District Heat Network	Promoting Low Emission Plant	Emission control equipment for small and medium sized stationary combustion sources / replacement of combustion sources	HBC	2016-20	TBC	1) Undertake Heat Demand Mapping exercise, and publish an Energy Masterplanning report 2) Undertake and publish a Heat Network Feasibility Study 3) Identify funding opportunities, and secure funding for delivery 4) Adopt policy framework which supports delivery of Urban Heat Networks.	TBC	• Demand Mapping Published Autumn 2016 • Heat Network Feasibility Study Completed Spring 2017, Published Summer 2018. • Policy Framework included in Local Plan 2036 pre-submission draft	TBC	See Table 2.2

Table 2.1 Continued…											
UK0012-HBC_24	Invest in Public Rapid Charging Network	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	HBC, ChargePoint	2017	2018-19	1) Install four 48kw universal rapid chargers at Public Owned Car Park locations 2) Monitor & report on initial usage 3) Adopt policy framework which adequately provides for Plug-in EV charging points at all new residential development	TBC	• Two Rapid Chargers Installed (2018) • Policy Framework included in Local Plan 2036 pre-submission draft	2019	See Table 2.2
UK0012-HBC_25	Prioritise LEV & ULEV in public sector procurement	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	HBC	2018	2018-2020	1) Replacement of minimum 3 Diesel Fuelled LDV service vehicles by summer 2019 2) Collection of key cost & performance metrics 3) Derive & Adopt corporate procurement policy / criteria for fleet replacements 4) Install one intermediate-duty (22KW) fleet charging facility at all public service premises serving as an EV fleet vehicle 'home base'.	TBC	• Order Placed. Delivery of First Vehicle expected December 2018.	2020	See Table 2.2

Table 2.2 – Commentary on Measures to Improve Air Quality

Measure No.	Measure	Comentary on Aims, Progress & Barriers to Implementation
UK0012-HBC_3	MATiSSE smarter working project (& ongoing arrangements): Home working, traffic management	• Local policy & practice is subject to change in response to changes in managerial priority, facilities management strategy, and continuity of ICT service contract arrangements. • Levels of participation have ranged from 85% to <20% on a time basis (individual, FTE) in response to both role and prevailing policy. • ICT services contract change has substantially reduced availability of Flexible working to staff, and has resulted in increased staff trips. • Options are currently being explored for reintroduction of a corporate provision for flexible working , but this is funding dependent, and no commitments have yet been possible as at August 2018.
UK0012-HBC_4	Havant Borough Active Travel Strategy: Encourage zero emissions transport & developing infrastructure	• Local Walking Strategy now 'expired'. County level 2015-2025 strategy is being supported by HBC in the interim. • Web promotion of walking strategy complete / ongoing; e.g. Promoting & Supporting the 'Walking for Health" scheme & long distance recreational walks, Signposting Hampshire County Councils excellent "Street's Ahead" Pedestrian Safety Training scheme for children. • Link to Comprehensive multi-modal journey planner (MyJourney Hampshire) & external resource signposting (e.g. "Walk-it" route planner) is complete & regularly maintained. • Infrastructure development project list is 'live', new schemes are being added & implemented on an active basis through development contributions, through impact mitigation and highway safety schemes. See Table H.1 , Appendix H for recently completed and pipeline schemes.
UK0012-HBC_5	Havant Borough Active Travel Strategy: Encourage zero emissions transport	• Local Cycling Strategy now 'expired'. County level 2015-2025 strategy is being supported by HBC in the interim. • Web promotion of cycling complete / ongoing. Focus is on publicising progress in improving local cycling infrastructure, but partner resources such as Hampshire County Councils "bikeability" training scheme for schoolchildren are also signposted, alongside local travel planning resources • An all-new print-friendly Cycle information and Route Map is now available, updated August 2018 to include new local routes, information on cycling charity & sustainable travel resources, and promoting local cycling services. • 'Bike Doctor' sessions are run on a continuing basis in partnership with MyJourney Hampshire • Infrastructure development project list is 'live', new schemes are being added & implemented as under UK0012-HBC_4. See Table H.1 , Appendix H for recently completed and pipeline schemes.
UK0012-HBC_12	Transportation Assessment and seeking developer contributions for traffic impact mitigation (Policy)	• Relevant Existing Policies of the Core Strategy 2011: CS20 - Transport & Access, DM11 - Sustainable Travel, DM12 - Mitigating the impacts of travel, DM15 - Safeguarding Transport Infrastructure, DM16 Freight Transport. Valid until Adoption of the Local Plan 2036 • Local Plan 2036 Draft Policies ensure continued progress with mitigation of the upward pressure on local transport infrastructure associated with new development, through the assessment of the impact of travel (IN3), the securing of developer contributions towards necessary infrastructure (IN1) and a strategic approach towards investment in the transport network (IN2). Draft Policy IN3 requires travel plans for significant development, encouraging shift from private motor car to sustainable and active travel modes. • Draft policy IN4 is a new provision seeking to specifically address the disproportionate disruption to existing traffic flows that can arise from the use of new access points to the existing highway network

Table 2.2 Continued…		
UK0012-HBC_13	Forward Planning	• Relevant Existing Policies of the Core Strategy 2011: CS17 Concentration of development within urban areas, DM13 Car & Cycle Parking • Local Plan 2036 Draft Policies ensure continued progress with mitigation of the upward pressure on local transport infrastructure associated with new development though providing well connected local development that provides sufficient & accessible cycle storage (E1), provides a high quality urban environment to promote Health & Wellbeing (E2), and identifies opportunity areas for high-density development, concentrating on areas with good access to public transport (H3), where Parking SPD provides for reduced, or even zero provision for highly accessible areas or where innovative transport alternatives are proposed. • Policies DR1, DR2, H1, KS1-KS7 provide support for high density forms of accommodation in urban centres aiming to i) discourage car ownership, ii) maximise opportunities for residents to sustainable & active travel choices, and iii) minimising travel demand by co-locating dwellings, with employment opportunities, retail outlets and & services
UK0012-HBC_14	Seek mitigation of emissions associated with new development on an 'all-sources' basis	• Draft policy E24 marks a shift in approach to the management of air quality, aiming to achieve improvements by targeting sources contributing to aggregate background. • Emission reductions from all sources are within scope, especially those associated with heating, cooling & ventilation. • Physical separation, buffering, interception and deposition measures are also within scope, • Policy functions as part of an integrated approach to sustainable development; complementing the wider aims of Design, Energy, Carbon, Health, Transport & Landscapes policies to achieve co-benefits for health, climate and the environment. • Supporting position statements or informal developer guides may be required to support this policy upon adoption. Policy provides a material framework though which output from UK0012-HBC_19 could be formally implemented.
UK0012-HBC_15	Supporting Local Shopping	• Havant Borough Council continues to seek to exercise Planning Policy to avoided the introduction of restrictive policies at new retail & leisure developments which discourage the making of linked and combined trips. • Neither the 2016 Local Parking SPD, nor the Local Plan 2036 Draft Policies place any specific requirements on developments to adopt permissive parking enforcement policies. • Following adoption, the Council will be reliant on NPPF provisions 102 e) & 106, and Local Policy E2 b) under the banner of 'good urban design'. This
UK0012-HBC_16	Parking Service Policy	• Parking service is active in securing funds for on-road parking restrictions through planning where risks of 'overspill parking' exist, and using those funds to actively manage local traffic orders • Revised parking SPD was published in 2016, responding to the experience of schemes approved under the preceding scheme - increased residential allocations have been included to avoid highway traffic / parking conflicts.

Table 2.2 Continued…		
UK0012-HBC_17	Development of SE Hampshire Integrated Rapid Transit Network	• SEHRT is expected to support economic growth within the region, and improve the sustainable travel opportunities for the 18,000 workers who commute daily between the HBC & PCC areas, and help reduce the "single occupancy motor vehicle" mode share from it's current level of 73%. • The project also aims to support delivery of the objectively assessed level of housing need within the Havant Area • Supporting studies to accurately quantify baseline conditions have been completed • Strategic modelling of SEHRT has been completed, forecasting an additional 10500 trips, and a +12% increase in peak trip generation by 2036; concluding that SEHRT development would facilitate this more intensive trip generation, which cannot be sustainably accommodated on the existing Strategic Road Network. • Proposals amounting to an investment of >£90m have been proactively developed to an advanced stage (specific scheme design currently has 'confidential' status), with a ratio of benefit:cost expected to exceed 2:1. • A Funding bid was made to the DfT Transforming Cities Fund in June 2018 for further development and support for implementation of the SEHRT project proposals • Details can be found at the following link: https://www.hants.gov.uk/transport/strategies/fundingbids
UK0012-HBC_18	PUSH Area Air Quality Assessment	The output from the sub-regional air strategic Air Quality assessment will; • Inform the development of all Local Plan polices where Air Quality is a material consideration; placing air quality as a central component of landuse, transport & infrastructure planning, alongside policy relating to design, landscapes, sustainability, and environmental quality (health and ecology) • Inform the need for a primary planning policy-, or for supplementary planning guidance to address air quality issues, and if justified; to faciliate it's formulation • Help guide strategic infrastructure investment; and • Assist in identifying sensitive ecology already affected by poor air quality where action may be needed to reduce emissions from existing sources. • HBC led a competitive tender process in early 2017 for a sub-regional scale dispersion modelling study considering Nitrogen, Ammonia, and Particulates, and the impact upon both Health & Ecology. • Inception meeting held with winning tender, project scope was finalised in consultation with PUSH contributors in April 2017 • HBC project managed the assessment work, providing a technical lead on the steering panel • Draft Reports issued in Jan and Jun '18, and presented to the wider PUSH POG group in Jun '18. • Final technical comments have been collated. Some revisions to figures relating to the East Hampshire District are being undertaken, and publication of the final report is anticipated in Autumn 2018.

Table 2.2 Continued…		
UK0012-HBC_19	PUSH Area Low Emission Strategy	It is expected that a sub-regional strategy could serve to; • Support the sustainable delivery of the objectively assessed level of housing need within the Whole-Sub-Region, including the Havant Area • Ensure continued compliance with air quality objectives in the long term to minimise the health impacts of NO_x/NO_2, PM_{10} & $PM_{2.5}$ in particular. • To reduce air pollution impacts of airborne NO_x, & Ammonia, and Nutrient Nitrogen deposition upon protected habitats, and; • Support transport planning initiatives which deliver co-benefits including reductions in congestion and pollution • Consideration of a Low Emissions Strategy was a direct recommendation of the PUSH AQ study (UK0012-HBC_18) • PUSH Partnership is exploring feasibility of a coherent sub-regional strategy ahead of the issue of the final draft of the ED 10415100 PUSH Air Quality Impact Assessment • Southampton City Council is taking a lead on development of Air Quality SPG in connection with it's Air Quality Action Plan, and it's additional duties under the Air Quality Plan for NO_2 in the UK & under the Air Quality Direction 2018, and Havant Borough Council will contribute through the PUSH group.
UK0012-HBC_20	Safer Routes to School; School Travel Planning	Support HCC Schools AQ Campaign through provision of NO_2 passive diffusion tubes, and technical advice. • 4 Schools participated in 2017/18, Barncroft Primary, Bosmere & Hart Plan and Trosnant Juniors. • Annualised & Corrected results to be reported in 2019 ASR. • See Appendix G for preliminary results, • See Appendix G for schools Air Quality campaign plans, promoting travel mode shift from private motor car to sustainable modes of travel • Where schools have not already been achieved a 'mode-shift stars'* (Sustainable School Travel) award, it is a primary goal to achieve at lease a 'bronze' award in the year following the production of the campaign plan. • Where schools already have a mode-shift stars* award, it is hoped that the campaign plan will qualify the school for an upgraded award standard (silver or gold), or that an existing 'gold level' award will be maintained. (* - https://www.modeshiftstars.org/)
UK0012-HBC_21	Strategic Road Transport Assessment	• Together, these Transport Assessments aim to fully explore the strategic transport constraints and issues facing the Borough, and seek to determine whether there is scope for development proposals to mitigate constraints. • Access to Hayling Island is considered to require special attention, given the single strategic link to the mainland (A3023, Langstone Bridge). Assessment is to include a 'micro-simulation' model & more robust scenario testing. • Publication was anticipated autumn 2017, however there have been considerable delays. The earliest that this document is now expected to be published is autumn/winter 2018. • Havant Borough Council has published it's draft Local Plan 2036 without fully understanding the transport capacity of the Borough, particularly with respect to Hayling Island. • The Pre-Submission draft of the Local Plan 2036 is expected to be fully informed by the borough-wide Transport Assessment and the Hayling Island Highway and Transport Infrastructure Assessment.

Table 2.2 Continued…		
UK0012-HBC_22	New A27 Access & Link Road	• A new or (substantially improved) access to the A27 at Emsworth is being considered to support of strategic development at Southleigh. Subject to junction design adopted, this has the potential to impact Havant TC congestion substantially. • Modelling is in progress to inform optimal layout selection. Currently 'optimal' is defined in highways terms (and not in air quality impact terms) • The purpose of design & testing work is to inform decision-making only; there are no plans to publish. • Funding for detailed design / delivery will be subject to Highways England bid processes. • Air quality assessments will follow in due course, once the scheme has gained in principal approval. • Draft policy Framework is in place within the pre-submission Local Plan 2036. KS5 provides for assessment of need. H9, H10, H15, C9, IN2 i) provide for the safeguarding of land and the co-ordination of allocated strategic development. KS5 & IN2 provide for delivery. E23 provides for assessment of Air Quality to ensure continued compliance with NAQS objectives.
UK0012-HBC_23	District Heat Network	• Demand Mapping identified a number of areas which met the DECC minimum requirements for a Urban Heat Network viability, including the 'Civic Campus', 'New Lane' & 'Brockhampton' Industrial Areas. • Civic Campus is regarded as the most viable location, due to the Public land ownership and the ability of the leisure centre to act as an energy demand 'anchor' for the scheme . • Feasibility Study Concluded that a Heat Network was feasible in principle within the 'Civic Campus', with potential to extend to other areas with favourable viability following establishment of the core of the network. • No specific funding source has been identified to facilitate detailed design or delivery. • Draft Local Plan Policies DR1, KS1 & E12 provide a policy framework which supports delivery of a scheme in the Civic Campus Area, with District Heat core network delivery funding becoming more feasible as a part of wider strategic redevelopment.
UK0012-HBC_24	Invest in Public Rapid Charging Network	• Rapid Chargers are to be provided on a 'space-lease' basis to a commercial network provider (Geniepoint network) • Rapid Chargers have been installed at South Street Emsworth, and Tidworth Road, Leigh Park. Civil Engineering works are underway at the time of Writing for a dual bay rapid charger at Wellington Way, Waterlooville, which when complete, will have doubled the available rapid charging points available within the Borough. • Draft Local Plan Policy IN3 provides for home EV chargers to be provided at all new residential development (for visitors and private use) • Draft local plan will need to pass consultation and inspection before policy becomes exercisable • Expansion of the public charging network will be subject to the success of the chargers reported here, the availability of suitable locations, and the capacity of the local power network to support the power demand of rapid chargers.
UK0012-HBC_25	Prioritise LEV & ULEV in public sector procurement	• Target completion date stages; i) initial / pilot procurement anticipated by 2018/19; ii) collection of key metrics / consideration of lessons learned 2019/2020, iii) development of fleet replacement policy 2020. • Retention of UK0012-HBC_25 on an 'ongoing' basis beyond 2020, will be dependent upon favourable performance metrics demonstrating the capability of available EV's to meet the operational requirements (duty cycle) • Specific targets / criteria are expected to arise from the review of the pilot procurement, but the scope of the policy will depend upon performance metrics returned.

2.3 PM2.5 – Local Authority Approach to Reducing Emissions and/or Concentrations

There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. This has a direct link to the Public Health Outcomes Framework (PHOF) indicator *"3.01 Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution (measured as fine particulate matter, $PM_{2.5}$)"*, albeit that this indicator is currently recognised within the framework as being relatively poor at distinguishing the influence of ambient levels of $PM_{2.5}$ from other lifestyle factors such as occupational exposures, smoking and obesity; all of which contribute to mortality by similar conditions.

$PM_{2.5}$ is an aggregate term representing a broad range of potential pollutants, grouped by their physical size (aerodynamic diameter). The grouping includes much smaller particles, and in practice represents particles of a size greater than 0.0 microns (µm) and less than 2.5µm. Notably, emerging research is beginning to associate the observed health impacts more strongly with the >1µm fraction of this group.

Particles of <2.5µm size are sufficiently small as to be capable of being drawn deep into the lungs, to the alveoli, where a proportion is able to cross into the bloodstream via the lung capillaries. The commonality of pollutants falling within this group is the mode of exposure, namely the ability of the solid-phase pollutant to enter the cardiovascular system. The associated health impact is however a function of the chemical compound which the particulate pollutant represents, and the range of chemical compounds which might fall into this category can be quite diverse.

$PM_{2.5}$ is derived from both natural sources and man-made sources. Natural sources, such as sea-salt (representing as much as 7% of $PM_{2.5}$) are thought likely to cause negligible harm, whereas organic compounds associated with combustion are conversely fat-soluble, chemically persistent, and bioactive – accumulating in body tissues and capable of causing long-term harm.

In this way, the absolute concentration of particulates is less important for health than is the origin.

2.3.1 Regulatory and policy drivers

There is no regulatory standard to the role of Local Authorities in England in taking action to reduce emissions or concentrations of fine particulate ($PM_{2.5}$) air pollution. The duty to meet the objectives and standards of the Air Quality directive (2008/50/EC) applies and the macro-scale, and rests with the Secretary of State under the Air Quality Standards Regulations (2010).

Harm caused by this group of pollutants is nevertheless recognised to be 'non-threshold', where any level of exposure represents an incremental contribution towards an overall 'pollutant burden' which both cumulatively and in combination with other lifestyle factors leads to poor health outcomes. As a result, any action taken to reduce levels of particulate pollutants will contribute incrementally to overall public health, albeit that the direct impact would not be readily distinguishable from health data currently collected.

Policy Guidance LAQM.PG16 (Chapter 7) recognises the value of securing incremental change, making clear that Local Authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ in their local area, as practicable[53].

The National Planning Policy Framework (NPPF)[54] reinforces this guidance by requiring Local Authorities actively manage growth patterns and ensure that local policy serves to sustain compliance with relevant limit values and contributes towards securing improvements in air quality.

Directive 2008/50/EC defines 'practicable' as not entailing 'excessive cost'. The directive does not define where relevant costs may fall, and it could reasonably be interpreted to extend to 'the community served' (i.e. the local economy).

It is not always possible to prevent new development or economic activity from contributing to increasing levels of particulate pollution in an in an economically neutral way. Seeking to achieve net emissions reductions can be even more challenging, and the cost-per-unit reduction is subject to a 'law of diminishing returns'. There is an inherent conflict between economic and development aspirations (in some cases driven by National requirements, such as the requirement to meet the objectively assessed housing need, OAN), the economic cost associated with achieving air quality improvements, and the concept of 'proportionality' (as it relates to 'excessive' in the consideration of 'excessive cost').

It is recognised that there are economic benefits to the improvements in public health that would result from such action, but as is outlined in the section above it is difficult to quantitatively demonstrate the benefits. Air quality impacts are associated with socio-economic factors, and as a result the Council must be mindful of reciprocal public health harms associated with unemployment, low wages, or poor-quality employment opportunities that might result from taking an more precautionary approach to the management of air quality which disproportionately impacts local business and levels of development, relative to the achieved benefits.

The regulatory environment therefore requires a balance be struck between the costs and benefits of taking steps to reduce emissions, and so to improve local air quality and public health. This applies at the local scale as it does at the national level.

2.3.2 Sources

According to a report published by the Air Quality Expert Group (AQEG)[55], between 50 and 55% of UK $PM_{2.5}$ originates from within the UK, with the remainder being a result of transboundary air pollution and natural sources of particulate matter, such as sea salt.

Natural sources may be particularly important within Havant Borough, due to the length of shoreline and proximity of urban areas to coastal waters. Between 5 & 7% of atmospheric $PM_{2.5}$ is thought to derive from this source on average, but this proportion is likely to be greater at some locations, especially in rural areas where local anthropogenic (direct) emissions are relatively low, and natural sources likely to be high, such as Hayling Island.

[53] LAQM PG(16) available at https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf
[54] Available from https://www.gov.uk/housing-local-and-community/planning-system
[55] 'Mitigation of United Kingdom PM2.5 Concentrations', Air Quality Expert Group Report Ref: PB14161, 2013. Available here: https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1508060903_DEF-PB14161_Mitigation_of_UK_PM25.pdf

Recent studies have shown that 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% & 13% respectively, according to figures recognised by the UK government[56] . These estimates are concerned with primary emissions only, and are heavily influenced by research focussed upon affluent Metropolitan Areas[57]. There is likely to be wide variation in contributions nationally, and the balance of proportional contributions would likely differ significantly if secondary atmospheric production of $PM_{2.5}$ were also considered.

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 it's location, levels 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, $PM_{2.5}$ within the Havant area is likely to include a significant proportional contribution from shipping.

This source is not unlikely to be a significant contributor towards the estimated all-cause mortality attributable to Particulate Air Pollution (PHOF 3.01) being consistently higher for the Portsmouth area when compared either the Hampshire or National averages (England 5.1%, Hampshire 5.6%, Portsmouth 6.3% mortality)[58]. The Energy from waste (municipal waste incineration) facility at Portsmouth is also likely to contribute to local emissions peaks in the area – the likely level of contribution is unclear as particulate emissions from the facility are reported as PM_{10} (10µm diameter fine dust, comprising total particulates in the range 0-10µm in size, i.e. including the $PM_{2.5}$ fraction.).

2.3.3 Local Ambient Concentrations

The National Average Exposure Indicator (AEI) for $PM_{2.5}$ was 11 µg/m^3 in 2016, and the Portsmouth Urban Agglomeration (UK0012, within which falls parts of Havant, Widley & Bedhampton), was assessed to comply with both the Stage 1 (25 µg/m^3, from 2015) and Stage 2 (20 µg/m^3, by 2020) limit values[59]. These figures also show that the UK has already met it's 2020 National Exposure Reduction Target (NERT) of 15% (from a baseline of 13 µg/m^3).

It should be noted that the target and reduction values apply to a specific assessment protocol which considers the 'general ambient background'. Local concentrations at Urban, Industrial and Roadside locations may be substantially higher, though this should not be taken to necessarily represent a significant health concern - the limit values have been derived on the basis of underlying exposures and were not designed to apply to locally elevated concentrations over short periods of exposure.

Recently modelled background concentrations of $PM_{2.5}$ within Havant Borough range between a minimum of 6.6 µg/m^3 just off the Southeastern Coast of Hayling Island (off-shore), to a maximum of 11.5 µg/m^3 at the industrial centre in New Lane, Havant. As for

[56] http://naei.beis.gov.uk/data/
[57] http://ec.europa.eu/environment/integration/research/newsalert/pdf/373na2_en.pdf. Fuller, G. W., Tremper, A. H., Baker, T. D. et al. (2014) "Contribution of wood burning to PM10 in London". Atmospheric Environment. 87: 87–94. DOI:10.1016/j.atmosen v.2013.12.037
[58] Public Health Outcomes Framework Data included in 1st May 2018 Publication, PHE Publications, available from: http://www.phoutcomes.info/public-health-outcomes-framework#gid/1000043
[59] Air Pollution in the UK 2016, available from https://uk-air.defra.gov.uk

the National AEI, these values refer to 'local annual average background ambient' for a 1km x 1km grid square. Concentrations may vary widely on an annual average basis at specific locations within this area, at both shorter timescales and at different heights within the urban environment at any given location. Measurements taken in Portsmouth (at a height of 4.0m) in an Urban Background location are illustrative; ranging between 0.0 & 72.5 µg/m^3, 5.3 & 26.3 µg/m^3, and 5.9 & 17.0 µg/m^3 on an hourly, daily, and monthly basis respectively, against a calculated annual average concentration of 11.15 µg/m^3.

Concentrations adjacent to sources and within the 'breathing zone' (below 1.8m) are likely to vary more widely.

Based upon the area characteristics (density of industry & dwellings, and volumes of traffic carried on the local road network), the "worst case" particulate $PM_{2.5}$ levels in the Havant area are considered likely to broadly correspond to the urban background levels measured at the Portsmouth AURN site.

2.3.4 $PM_{2.5}$ Air Quality Standards – EU, Legislative, and WHO

The binding standards originate from the Air Quality Directive 2008/50/EC. These are transposed into UK legislation as Schedule 3 to the Air Quality Standards Regulations 2010, setting a limit of 25µg/m^3 to apply to annual average ambient concentrations, and to be achieved by the 1st of January 2015. Schedule 7 sets out the National Exposure reduction targets for this pollutant vary between 0% & 20% as a sliding scale which responds to the calculated AEI for the base year of 2010. An absolute target of 18µg/m^3 is set for areas where the calculated AEI exceeds 22µg/m^3 for the base year.

2020 reduction targets have already been met Nationally, and within the Portsmouth Agglomeration area. With reference to monitoring data at AURN sites within the Portsmouth Area, it is considered probable that the emissions reduction obligation has also been met within the Havant Area.

$PM_{2.5}$ has been a high-profile media topic over the past 12 months, with significant focus on comparison of UK $PM_{2.5}$ data with the WHO recommendation for a 10 µg/m^3 annual mean- and 25 µg/m^3 daily- limit value; and whether these should be locally adopted.

The WHO standards were calculated using a different set of considerations, assumptions and aims than did the binding EU standards. It does not necessarily follow that measured levels which exceed the WHO standard should be taken to justify directed action to reduce concentrations.

It is not the role of the Local Authority to decide on the technical merits of any particular air pollution benchmark – the calculation of which must necessarily balance the health benefits against what is both technically feasible and economically desirable, accounting the factors described at 2.3.1.

It is evident from the figures quoted above for Portsmouth that the way in which comparisons are made to the reference standards, and which measurement locations are considered suitable for direct comparison to standards are more significant determinants of compliance (or non-compliance) than is the standard itself. It is notable that measurements at 'Portsmouth Centre' (UK00421) were compliant with the WHO suggested daily limit on 343 days in 2017, and only marginally exceeded the annual mean limit.

With particular reference to $PM_{2.5}$, application of the WHO limit as an absolute at the micro scale, and seeking to bring levels in line with this standard by local means alone would likely be substantially contrary to the EU cost caveat.

For this reason, the question of whether to adopt-, and if so, how to apply- the WHO limit is considered to be outside the scope of Local Authority Duties.

2.3.5 Identifying Opportunities for Supporting Continued Compliance with $PM_{2.5}$ Emissions

The AQEG report referenced at 2.3.2 identified a non-linear relationship between $PM_{2.5}$ precursor chemicals and $PM_{2.5}$ concentrations down-wind of source areas. This suggests that the reduction in $PM_{2.5}$ mass which could be achieved by seeking to reduce emissions of precursor pollutants is relatively limited.

Conversely, reducing primary combustion emissions at urban scales has been shown to result in concentration reductions broadly proportional to the primary combustion component of total $PM_{2.5}$ (as might be expected). A similar proportional relationship can be inferred for other direct emission sources.

Ammonia has also been identified as having a reasonably strong proportional result relative to the other precursor pollutants, and it is concluded that ammonia reduction strategies may also have some value in addressing elevated ambient $PM_{2.5}$ concentrations.

These conclusions suggest that measures aiming to reduce urban exposure to $PM_{2.5}$ should primarily focus on the reduction of primary emissions derived from transportation and combustion, but that measures to reduce agricultural emissions of ammonia could helpfully support efforts to reduce urban $PM_{2.5}$.

Transport emissions include a variety of distinct sources;

- Combustion of conventional fuel (petrol and diesel),
- Releases of unconsumed ammonia & ammonium sulphates from diesel Selective Catalytic Reduction (SCR), and
- Direct particulate emissions from tyre & brake pad wear. Both regenerative braking used on electric & hybrid vehicles, the additional vehicle mass, and the additional kerb-weight of these vehicle types can produce greater concentrations of non-combustion related particulates, as a result of increased levels of tyre wear.

Other combustion sources in the urban environment arise from industrial and commercial landuses (including cooking processes), and domestic solid fuel burning. Use of oil as a domestic fuel does represent a source, but this is more common at isolated properties rural settings, where fewer local sources will be present.

The Borough is not subject to particularly high levels of domestic solid fuel or oil burning, and residential property has good levels of access to mains gas. The Council also recognises the relative difficulty in exerting local controls on emissions from road legal vehicles, or from commercial & industrial sources not subject to regulation under the Environmental Permitting Regulations 2016.

Policy Guidance LAQM.PG(16) makes clear that policy measures should focus on the negative health impacts associated with exposure to $PM_{2.5}$, and not simply on emissions

reduction. Given this, and the factors above, the most successful measures are likely to be those which deliver co-benefits of emissions reductions, quality of place, and environmental sustainability. For example;

- Policy which seeks to promote personal health and to reduce emissions by facilitating 'mode shift' from a polluting means of travel (e.g. single occupancy car journeys) to a zero-emission active travel mode such as walking or cycling. Active travel can be very effective in improving health outcomes, and can be supported by ensuring the choice to travel by active means is as safe and convenient as possible. Travel to school is particularly important both because infants and children are more sensitive to pollution exposures, and because of the opportunity to encourage healthy lifestyle & attitudes at this formative stage which will be carried into adulthood.
- Policy which seeks to limit the number of hot food takeaways in urban centres and close to schools. This would reduce a direct urban source of $PM_{2.5}$ (& PM_{10}), and would support public health efforts to tackle lifestyle factors which serve to exacerbates harm arising from exposure to air pollution, leading to poor health outcomes.
- Policy which supports a three-dimensional green landscape in urban areas which serves to intercept pollutants from the air, and to either treat these by adsorption, or to allow pollutants to be washed away with rainfall. Well-designed, such features can provide co-benefits for ecology, flooding, fitness & wellbeing, in addition to providing an air pollution reduction service.
- Measures to make the choice to switch to an EV or LEV as easy & convenient as possible – developing the local charging network or facilitating electricity infrastructure which will support the adoption of this burgeoning technology.

2.3.6 The Local Approach to Reducing $PM_{2.5}$ Emissions

Havant Borough Council has not set any specific proportional reduction target for $PM_{2.5}$.

It is recognised that the Stage 2 national reduction target has already been met in the area, and that it would be difficult to justify specific targeted measures to reduce already compliant concentrations of this pollutant.

It is considered that the most proportionate way to meet the policy obligation to work toward reductions in $PM_{2.5}$ emissions is to seek to achieve reductions as an ancillary benefit to actions which are justified by other environmental and strategic policy objectives.

Planning Policy and strategic regeneration can play an important role in achieving the kind of synergistic benefits described in the sections above. Air quality forms an integral component of the general concept of 'sustainable development' which is enshrined within the National Planning Policy Framework alongside carbon reduction, mitigation of- and adaption to- climate change, convenient access to health and transport, provision of green infrastructure and quality landscapes, and supporting ecology and a healthy water environment. Section 2.5.1 outlines the local approach to strategic planning policy in order to achieve these aims.

In addition, Havant Borough Council is also actively considering a change to it's enforcement policy which will formalise the procedure for exercising powers conferred upon Local Authorities under the Anti-social Behaviour, Crime & Policing Act 2014. This may be used to more effectively control acute problems with smoke which fall outside existing legislative provisions (e.g. the Control of Pollution Act 1974, Environmental

Protection Act 1990, Clean Air Act 1993, or Environment Act 1995), and could contribute to local reductions in emissions of Particulate Matter.

2.4 The Charter for Cleaner Air

In partnership with Greenpeace UK and Friends of the Earth, Oxford City Council has launched a charter for cleaner air, calling upon central Government to place the health of communities first, and to equip local authorities with the necessary tools and resources to meet the challenge of meeting local air quality objectives.

The charter invites other local authorities to sign up in support, and in 2018, Southampton City Council was the first authority to formally announce support for the charter.

Havant Borough Council has not to date formally considered adoption of the charter. The sections below provide a brief consideration of the ten key actions that form the substance of the charter. This is presented with a view to providing some local context, to inform any future debate on adoption of the charter by Havant Borough Council, or any other commitment to local actions & initiatives which support elements of the charter.

2.4.1 Action 1) 'Remove the most polluting vehicles from most polluted parts of towns and cities'

It is acknowledged that road transport is a major source of harmful levels of air pollution, and that national leadership in the development of Clean Air and Zero Emission Zones across the UK and the provision of support for private individuals & businesses to move to cleaner forms of transport could be instrumental in solving acute problems in densely populated metropolitan areas.

Clean Air or Zero-emission zones are however unlikely to be necessary in less densely populated areas, or necessarily represent an appropriate solution for managing a highly localised air quality problem. This concept might most appropriately be adopted within Havant Borough in the form of actions and initiatives aimed at reducing travel demand, and at making active & sustainable travel choices easy & convenient.

2.4.2 Action 2) 'Provide greater investment in public transport, walking and cycling infrastructure'

Fewer, and cleaner vehicles on the local road network will not only help reduce air pollution, but also help to tackle congestion and make our towns and cities healthier, safer and better places to live and work. This concept holds true at all urban scales, due to the strong links to 'quality of place' and to the public health benefits of engaging in active modes of travel.

A high quality public realm will help to make walking and cycling safer and more convenient, making sustainable travel an easier and genuinely viable choice for local residents. Use of the local pedestrian footway & cycle path network needs to be supported by 'permeable' developments to facilitate efficient journeys, and by good cycle parking (especially at public transport hubs). Investment should focus should upon frequent journeys – particularly those to schools & colleges, and to common commuter destinations.

When coupled with policies which allow low-to-zero parking allocations at highly accessible locations (or where innovative transport-access schemes are provided), high density residential development can also contribute to discouraging vehicle ownership, and to supporting public transport by ensuring local customer demand.

2.4.3 Action 3) 'End the sale of all new petrol and diesel cars and vans earlier than 2040'

The need to make alternatively fuelled vehicles more affordable & accessible is acknowledged. It is less clear that there needs to be an imposed ban on vehicles with conventional power-trains (petrol & diesel internal combustion / compression ignition engines).

The effective implementation of aim 1) would serve to address the urban air quality problem, and with respect to elsewhere, it would only be necessary to shift the proportion of conventionally fuelled petrol & diesel vehicles on the local road network by a few percentage points to make a sustained and material improvement to local air quality, and to sustain compliance with the National objectives and European limit values.

It must be acknowledged that alternative fuels are relatively unproven in under 'real-world' conditions across the range of consumer and commercial duty cycles that may be required, and electric options are similarly unproven under mass market charging demand.

There are several consumer barriers to 'mass market' adoption of electric vehicles which need to be solved, and the use of electric vehicles needs to be supported by clean energy and an appropriately robust power distribution network for it to deliver real (national aggregate) emissions reductions.

Power network capacity forecasts are presently unfavourable. Future availability is also in question following the abandonment of Nuclear generation plans at Moorside, and the recent stalling of the Anglesey Nuclear Power Project, both arising from funding problems which are inherent with this type of infrastructure. Any shortfall of baseline network generation capacity could result in increased use of local 'short term operating reserve' (STOR) generators. These are typically network-embedded plant (local to the demand) which generate power from fossil fuel (natural gas or diesel), and so contribute to both national (net, aggregate-) and local/urban emissions. These plant are comparatively cheap to bring online, albeit that the generated power is expensive; and so could prove to be a popular option to plug short term supply problems such as those that could arise by the electric vehicle market outpacing the co-development of power infrastructure. The Havant area currently has 40MW of STOR capacity, 50% of which is diesel fuelled.

There are also several additional environmental concerns with a market-wide adoption of alternative powertrain vehicles, for example;

- *Additional weight increases acceleration energy requirement*;* A Tesla Model S is around 40% heavier than an equivalently sized petrol vehicle (e.g. VW Passat), increasing average per-km energy consumption by around +29% before regenerative braking is accounted for. Examples of vehicles currently offering both pure internal combustion and hybrid versions show that hybrid versions may typically be +15% heavier, corresponding to around +13% energy consumption. (*additional 'per-additional-kg' energy is required to overcome rolling & wind resistance, but this is less significant). It is also notable that the 'performance' vehicle market is being targeted, taking advantage of the high torque properties of

electric vehicle propulsion. This targets drivers arguably more likely to practice driving technique. Poor driving style may have a greater impact in an electric vehicle than a vehicle powered by an internal combustion engine, due to increased acceleration energy demands (additional weight), and loss of regenerative braking gains (when using brakes to slow the vehicle rapidly).

- *Self-charging hybrids don't reduce overall emissions;* Whilst self-charging hybrids can optimise use of the combustion engine to maximise the efficiency of the fuel>electricity conversion rate, the actual energy consumed to achieve propulsion is increased as a result of the additional battery / system weight, and is still affected by poor driving styles.
- *Full electric vehicles only deliver total emissions reductions if the energy used for charging is low or zero emission*

Air quality is a local problem, generally limited to relatively small areas of densely populated urban areas. Given the potential for increased per-km energy demand, electric vehicles could represent relatively poor energy efficiency if used inappropriately, or used for an inappropriate duty cycle, and conversely, vehicles fuelled by internal combustion engines could represent the most energy- (and carbon-) efficient propulsion option for certain purposes, duty cycles, or regions.

For example, freight transport and intra-urban commercial distribution journeys are unlikely to be suitable for electric propulsion as the required battery mass & charge times are prohibitive given currently available technologies. Similarly, rural areas are typically fully compliant with air quality objectives and limits, and refuelling and charging opportunities are relatively poor. In these areas, range considerations & overall efficiency should be the most appropriate factors for fuel choice, in principle favouring internal combustion engine propulsion options over electric.

Whilst air quality is an important issue, it is not necessarily defensible to seek to address the problem at the expense of overall energy efficiency, or at the expense of aggregate total carbon emissions. The EU 'clean air for all' factsheet lists air pollution at the *second biggest* environmental concern *after climate change*. It follows that the solution to air pollution should not be detrimental to efforts to tackle a super-ordinate risk.

The 2040 target for phasing out of internal combustion engine vehicles allows industry time to develop technologies which achieve benefits to local air quality without detriment to aggregate carbon emissions. It could be argued that bringing forward the target date should only be considered where viable options have been brought to market which are likely to prove net beneficial in emissions, energy and carbon terms, and which permit widespread uptake (i.e. are affordable).

2.4.4 Action 4) 'Revise the tax regime, and provide fiscal incentives to help people and businesses adopt cleaner vehicles'

The charter advocates use of taxation & subsidy to encourage the take up of cleaner vehicles, including electric bicycles, and targeted diesel scrappage and retrofit schemes, to help people on low-incomes and small businesses access cleaner vehicles, public transport season tickets and car clubs.

As with 3) above, these schemes should not prejudice efforts to tackle climate change. For example, any diesel scrappage scheme devised should be designed so as not to unnecessarily waste the vehicle embodied energy (energy used to manufacture the vehicle) by scrapping the vehicle before it has served a significant proportion of it's design-life.

It is also important to recognise that a significant shift away from petroleum as a transport fuel will reduce the tax-receipts from this highly-taxed commodity. Tax reforms should avoid crude electricity taxation which brings domestic use within scope – otherwise zero-emission-at-point-of-use domestic technologies could be inadvertently discouraged.

2.4.5 Action 5) 'Invest in charging infrastructure and the supporting power network'

The UK's power network must be ready to support the growing number of electrified vehicles on the road network - ensuring security of supply, availability of capacity, and appropriate fee structures which account for the new demands being placed upon the network (e.g. to ensure the customer-funding model sustains network & capacity development).

The overall aim of increasing the availability of charging infrastructure to support people and business in adopting cleaner propulsion technologies is supported. It is however also recognised that achieving this will require more than simply the provision of charging points. Joined-up policy and regulation is required to ensure that funding and purchase models do not fragment the network for customers, that the network is served by clean energy sources, and that areas with smaller markets (e.g. rural areas) are adequately served without a significant price penalty.

2.4.6 Action 6) 'Ensure fossil fuels do not generate the power used to fuel electrified vehicles'

No air quality or gains or carbon reductions will be achieved if the energy for electric vehicles is provided by fossil fuels; especially if electric and hybrid vehicles 'per-km-total-energy-consumption' remains proportionally higher than that for traditionally fuelled vehicles.

2.4.7 Action 7) 'Tighten legal limits on air pollution to match World Health Organisation guideline levels'

The charter highlights that current legal limits for PM2.5 & PM10 are twice as high as World Health Organisation (WHO) guideline levels, and calls for UK air quality law to i) reflect the latest scientific consensus to better protect people's health and ii) adopt WHO guideline levels for particulate matter, and to commit to achieve these by 2030.

It should be noted that the WHO guideline levels for PM10 (& PM2.5) are set at the current 'lowest observable effect level', derived without regard to any macro-economic cost / benefit calculation (e.g. to compare the costs of achieving the standard and the quantified health benefits of achieving it; or the expected benefits from allocating a value equivalent to the cost to other public health programmes).

The WHO standards are recommended as a guideline (only), and it does not logically follow that their adoption would in all cases represent a rational public health decision against a backdrop of finite resources being available to achieve them, when considered against alternative resource allocation.

If standards are adopted, the method of assessment would need to be given consideration – the PM- pollutant groups include a wide range of constituent components with widely varying health impacts. It could (for example) be appropriate to discount or exclude natural sources such as sea-salt, or VOC's of vegetative origin – where either the

component does not contribute significantly to public health harms, where regulations / source control would be ineffective, or where ancillary benefits of the source outweigh the contribution (and therefore control of the source would be undesirable).

Adoption of tighter standards should be supported where a genuine public health benefit is likely to be achieved in a way which represents good value relative to the source control effort required. Where it appears that lowering standards for particulates is likely to achieve marginal public health gains relative to cost, and/or where substantially greater public health benefits could be achieved in other areas at equivalent cost; it may be more productive to consider control of specific precursors or investment in alternative public health initiative (instead).

2.4.8 Action 8) 'Improve the national monitoring and modelling of air pollution'

The Charter raises concerns about disparity between data collected locally, and the data used to inform the UK's national plan – highlighting that the current national system overlooks known local pollution hotspots (which then do not receive targeted national support). Calls are made for all appropriate local authority data to be taken into account in national policy formulation.

This aim appears to fail to recognise that;

- the National and Local Monitoring systems are governed under separate domestic regulations, and;
- the assessment procedures at local and national scales are for different purposes, being specifically laid out in the European regulations

2008/50/EC sets out the requirements for macro (National) and Micro-scale (Local) assessment. The National Limit Values are 'regional, ambient' standards which aim to set a standard of general exposure of the population over a large averaging area, and are for this reason *required* to ignore local pollution hot-spots. Whist it is recognised that the Government could, and possibly should, take account of local authority data when making domestic resourcing decisions – local authority data should only be used for reporting National Compliance where it is necessary to meet the required sampling resolution (averaging area), and the location is appropriate to measure macro-scale ambient air quality.

Local monitoring should be in accordance with the local assessment regime, and funding / investment decisions made accordingly, following the identification of a local air pollution problem (hot-spot). Whether additional government funding should be provided to Local Authorities for the purpose of tacking the problem of local air pollution, or whether Local Authorities should be granted additional freedom to use local taxation to raise additional funds to support the undertaking of LAQM duties is another question.

It is also worth highlighting here that a local detailed modelling study undertaken across the PUSH region returned results indicating that levels within several South Hampshire AQMA's were likely already compliant with the NAQS objectives for which they were derived, and similarly identified likely exceedances of NAQS objectives where local measurements would indicate compliant air quality.

Modelling can present an illusion of precision, but the reality could be more accurately described as a 'high-resolution best-estimate'; with results displaying a reasonably broad range of both precision & accuracy depending on local characteristics. Regional-scale

modelling is always relatively poor at accounting for highly local factors – due principally to the need to simplify the data for consistency, and to make calculations feasible. This is particularly true for traffic flow models (which would typically underpin an air pollution model). Even at the junction scale, these are relatively poor at predicting driver response to congestion.

Whilst striving for improved modelling is desirable, it is only as good as the available input data and must be verified by good monitoring. The purpose & objectives of the national compliance assessment should not be overlooked.

It is not clear at this stage that significant investment in 'accurate' regional-scale modelling that better accounts for local hot-spots is either feasible, desirable or necessary.

2.4.9 Action 9) 'Adopt a new Clean Air Act, or equivalent for 21st century and independent watchdog with teeth'

This action calls for a new Clean Air Act to tackle our modern pollution problem and safeguard our right to breathe clean air. It is understood that the Government has this on the legislative agenda, and is looking to control domestic fuel use in particular as a key measure to achieve reductions in urban particulate emissions.

Unless agricultural sources are included in the revised Act, it's impact is expected to be relatively limited to metropolitan areas. Proposed new controls and restrictions on domestic fuel combustion are unlikely to solve local nuisance issues, and are unlikely to be invoked by Local Authorities where there are no pre-existing air pollution problems. Where invoked, it is anticipated that sources will be 'limited' and not 'prohibited', so readers should not over-estimate the likely impact of this forthcoming legislation, either in general, or specifically within Havant Borough.

The need for post-Brexit governance arrangements for air quality (and all environmental matters presently governed by the ECJ is acknowledged.

2.4.10 Action 10) 'Launch a national public health campaign and alert system to highlight the dangers of air pollution'

This point of the charter highlights the need for the public to understand how dirty air affects their health and that of their families, as well as how they can be part of the solution. This need is acknowledged.

It could also be argued that such a public health campaign should have broader scope than 'dirty-ambient-air', to include the contribution of indoor air pollution and occupational exposures on personal pollutant exposure, empowering people to make informed decisions about their own personal health - and that of their family.

2.5 Impact of National Policy

The National Planning Policy Framework (NPPF) was originally published by the UK's Department of Communities and Local Government in March 2012, consolidating the previous canon of English planning guidance (Planning Policy Statements [PPS], and Planning Policy Guidance Notes [PPG]). The Ministerial Foreword makes sustainable development a central theme of the NPPF, defined as a concept of 'positive growth' (the making economic, social and environmental progress for both current & future

generations). This significant reform of the planning system sought to position planning as a key tool for the delivery of positive economic growth.

The three distinct roles of planning were further defined under Paragraph 7 (8 of the 2018 revision);

- *Economic:* to contribute to the building of a strong & competitive economy, by ensuring strategic availability of land to support growth & innovation, by identifying development requirements, and coordinating the provision of infrastructure
- *Social:* to support strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high-quality built environment which reflects the community's needs and support its health, social and cultural well-being; and
- *Environmental:* to protect and enhance our natural, built and historic environment; to help improve biodiversity, to use natural resources prudently, minimise waste & pollution, and to mitigate and adapt to climate change and to facilitate the transition to a low carbon economy.

The policy stresses that these roles are mutually dependent, and that to achieve economic, social (public health) and environmental gains, all three roles should be exercised jointly, simultaneously, and in a balanced way– with the planning system playing an active role in guiding private development to sustainable solutions which serve the public interest.

A recent report published by the Royal Town Planning Institute (RTPI)[60] reports on the effect that these planning reforms to date, highlighting that despite the wholistic concept of sustainable development embodied within the NPPF, the pursuit of a 'pro-housing, pro-growth' agenda has led to a systemic bias toward the economic role.

It has also led to a narrow interpretation of the social role as predominantly comprising the 'supply of housing' (meeting the housing need), and less [to support] 'the health, social and cultural well-being' of the community. This is to some extent reflected by the OAN technical Guidance note[61] which sees the key objective of the framework as being to 'boost significantly the supply of housing' (para. 49, NPPF 2012).

The report also argues that this bias has come at the expense of important environmental agendas, and that the effect of this 'policy drift' has been exacerbated by both deregulatory planning reforms over this period (16 amendments to the English GPDO, and it's remaking in 2015), and almost a decade of UK-wide austerity. This has caused significantly harm to the ability of local authorities to exercise the policy levers provided by the National Framework in the public interest, to achieve environmental and public health gains.

The 2018 revision of the NPPF recognised that the balance of planning roles was not well met by the 2012 policy – strengthening the existing environmental and public health provisions. Despite this, the RTPI report which (post-dates the 2018 NPPF revision), points to the continued rise of "proceduralism", driven by both economic pressures, and the growth agenda, as having restricted the latitude that planners had traditionally enjoyed to exercise professional discretion and proactive planning; making it harder to undertake the kind of long-term strategic

[60] 'Serving the Public Interest? The reorganisation of UK planning services in an era of reluctant outsourcing' Royal Town Planning Institute, 2019. Available here: https://www.rtpi.org.uk/witpi

[61] Objectively Assessed Need and Housing Targets Technical advice note, Second edition. Planning Advisory Service, July 2015; available here: https://www.local.gov.uk/sites/default/files/documents/objectively-assessed-need-9fb.pdf

thinking required to deliver a built environment which serves the goal of truly sustainable development.

Austerity, under-resourcing, and restructuring are blamed for creating an environment where the private sector becomes a more attractive prospect for planning professionals, reducing the numbers of experienced senior planners in the public sector. The longer-term consequences of these shifts – in funding, outsourcing, leadership, and practice – is an erosion of the ability to plan effectively in the public interest.

Air quality is an issue which cuts across many policy areas, including;

- the strategic delivery of transport infrastructure, influencing existing traffic flows on the local & strategic road network.
- the relative locations of employees to quality employers, residents to services, retail and leisure opportunities, and housing to public transport hubs
- delivery of high-quality & energy-efficient development which minimises overall carbon emissions and the need for local fuel combustion,
- delivery of strategic measures to facilitate transition to low-carbon & low-emission transportation,
- achieving ecological, public health co-benefits from quality landscapes, green infrastructure,
- measures to ensure that the energy demands of the local area are met in a clean and efficient way,
- mitigating exposure of both people & sensitive landscapes to pollution, mitigating emissions rates, and
- Improving public health.

All of these policy areas require a wholistic, joined-up & strategic approach to planning, and so are all areas at risk from the current funding environment for Local Authorities, and the centrally driven development agenda. If, in the consideration of planning 'balance', these areas continue to be regarded as subordinate to economic development needs, the ability of the planning system to contribute to continuing air quality gains will be diminished.

The RTPI campaigning for local authorities to "put planning back at the top-table of corporate decision-making" and will continue to make the case for better resourcing.

2.5.1 The Policy Response in within Havant Borough

Havant Borough Council recognises that Air Quality forms an integral component of the general concept of 'sustainable development', falling within both the 'social' and 'environmental' roles which the planning system is required to serve.

The Havant Borough Council Local Plan 2036 was at an advanced stage of development when the 2018 revised NPPF was published in July 2018. It was recognised that the 2018 revision contained some key amendments with respect to environmental policy, particularly in respect of sustainable transport & air quality.

Key NPPF policy changes can be summarised briefly as;

- *Para. 102* requires transport issues to be considered at the earliest stages of both strategic plan making, and development proposals. This is not a new concept, but

the sub-sections to this paragraph give this requirement some substance; requiring the development impacts to be quantified & mitigated (a, d), that the transition to LZC transport (ULEV & EV) is supported (b), opportunities to develop sustainable transport networks & infrastructure are secured (c), and that opportunities to achieve net environmental (air quality) gains are considered, and secured where possible (d).

- *Para. 103* expands on the NPPF'12 para. 30, relating the pattern of development to supporting the objectives of para. 102, minimising the need for travel, and promoting sustainable and active travel modes to 'improve air quality and public health'
- *Para. 170 e)* re-states NPPF'12 para. 109, but introduces a requirements for development to contribute towards improving the local environmental conditions, specifically air & water quality.
- *Para. 180* is a development NPPF'12 para. 120, requiring the local policy and individual planning decisions ensure that development is suitable for it's location, accounting for the cumulative effects of pollution (including air pollution) on health, living conditions and the natural environment.
- *Para. 181* specifically relates to air quality, and retains all of the wording from NPPF'12 para 124, but extends the provisions to individual planning decisions. Additions under this paragraph include a requirement to identify opportunities to improve air quality, mitigate the impacts of development and to take a strategic approach to these requirements at the plan-making stage.

It was considered that together with the collection of recent strategies, policy reforms, guidance and assessment referenced in section 1.1.1, the above revisions to the NPPF justified consideration of a different approach to air quality through the planning system, to ensure that the 2036 local plan provisions are 'fit for future'.

The policy response recognises that all new development has the potential to impact local air quality, and that even where ambient concentrations are compliant, reducing local air pollution will achieve public health benefits. The policy represents a non-targeted, 'general emissions offsetting' approach which does not have specific regard for existing air quality. This avoids the need to quantify existing environmental concentrations, estimate the development condition & magnitude of change, and the need to establish a threshold between 'negligible' and 'significant' change.

The aim of the draft policy is to make air quality a core design consideration, seeking 'low-emission-design by default' considering all aspects of development including;

- the emissions related to it's transport demand,
- it's contribution toward mode-shift from conventionally fuelled private motor car(s) to sustainable and active modes of travel,
- the local emissions related to local combustion (for space & water heating) and their avoidance through use of 'zero-emission-at-point-of-use' alternatives, heat recovery or LZC options,
- the non-local emissions related to meeting the energy demand of the development (i.e. development energy efficiency and micro-generation),
- the contribution of the development to interception, dispersal and/or destruction (or phase shift) of air pollutants, for example layout, height and massing, landscaping & planting, and the use of green walls and roofs.

The draft policy also retains a threshold-based assessment which serves to quantify the air pollution impact of development where an adverse impact is considered to be possible – and where identified, enhanced mitigation would be required to make proposed development acceptable in planning terms.

The Air Quality policy does not seek to duplicate the controls under other policy, rather it is intended to complement a suite of air quality and environmental sustainability policy and to reinforce the need for a wholistic design approach which secures synergistic environmental and public health benefits without stifling local development.

Policies are being actively drafted, and for this reason detailed descriptions will not be provided within this report. Policy measures will be described in more detail in the first ASR which follows the adoption of the local plan. Table 2.2 provides an overview of some of the air quality relevant policies included in the pre-submission draft.

It should be noted that until the plan is adopted, policies may be subject to significant amendment or deletion.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Havant Borough Council did not undertake any automatic (continuous) monitoring during 2017.

Data from Automatic Urban & Rural Network (AURN) monitoring sites are available from DEFRA's online "data selector" tool[62], and information about the context of the monitoring sites & pollutants monitored can be found at the AURN home-page[63] (see the 'site selector' under the heading "Current and Closed AURN monitoring sites", towards the bottom of the web page.

There are 14 ARUN monitoring sites within a 50 mile radius of Havant Borough, with the closest network monitoring sites to Havant being those located at Portsmouth (Urban Background, Ref: UKA00421, 3 miles), and Southampton Centre (Urban Background, Ref: UKA00235, 17 miles).

Non-network automatic monitoring sites are also maintained by neighbouring Local Authorities, East Hampshire District Council at Bordon (14 miles), and Chichester District Council at Chichester & adjacent to the A27 Chichester Bypass (5, & 7 miles). Data for Chichester Monitoring sites are available on the *Sussex Air* web pages[64]

Data from urban background AURN sites at Reading, Brighton, Bournemouth, Chilbolton, Southampton and Portsmouth have been used for the purposed of calculating annualisation factors for local passive monitoring, and have not been specifically considered as an indicative proxy for Diurnal concentration patterns for Nitrogen Dioxide concentrations.

The sections below may make anecdotal reference to typical annual concentration patterns from the above locations, where helpful to the context of local results or estimates (e.g. as 2.3.2 as illustrative range of $PM_{2.5}$ concentrations).

3.1.2 Non-Automatic Monitoring Sites

Havant Borough Council undertook non-automatic (passive) monitoring of Nitrogen Dioxide (NO_2) at 28 locations during 2017. Not all of these locations were monitored concurrently, and the total includes locations that were decommissioned within the 2017 monitoring year, and new locations established within the same period.

[62] https://uk-air.defra.gov.uk/data/data_selector
[63] https://uk-air.defra.gov.uk/networks/network-info?view=aurn
[64] http://www.sussex-air.net/Default.aspx

Decisions to decommission locations followed an objective review of the location characteristics & context, considered against the legislative requirements for monitoring results to be valid for direct comparison with the relevant objective values.

- Table A.1 in Appendix A shows the details all locations monitored during 2017.
- Appendix F includes details of the comprehensive position review. A summary of rationale for decommissioning existing locations is also presented.
- Appendix F also set out guiding principles for selection of future monitoring locations, alongside a position assessment & classification for newly established locations.
- Maps showing the location of the monitoring sites are provided in Appendix D
- Further details on statistical corrections & adjustments to raw monitoring data are included in Appendix C, including corrections for Bias, Annualisation, and Dispersion ('fall-off with distance', FOWD) adjustments.
- Diffusion Tube Quality Assurance/Quality Control (QA/QC) information is included in Appendix C.

No monitoring has been undertaken for PM_{10}, $PM_{2.5}$, or SO_2.

3.2 Nitrogen Dioxide (NO_2)

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, "annualisation" and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Monitoring Results

Monitoring results for Nitrogen Dioxide are presented in Appendix A, and Appendix B.

- See Table A.1 for a brief description of monitoring sites, and Appendix D for location maps.
- Table B.1 presents monitoring data at a monthly resolution. Monthly results are not corrected for bias. An uncorrected annual mean is presented, alongside an annual mean value which is corrected both for bias, and for any missing periods of data collection (i.e. an annualised mean). Estimated concentrations at the nearest point of relevant exposure to the measurement point are also presented.
- Table A.2 presents 'point of measurement' annual mean monitoring results for the past 5 years (2012 – 2017). All figures are bias corrected & annualised.
- Figure A.1 presents the information from Tables A.2 & A.3 graphically, including an indicative estimate of measurement uncertainty.
- Table C.1 summarises the statistical corrections applied, and estimates made.
- Table C.2 provides details of incomplete monitoring periods (usually resulting from tube theft, or weather-related damage, but also used where locations are established part-way through the reporting year or where problems arise with tube supply or analysis).
- Table C.3 summarises the annualisation calculations & correction factors for each period of incomplete monitoring identified in Table C.2.

3.2.2 Comparison of Results with NAQS Objectives

Section 1.1.2 describes the legislative background to the current air quality objective values, and the context of their derivation and application.

It is important to note that in application, there is a difference between an '*exceedance'* of-, and the '*breach'* of-, an air quality standard.

An *'exceedance'* of an air quality standard would refer to any measured concentration that is greater than the objective value - irrespective of it's local context, averaging period or the frequency of occurrence. An *exceedance* may or may not also represent a *breach* of an air quality standard.

A *'breach'* of an air quality standard would refer to a measured concentration that-;

i) Has been made at locations compliant with the relevant legislative provisions (i.e. at places where the air quality standard is applicable, termed locations where there is *'relevant exposure'*)

ii) Has been obtained using monitoring methods-, and to standards of data quality- that are compliant with the legislative requirements

iii) Has been averaged over a relevant period, and;

iv) (Where the applicable averaging period for the air quality standard is less than a calendar year;) The exceedance has been recorded on a greater number of occasions than the permitted number of exceedances.

In this way, an exceedance that does not represent a breach is both permitted by- and is complaint with- the relevant legislative regime.

It is however recognised that the health impacts from exposure to air pollutants is often non-threshold (whereby any increase in exposure in principle represents an increase in the risk- or degree- of harm), and that the effects on individuals will vary. It is taken as a base assumption that these factors have been taken in to account in the derivation of the air quality standards at the Community Level, alongside a specific set of assumptions which relate to the nature, duration and frequency of exposure.

The standards should therefore be regarded as the level below which '*the degree of harm caused is deemed to be acceptable'*, and not to a level at which '*the concentration of the air pollutant is either 'safe' or harmless'*.

Individuals will be subject to a greater degree of harm where they are exposed at a frequency or duration that falls outside the parameters of the assumptions of the toxicological assessment that underpins the air quality standards. Similarly, persons with pre-existing heath conditions that could be exacerbated by exposure to poor air quality may well be subject to a degree of harm associated from exposure to levels of air pollution that are complaint with the air quality standards.

It should also be borne in mind however that toxicological assessments are typically conservative in nature, and would normally consider harm to a sensitive person – often an infant – over a realistic but idealized & cautious exposure scenario. Standards that are protective of this sensitive person can be safely regarded to be protective of non-sensitive persons (e.g. working age adults).

Havant Borough Council is acutely aware of the high profile that air quality currently receives within mainstream reporting, but notes that little (if any) attention is paid to the technical difference between *'exceedance'* & *'breach'* of air quality standards – with exceedances often reported as representing *'illegal air pollution'*. Media campaigns from non-governmental bodies, individuals & businesses to encourage emissions reductions or the uptake of low pollution technologies (etc.) are legitimate in their aim to achieve public health benefits from general exposure reductions – however in discharging LAQM duties, Local Authorities must consider the data within the narrow framework of interpretation as laid out within the legislative regime.

Annex III of 2008/50/EC sets out the sampling requirements for making comparisons with the air quality standards. SI No. 1001 (Schedule 1) transposes these requirements to domestic law in full, albeit with slightly amended wording to improve readability. There is no similar stipulation under either the Environment Act 1995 (c.25)[65] or SI 928[66], however the principles outlined in Annex III to 2008/50/EC have been incorporated within the LAQM technical guidance (TG(16)).

Nitrogen Dioxide diffusion tube Monitoring Results for Havant Borough show that;

- Point of measurement monthly average concentrations exceeded the objective value at 15 of 28 locations monitored, for at least one monitoring period.
- Of those (15) sites with at least one monthly average concentration exceeding the objective value, 7 (47%) were roadside sites, 2 (13%) were kerbside, 1 (7%) was at an urban centre location, and 1(7%) was an urban centre site. 3 sites were locations where the site was not classifiable, and results were not able to be compared directly with the NAQS objectives, as the locations were likely to be unduly influenced by local factors (and therefore not representative of 'ambient' concentrations). 4 sites (27%) were locations considered to be representative of relevant exposure.
- Before accounting for field exposure bias, and for periods of missing data, exceedances of the NAQS annual objective were recorded at 6 locations.
- After taking account of bias and regional trends (to estimate likely mean concentration), 3 locations recorded an exceedance of the NAQS annual objective. These locations remain unchanged from those reported in the 2017 ASR, comprising 19(B) Langstone Road (East), and both 21 & 23 on the east side of Park Road South; at Solent Road & Elm Lane respectively. It is notable that none of these locations could be classified under the TG(16) criteria for comparison with 'ambient' quality standards.
- When concentrations are estimated at the closest point of relevant exposure, all concentrations are shown to be within the air quality objective value.
- The maximum estimated concentration at a point of relevant exposure is 34.7 µg/m^3, representing property at no's 8-11 Regents Court, East of Langstone Road, and South of the A27 Havant Bypass junction.
- No recorded annual mean concentration exceeds the indicative 60 µg/m3 threshold value above which there is considered to be potential for exceedance of the 200 ug/m^3 hourly objective value. One point of measurement exceedance of this indicative value was been recorded over a monthly averaging period in January at site 19(B) Langstone Road (East), but is disregarded as this concentration level is not sustained at an annual resolution.

[65] http://www.legislation.gov.uk/ukpga/1995/25
[66] The Air Quality (England) Regulations 2000 SI 928, http://www.legislation.gov.uk/uksi/2000/928/contents/made

3.2.3 Trends & Associations

Figure A.2 shows recent trends in annual mean NO_2 concentrations, as averaged across sites of like or similar type, between 2013 & 2017.

- Averaged Trends were generally qualitatively declining at kerbside & roadside sites, within the only exception being 9B London Road (Waterlooville), which is the only site returning an increasing qualitative trend. Rates of change estimated from -2.06% to +0.61% per annum, with the average annual rate of decline in NO_2 concentrations being 1.37%.
- Averaged Trends were generally qualitatively declining at urban centre, suburban and urban background sites, returning average annual rates of change of between 0.36% & 3.06%, averaging 2.04%.
- No statistically consistent trends were returned by aggregated location classifications over the period 2013-2017. R^2 values calculated from monthly data did not exceed 0.05 for any site type grouping.
- Calculated from Annual mean data (i.e. excluding seasonal variations), R^2 values but were substantially improved. No particular location type appeared to display any particular consistency of trend, with the maximum consistency (R2 values) corresponding to Kerbside and Urban Centre locations (0.69 & 0.68 respectively), and the poorest consistency of trend recorded for Roadside, Urban Background and Non-Classifiable sites (0.003, 0.029, 0.087 respectively).
- Averaged concentrations show high concentrations over the 2016/17 winter period (relative to other winters over the past 5 years). It is considered that meteorological factors are likely to explain this, given the consistency of this peak across all location classifications.

Table A.3 presents a summary of long-term trends in annual mean NO_2 concentrations for individual monitoring sites, between 2004 & 2017.

- The qualitative trend in ambient Nitrogen Dioxide concentrations is declining at 18 of the 22 monitoring locations monitored for which sufficient data is available to calculable a trend.
- Of the remaining (4) locations, the long-term trend is static (indicating neither improvement nor deterioration of average ambient air quality)
- Of the 18 qualitatively declining trends (i.e. qualitatively improving air quality), 11 (61%) display a non-negligible strength of association, of which 9 are either moderate or strong (R^2 0.6-0.8).
- Tests for the statistical significance of trends (calculated over a 10-year period on an 'individual location basis', from annual means), returned statistically significant 'moderate' or 'strong' declining trends at 6 locations. Significant relationships were evident at a number of other locations, but these generally displayed a poor trend association (R2 <0.5), and are so not regarded as reliable.

Table C.8 summarises information on the proportion of HGV traffic in the vehicle mix at a number of D*f*T monitoring sites (predominantly representing the strategic / classified road network), between 2000 & 2017.

- Recent period trends (2010-2017) show an increase in the proportion of HGV traffic at around 30% of monitored sites, with estimated annual increases ranging from +1.1% to +10.6% (Note, percentages relate to an increase in *proportion*, i.e. +10% would relate to a change from 1% AADT as HGV's to 1.1% AADT as HGV's)
- 34% monitored sites show a declining trend (recent) in the proportion of HGV traffic, with estimated annual reductions ranging from -1.2% to -8.6%.
- 34% of sites displayed negligible trend (recent), with proportions remaining broadly static over the past 5 years.
- Just 22% of monitored locations displayed any material increase in the proportion of HGV traffic between 2000 & 2017.
- Summary figures for long term trends (2000-2017, not shown in C.8) return 18% increasing, 53% declining, and 26% static, with rates of change ranging from -8.5% to +10.6% per annum.
- It is concluded that data would not support a conclusion that increasing proportion of HGV traffic on the local roads is likely to be of material concern as a driver for increasing levels of ambient Nitrogen Dioxide (or Particulate) pollution.

Table C.9 summarises information on the absolute traffic flows at a number of Department for Transport monitoring sites (predominantly representing the strategic / classified road network), as annual average daily flow (AADT) between 2000 & 2017.

- Recent period trends (2010-2017) show an increase in AADT flows at around 63% of monitored sites, with estimated annual increases ranging from +1.13% to +27.9%, the maximum increase relating to the A27 Eastbound on-slip at the A3(M), a site for which only recent data is available (i.e. where annual variation may be more pronounced than for locations where longer term data are available).
- 16% monitored sites show a declining trend (recent) in AADT flows, with estimated annual reductions ranging from -2.3% to -7.4%.
- 22% of sites displayed no meaningful trend (recent), with flows remaining broadly static over the past 5 years.
- 72% of monitored locations (for which sufficient data were available) displayed a material increase traffic flows between 2000 & 2017.
- Recent increasing trends associated with the A3(M) have a notably strong statistical association that is broadly consistent across the entire road link, with few exceptions. The exceptions (North of J4, static trend, no association) suggest that there may be significant road traffic growth on Purbrook Way &/or on the B2150 Hulbert Road (as there is strong growth and strong trend associations on links both North and South of this road segment)
- Traffic growth patterns on the A27 are broadly consistent with the increase in A3(M) traffic, with qualitative declines on exit & entry points. This suggests that there is increasing bias for transient travel (where both origins and destinations are outside of the Borough).

- Summary figures for long term trends (2000-2017, not shown in C.8) return 34% increasing, 26% declining, and 39% static, with rates of change ranging from -7.42% to +7.4% per annum (excluding the ~27% increase discussed above). Most notable trends are on the A3023, returning an average annual growth of just 0.03% at Langstone Road, and zero net increase over the past 17 years.
- It is concluded that data support a broad conclusion that traffic growth is generally concentrated on the strategic road network, and that there is not strong evidence to suggest that traffic growth on local roads is unsustainable – with particular reference to local strategic routes, such as the A3023 (Langstone Road, Manor Road), A2030 (Havant Road), and A259 (Havant Road).
- It is also notable that the growth in volumes of road traffic on the Strategic Road Network is not reflected in the concentration of Nitrogen Dioxide pollution at the roadside – suggesting that the tightening of vehicle emissions standards is having a material effect, both compensating for the currently levels and contributing to statistically significant reductions of concentrations of Nitrogen Dioxide in ambient air.

3.2.4 Changes to Monitoring

The 2017 ASR demonstrate a likelihood that monitoring position 19B is not compatible with the requirements of LAQM. Whilst it was concluded to be unhelpful to continue to monitor this location in the long term, it was considered to serve the interests of transparency to continue to monitor the location in the short term to serve as a comparative data set against which alternative representative locations could be considered.

Position 19C was established 60m South of 19B, at a position selected to be;

i) On the same side of the road, so as to be similarly affected by the influence of prevailing winds,
ii) Sufficiently far South of the Bus Stop as to be outside of the 'acceleration zone' for buses leaving the lay-by,
iii) To be located within the 'merging' zone of Southbound traffic on the A3023, so as the monitoring continues to be representative of prevailing driving style whilst 'gap-seeking' on this road segment, and;
iv) To be located sufficiently distant from the kerbside as to minimise as far as possible the relative distance between the source (free-flowing traffic on the A3023) and the relevant receptors (no's 8-11 Regents Court)

It was not possible to locate the alternative monitoring position distant from all features that may affect local results. For example, 19C is located within the radius of an overhanging tree canopy (tall), and within 2.5m of a 1.8m barrier, both of which represent factors likely to result in appreciably elevated concentrations than would be measured were the tube located in 'free-field' conditions. Nevertheless, it was considered to represent the best available location.

Attempts were made to locate an additional monitoring tube directly at the relevant receptors, however it was not possible to achieve this due to the following reasons;

i) Of the 6 properties contacted only one responded positively, and was willing to grant consent for a tube to be positioned on the building.
ii) The properties are of 'terraced' style, with the rear façade representing the relevant exposure with respect to traffic on the A3023. No rear access was possible without the consent and attendance of the occupant, making sample collection unreliable.
iii) Alternative positions were considered on the sides and frontage of the properties, but either no mounting positions were available that met the required siting criteria with respect to vegetation and turbulence, or the position was within just a few meters of boiler flues & kitchen extracts, such as local sources were likely to be measured.

As a result, only the position at 19C was established, and was monitored concurrently alongside the position at 19B, for comparison. The aim of this monitoring was to establish with a greater degree of certainty that the assessment presented in the 2017 ASR in respect of 19B is likely to be correct (i.e. to 'ground truth' the assessment).

Preliminary results were not favourable. It was anticipated that there would be a marked difference between the two positions (19B & 19C), but the first month exposure returned a variance of <5%, and the second month <8%.

It was considered that this may indicate that the ambient air quality on the Eastern side of the A3023 Langstone Road may be poorer than anticipated, and that it may be worthwhile establishing additional locations with a view to establishing the 'most representative' location to monitor in the long term. Additional locations have been established, and the 2019 ASR will consider results in more detail.

It suffices to confirm here that the consistency between results from positions 19B & 19C has not been maintained, and that the differential between the two locations is more typically 30%, with 19B returning the highest results. It remains unclear why the initial monitoring period (represented in the results presented in Table B.1 to this report) were so consistent – but it appears likely to be due to local traffic factors which were atypical.

As regards the changes to monitoring positions arising from the comprehensive review of the characteristics of the current monitoring network positions, the following changes were made during the 2017 monitoring period:

- Monitoring at locations which were not classifiable under TG(16) criteria has been ceased. This has resulted in the decommissioning of location no's 21, 23, 9 & 26. The reason for these positions not being directly comparable to ambient standards is their proximity to localised emission sources, and these are (therefore) largely positions which returned elevated results.
- Monitoring at locations which are not particularly useful for demonstrating long-term trends, where there is high confidence in the continued compliance, where there are data consistency problems, or where monitoring is duplicated within the conceptual 'represented road length' was not considered to represent good value. This has resulted in the decommissioning of location no's 1B, 5, 13, & 15.
- The decommissioned locations has freed resources for more informative deployment, allowing the establishment of useful long-term monitoring sites in the

urban centres within the Borough, and to plug 'knowledge gaps' through short term deployments in areas of the Borough not previously monitored.

- One new monitoring position has been established on the East side of Park Road South, aiming to replicate the 'reason' for monitoring at position no's 21 & 23 (23 in particular) without the location issues that affected the applicability of data from the aforementioned positions. The new position (28) is generally well sited, but is only compliant if it is accepted that the signal controlled pedestrian crossing (interrupting traffic flows on the principle route estimated to exceed 25K AADT) does not meet the definition of 'busy road junction'. It is acknowledged that traffic at this point is not free-flowing, and is instead 'stop-start', with vehicles accelerating away from a 'stop-line' from stationary. The monitoring position is located within the acceleration zone, and so could be regarded as being unrepresentative. It is however the best available position, and serves as a more representative 'worst case'. It's results should however be regarded with some caution, as they are likely to over-state 'ambient' concentrations.
- Urban Background and Centre sites have been established in Emsworth and Havant Town Centres, with a view to the future monitoring of long term trends.
- A monitoring position has been established at Orchard Road, in order to replicate the reason for monitoring at position no. 13 (representative of a residential area down-prevailing-wind of the A27 carriageway), but aiming to better capture 'worst case' concentrations.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2,3)	Tube collocated with a Continuous Analyser?	Height (m)
1(B)	Langstone Road (West)	Roadside	(SU) 71610	05592	NO_2	No	13	2.75	NO	2.5
2	Rectory Road	Suburban	(SU) 71742	05794	NO_2	No	7	11	NO	2.8
3	Havant Road	Kerbside	(SU) 72198	02048	NO_2	No	2	1	NO	2.6
4	New Brighton Road	Suburban	(SU) 74866	06425	NO_2	No	13	2.5	NO	2.65
5	South Street	Urban Centre	(SU) 71789	06205	NO_2	No	17	1.5	NO	3.05
6(B)	Park Road South (West Street)	Roadside	(SU) 71555	06298	NO_2	No	24	4.25	NO	2.7
7(B)	Brockhampton Lane	Urban Centre	(SU) 71180	06063	NO_2	No	11	8	NO	2.65
8	London Road (Purbrook)	Roadside	(SU) 67322	07976	NO_2	No	15	2	NO	2.7
9(B)	London Road (Waterlooville)	Other	(SU) 68305	09548	NO_2	No	9	2.5	NO	2.8
10	Ramblers Way	Suburban	(SU) 70032	10043	NO_2	No	5	43.5	NO	2.7
12(B)	Xyratex	Roadside	(SU) 71611	05680	NO_2	No	12	2.75	NO	2.45
13	Grove Road	Suburban	(SU) 71988	06076	NO_2	No	8.5	2	NO	2.5
14	Elm Park Road	Suburban	(SU) 71777	06759	NO_2	No	8.5	1.75	NO	2.65
15	Front Lawn Junior, Broadmere Av.	Urban Background	(SU) 71894	08403	NO_2	No	0	27	NO	2.45
18	Waterlooville Precinct	Urban Background	(SU) 68264	09415	NO_2	No	0	120	NO	2.45

Table A.1 Cont'd…										
19(B)	Langstone Road (East, Bus Stop)	Kerbside	(SU) 71640	05794	NO_2	No	7	1	NO	2.55
19(C)	Langstone Road East (Woodbury)	Roadside	(SU) 71637	05686	NO_2	No	21	3.75	NO	2.5
20	Bosmere Junior	Urban Centre	(SU) 71693	05920	NO_2	No	0	35	NO	2.35
21	Park Road South (Solent Road)	Other	(SU) 71589	06132	NO_2	No	7	2	NO	3
22	Park Road South (Bulbeck Road)	Roadside	(SU) 71573	06200	NO_2	No	50	2	NO	3.1
23	Park Road South (Elm Lane)	Other	(SU) 71571	06374	NO_2	No	3.75	0.25	NO	3
25(B)	Stakes Road	Roadside	(SU) 68479	07721	NO_2	No	24	4.5	NO	2.55
26	Ladybridge Road	Other	(SU) 67228	07849	NO_2	No	35	2	NO	2.65
27	Havant Precinct	Urban Background	(SU) 71654	06287	NO_2	No	71	82	NO	2.5
28	Park Road South (West Street)	Roadside	(SU) 71577	06280	NO_2	No	28	4.75	NO	2.75
29	Orchard Road	Suburban	(SU) 72019	05800	NO_2	No	5.7	31	NO	2.5
30	St. Peters Square, Emsworth	Urban Centre	(SU) 74957	05731	NO_2	No	0	2.75	NO	2.7
W10	Compton Court	Roadside	(SU) 71368	06805	NO_2	No	0	12.5	NO	2.35

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property, Background or Urban Centre Location).

(2) N/A if not applicable.

(3) Values may differ from previous reports – re-calibrated to 'nearest busy road' (source target road), not 'nearest road'

Note; other values may differ from those previously reported. Unless stated otherwise these result either from simple corrections of prior errors, kerb re-alignments, new/newly identified relevant exposure, or re-consideration of location against TG(16) wording, and does not represent a physical change of sample location unless stated.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type [4]	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3]				
					2013	2014	2015	2016	2017
1(B)	Roadside	Diffusion Tube	100.00%	83.30%	28.638	32.386	33.587	38.470	34.182
2	Suburban	Diffusion Tube	100.00%	100.00%	27.876	26.644	24.337	27.998	25.068
3	Kerbside	Diffusion Tube	100.00%	100.00%	30.936	32.678	28.722	33.379	31.183
4	Suburban	Diffusion Tube	100.00%	100.00%	22.659	23.181	19.683	23.524	20.353
5	Urban Centre	Diffusion Tube	58.30%	58.30%	22.930	24.822	22.293	25.936	20.977
6(B)	Roadside	Diffusion Tube	100.00%	83.30%	38.285	35.295	31.534	33.755	31.328
7(B)	Urban Centre	Diffusion Tube	100.00%	100.00%	27.935	26.425	25.281	28.109	25.892
8	Roadside	Diffusion Tube	83.30%	83.30%	25.874	26.533	23.473	26.800	26.281
9(B)	Other	Diffusion Tube	100.00%	83.30%	36.133	38.867	36.091	39.713	36.454
10	Suburban	Diffusion Tube	100.00%	100.00%	22.895	22.837	19.601	22.935	19.594
12(B)	Roadside	Diffusion Tube	100.00%	100.00%	35.025	39.587	29.802	34.205	29.866
13	Suburban	Diffusion Tube	30.00%	25.00%	20.741	20.251	18.843	19.803	19.211
14	Suburban	Diffusion Tube	91.60%	91.60%	21.012	21.029	18.586	20.843	19.624
15	Urban Background	Diffusion Tube	100.00%	83.30%	14.410	14.943	13.514	14.712	13.628
18	Urban Background	Diffusion Tube	100.00%	100.00%	19.852	22.426	17.813	20.665	19.190
19(B)	Kerbside	Diffusion Tube	100.00%	100.00%	38.236	**41.798**	**43.366**	**56.321**	**45.745**
19(C)	Roadside	Diffusion Tube	16.60%	16.60%	-	-	-	-	37.327
20	Urban Centre	Diffusion Tube	83.30%	83.30%	29.792	29.216	26.052	28.866	26.998
21	Other	Diffusion Tube	90.00%	75.00%	39.775	**42.465**	38.465	**40.943**	**38.736**
22	Roadside	Diffusion Tube	100.00%	100.00%	35.007	34.665	29.672	35.751	30.677
23	Other	Diffusion Tube	100.00%	83.30%	**41.756**	**45.789**	**40.046**	**43.313**	**41.447**

Table A.2 Cont'd…									
25(B)	Roadside	Diffusion Tube	83.30%	83.30%	25.041	25.978	22.361	24.444	23.060
26	Other	Diffusion Tube	100.00%	83.30%	26.716	24.890	21.595	24.903	24.338
27	Urban Background	Diffusion Tube	100.00%	16.60%	-	-	-	-	25.749
28	Roadside	Diffusion Tube	100.00%	16.60%	-	-	-	-	30.641
29	Suburban	Diffusion Tube	100.00%	16.60%	-	-	-	-	24.161
30	Urban Centre	Diffusion Tube	100.00%	16.60%	-	-	-	-	19.449
W10	Roadside	Diffusion Tube	91.60%	91.60%	30.408	30.680	26.386	30.098	26.911

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where <12 data are available**

Notes:

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

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

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year (figures presented related to 2016).

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 100%. See Appendix C for details.

(4) Sites classified as 'Other' do not meet any TG(16) site classification criteria, and may not meet ED48673043 Issue 1a or 2008/50/EC requirements for direct comparison of measurement to ambient quality standards..

* - Tube number 1 relocated 10/10/2014, -19m (closer) to major junction, +0.5m (further) from kerb
- Tube number 6 relocated 06/06/2013, from traffic island to roadside footpath (+1.2m from principal traffic route)
- Tube number 12 relocated 10/10/2014, +8m from major road junction, +8m from minor road junction, +0.25m from kerbside
- Tube number 19 relocated 10/10/2014, +49m from major road junction, +0.75m from kerbside [adjacent to bus stop]
- Tube Number 25 relocated 12/11/2013, within 2.5m radius of position "A", +0.9m from kerbside

Figure A.1 – Annual Mean NO_2 Monitoring Results & Estimated Mean NO_2 at Nearest Relevant Exposure (2017)

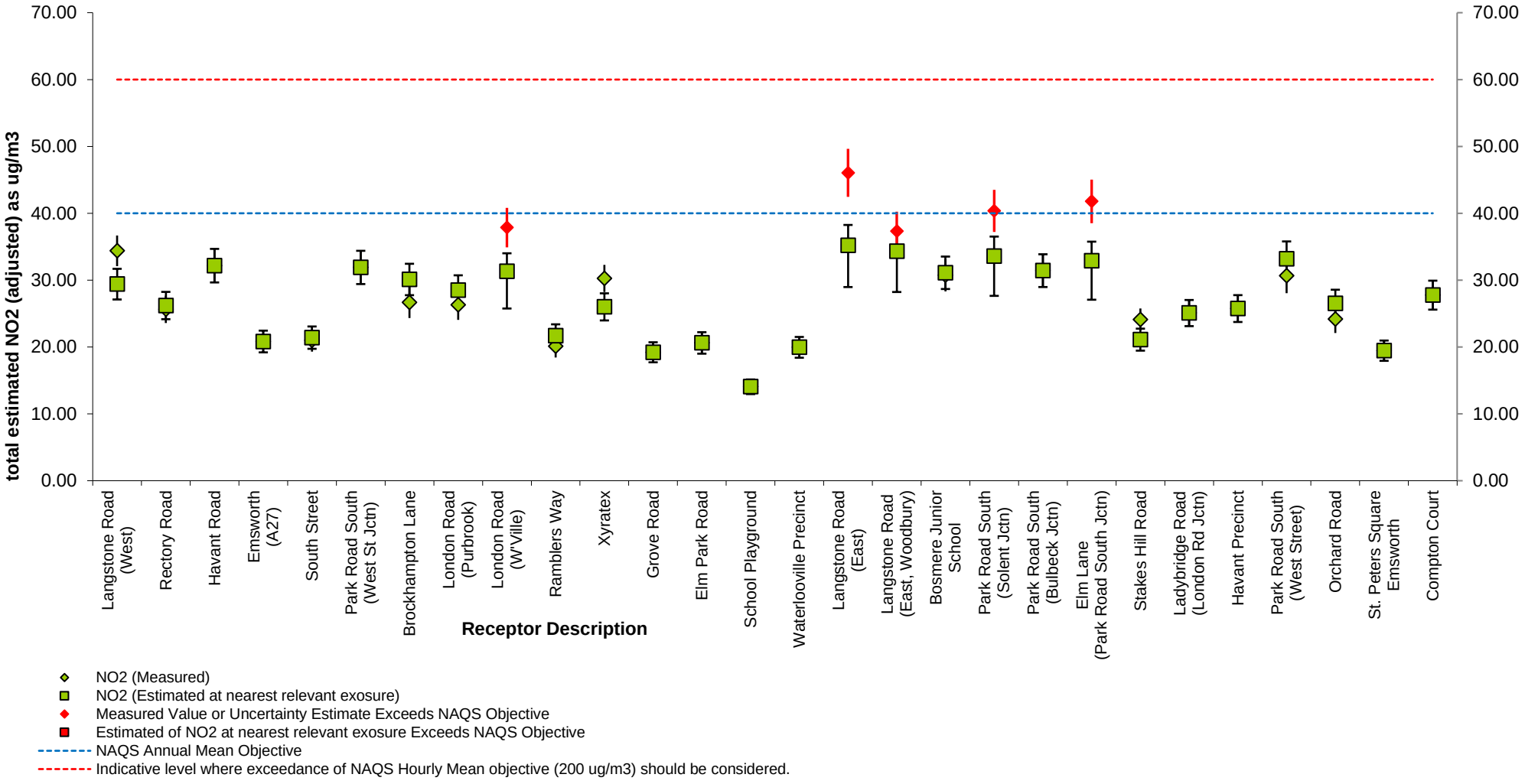


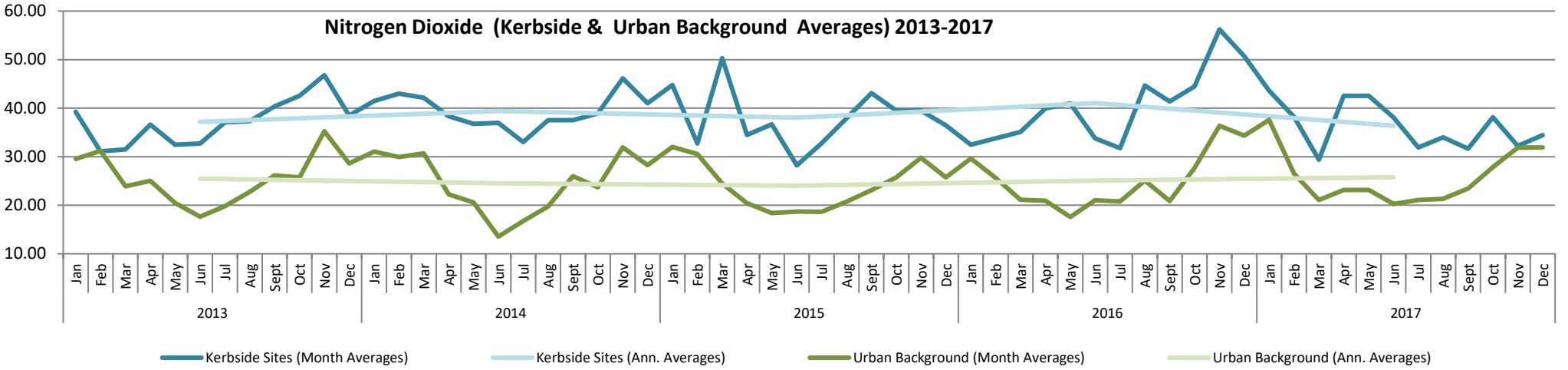
Table A.3 – Long Term Trends in Annual Mean NO2 Concentrations

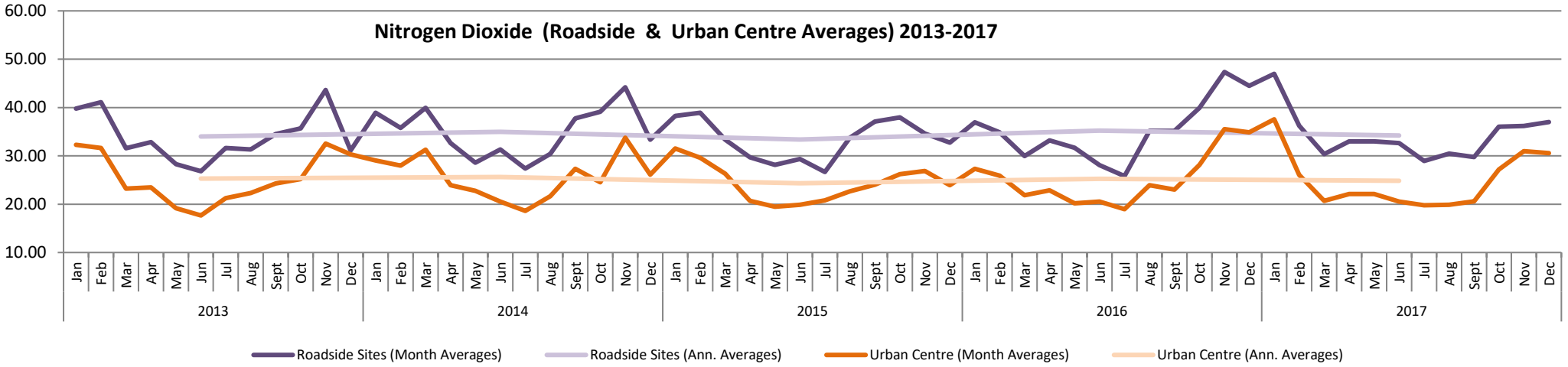
Site ID	Period [yrs]	Qualitative Trend	R^2	Est. Rate of Change (% p.a)	Strength of association*	Chi Sq. Test			T-Test			Confidence
						Data Valid?	Result	Significance level (p-value)	Data Valid?	Result	Significance level (p-value)	
1A & 1B^	2004-2017 [14 Years]	static	0.003	0.123%	No Clear Association	Yes	Significant	<0.001	Yes	Not Significant	-	-
2		declining	0.669	-2.602%	Moderate	Yes	Not Significant	-	Yes	Significant	<0.05	Poor
3		declining	0.686	-1.734%	Moderate	Yes	Significant	<0.001	Yes	Significant	<0.001	Very High
4		declining	0.741	-2.694%	Strong	Yes	Significant	<0.001	Yes	Significant	<0.01	High
5		declining	0.484	-2.145%	No Clear Association	No	-	-	No	-	-	-
6B		declining	0.669	-2.063%	Strong	Yes	Significant	<0.001	Yes	Significant	<0.01	High
7B		declining	0.682	-1.916%	Moderate	Yes	Significant	<0.05	Yes	Significant	<0.01	High
8		declining	0.332	-1.390%	No Clear Association	Yes	Significant	<0.001	Yes	Significant	<0.05	Uncertain
9		Increasing	0.115	0.609%	No Clear Association	No	-	-	No	-	-	-
10		declining	0.617	-2.180%	Moderate	Yes	Significant	<0.001	Yes	Significant	<0.05	High
12A & 12B^		declining	0.593	-1.839%	Weak	Yes	Significant	<0.001	Yes	Significant	<0.001	Good
13		declining	0.465	-2.217%	No Clear Association	Yes	Significant	<0.05	Yes	Significant	<0.01	Uncertain
14		declining	0.817	-3.062%	Strong	Yes	Significant	<0.001	Yes	Significant	<0.001	Very High
15		declining	0.678	-2.540%	Moderate	Yes	Significant	<0.001	Yes	Significant	<0.01	High
18B	2005-2017 [12 Years]	static	0.029	-0.363%	No Clear Association	Yes	Significant	<0.05	Yes	Significant	<0.05	Uncertain
20	2007-2017 [10 Years]	declining	0.258	-0.363%	No Clear Association	Yes	Significant	<0.05	Yes	Significant	<0.05	Uncertain
21		declining	0.087	-0.71%	No Clear Association	Yes	Significant	<0.01	Yes	Significant	<0.01	Uncertain
22		declining	0.397	-1.51%	No Clear Association	Yes	Significant	<0.001	Yes	Significant	<0.01	Uncertain
23		declining	0.316	-1.75%	Weak	Yes	Significant	<0.01	Yes	Significant	<0.01	Good
25		declining	0.499	-1.54%	No Clear Association	No	-	-	No	-	-	-
26		declining	0.457	-2.63%	No Clear Association	Yes	Significant	<0.001	Yes	Significant	<0.01	Uncertain
W10	2012-2017 [6 Years]	declining	0.205	-1.04%	Moderate	Yes	Not Significant	-	Yes	Significant	<0.05	Poor

*** - Very Weak = R2 0.5-0.6 | Weak = R2 0.6-0.7 | Strong = R2 0.7-0.8 | Very Strong = R2 >0.8**

^ - Two separate, proximal locations represented for each of position no. 1 & position no. 12. 'B' positions (2014-2016) have been distance corrected to estimate representative concentrations at the former 'A' position (2007-2014) , in order to derive a contiguous dataset from which an illustrative trend can calculated.

Figure A.2 – Recent Trends in Annual Mean NO_2 Concentrations





Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1(B)	**57.06**	39.50	36.43	36.43	36.01	36.62	32.15	32.14	31.12	36.37	-	-	37.61	34.38	29.3
2	**41.22**	29.36	25.25	25.25	23.08	21.39	22.30	25.93	27.40	30.23	**40.63**	32.55	29.46	25.63	25.6
3	**48.27**	36.22	29.61	29.61	32.95	36.33	26.35	38.00	31.06	**40.21**	**42.50**	39.13	36.97	32.17	32.2
4	38.73	25.34	20.41	20.41	22.06	20.30	17.76	18.78	19.28	26.53	23.82	26.85	23.94	20.82	20.8
5	34.96	21.91	-	-	-	-	21.03	20.54	20.93	-	29.70	28.17	25.33	20.98	21.4
6(B)	**48.06**	35.99	31.53	31.53	32.23	33.98	30.42	35.45	29.89	33.69	-	-	34.90	31.90	31.9
7(B)	**44.66**	26.54	24.77	24.77	27.93	25.52	24.67	25.74	27.53	33.89	33.22	36.83	30.67	26.68	29.1
8	**40.32**	27.92			24.27	24.06	23.32	28.04	30.59	34.74	32.54	34.43	30.08	26.28	28.5
9(B)	**46.56**	**45.22**	33.17	33.17	**42.28**	**41.72**	**41.87**	30.27	35.81	**47.87**	-	-	**41.41**	37.86	30.3
10	38.35	24.29	19.16	19.16	22.71	20.49	17.13	17.11	18.58	23.90	24.66	24.30	23.13	20.12	21.0
12(B)	**52.65**	37.77	31.85	31.85	31.87	31.60	24.03	28.42	26.46	35.96	39.09	**40.09**	34.78	30.26	26.1
13	34.38	-	-	-	-	-	-	18.41	-	23.08	-	-	25.57	19.21	19.2
14	33.70	26.41	17.39	17.39	18.36		17.47	19.79	19.40	26.63	30.52	26.95	24.34	20.61	20.6
15	27.29	19.00	12.88	12.88	12.77	12.15	11.42	12.25	11.69	16.48	-	-	15.37	14.05	14.1
18	36.90	25.25	17.24	17.24	17.41	16.06	15.29	18.83	18.80	25.39	28.24	27.00	22.93	19.95	19.9

Table B.1 Cont'd…															
19(B)	**67.32**	**51.87**	**50.65**	**50.65**	**56.20**	**55.02**	**47.04**	**51.39**	**45.47**	**47.87**	**51.94**	**55.91**	**52.93**	**46.05**	34.7
19(C)	-	-	-	-	-	-	-	-	-	-	**50.70**	**52.14**	**51.44**	37.33	34.0
20	38.37	36.84	25.13	25.13	28.79	28.01	28.49	-	-	33.62	36.59	38.28	33.63	30.74	27.2
21	**43.56**	**45.37**	35.57	35.57	**47.95**		**42.50**	**43.55**	**41.02**	**46.41**	-	-	**44.15**	**40.36**	32.5
22	**47.82**	38.93	30.55	30.55	37.12	34.75	31.91	33.10	30.30	35.79	32.81	39.16	36.11	31.42	31.4
23	**52.25**	**46.84**	**43.77**	**43.77**	**53.12**	**49.30**	**40.07**	**41.49**	**40.27**	**43.39**	-	-	**45.70**	**41.78**	32.7
25(B)	39.40	30.31	22.07	22.07	-	-	21.32	25.30	23.66	32.15	31.62	29.74	29.05	24.12	20.4
26	38.22	29.18	23.09	23.09	26.32	30.85	21.35	21.74	24.47	27.66	-	-	27.43	25.08	25.1
27	-	-	-	-	-	-	-	-	-	-	36.11	34.90	35.49	25.75	25.7
28	-	-	-	-	-	-	-	-	-	-	**42.62**	**41.86**	**42.23**	30.64	33.2
29	-	-	-	-	-	-	-	-	-	-	33.38	33.22	33.30	24.16	26.5
30	-	-	-	-	-	-	-	-	-	-	27.00	26.62	26.80	19.45	19.4
W10	**43.61**	35.35	26.81	26.81	33.82	-	29.08	27.21	28.25	32.03	33.90	32.26	32.78	27.76	27.8

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <100%**

☒ **Data has been distance corrected for relevant exposure, where appropriate, and where indicated by column header**

Notes:

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

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

Cells marked "- " indicate data not available (tube damaged, missing, or position established part-way through monitoring year)

(1) Annual Means for diffusion tubes have been corrected for bias using the average correction factor from National Bias Adjustment Correction Data (v0618). All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 100%. See **Appendix C for details.**

(2) Distance corrected to nearest relevant public exposure using the Bureau Veritas Calculator v4.2 (march 2018)

(3) Exposure Periods did not strictly follow the LAQM suggested calendar, annual averages calculated using time weighted average method.

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

Table C.1 – Statistical Methods Applied

Statistical Method / Adjustment	Applied to monitoring location No.'s	Description & Justification
Adjustment Factor Derived from local co-location study	[none]	Comparison of a Triplicate diffusion tube monitoring at a single site with a chemiluminescent analyser reference concentration from the same location. Used to derive a statistical factor to indicate performance (accuracy) of diffusion tube measurements for the sample media / tube preparation used. **Havant Borough Council did not undertake Triplicate monitoring against a reference concentration from an automatic analyser. No local factor has been therefore derived, or applied.**
Generic Measurement Bias Adjustment Factor	All Tubes	The University of West England provide a collated Table of all local co-location (field inter-comparison) studies undertaken by UK authorities. In the absence of a local co-location study (described above), this database can be used to find all studies relating to a specific laboratory, tube preparation, exposure type & year. From this an indicative statistic can be derived to estimate tube performance (accuracy). The mean value for all available studies is then used to adjust monitoring data to account for any inaccuracy identified by the component studies. This value is applied as a generic adjustment factor to all local diffusion tubes, though values other than the overall aggregate factor could be more appropriate (e.g. to suit location type; see Table C.7). **Bias adjustment factor derived from all available inter-comparison studies was applied, with no amendment to account for location type. Factors applied are as follows: x0.95 (2013), x0.92 (2014), x0.87 (2015) & x0.94 (2016) & x0.87 (2017). All diffusion tubes are subject to some form of measurement bias, and although generic (i.e. not local), the results of appropriately adjusted measurements are considered more representative than raw results**.
Seasonal Bias Adjustment Factors ('AURN Trend', 'Annualisation')	Various, depending on data capture & sample year.	Statistical method whereby the regional seasonal trend (derived from nearby automatic monitoring locations) is used to estimate a representative annual mean from an incomplete dataset. All NO_2 measurements are subject to seasonal variation, and this method is necessary to reduce the skewing of data from periods where no data is available. This correction must be undertaken where <9 months data are available (see box. 7.10, p. 7-56 TG(16)), however the principle holds for the correction of any data set where results are available for <100% sampled periods. **For consistency, and to adequately account for seasonal variability for any period of missing data, factors have been calculated & applied to the results of all tubes where <12 months data were available. See Table C.2, & C.3 for details.**
Measurement Uncertainty (MU)	All Tubes	The analysing laboratory reports an estimate of the accuracy of their results on a monthly basis. Laboratory mean MU values range between **5.30%** & **9.32%** (2013-'17) for tubes prepared using 20% TEA in Water. Values are applied to annual means on a +/- basis to give an indication of the probable range within which the true result falls *due to laboratory factors (i.e. laboratory MU relates to the accuracy of measurement of Nitrite on sample media - environmental factors influencing the absorption of Nitrogen to the sample media are accounted for as bias)*. **Values are applied for illustrative purposes – see Figure A.1.** Concentrations estimated using the fall-off with distance method (see 7.77 – 7.79, p. 7-4 TG()) are subject to additional uncertainty. Indicative uncertainty rates have been calculated using validation monitoring undertaken during 2011-2012 (as outlined in the 2015 USA Report for Havant Borough). Uncertainty estimates were asymmetric, -9.9% & +0.87% (**0.901** & **1.009**, respectively).
Fall-Off With Distance	As indicated in Table C.4	Air Quality Consultants Report No. 504/1/F1 (NO_2 Concentrations and Distance from Roads) identifies a linear reduction in the influence of NO_2 emitted on a carriageway to the natural logarithm of distance from the kerbside. This relationship accounts for the physical volumetric dilution in the atmosphere from the point of release, as well as a proportion of other decay factors related to atmospheric conditions & deposition. This relationship has been recognised in LAQM TG(16), and a standard tool made available where estimates of NO_2 concentrations at a point of relevant exposure where the measurement and receptor are at differing equivalent distances from the kerbside, and there is a reasonable spatial proximity. The adjustment may be used where either the measurement or the receptor are closer to the road source. **Calculations made has used the Bureau Veritas Calculator v4.2 (March 2018). Inputs & results are presented in Table C.4. Figure A.1 presents both 'point of measurement' & 'distance corrected' data. Table B.1 presents distance corrected values only where indicated. Table A.2 presents 'point of measurement' data only.**

Table C.2 – Summary of periods of incomplete data collection

Year	Period No.	absent data* 1 from	1 To	2 from	2 to	3 from	3 to	No. Days Absent Data	Tube Locations to Which Missing Period Applies [Loc. Ref]**
2017	1	13/03/17	07/07/17	09/10/17	07/11/17	-	-	145	South Street [5]
	2	13/03/17	10/05/17	-	-	-	-	58	London Road (Purbrook) [8]
	3	10/02/17	09/08/17	06/09/17	09/10/17	07/11/17	10/01/18	277	Grove Road [13]
	4	07/06/17	07/07/17	-	-	-	-	30	Elm Park Road [14] Compton Court [W10]
	5	09/08/17	09/10/17	-	-	-	-	61	Bosmere Junior School [20]
	6	07/06/17	07/07/17	07/11/17	10/01/18	-	-	94	Park Road South (Solent) [21]
	7	10/05/17	07/07/17	-	-	-	-	58	Stakes Hill Road [25]
	8	07/11/17	10/01/18	-	-	-	-	64	Langstone Road (West) [1B] West Street [6(B)] London Road (Waterlooville) [9] School Playground [15] Ladybridge Road [26]
	9	10/01/17	07/11/17	-	-	-	-	301	Langstone Road (Woodbury)[19C] Havant Precinct [27] Park Road South (West St.) [28] Orchard Road [29] St. Peters Square [30]

** - data for multiple absent periods were aggregated, and a single correction factor (CF) calculated & applied.*
*** - See Table A.1 for Diffusion Tube monitoring site descriptions*

Table C.3 – Summary of AURN period corrections (Annualisation)

			Brighton Preston Park (UKA00483; Urban B/G)		Reading New Town(UKA00462; Urban B/G)		Portsmouth (UKA00421; Urban B/G)		Bournemouth (UKA00429; Urban B/G)		Southampton Centre (UKA00235; Urban B/G)		Chilbolton Observatory (UKA00614); Rural B/G)		Notes
	On	Off	B1	Capture (%)	B2	Capture (%)	B3	Capture (%)	B4	Capture (%)	B5	Capture (%)	B6	Capture (%)	
Annual (Am)	**10/01/2017**	**10/01/2018**	**16.65**	**98.10%**	**28.35**	**99.17%**	**18.93**	**98.19%**	**12.44**	**95.92%**	**29.70**	**95.04%**	**28.35**	**99.17%**	
January	**10/01/2017**	**10/02/2017**	27.32	95.57%	46.82	96.74%	31.29	96.35%	26.17	99.87%	37.25	50.13%	46.82	96.74%	UKA00429 Rejected for (Periods 1, 3, 4,7 & 9 due to low average period capture (Jun, <70%). UKA00235 Rejected for Period 9 due to low average period capture (Jan, <70%), and Low Period 9 Capture rate (<80%)
February	**10/02/2017**	**13/03/2017**	17.56	94.36%	31.52	99.87%	20.17	99.19%	13.05	97.32%	34.53	99.73%	31.52	99.87%	
March	**13/03/2017**	**10/05/2017**	15.55	99.57%	31.82	99.78%	18.75	99.93%	11.31	99.86%	27.88	99.57%	31.82	99.78%	
April	**10/05/2017**	**10/05/2017**	15.55	99.57%	31.82	99.78%	18.75	99.93%	11.31	99.86%	27.88	99.57%	31.82	99.78%	
May	**10/05/2017**	**07/06/2017**	12.96	99.85%	23.38	99.70%	14.79	83.36%	8.73	97.92%	26.93	99.41%	23.38	99.70%	
June	**07/06/2017**	**07/07/2017**	10.89	99.58%	18.70	99.31%	13.45	99.86%	8.43	59.78%	23.85	99.45%	18.70	99.31%	
July	**07/07/2017**	**09/08/2017**	8.77	99.12%	16.49	96.34%	10.53	99.87%	4.97	99.87%	20.36	99.75%	16.49	96.34%	
August	**09/08/2017**	**06/09/2017**	15.49	92.57%	22.39	100.00%	14.94	99.55%	8.49	99.55%	25.25	99.11%	22.39	100.00%	
September	**06/09/2017**	**09/10/2017**	13.72	98.11%	24.17	99.87%	14.95	99.50%	9.08	96.97%	27.03	96.85%	24.17	99.87%	
October	**09/10/2017**	**07/11/2017**	18.82	99.71%	28.18	99.86%	21.41	99.71%	13.35	100.00%	34.33	99.86%	28.18	99.86%	
November	**07/11/2017**	**08/12/2017**	23.28	99.33%	33.17	99.87%	25.42	99.87%	16.29	99.60%	36.27	99.87%	33.17	99.87%	
December	**08/12/2017**	**10/01/2018**	19.75	99.75%	31.21	99.37%	21.85	100.00%	15.46	100.00%	37.70	99.75%	31.21	99.37%	
		Period (see Table C.2)	**Pm**	**Am/Pm (Ratio)**	**Pm**	**Am/Pm (Ratio)**	**Pm**	**Am/Pm (Ratio)**	**Pm**	**Am/Pm (Ratio)**	**Pm**	**Am/Pm (Ratio)**	**Pm**	**Am/Pm (Ratio)**	**Av. Am/Pm Ratio (Excluding Rejected)**
		Period 1	17.98	0.93	29.40	0.96	19.88	0.95	13.36	0.93	31.20	0.95	29.40	0.96	0.95
		Period 2	16.85	0.99	27.60	1.03	18.88	1.00	12.40	1.00	30.35	0.98	27.60	1.03	1.00
		Period 3	20.54	0.81	32.46	0.87	22.55	0.84	16.01	0.78	32.27	0.92	32.46	0.87	0.86
		Period 4	17.16	0.97	29.18	0.97	19.35	0.98	12.57	0.99	30.49	0.97	29.18	0.97	0.97
		Period 5	17.04	0.98	29.31	0.97	19.64	0.96	12.91	0.96	30.70	0.97	29.31	0.97	0.97
		Period 6	15.66	1.06	27.53	1.03	17.90	1.06	11.49	1.08	28.53	1.04	27.53	1.03	1.05
		Period 7	17.58	0.95	29.76	0.95	19.81	0.96	12.95	0.96	30.85	0.96	29.76	0.95	0.95
		Period 8	15.66	1.06	27.53	1.03	17.90	1.06	11.49	1.08	28.53	1.04	27.53	1.03	1.05
		Period 9	21.52	0.77	32.19	0.88	23.63	0.80	15.87	0.78	36.98	0.80	32.19	0.88	0.83

Table C.4 – NO_2 Concentration Estimates at Closest Relevant Exposure ('Fall-Off With Distance' Calculations)

	Year	Distance between measurement & KERB (Metres)	Distance between receptor & KERB (Metres)	Local annual mean background NO_2 (mg/m^3)	Measured annual mean NO_2 (corrected, annualised) (mg/m^3)	predicted annual mean NO_2 at receptor (mg/m3) [Rejected Estimate]	Use Measured (M) or Use Calculated (C)	Notes
Langstone Rd. (West) (1B)	2017	2.75	9.75	18.98	34.38	29.30	C	
Rectory Rd. (2)	2017	11.0	8.75	18.98	25.63	25.60	C	
Havant Rd. Hayling Island (3)	2017	1.00	1.75	10.53	32.17	32.17 [28.90]	M	
New Brighton Rd. Emsworth (4)	2017	2.50	12.5	14.24	20.82	20.82 [17.90]	M	
South St. Havant (5)	2017	1.50	0.90	17.33	20.98	21.40	C	
Park Rd. South (West St.) (6B)	2017	4.25	27.5	17.33	31.90	31.90 [23.70]	M	Receptor >20m further from kerb than monitor, treat FOWD result with caution
Brockhampton Lane (7B)	2017	8.00	2.75	17.33	26.68	29.10	C	
London Rd. Purbrook (8)	2017	2.00	0.90	14.22	26.28	28.50	C	
London Rd. Waterlooville (9B)	2017	2.50	7.75	14.53	37.86	30.30	C	
Ramblers Wy. (10)	2017	43.50	32.5	13.90	20.13	21.00	C	Monitor >10m further from kerb than receptor, treat FOWD result with caution
Xyratex (Langstone Rd.) (12B)	2017	2.75	12.25	18.98	30.26	26.10	C	
Grove Rd. (13)	2017	2.00	8.75	17.33	19.21	19.21 [18.60]	M	
Elm Park Rd. (14)	2017	1.75	6.75	17.33	20.61	20.61 [18.90]	M	
Front Lawn Junior (Broadmere Ave.) (15)	2017	27.0	14.5	13.38	14.05	14.05 [13.7]	M	Monitor >10m further from kerb than receptor, treat FOWD result with caution
Waterlooville Pedestrianised Precinct (18)	2017	120.0	101.0	14.53	19.95	19.19	M	Background site
Langstone Rd. (East) (19B)	2017	1.00	7.25	18.98	46.05	34.70	C	
Langstone Road (East, Woodbury) (19C)	2017	3.75	7.25	18.98	37.33	34.00	C	
Bosmere Junior (South St., Havant) (20)	2017	35.0	33.6	18.98	30.74	27.20	C	
Park Rd. South (Solent Rd.) (21)	2017	2.00	7.00	17.33	40.36	32.50	C	
Park Rd.. South (Bulbeck Rd.) (22)	2017	2.00	1.75	17.33	31.42	31.42 [31.10]	M	
Park Rd. South (Elm Ln.) (23)	2017	0.25	2.50	17.33	41.78	32.70	C	
Stakes Road Purbrook (25B)	2017	4.50	12.75	14.08	24.11	20.40	C	

Table C.4 Cont'd…								
Ladybridge Road Purbrook (26)	2017	2.00	34.0	14.22	25.08	25.076 [17.60]	M	Receptor >20m further from kerb than monitor, treat FOWD result with caution
Havant Precinct (27)	2017	82.0	71.0	17.33	25.75	25.75	M	Background site
Park Road South (West Street) (28)	2017	4.75	2.50	17.33	30.64	33.20	C	
Orchard Road (29)	2017	31.0	21.3	14.84	24.16	26.50	C	
St. Peters Square, Emsworth (30)	2017	2.75	2.75	12.16	19.45	19.45	M	Background/Centre site
Compton Court Flats (W10)	2017	12.5	12.75	17.33	27.76	27.76	M	Measurement at receptor

Table C.5 – Summary of Laboratory Nitrogen Dioxide Proficiency Results 2012-2016

Scheme	Rounds [Year]	Method^	Z-Statistic*			% Error^^			Rating (S/C/NS)*
			Max	Min	Average	Max	Min	Average	
WASP	R120(1) - R123(4) [2013]	GLM7	0.8	-0.4	0.1	6.0	-3.2	0.6	S
		GLM9	0.4	0.0	0.2	3.2	-0.2	1.3	S
	R124(1) - R124(4) [2014]	GLM7	0.4	0.1	0.2	3.3	0.4	1.3	S
		GLM9	0.5	0.1	0.3	4.0	1.1	2.6	S
AIR-PT	R1(1) - R4(4) [2014]	GLM7	0.8	-0.3	0.1	5.9	-2.1	0.4	S
		GLM9	0.4	0.0	0.2	2.9	0.0	1.6	S
	R6(1) - R10(4) [2015]	GLM7	1.2	-0.4	0.1	9.0	-3.3	1.0	S
		GLM9	0.7	0.1	0.4	5.3	0.8	3.2	S
	R12(1) - R16(4) [2016]	GLM7	0.1	-1.2	-0.5	0.9	-9.1	-3.4	S
		GLM9	0.7	0.1	0.3	5.1	0.8	2.4	S
	R18(1) - R21(4) [2017]	GLM7	0.5	-1.3	-0.2	0.0	-0.1	0.0	S
		GLM9	1.5	-0.2	0.3	0.1	0.0	0.0	S

^ - GLM7 = Camspec M550 (UV/Visible Light spectrophotometry); GLM9 = QuAAtro (Continuous flow gas analysis)
^^ - As % Measured Concentration cf. Calibrated Reference Sample (NO2- Nitrite, µg)
** - z-Statistic [z= (X_{lab} - X_{ref}) / (X_{ref}*0.075)]; Rating classified as [z = +/-2.00] S = Satisfactory; [z = > +/-2.00 & < +/-3.00] C = "Caution"; [z = > +/- 3.00] NS = Not Satisfactory*.

Table C.6 – Laboratory Nitrogen Dioxide Proficiency Results 2012-2016 (Detailed)

		GLM7 - Camspec M550 Spectrophotometer					GLM 9 – QuAAtro Continuous Flow analyser				
Round No. (Month, Yr.)		Reference Value (NO2- ug)	Measured Value (NO2- ug)	Z-Score*	Rating (S/C/NS)*	Error^^ (%)	Reference Value (NO2- ug)	Measured Value (NO2- ug)	Z-Score*	Rating (S/C/NS)*	Error^^ (%)
WASP-PT	R120 (1-4) (February 2013)	2.02	1.956	-0.42	S	-3.2	2.02	2.063	0.3	S	2.1
			2.026	0.04	S	0.3		2.059	0.3	S	1.9
		1.66	1.681	0.17	S	1.3	1.66	1.711	0.4	S	3.1
			1.698	0.31	S	2.3		1.692	0.3	S	1.9
	R121 (1-4) (May 2013)	0.99	0.984	-0.08	S	-0.6	0.99	0.988	0.0	S	-0.2
		1.37	1.379	0.09	S	0.7	1.37	1.38	0.1	S	0.7
		1.37	1.339	-0.30	S	-2.3	1.37	1.392	0.2	S	1.6
		0.99	0.98	-0.13	S	-1.0	0.99	0.995	0.1	S	0.5
	R122 (1-4) (August 2013)	2.1	2.098	-0.01	S	-0.1	2.1	2.113	0.1	S	0.6
		2.07	2.125	0.35	S	2.7	2.07	2.108	0.2	S	1.8
		1.27	1.253	-0.18	S	-1.3	1.27	1.269	0.0	S	-0.1
		1.25	1.249	-0.01	S	-0.1	1.25	1.263	0.1	S	1.0
	R123 (1-4) (November 2013)	1.62	1.656	0.30	S	2.2	1.62	1.649	0.2	S	1.8
		1.76	1.77	0.08	S	0.6	1.76	1.76	0.0	S	0.0
		1.62	1.717	0.80	S	6.0	1.62	1.672	0.4	S	3.2
		1.77	1.796	0.20	S	1.5	1.77	1.777	0.1	S	0.4
	R124 (1-4) (February, 2014)	0.9	0.91	0.15	S	1.1	0.9	0.91	0.1	S	1.1
		2.24	2.25	0.06	S	0.4	2.24	2.31	0.4	S	3.1
		2.24	2.25	0.06	S	0.4	2.24	2.33	0.5	S	4.0
		0.9	0.93	0.44	S	3.3	0.9	0.92	0.3	S	2.2
AIR-PT	R1 (1-4) (May, 2014)	1.39	1.44	0.48	S	3.6	1.39	1.43	0.4	S	2.9
		1.36	1.44	0.78	S	5.9	1.36	1.4	0.4	S	2.9
		0.97	0.95	-0.27	S	-2.1	0.97	0.98	0.1	S	1.0
		0.99	0.97	-0.27	S	-2.0	0.99	0.99	0.0	S	0.0
	R3 (1-4) (August, 2014)	1.84	1.84	0.00	S	0.0	1.84	1.87	0.2	S	1.6
		1.71	1.71	0.00	S	0.0	1.71	1.72	0.1	S	0.6
		1.66	1.65	-0.08	S	-0.6	1.66	1.69	0.2	S	1.8
		1.83	1.87	0.29	S	2.2	1.83	1.88	0.4	S	2.7

Table C.6 Cont'd…											
	R4 (1-4) (November, 2014)	2	1.99	-0.07	S	-0.5	2	2.05	0.3	S	2.5
		1.98	1.95	-0.20	S	-1.5	1.98	2.01	0.2	S	1.5
		1.15	1.15	0.00	S	0.0	1.15	1.16	0.1	S	0.9
		1.14	1.14	0.00	S	0.0	1.14	1.15	0.1	S	0.9
	R6 (1-4) (February, 2015)	0.88	0.9	0.30	S	2.3	0.88	0.91	0.5	S	3.4
		2.02	2.09	0.46	S	3.5	2.02	2.12	0.7	S	5.0
		0.89	0.97	1.20	S	9.0	0.89	0.9	0.1	S	1.1
		2.09	2.09	0.00	S	0.0	2.09	2.12	0.2	S	1.4
	R7 (1-4) (May, 2015)	1.3	1.29	-0.10	S	-0.8	1.3	1.34	0.4	S	3.1
		0.96	0.98	0.28	S	2.1	0.96	0.99	0.4	S	3.1
		0.96	0.98	0.28	S	2.1	0.96	0.99	0.4	S	3.1
		1.3	1.29	-0.10	S	-0.8	1.3	1.31	0.1	S	0.8
	R9 (1-4) (August, 2015)	1.5	1.54	0.36	S	2.7	1.5	1.58	0.7	S	5.3
		1.26	1.27	0.11	S	0.8	1.26	1.29	0.3	S	2.4
		1.49	1.52	0.27	S	2.0	1.49	1.55	0.5	S	4.0
		1.25	1.24	-0.11	S	-0.8	1.25	1.29	0.4	S	3.2
	R10 (1-4) (November, 2015)	1.91	1.89	-0.14	S	-1.0	1.91	2.01	0.7	S	5.2
		2.09	2.02	-0.45	S	-3.3	2.09	2.17	0.5	S	3.8
		2.1	2.05	-0.32	S	-2.4	2.1	2.17	0.4	S	3.3
		1.92	1.92	0.00	S	0.0	1.92	1.98	0.4	S	3.1
AIR-PT	R12 (1-4) (February, 2016)	0.97	0.95	-0.27	S	-2.1	0.97	0.98	0.14	S	1.03
		0.98	0.94	-0.54	S	-4.1	0.98	1	0.27	S	2.04
		1.58	1.55	-0.25	S	-1.9	1.58	1.66	0.68	S	5.06
		1.57	1.53	-0.34	S	-2.5	1.57	1.64	0.59	S	4.46
	R13 (1-4) (May, 2016)	1.72	1.67	-0.39	S	-2.9	1.72	1.76	0.31	S	2.33
		1.17	1.11	-0.68	S	-5.1	1.17	1.19	0.23	S	1.71
		1.19	1.14	-0.56	S	-4.2	1.19	1.2	0.11	S	0.84
		1.73	1.63	-0.77	S	-5.8	1.73	1.78	0.39	S	2.89
	R15 (1-4) (August, 2016)	0.89	0.86	-0.45	S	-3.4	0.89	0.9	0.15	S	1.12
		1.32	1.2	-1.21	S	-9.1	1.32	1.37	0.51	S	3.79
		0.89	0.83	-0.90	S	-6.7	0.89	0.9	0.15	S	1.12
		1.32	1.2	-1.21	S	-9.1	1.32	1.36	0.40	S	3.03
	R16 (1-4) (October, 2016)	2.03	2.04	0.07	S	0.5	2.03	2.07	0.26	S	1.97
		2.28	2.3	0.12	S	0.9	2.28	2.31	0.18	S	1.32
		2.24	2.26	0.12	S	0.9	2.24	2.33	0.54	S	4.02
		2.05	2.05	0.00	S	0.0	2.05	2.1	0.33	S	2.44

Table C.6 Cont'd…

AIR-PT	R18 (1-4) (February, 2017)	0.87	0.88	0.15	S	0.0	0.87	0.86	-0.15	S	-0.01
		1.13	1.12	-0.12	S	0.0	1.13	1.12	-0.12	S	-0.01
		1.14	1.11	-0.35	S	0.0	1.14	1.13	-0.12	S	-0.01
		0.88	0.87	-0.15	S	0.0	0.88	0.87	-0.15	S	-0.01
	R19 (1-4) (May, 2017)	0.55	0.57	0.49	S	0.0	0.55	0.61	1.46	S	0.11
		0.56	0.58	0.48	S	0.0	0.56	0.61	1.19	S	0.09
		1.15	1.18	0.35	S	0.0	1.15	1.2	0.58	S	0.04
		1.13	1.16	0.34	S	0.0	1.13	1.21	0.90	S	0.07
	R20 (1-4) (August, 2017)	1.55	1.49	-0.49	S	0.0	1.55	1.6	0.41	S	0.03
		2.02	1.9	-0.79	S	-0.1	2.02	2.09	0.46	S	0.04
		2.04	1.83	-1.28	S	-0.1	2.04	2.07	0.18	S	0.02
		1.57	1.41	-1.29	S	-0.1	1.57	1.62	0.40	S	0.03
	R21 (1-4) (October, 2017)	0.92	0.91	-0.14	S	0.0	0.92	0.91	-0.14	S	-0.01
		0.91	0.9	-0.15	S	0.0	0.91	0.91	0.00	S	0.00
		1.02	1.02	0.00	S	0.0	1.02	1.02	0.00	S	0.00
		1.01	1.01	0.00	S	0.0	1.01	1.01	0.00	S	0.00

^ - GLM7 = Camspec M550 (UV/Visible Light spectrophotometry); GLM9 = QuAAtro (Continuous flow gas analysis)

^^ - As % Measured Concentration cf. Calibrated Reference Sample (NO2- Nitrite, µg)

** - z-Statistic [z= (X_{lab} - X_{ref}) / (X_{ref}*0.075)]; Rating classified as [z = +/-2.00] S = Satisfactory; [z = > +/-2.00 & < +/-3.00] C = "Caution"; [z = > +/- 3.00] NS = Not Satisfactory*.

Table C.7 – Summary of Field Intercomparison results 2013-2017 (Gradko, 20% TEA in Water); by exposure site classification

Location Type	Year	No. of Studies	Max Reference Concentration (ug/m3)	Max. Positive Bias (%*)	Max. Negative Bias (% *)	Studies reporting positive bias* No. [%]	Studies reporting negative bias* No. [%]	Average Reported Bias (%)*	Average Bias Correction (Factor)^	All Studies Bias Correction (Factor)^^	Average Site Type Performance**
All Types (Aggregate)	2013	36	80.61	37.53%	-20.02%	25 [69 %]	11 [31 %]	5.25%	0.95	0.95	
	2014	22	80.25	42.77%	-12.61%	16 [73 %]	6 [27 %]	9.72%	0.92	0.92	
	2015	30	81.04	48.62%	-8.99%	24 [80%]	6 [20 %]	0.00%	0.88	0.88	-
	2016	21	79.28	25.17%	-22.01%	15 [71%]	6 [29%]	0.00%	0.95	0.95	
	2017	39	78.70	14.26%	-7.86%	33 [85%]	7 [15%]	14.26%	0.89	0.89	
Background	2013	0	-	-	-	-	-	-	-	0.95	
	2014	0	-	-	-	-	-	-	-	0.92	
	2015	1	2.70	36.73%	-	1 [100 %]	-	36.73%	0.73	0.88	Good
	2016	1	29.92	2.30%	-	1 [100 %]	-	2.30%	0.98	0.95	
	2017	2	33.33	14.88%	-6.04%	1 [50 %]	1 [50 %]	4.42%	0.97	0.89	
Urban Centre	2013	0	0.00	0.00%	-	1 [100 %]	0 [0 %]	0.00%	0.00	0.95	
	2014	0	0.00	0.00%	-	1 [50 %]	1 [50 %]	0.00%	0.00	0.92	
	2015	0	0.00	1.45%	-3.52%	1 [50 %]	1 [50 %]	-1.03%	0.00	0.88	Poor
	2016	0	0.00	-	-	-	-	-	0.00	0.95	
	2017	0	0.00	27.50%	-	2 [100%]	0 [0%]	16.41%	0.00	0.89	
Urban Background	2013	1	31.21	0.00%	0.00%	1 [33.3 %]	2 [66.6 %]	0.00%	0.94	0.95	
	2014	2	31.63	0.00%	0.00%	1 [50 %]	1 [50 %]	0.00%	0.96	0.92	
	2015	2	29.39	20.93%	-8.99%	1 [50 %]	1 [50 %]	5.97%	1.01	0.88	Good
	2016	0	-	18.61%	-4.66%	1 [50 %]	1 [50 %]	6.97%	-	0.95	
	2017	2	25.04	26.62%	-	4 [100%]	0 [0 %]	18.22%	0.87	0.89	
Roadside	2013	30	60.37	6.14%	6.30%	21 [70 %]	9 [30 %]	6.31%	0.96	0.95	
	2014	17	59.63	0.00%	0.00%	12 [71 %]	5 [29 %]	0.00%	0.93	0.92	
	2015	23	53.67	48.62%	-5.89%	19 [83 %]	4 [17 %]	15.02%	0.88	0.88	Excellent
	2016	17	54.46	18.98%	-22.01%	12 [71 %]	5 [29 %]	5.57%	0.96	0.95	
	2017	29	53.53	59.25%	-7.86%	24 [83%]	5 [17 %]	14.28%	0.89	0.89	
Kerbside	2013	2	40.24	7.10%	-	2 [100 %]	0 [0 %]	9.92%	0.80	0.95	
	2014	1	80.25	0.00%	-	1 [100 %]	0 [0 %]	0.00%	0.70	0.92	
	2015	1	81.04	31.11%	-	1 [100 %]	0 [0 %]	28.64%	0.78	0.88	Poor
	2016	1	79.28	25.17%	-	1 [100 %]	0 [0 %]	25.17%	0.80	0.95	
	2017	1	78.70	28.62%	-	1 [100 %]	0 [0 %]	28.62%	0.78	0.89	

' - as compared with reference value, derived from local automatic chemiluminescent monitor where data capture for period exceeds 75% (a). Negative figures indicate an under-estimate, positive figures indicate an over-estimate. '** - (against All-Studies factor), Excellent = +/- (<)2.5%, Good -= +/- (>2.5-)5%, Poor +/- >5%. '^ - calculated arithmetically from reported values. May be subject to marginal rounding error. '^^ - accuracy with 95% CI, by orthogonal regression (b). '(a) Study average for Local authority field intercomparisons, by tube for Gradko (Laboratory) field intercomparisons. '(b) as reported National Diffusion Tube Bias Adjustment Factor Spreadsheet v09/15 for Local authority field intercomparisons, as reported by Gradko for Laboratory field intercomparisons.*

Table C.8 – Trends in HGV Traffic Volumes, 2000 - 2017

		HGV as % of total AADT (for Yr.)					% Change in HGV Flow (Period)				Trend Data (Recent, 2010-2017 Period)				
	Typ.^^	2000	2005	2010	2015	2016	2000 to 2017	2005 to 2017	2010 to 2017	2015 to 2017	Qualitative Trend	R2	Est. Rate of Change (as % p.a)	Significant?* (Result : Strength)	HGV Growth 2000-2017?
Lovedean Lane	LU	-	-	0.53%	0.99%	0.81%	-	-	53.3%	-17.7%	increasing	0.004	1.59%	No : [N/A]	ND
Scratchface Lane	LU	-	-	0.54%	0.68%	0.76%	-	-	39.6%	11.4%	increasing	0.186	10.57%	No : [N/A]	ND
B2147 New Brighton Road	LS	-	-	0.49%	0.78%	0.40%	-	-	-18.3%	-49.2%	increasing	0.030	2.80%	No : [N/A]	ND
B2149 Petersfield Road	LS	-	-	2.38%	2.98%	2.34%	-	-	-1.8%	-21.6%	declining	0.053	-1.30%	No : [N/A]	ND
B2150 Hambledon Road	LS	-	-	1.05%	2.12%	1.65%	-	-	56.8%	-22.1%	increasing	0.008	1.27%	No : [N/A]	ND
B2177 Southwick Road	LS	-	-	1.85%	1.78%	1.47%	-	-	-20.7%	-17.6%	declining	0.179	-4.11%	No : [N/A]	ND
B2177 Southwick Hill Road	LS	-	-	0.72%	0.52%	0.59%	-	-	-18.5%	12.8%	declining	0.413	-8.63%	No : [N/A]	ND
A2030 Havant Road (West of A3(M))	SRN (S)	2.84%	5.69%	3.28%	4.37%	4.31%	51.9%	-24.3%	31.5%	-1.5%	increasing	0.670	3.94%	Yes : Weak	Yes
A259 Main Road	SRN (S)	2.67%	3.30%	2.95%	3.06%	1.77%	-33.7%	-46.3%	-39.9%	-42.1%	declining	0.480	-6.10%	No : [N/A]	No
A259 Havant Road	SRN (S)	3.65%	4.26%	2.89%	2.10%	1.33%	-63.5%	-68.7%	-53.8%	-36.5%	declining	0.675	-8.07%	Yes : Weak	No
A3 South of B2177	SRN (S)	1.66%	1.80%	0.87%	0.91%	0.90%	-45.4%	-49.8%	4.1%	-0.5%	static	0.044	0.32%	No : [N/A]	No
A3 Maurepas Way	SRN (S)	1.37%	1.88%	1.56%	1.41%	1.52%	10.7%	-19.4%	-2.4%	7.5%	static	0.044	-0.60%	No : [N/A]	Yes
A3 London Road Waterlooville	SRN (S)	1.66%	1.80%	0.87%	0.91%	0.90%	-45.4%	-49.8%	4.1%	-0.5%	static	0.044	0.32%	No : [N/A]	No
A3 Portsmouth Rd. Cowplain	SRN (S)	1.77%	1.38%	1.79%	1.86%	1.84%	4.1%	34.1%	3.2%	-1.0%	static	0.025	0.21%	No : [N/A]	Yes
A3023 Manor Road (Hayling)	SRN (S)	2.87%	3.61%	2.18%	2.25%	1.85%	-35.7%	-48.8%	-15.1%	-17.9%	declining	0.367	-2.42%	No : [N/A]	No
A3023 Langstone Road Nr A27 Jct'n	SRN (S)	2.19%	1.64%	2.21%	1.96%	1.34%	-38.8%	-18.5%	-39.4%	-31.8%	increasing	0.009	1.10%	No : [N/A]	No
A3023 Langstone Road North of Hayling Bridge	SRN (S)	2.19%	1.64%	2.22%	1.96%	1.34%	-38.8%	-18.3%	-39.7%	-31.8%	static	0.005	0.84%	No : [N/A]	No
A3023 Havant Road North of Church Lane	SRN (S)	2.20%	2.23%	2.19%	2.37%	2.42%	10.0%	8.8%	10.7%	2.3%	increasing	0.600	1.77%	Yes : Weak	Yes
A27 North of Harts Farm Wy.	SRN (S)	3.70%	3.76%	2.70%	2.85%	2.89%	-22.0%	-23.2%	7.1%	1.5%	increasing	0.534	1.29%	Marginal : Very Weak	No
A27 East of Emsworth Junction	SRN (T)	7.57%	6.78%	5.49%	5.12%	5.27%	-30.4%	-22.3%	-4.1%	2.9%	declining	0.087	-1.68%	No : [N/A]	No
A27 East of Havant Jct'n	SRN (T)	4.74%	5.04%	4.75%	3.86%	4.35%	-8.2%	-13.7%	-8.5%	12.6%	declining	0.540	-2.87%	Marginal : Very Weak	No
A27 West of Havant Jct'n	SRN (T)	5.24%	4.96%	3.39%	3.76%	3.92%	-25.2%	-21.1%	15.7%	4.1%	static	0.002	-0.20%	No : [N/A]	No
A27 at A3(M) J5	SRN (T)	1.37%	5.34%	4.47%	4.46%	4.65%	240.1%	-12.8%	4.0%	4.3%	static	0.068	0.69%	No : [N/A]	Yes
A27 WB Offslip at A3(M)	SRN (T)	-	-	-	3.41%	3.51%	-	-	-	2.8%	static	0.000	0.01%	No : [N/A]	ND
A27 EB Onslip at A3(M)	SRN (T)	-	-	-	4.50%	3.58%	-	-	-	-20.6%	declining	0.599	-4.64%	Marginal : Very Weak	ND
A27 WB Onslip from A2030	SRN (T)	-	-	-	4.82%	5.03%	-	-	-	4.4%	increasing	0.904	2.46%	Yes : Very Strong	ND
A27 West of A3(M)	SRN (T)	4.72%	4.99%	4.37%	4.43%	3.83%	-19.0%	-23.4%	-12.5%	-13.6%	increasing	0.048	1.16%	No : [N/A]	No
A3(M) North of J2	SRN (T)	5.79%	5.32%	5.20%	4.23%	4.55%	-21.5%	-14.5%	-12.6%	7.5%	declining	0.490	-2.48%	No : [N/A]	No
A3(M) North of J3	SRN (T)	4.90%	4.70%	4.30%	4.21%	3.95%	-19.5%	-16.1%	-8.1%	-6.3%	declining	0.146	-1.24%	No : [N/A]	No
A3(M) North of J4 (S of J3)	SRN (T)	5.12%	4.37%	3.79%	3.95%	3.69%	-27.9%	-15.5%	-2.6%	-6.5%	static	0.201	0.96%	No : [N/A]	No
A3(M) North of J5	SRN (T)	3.35%	4.02%	3.89%	3.10%	3.36%	0.1%	-16.4%	-13.6%	8.3%	static	0.047	-1.00%	No : [N/A]	Yes
A3(M) South of J5 (A3(M)>A27 Link)	SRN (T)	3.35%	4.02%	3.88%	3.10%	4.09%	21.9%	1.8%	5.3%	31.9%	static	0.009	0.49%	No : [N/A]	Yes

*From DfT Figures. * - Not Significant ("No") = R^2 <0.5; Marginal = R^2 0.5-<0.6; Significant ("Yes") = R^2 >0.6. Very Weak = R^2 0.5-0.6; Weak = R^2 0.6-0.7; Strong = R^2 0.7-0.8; Very Strong = R^2 >0.8.*
^ - "Static" where rate of change <+/- 1% p.a. ^^ - LU = 'Local, Unclassified', LS = 'Strategically Important Unclassified Route', SRN (S) = 'Strategic Road Network – Classified Single Carriageway', SRN(T) = 'Strategic Road Network, Trunk Road'

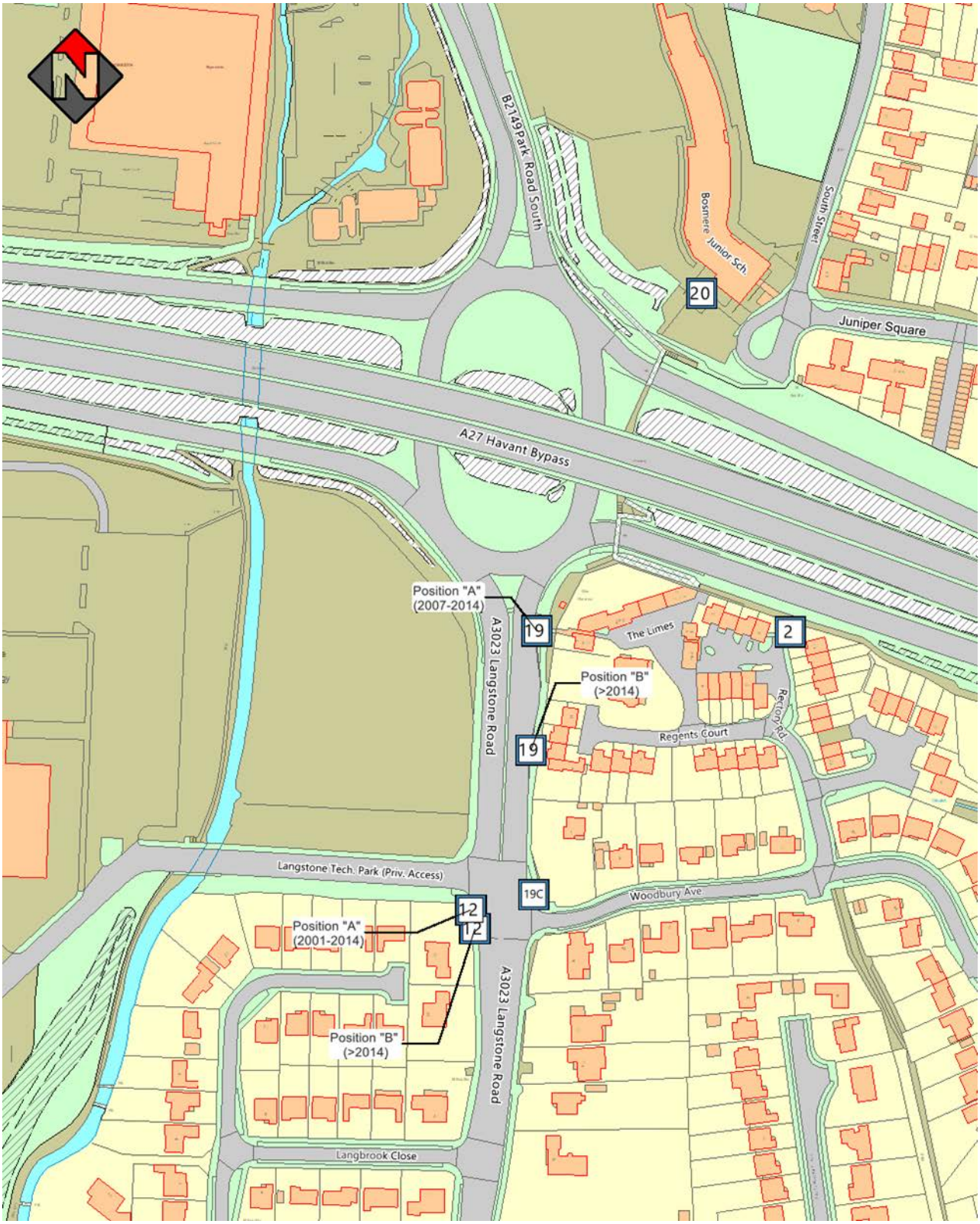
Table C.9 – Trends in Annual Average Daily Traffic (AADT), 2000 - 2017

		AADT (Yr.)					% Change in AADT (Period)				Trend Data (Recent, 2010-2017 Period)				
	Typ.^^	2000	2005	2010	2015	2017	2000 to 2017	2005 to 2017	2010 to 2017	2015 to 2017	Qualitative Trend^	R2	Est. Rate of Change (as % p.a)	Significant?* (Result : Strength)	AADT Growth 2000-2017?
Lovedean Lane	LU	-	-	4333	5965	5407	-	-	24.8%	-9.4%	increasing	0.459	2.82%	No : [N/A]	ND
Scratchface Lane	LU	-	-	1286	1173	1053	-	-	-18.1%	-10.2%	declining	0.240	-4.08%	No : [N/A]	ND
B2147 New Brighton Road	LS	-	-	5151	6282	6052	-	-	17.5%	-3.7%	increasing	0.587	2.79%	Marginal : Very Weak	ND
B2149 Petersfield Road	LS	-	-	16877	18714	18777	-	-	11.3%	0.3%	increasing	0.763	1.35%	Yes : Strong	ND
B2150 Hambledon Road	LS	-	-	3991	2691	3514	-	-	-12.0%	30.6%	declining	0.382	-4.01%	No : [N/A]	ND
B2177 Southwick Road	LS	-	-	6525	6277	7072	-	-	8.4%	12.7%	increasing	0.231	1.55%	No : [N/A]	ND
B2177 Southwick Hill Road	LS	-	-	6654	6716	6465	-	-	-2.8%	-3.7%	static	0.105	0.99%	No : [N/A]	ND
A2030 Havant Road (West of A3(M))	SRN (S)	21332	21274	22318	22848	23684	11.0%	11.3%	6.1%	3.7%	static	0.865	0.88%	Yes : Very Strong	Yes
A259 Main Road	SRN (S)	12898	12466	11858	12530	13979	8.4%	12.1%	17.9%	11.6%	increasing	0.748	2.57%	Yes : Strong	Yes
A259 Havant Road	SRN (S)	18704	17923	20306	21519	19633	5.0%	9.5%	-3.3%	-8.8%	static	0.229	-0.86%	No : [N/A]	Yes
A3 South of B2177	SRN (S)	21323	17231	16938	17964	19043	-10.7%	10.5%	12.4%	6.0%	increasing	0.843	1.70%	Yes : Very Strong	No
A3 Maurepas Way	SRN (S)	36402	29316	28928	29260	31097	-14.6%	6.1%	7.5%	6.3%	static	0.706	0.85%	Yes : Strong	No
A3 London Road Waterlooville	SRN (S)	21323	17231	16938	17964	19043	-10.7%	10.5%	12.4%	6.0%	increasing	0.843	1.70%	Yes : Very Strong	No
A3 Portsmouth Rd. Cowplain	SRN (S)	11003	11118	7438	7836	8022	-27.1%	-27.8%	7.9%	2.4%	increasing	0.848	1.28%	Yes : Very Strong	No
A3023 Manor Road (Hayling)	SRN (S)	5430	5240	7306	7647	5684	4.7%	8.5%	-22.2%	-25.7%	declining	0.450	-3.07%	No : [N/A]	Yes
A3023 Langstone Road Nr A27 Jct'n	SRN (S)	28075	25645	25630	26343	24597	-12.4%	-4.1%	-4.0%	-6.6%	static	0.058	-0.36%	No : [N/A]	No
A3023 Langstone Road North of Hayling Bridge	SRN (S)	27798	25391	26379	26082	24354	-12.4%	-4.1%	-7.7%	-6.6%	static	0.334	-0.80%	No : [N/A]	No
A3023 Havant Road North of Church Lane	SRN (S)	17145	19291	18988	19714	20294	18.4%	5.2%	6.9%	2.9%	increasing	0.615	1.13%	Yes : Weak	Yes
A27 North of Harts Farm Wy.	SRN (S)	25026	26534	28012	32167	33398	33.5%	25.9%	19.2%	3.8%	increasing	0.792	2.83%	Yes : Strong	Yes
A27 East of Emsworth Junction	SRN (T)	38787	46269	44502	51236	53739	38.5%	16.1%	20.8%	4.9%	increasing	0.887	3.00%	Yes : Very Strong	Yes
A27 East of Havant Jct'n	SRN (T)	63543	65148	60087	61003	69530	9.4%	6.7%	15.7%	14.0%	increasing	0.587	1.73%	Marginal : Very Weak	Yes
A27 West of Havant Jct'n	SRN (T)	71311	80857	80257	79786	78423	10.0%	-3.0%	-2.3%	-1.7%	static	0.012	0.20%	No : [N/A]	Yes
A27 at A3(M) J5	SRN (T)	60745	64469	59421	66365	64041	5.4%	-0.7%	7.8%	-3.5%	increasing	0.574	1.07%	Marginal : Very Weak	Yes
A27 WB Offslip at A3(M)	SRN (T)	-	-	-	18072	11610	-	-	-	-35.8%	declining	0.556	-7.42%	Marginal : Very Weak	ND
A27 EB Onslip at A3(M)	SRN (T)	-	-	-	4199	11047	-	-	-	163.1%	increasing	0.720	27.89%	Yes : Strong	ND
A27 WB Onslip from A2030	SRN (T)	-	-	-	6430	5923	-	-	-	-7.9%	declining	0.530	-2.29%	Marginal : Very Weak	ND
A27 West of A3(M)	SRN (T)	119351	129092	118079	139716	144911	21.4%	12.3%	22.7%	3.7%	increasing	0.865	2.65%	Yes : Very Strong	Yes
A3(M) North of J2	SRN (T)	39082	43744	43139	54317	56334	44.1%	28.8%	30.6%	3.7%	increasing	0.856	4.31%	Yes : Very Strong	Yes
A3(M) North of J3	SRN (T)	47518	53613	48464	60559	65152	37.1%	21.5%	34.4%	7.6%	increasing	0.890	4.44%	Yes : Very Strong	Yes
A3(M) North of J4 (S of J3)	SRN (T)	55877	63043	64568	70308	73672	31.8%	16.9%	14.1%	4.8%	increasing	0.495	1.39%	No : [N/A]	Yes
A3(M) North of J5	SRN (T)	68032	84045	78071	94009	94174	38.4%	12.1%	20.6%	0.2%	increasing	0.741	2.53%	Yes : Strong	Yes
A3(M) South of J5 (A3(M)>A27 Link)	SRN (T)	54427	67235	62454	75207	67842	24.6%	0.9%	8.6%	-9.8%	increasing	0.516	2.10%	Marginal : Very Weak	Yes

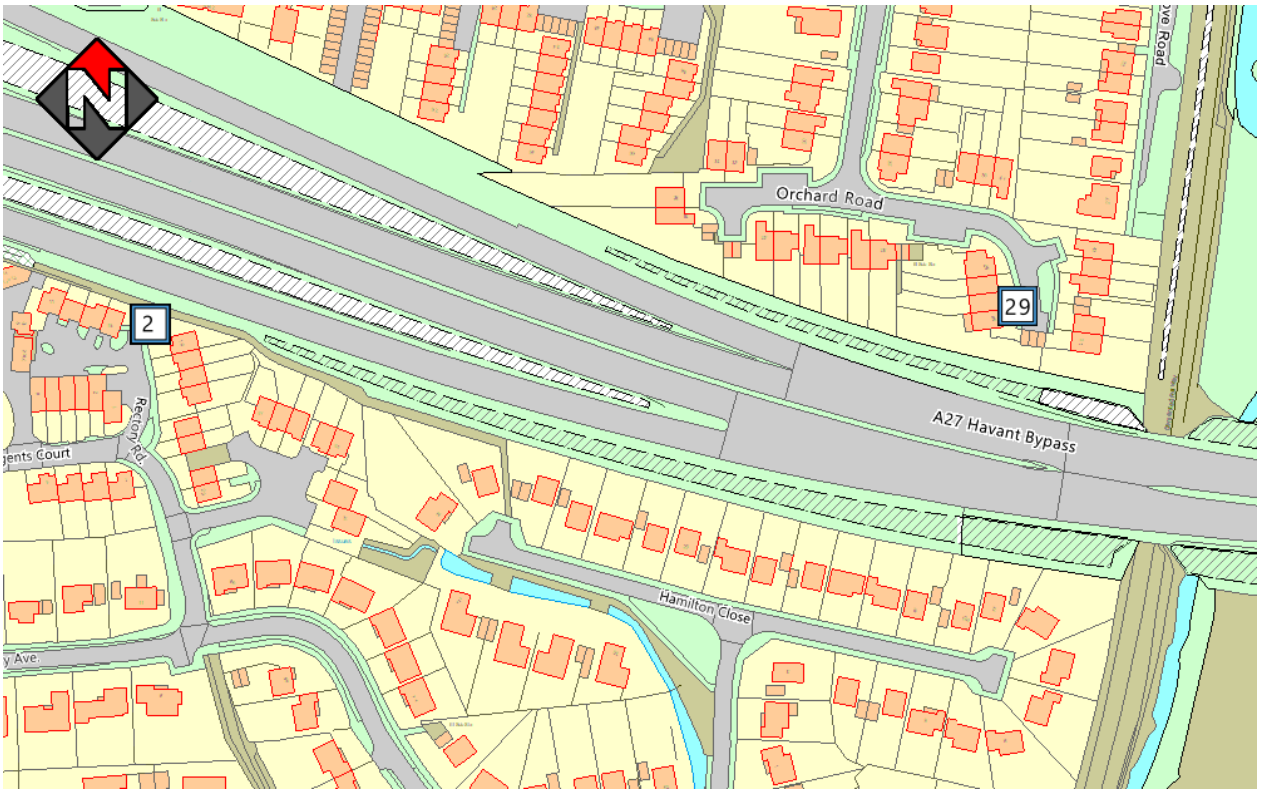
*From DfT Figures. * - Not Significant ("No") = R^2 <0.5; Marginal = R^2 0.5-<0.6; Significant ("Yes") = R^2 >0.6. Very Weak = R^2 0.5-0.6; Weak = R^2 0.6-0.7; Strong = R^2 0.7-0.8; Very Strong = R^2 >0.8.*
^ - "Static" where rate of change <+/- 1% p.a. ^^ - LU = 'Local, Unclassified', LS = 'Strategically Important Unclassified Route', SRN (S) = 'Strategic Road Network – Classified Single Carriageway', SRN(T) = 'Strategic Road Network, Trunk Road'

Appendix D: Map(s) of Monitoring Locations (NO_2)

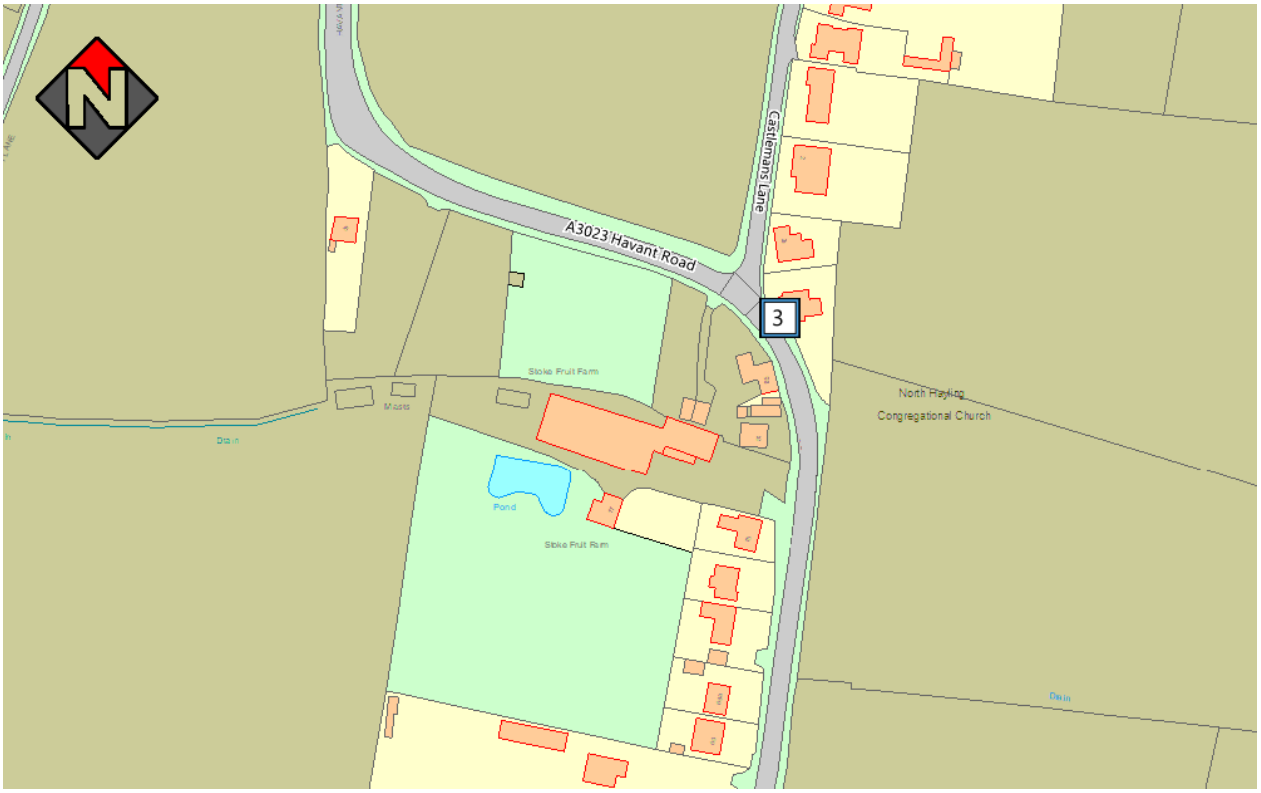
(D.1) A27 / A3023 / B2149 Junction: 2 – Rectory Rd.; 19(B) – Langstone Rd. East, 19(C) – Woodbury Ave., 20 – Bosmere Junior School



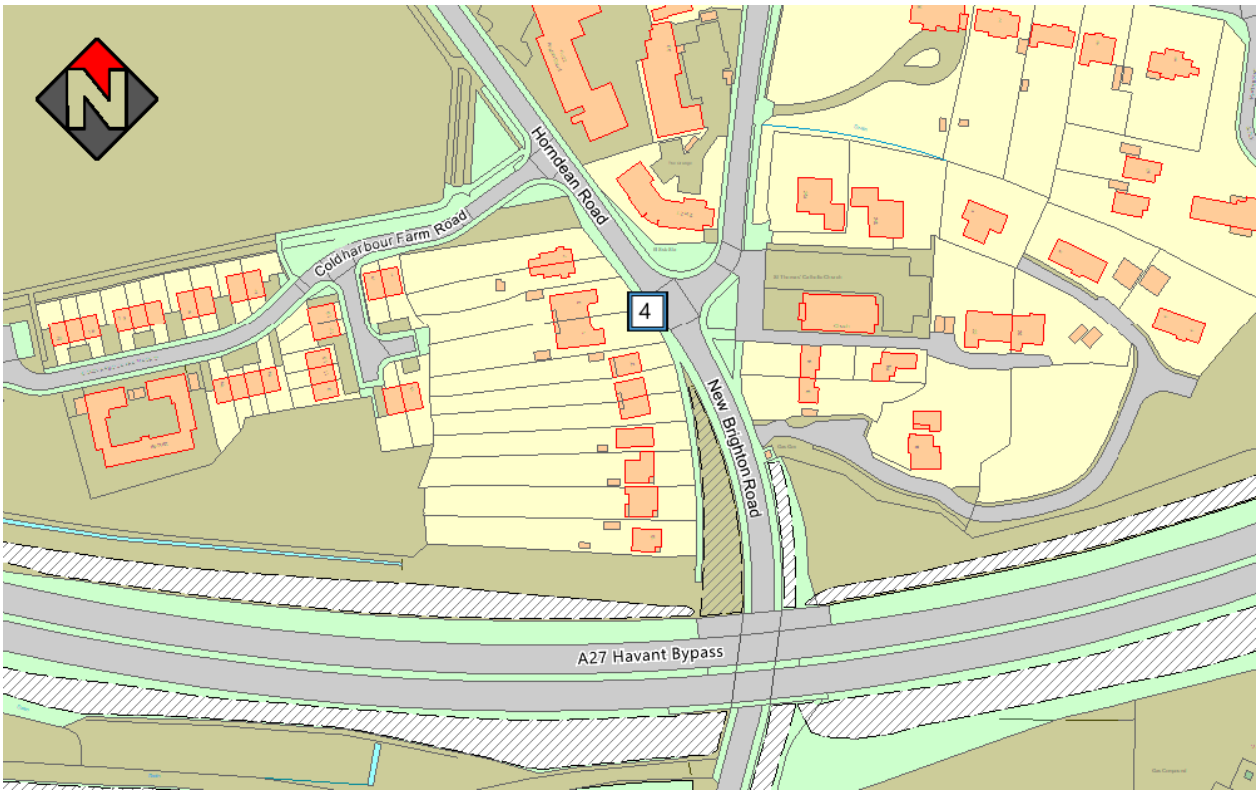
(D.2) A27 Havant Bypass: 29 – Orchard Road



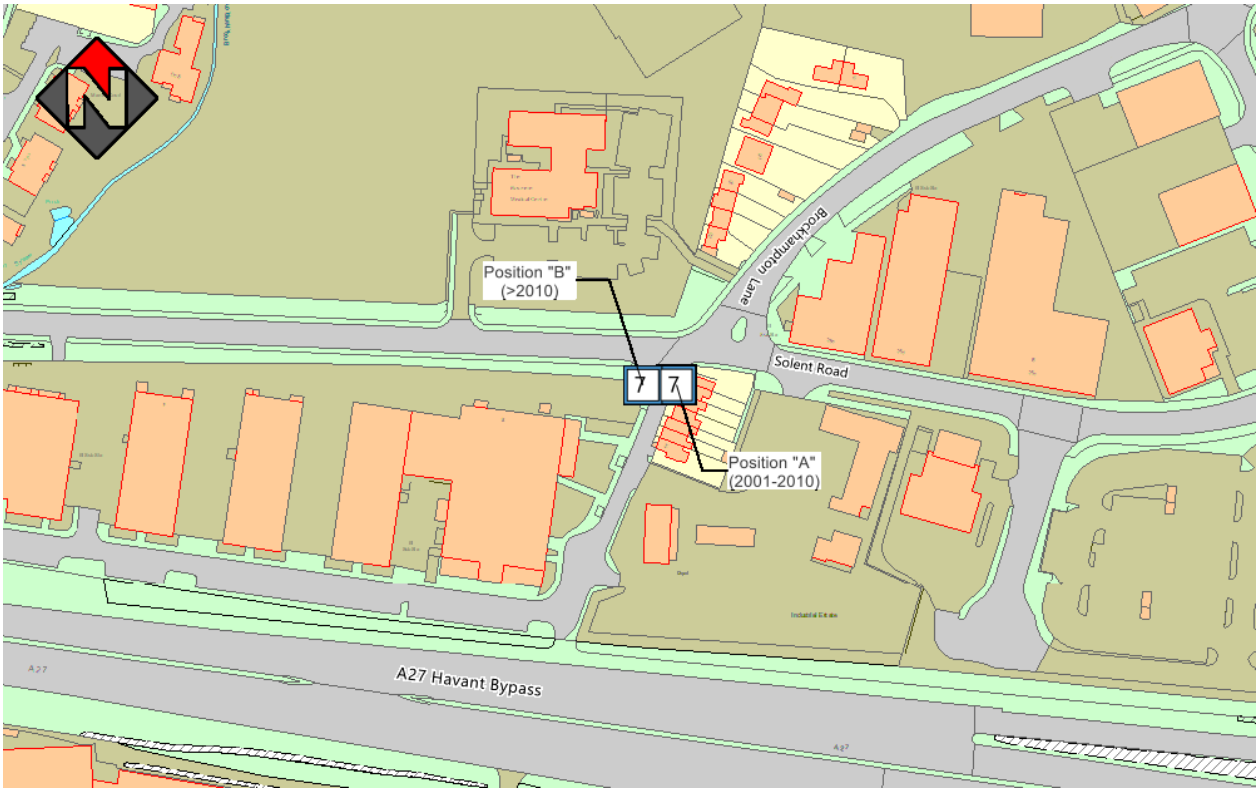
(D.3) A3023 (Hayling Island): 3 – Havant Road



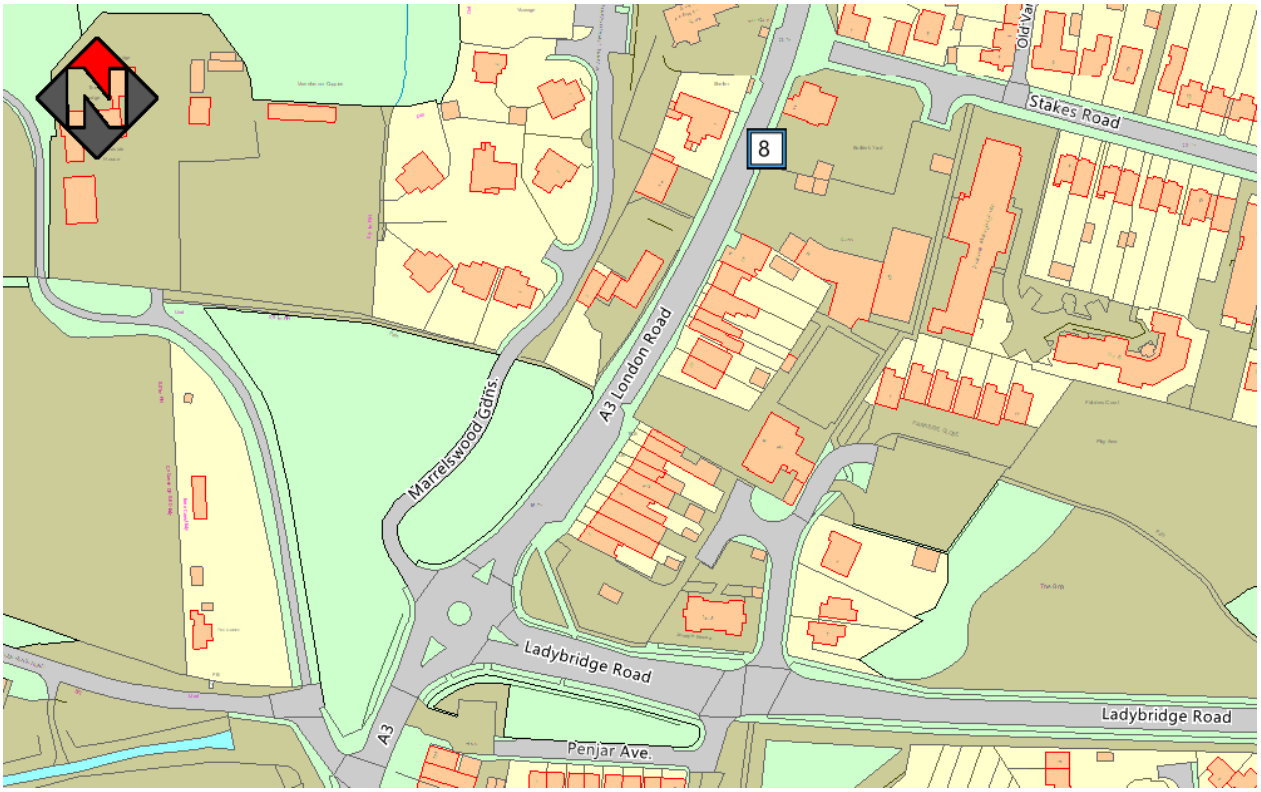
(D.4) A27 Havant Bypass: 4 – New Brighton Road



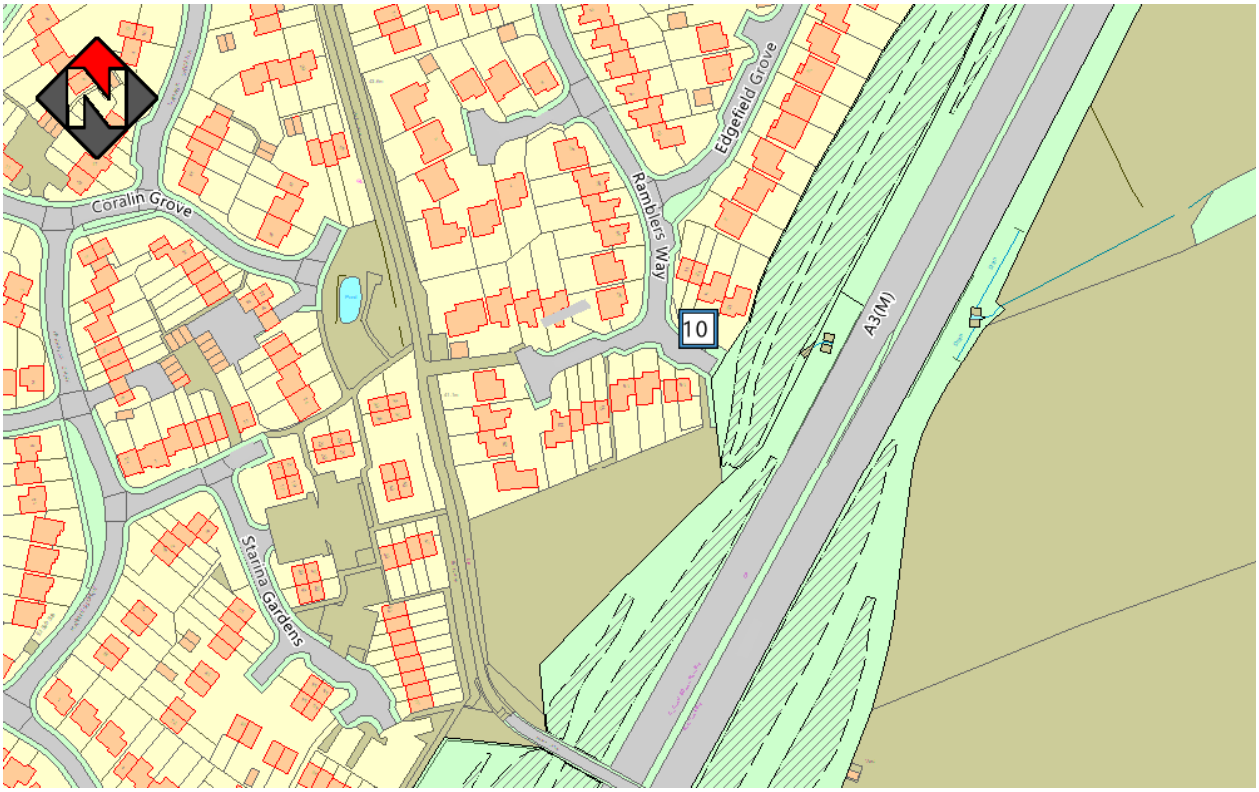
(D.5) Havant Centre (Solent Road Area): 7(B) – Brockhampton Lane



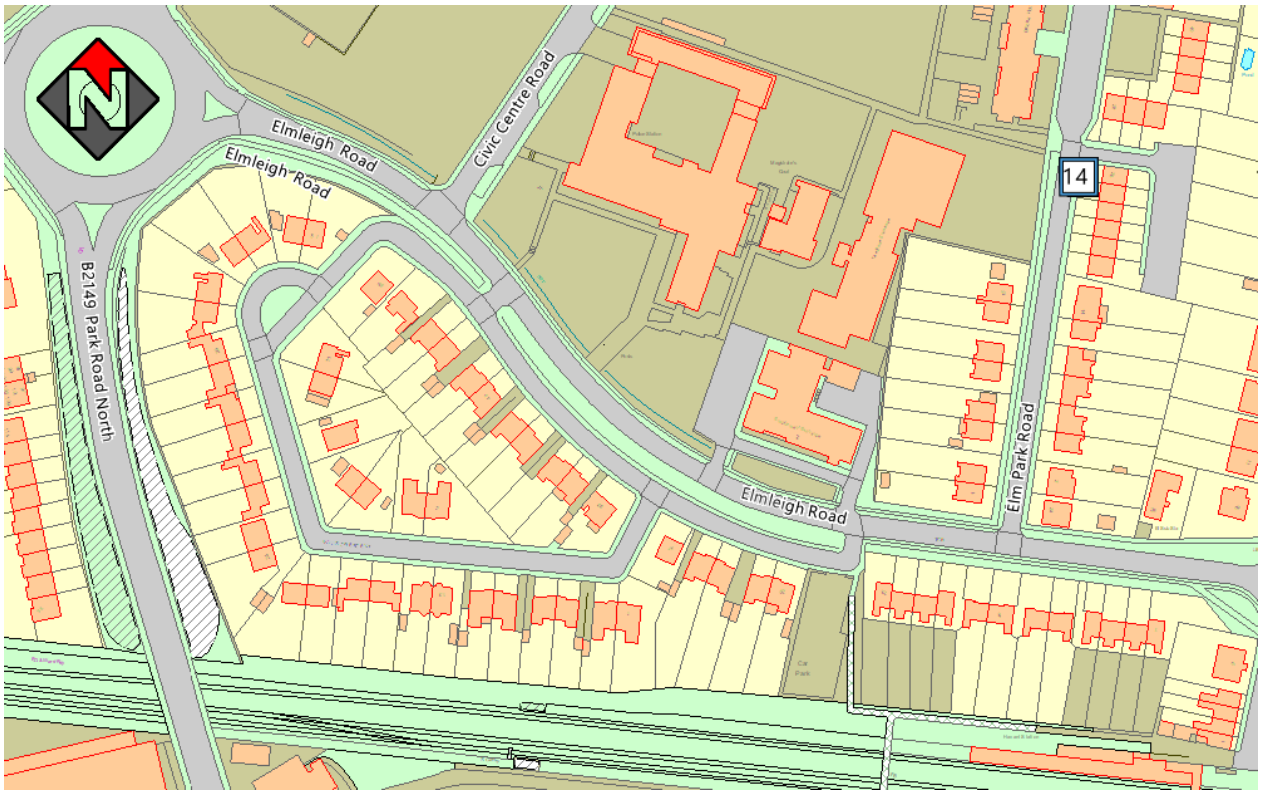
(D.6) A3 (Purbrook): 8 – London Road



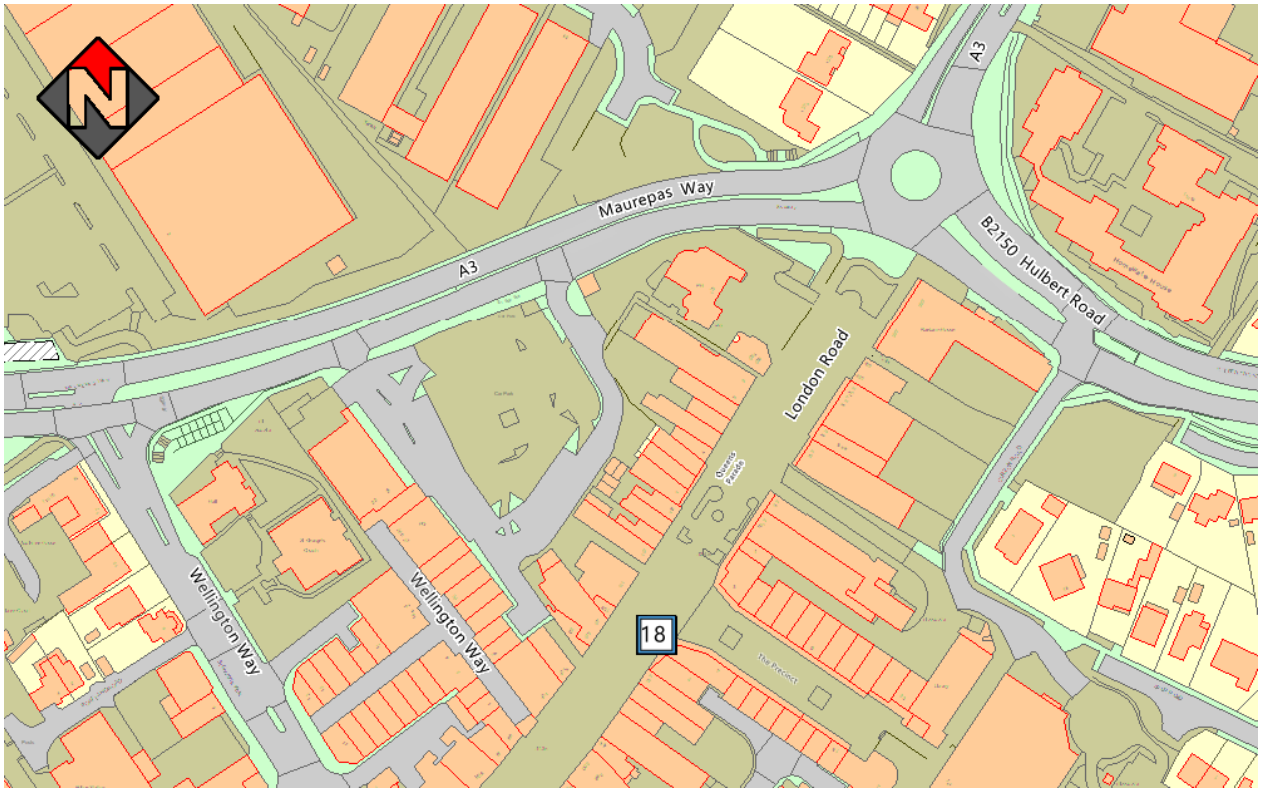
(D.7) A3(M) Trunk Road (Waterlooville): 10 – Ramblers Way.



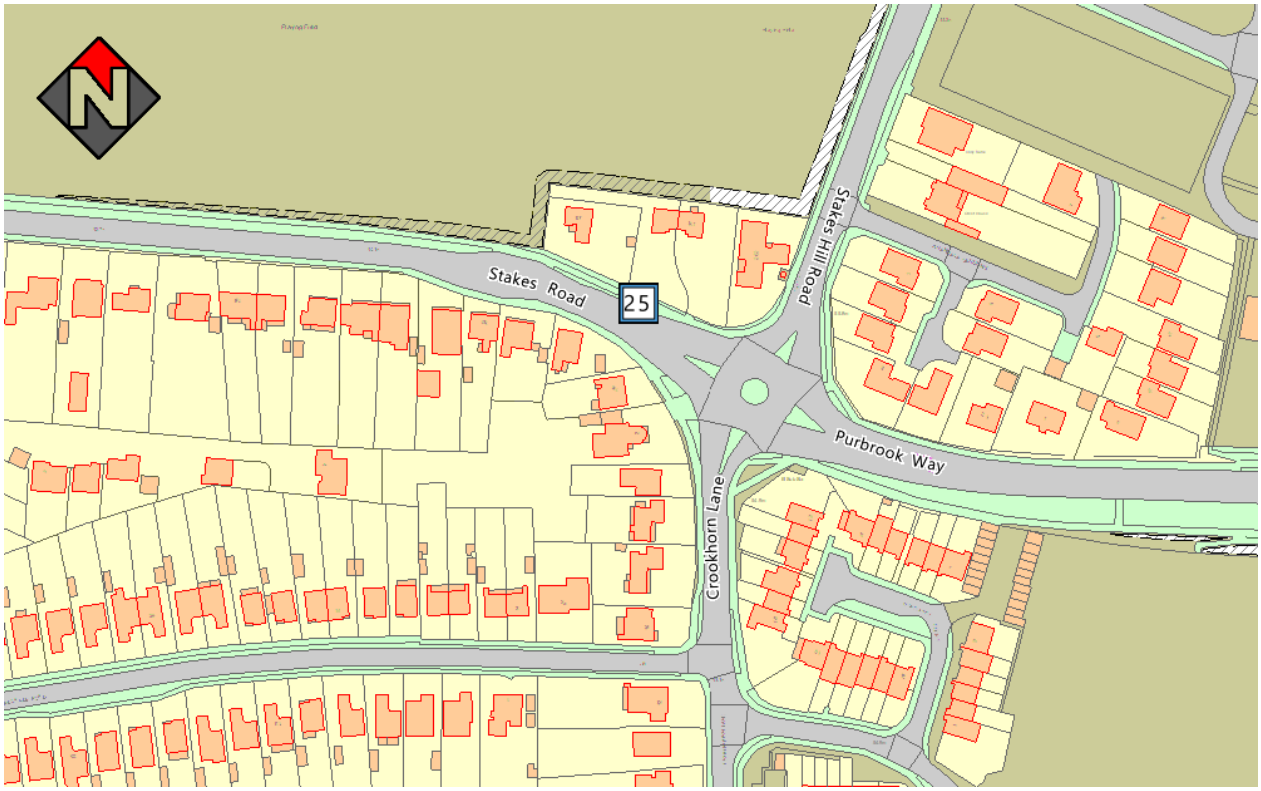
(D.8) Havant Centre (Civic Campus Area): 14 – Elm Park Road



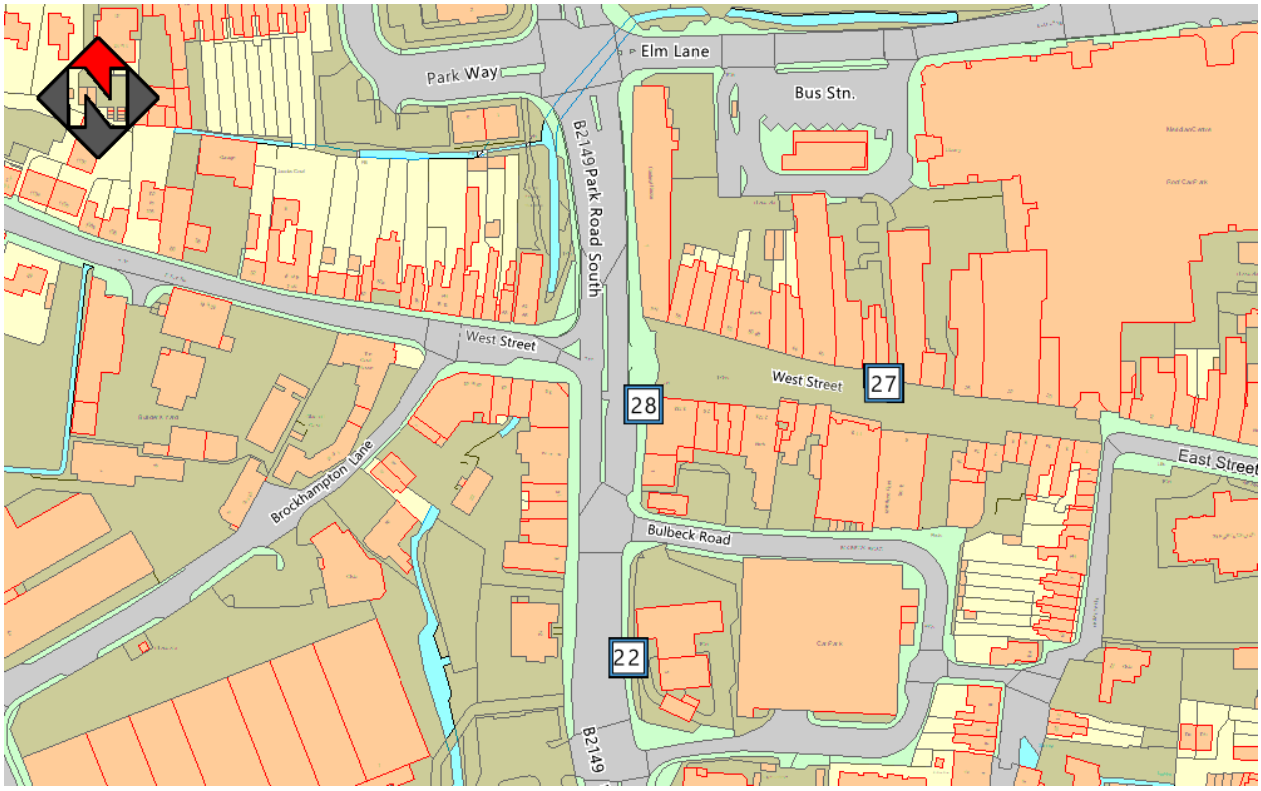
(D.9) Waterlooville Centre: 18– London Road Precinct (Urban Background)



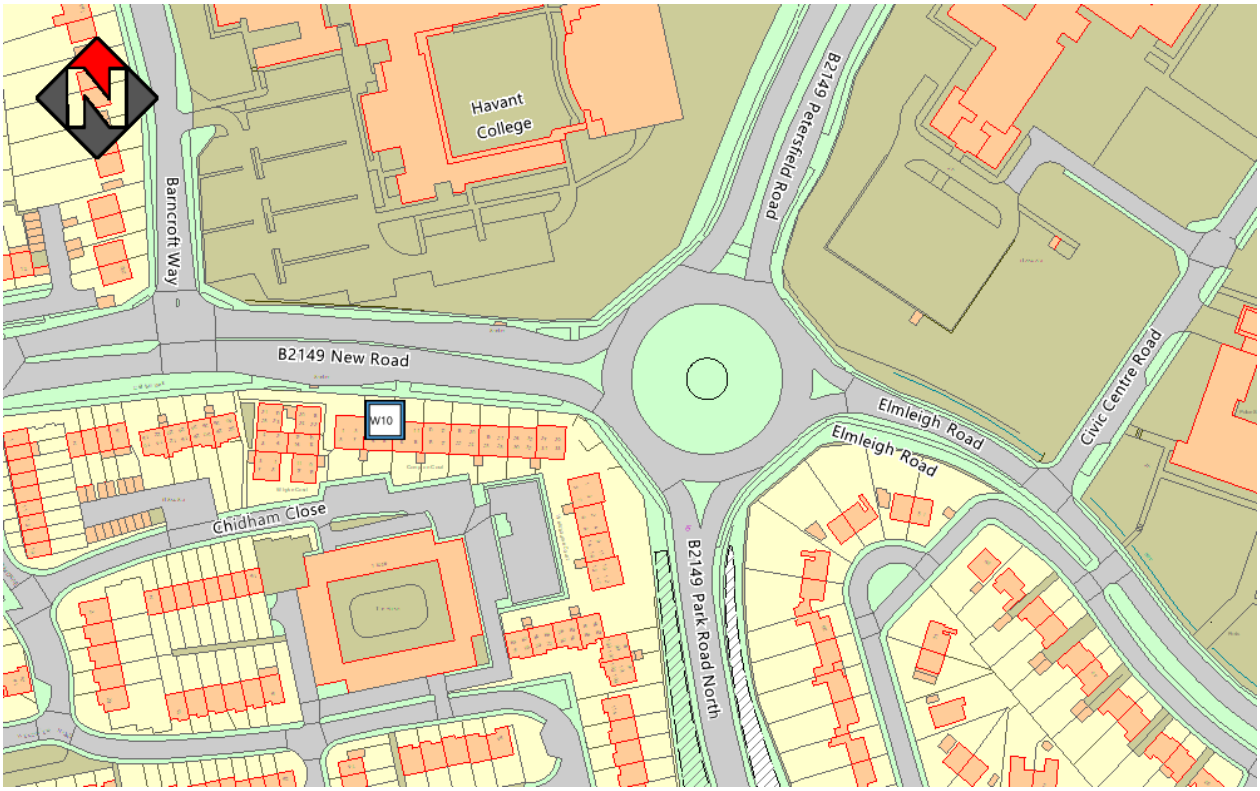
(D.10) Crookhorn: 25 – Stakes Road



(D.11) Havant Centre: 22 – Park Road South (Bulbeck Road), 27 – Havant Precinct (Urban Background), 28 – Park Road South (East)



(D.12) Havant Centre B2149 (Civic Campus Area): W10 – Compton Court



(D.13) Emsworth Centre: 30– St. Peters Square (Urban Centre)

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[67]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Appendix F: NO_2 Passive Diffusion Tube Position Review

The following footnotes apply to table F.1 – F.29

(1) "Within carriageway of road" includes the vehicular running surface, traffic islands, verges and pedestrian refuges located between carriageways

(2) "Micro-Environment" refers to the physical characteristics in the immediate and general vicinity of the sample tube. This requirement is generally satisfied where overhanging elements of buildings, building corners, or trees are not present within 5m of measurement point. Kerbside monitoring points on roads with a speed limit exceeding 40MPH would generally be regarded as influenced by a micro-environment due to vehicular turbulence.

(3) "unrestricted arc" would generally apply to the area in the near vicinity of the sample tube inlet – generally considered to be met where no overhanging obstructions to air flow are present within 5m. It is generally accepted that tube positions on building facades (where free arc will be generally less than 270^o) are acceptable.

(4) Annex III C defines the requirement to mount a tube >0.5m from the façade of the nearest building to include measurements aiming to measure air quality at the building façade. This requirement conflicts with the DEFREA / AEAT 'practical guidance' for diffusion tubes[68], which allows placement on a façade at a minimum distance of 0.1m

(5) Busy junction would generally be taken to mean a junction carrying > 25,000 vehicles on an AADT basis, or a junction subject to heavy congestion at peak periods. Busy road is generally taken to mean a road carrying > 10,000 AADT on an AADT basis, or a road subject to heavy congestion at peak periods

(6) Urban Background / Urban Centre sites are listed as 0m to nearest receptor, as the measurement is targeting general ambient concentrations. Generally, the annual objective does not directly apply at these locations, and at or exceeding the 40µg/m^3 limit may not be regarded as an indication that an AQMA is necessary (without further consideration)

[68] Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance, Ref ED48673043 Iss. 1a, DEFRA, 2008,

Table F.1		**Location 1(B) - Langstone Rd. West**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside*
Monitoring Target	-	-	*Worst Case Residential Exposure West Side of Langstone Road, Close to Havant Bypass Junction, known congested route (peak period queuing traffic adjacent). Key transport link to H.I*
Distance from Kerb	-	-	2.75m
Distance to Relevant Receptor	-	-	13.0m
Equivalent distance to Relevant Receptor	-	-	4.1m
Period of Available Data	-	-	*24 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath). Location intermediate point of measurement between road source and buildings used for permanent habitation.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location is positioned where highest concentrations are likely to occur, but the measurement method is not capable of sufficient resolution for application to an averaging period relevant to the public exposure at the point of measurement. Point of estimation does comply with this requirement. Closest point of relevant exposure (over a 400m+ section of the West kerbside of A3023) is within 50m of monitoring point.
Area representative of exposure of the general population		**Proxy**	N.B. Interpreting 'general population' as 'occupants of residential property fronting the A3023, and residences on roads adjacent to the A3023 where private garden areas share a boundary with the highway''
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Measurement position adjacent to a minor residential junction - material influence is possible, but is not thought likely to be significant. No constraints related to built environment
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	Unclear. With reference to current & previous results from locations 19(A), 19(B), 12(A) & 12(B), taken from within 150m of 1(B), on the same road); it would appear that there is a non-negligible variation over short distances (<100m). It is considered that the influence of the road junction is predominantly responsible.
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.5m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	~190m from B2149 / A3023 / A27 junction
Trend Assessment	-	-	*2014 position change appears to have resulted in a materially elevated average concentration. Short available monitoring history at present location, no specific value for assessment of long term trends.*
Other	-	-	*Position subject to pathway widening / carriageway running surface narrowing. Potential short-term usefulness as FOWD 'sense check'.*
Objectively reassessed Classification	-	-	*Roadside*

Table F.2		**Location 2, Rectory Rd**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	**-**	*Suburban*
Monitoring Target	-	-	*Residential Exposure South Side of A27*
Distance from Kerb (of nearest busy Road) [Nearest Road]	-	-	11.0m [2.0m]
Distance to Relevant Receptor	-	-	7.0m
Equivalent distance to Relevant Receptor	-	-	-2.2m
Period of Available Data	-	**-**	*168 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath). Location is convenient point of measurement located further from target source than closest building used for permanent habitation (to that source, the A27)
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Location is positioned where highest concentrations are likely to occur. As nearest relevant exposure is marginally closer to the targeted source, measurement method *is* relevant to the public exposure at an equivalent distance to the point of measurement.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'occupants of residential property at Rectory Road & The Limes'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Measurement position adjacent to A27 Westbound Offslip, within a residential area. No constraints related to built environment
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Tube is representative of residences over an approximate 400m section of the A27 (South side)
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.8m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**N/A**	Depends on 'junction' definition - disregarding sliproads, tube is ~95m from B2149 / A3023 / A27 junction
Trend Assessment	-	**-**	*Long-standing monitoring, not monitoring highly local source. R2 2004-2016 is 0.75; good data consistency.*
Other	-	**-**	
Objectively reassessed Classification	-	**-**	*Suburban*

Table F.3		**Location 3 Havant Road H.I**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Kerbside (Rural)*
Monitoring Target	-	-	*Worst Case Residential Exposure on Principal Route to South Hayling*
Distance from Kerb	-	-	1.0m
Distance to Relevant Receptor	-	-	2.0m
Equivalent distance to Relevant Receptor	-	-	2.0m
Period of Available Data	-	-	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath). Location is convenient point of measurement located between target road source and the closest building used for permanent habitation (to that source, the A3023)
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location is positioned where highest concentrations are likely to occur. Nearest relevant exposure is the closest relevant landuse to the A3023, over a distance of approx. 3500m segment (b/w Hayling Bridge & the Church Road Junction). Measurement is relevant to the public exposure only at the point of estimation.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'occupants of residential property fronting Havant Road, Hayling Island'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Measurement position is positioned to monitor worst-case exposure - at the narrowest point of Havant Road, with the least distance b/w the running surface & relevant exposure. Not a micro-environment, is worst case.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Tube is representative of residences over an approximate 3500m section of the A3023 (East & West Sides, due to lack of queuing bias in either NB or SB directions (tidal flow, NB congestion AM peak, SB congestion PM peak, approximately balanced flow)
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.6m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	
Trend Assessment	-	-	*Long-standing monitoring, not monitoring highly local source. R2 2004-2016 is 0.68; good data consistency.*
Other	-	-	
Objectively reassessed Classification	-	-	*Kerbside*

Table F.4		**Location 4 B2148 New Brighton Road**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	**-**	*Suburban*
Monitoring Target	-	-	*General Residential Exposure down-prevailing wind of A27 Trunk Rd.*
Distance from Kerb	-	-	2.5m
Distance to Relevant Receptor	-	-	13.0m
Equivalent distance to Relevant Receptor	-	-	6.2m
Period of Available Data	-	**-**	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath). Location is convenient point of measurement located down-prevailing wind of elevated section of A27. Position is further from target source than closest building used for permanent habitation to the target source.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location is adj. New Brighton Rd. (ca. 9K AADT), within 25m of the closest residence to the carriageway on this section of the B2148 route. 6 residences are closer to the B1248 (-2.3m), but in general the measurement point is representative of the building line adopted for the route, and in addition, is close to (but not at the closest point to), the down-prevailing-wind side of the elevated section of the A27. Measurement is relevant to the public exposure only at the point of estimation. Higher concentrations could occur closer to the A27 carriageway, but loc'n 20 provides context in this specific respect (tube no. 20 is located 40m closer to an elevated section of the A27 which carries a similar number of vehicles when traffic on adjacent slips is taken into account.)
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'occupants of residential property fronting New Brighton Road, and an equivalent distance North of the A27 West of Emsworth Junction'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Position is broadly "worst case" by location adjacent to a principal road junction (RH turn traffic obstruction). No nearby local emissions, no physical constraints.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Position considered generally representative of around 1.5km section of the B2148 (New Brighton Rd / Horndean Rd).
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	As Above.
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.65m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**N/A**	
Trend Assessment	-	**-**	*Long-standing monitoring, not monitoring highly local source. R2 2004-2016 is 0.71; good data consistency.*
Other	-	**-**	
Objectively reassessed Classification	-	**-**	*Suburban*

Table F.5		Location 5 South Street	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Urban Centre*
Monitoring Target	-	-	*General Residential Exposure at Urban Centre Location where mixed use commercial / residential buildings prevail, directly fronting the highway.*
Distance from Kerb	-	-	1.5m
Distance to Relevant Receptor	-	-	17.0m
Equivalent distance to Relevant Receptor	-	-	-0.7m
Period of Available Data	-	-	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	Yes	Members of the public have access (public footpath, shopping area). Location intermediate point of measurement between road source and buildings where 1st floor is used for permanent habitation.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	Yes	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	Yes	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	No	Location is adj. South St (AADT flow unknown, thought likely to be <5K) intended to represent general exposure in Havant Centre, not monitor a specific road traffic source. Position is broadly representative of the building line adopted for the route, but is not located at the worst case position, nor at a distance equivalent to the worst case position (i.e. FOWD would result in value greater than that monitored)
Area representative of exposure of the general population		Yes	
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	No	Position is close to trees, and may be prone to seasonal variability with canopy density. Close to corner of nearest building, may be subject to variable conditions of increased turbulence, or 'dead' air; depending on prevailing weather.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	Yes	If we disregard the potential for local variability associated with the physical tube position, location is generally representative of Urban Centre exposure.
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	No	Tube is located on a free-standing pole, held 100mm from the pole surface. Overhanging trees.
Tube mounted >0.5m from nearest building(4)		Yes	
Tube height between 1.5m & 4.0m		Yes	Tube located at 3.05m height from the footpath surface.
Tube position avoids local point sources		Yes	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		N/A	
Trend Assessment	-	-	*Long-standing monitoring, not monitoring highly local source. R2 2004-2016 is 0.4; poor data consistency, likely for the reasons outlined above.*
Other	-	-	
Objectively reassessed Classification	-	-	*Urban Centre*

Table F.6		**Location 6(B) Park Road South (West Street)**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside (Urban Centre)*
Monitoring Target	-	-	*General Ambient Air Quality in vicinity of the B2149 Park Road (North/South) transport corridor, Havant Town Centre.*
Distance from Kerb (of nearest busy Road) [Nearest Road]	-	-	4.25 [2.0m]
Distance to Relevant Receptor	-	-	24.0m
Equivalent distance to Relevant Receptor	-	-	24.0m
Period of Available Data	-	-	*42 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath, shopping area). Location intermediate point of measurement between road source and buildings used for permanent habitation. Position biased toward principal route roadside source.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**No**	Location is adj. Park Road South (AADT flow ca. 26K). Intended to measure worst case roadside exposure in Havant Centre. Position not representative of the building line adopted for West side of the route, and is forward of the building line for the East side of the route. Pedestrian / traffic conflicts (crossings) & restricted junctions / main route flow bias make unsafe any assumption of representativeness of NO_2 conc. adjacent to the SB B2149 carriageway. **(Proxy for hourly)**
Area representative of exposure of the general population		**No**	Location is a 'worst case' ambient adjacent to a principal road, up-prevailing-wind of source, representative of few nearby relevant receptors, even as an intermediate point of measurement. Known not to be representative of East side of principal route. Location is however valid as indicator of hourly exposure levels (with ref. to 60ug/m3 screening threshold) **(Proxy for hourly)**
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Point of measurement is a road junction, where queuing traffic is frequent - and an acceleration zone (away from West St, joining principal route, and away from signal-controlled pedestrian crossing). Local sources monitored as worst case - not a micro-environment, probably representative of a 100m section give n that other ancillary junctions and signal controls exist within the 500m section of the B2149 running through the Havant Retail area.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Interpreted as 'approx. 2m distance from western kerbside of B2149', Yes. However, position only representative of relevant exposure as a basis for estimation (i.e. FOWD).
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	As above.
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.7m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	~75m from Park Road N / Park Road S / Elm Lane / Park Wy. Junction; 200m From Park Rd. S / Solent Rd. Junction.
Trend Assessment	-	-	*Long-term monitoring in locality, previously non-compliant. 2013 reposition to location where average ambient appears materially different to prior location (reduced levels, good consistency over available data). Not monitoring highly local source. Aggregated 2004-2016 R2 = 0.7; 2013 re-location could have materially altered (enhanced) trend consistency. No specific value for assessment of long term trends for these reasons.*
Other	-	-	
Objectively reassessed Classification	-	-	*Roadside*

Table F.7		Location 7(B) Brockhampton Lane	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Urban Background*
Monitoring Target	-	-	*General Ambient Air Quality in vicinity of the retail park areas of Havant Town Centre.*
Distance from Kerb (of nearest busy Road) [Nearest Road]	-	-	8.0m [3.0m]
Distance to Relevant Receptor	-	-	11.0m
Equivalent distance to Relevant Receptor	-	-	-5.0m
Period of Available Data	-	-	*84 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath, shopping, business & residential area). Location is a convenient point of measurement further from principal road route than closest buildings used for permanent habitation.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Locaion is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Location is as close as possible to free-flowing traffic on Solent Rd. (AADT flow ca. 8.5K), at a junction serving industrial & residential premises, and retail park traffic (exit). As nearest relevant exposure is marginally closer to the closest road traffic source, measurement method is relevant to the public exposure at an equivalent distance to the point of measurement.
Area representative of exposure of the general population		**Yes**	Interpreted as 'residential premises on Brockhampton Lane both North & South of Solent Road'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Point of measurement is a road junction, but all nearby relevant receptors are also close to (within 100m) of this road junction.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	Monitoring targets a limited number of residential properties all broadly within the 100m road segment of which this location is intended to be representative.
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	As above.
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.65m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**N/A**	>100m from Superstore / Retail Park Access(es)
Trend Assessment	-	-	*Long-standing monitoring in locality, previously at compliant location closer to receptors. Forced relocation in 2010 due to column removal. Reposition to location where average ambient appears equivalent to original location. Not monitoring highly local source. Aggregated 2004-2016 R2 = 0.67. 2010 Relocation not considered to materially harm value as long-term indicator.*
Other	-	-	
Objectively reassessed Classification	-	-	*Urban Centre*

Table F.8		Location 8 A3 London Road Purbrook	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside (Urban Centre)*
Monitoring Target	-	-	*General Ambient Air Quality in vicinity of the A3 National Strategic & Local Principal Road route.*
Distance from Kerb	-	-	2.0m
Distance to Relevant Receptor	-	-	15.0m
Equivalent distance to Relevant Receptor	-	-	-0.4m
Period of Available Data	-	-	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath, bus stop, local businesses in area, residential area). Location is a convenient point of measurement, originally intended to benchmark short term exposure for customers waiting at the bus stop.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Location is broadly representative of the building line to the Purbrook Section of the A3 (AADT flow ca. 25K) - majority at greater distance from the carriageway (than the measurement point), a handful of properties marginally closer. Method is relevant to the public exposure at an equivalent distance to the point of measurement.
Area representative of exposure of the general population		**Yes**	Interpreted as 'residential premises fronting the A3 within the Widley & Purbrook Area'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Point of measurement is adjacent to free flowing traffic, broadly representative of the closest properties to the kerbside, and worst case relative to properties located at a greater distance (from eh kerb). AADT flows Widley side marginally higher (~27K) but within margin of uncertainty. Considered representative of up to max. 3km of the A3.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	As above.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.7m height from the footpath surface.
Tube position avoids local point sources		**Yes**	Arguably, positioning at a Bus stop risks direct intake - though comparison with position 26 indicates that the effect (if occurring) is minor. Tube positioned on the 'deceleration' side of the bus stop, and is shielded from direct PSV emissions by physical bus shelter. Materially different context to position 19B (positioned in acceleration zone, no shelter, with lay-by permitting longer waiting periods)
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	
Trend Assessment	-	-	*Long-standing monitoring at this location. Does not appear to be monitoring highly local source, though 2004-2016 R2 = 0.37, representing poor consistency. More variable results 2004-2007, reasonable latter consistency.*
Other	-	-	
Objectively reassessed Classification	-	-	*Roadside*

Table F.9		Location 9B A3 Maurepas Way / London Road, Waterlooville	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside (Urban Centre)*
Monitoring Target	-	-	*General Ambient Air Quality in vicinity of the A3 National Strategic & Local Principal Road route.*
Distance from Kerb	-	-	2.5m
Distance to Relevant Receptor	-	-	9.0m
Equivalent distance to Relevant Receptor	-	-	6.5m
Period of Available Data	-	-	*99 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath, adjacent well trafficked pedestrian underpass. Also adjacent to elderly care / supported accommodation. Location is a convenient point of roadside measurement, adjacent to a congested road junction on the classified road network (A3/A3/B2150), on the access route to the nearest A3(M) junction.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location is forward of the general building line applied to the A3 Maurepas Way / A3 London Road Waterlooville / Cowplain. AADT flow at road junction is ca. 50K. No exposure relevant to long term averages closer to carriageway than the measurement point/ Method is relevant to the public exposure at an equivalent distance to the point of measurement, and for benchmarking to hourly exposure (seating areas to Heroes PH).
Area representative of exposure of the general population		**No**	Measurement likely to be uniquely representative of conditions at/in the vicinity of this road junction (only)
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**No**	Targets road junction roadside as worst case indicator near sensitive relevant exposure, and is subject to widely variable results due to proximity to these localised traffic conditions. Probably representative of a 100-150m road segment (at an equivalent distance from the kerbside). Relevant to adjacent receptors by estimation only.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	As above.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.5m height from the footpath surface.
Tube position avoids local point sources		**No**	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**No**	
Trend Assessment	-	-	*Long-standing monitoring at this location. Forced relocation in 2008 due to column removal. Reposition to location where average ambient appears broadly equivalent to original location (not statistically different). Aggregated 2004-2016 R2 = 0.07; very poor consistency / highly variable (likely due to proximity to road traffic). Variability in response to local traffic conditions considered to reduce the value of the position as a long-term indicator of ambient AQ.*
Other	-	-	
Objectively reassessed Classification	-	-	*No Classification*

Table F.10		Location 10 Ramblers Way	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Suburban*
Monitoring Target	-	-	*General Ambient Air Quality in vicinity of the A3(M) National Trunk Road*
Distance from Kerb (of nearest busy Road) [Nearest Road]	-	-	43.5m [5.5m]
Distance to Relevant Receptor	-	-	5.0m
Equivalent distance to Relevant Receptor	-	-	-10.6m
Period of Available Data	-	-	*99 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access residential area. Location is a convenient point of measurement, representative of suburban areas adjacent to the National Trunk Route (A3(M))
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Location represents the closest practical position available to the running surface of the A3(M). Location is forward of the general building line applied to residential development adjacent to the A3(M), however, but a handful of properties are located closer.
Area representative of exposure of the general population		**Yes**	As above, widely representative.
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	As above. Probably representative of an approximate 6.7km segment of the A3(M) (at an equivalent distance west from the carriageway), between junctions 1 & 4, where AADT flows vary by <10%, and road orientation is fairly consistent on a NNE bearing. Relevant to adjacent receptors both directly, and by estimation
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	As above.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.7m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	
Trend Assessment	-	-	*Long-standing monitoring at this location. 2004-2016 R2 = 0.58; with good data consistency over recent years (max deviation from 10 year average is +/- 15%)*
Other	-	-	
Objectively reassessed Classification	-	-	*Suburban*

Table F.11		**Location 12B Xyratex**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	**-**	*Roadside*
Monitoring Target	-	-	*Worst Case Residential Exposure West Side of Langstone Road, Close to Havant Bypass Junction, at junction to enterprise park. Known congested route (peak period queuing traffic adjacent). Key transport link to H.I.*
Distance from Kerb	-	-	2.75m
Distance to Relevant Receptor	-	-	12.0m
Equivalent distance to Relevant Receptor	-	-	3.3m
Period of Available Data	-	**-**	*24 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath). Location intermediate point of measurement between road source and buildings used for permanent habitation.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location is positioned where highest concentrations are likely to occur. Short term public exposure not relevant at the point of measurement. Point of estimation does complies with this requirement. Closest point of relevant exposure (over a 400m+ section of the West kerbside of A3023) is within 50m of monitoring point, but is south of position 1B. Duplication of monitoring effort.
Area representative of exposure of the general population		**Proxy**	N.B. Interpreting 'general population' as 'occupants of residential property fronting the A3023, and residences on roads adjacent to the A3023 where private garden areas share a boundary with the highway''
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Measurement position adjacent to a commercial (enterprise zone / business park) access junction - material influence is possible, but is not thought likely to be significant. No constraints related to built environment
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	Unclear. With reference to current & previous results from locations 19(A), 19(B), 1(A) & 1(B) (taken from within 150m of 12(B), on the same road); it would appear that there is a non-negligible variation over short distances (<100m). It is considered that the influence of respective road junctions is predominantly responsible.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.45m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	
Trend Assessment	-	**-**	*It is unclear whether 2014 position change has resulted in a materially altered average concentration. Short available monitoring history at present location, no specific value for assessment of long term trends.*
Other	-	**-**	
Objectively reassessed Classification	-	**-**	*Roadside*

Table F.12		Location 13 Grove Road	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Urban Background*
Monitoring Target	-	-	*General Exposure in Residential areas of Havant, away from road transport sources*
Distance from Kerb	-	-	2.0m
Distance to Relevant Receptor	-	-	8.5m
Equivalent distance to Relevant Receptor	-	-	0m
Period of Available Data	-	-	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath), residential area. Location does not target any specific road traffic source, being located down-prevailing-wind of he A27 (290m), and around 120m from the next nearest road carrying in excess of 5K AADT (not classified)
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Locaion is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**No**	Located for general coverage / to be broadly representative. Alternative locations exist that are closer to the A27 main carriageway, within residential areas, and which are down-prevailing-wind.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'of residential areas of Havant'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	As Above.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	As Above.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**No**	Tube is located on a free-standing pole, held 100mm from the pole surface. Nearby trees have become overgrown, may contribute to tube loss (physical displacement of sample) and may be impacting air flow around inlet.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.5m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**N/A**	
Trend Assessment	-	-	*Long-standing monitoring at this location. 2004-2016 R2 = 0.42; apparently poor data consistency but due largely to erratic results in 2005/6. Over last 10 years, R2 is 0.81 declining. Max deviation from 10 year average is +/- 15%*
Other	-	-	
Objectively reassessed Classification	-	-	*Suburban*

Table F.13		Location 14 Elm Park Rd.	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Urban Background*
Monitoring Target	-	-	*General Exposure in Residential areas of Havant, away from road transport sources*
Distance from Kerb	-	-	1.75m
Distance to Relevant Receptor	-	-	8.5m
Equivalent distance to Relevant Receptor	-	-	0m
Period of Available Data	-	-	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath), residential area. Location does not target any specific road traffic source, being located down-prevailing-wind of the A27 (900m), Havant Town Centre (450m) and around 120m from the next nearest road carrying in excess of 5K AADT (not classified)
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**No**	Located for general coverage / to be broadly representative.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'of residential areas of Havant'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	As Above.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	As Above.
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.65m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**N/A**	
Trend Assessment	-	-	*Long-standing monitoring at this location. 2004-2016 R2 = 0.83; highly consistent data, making a good overall trend monitoring position. Max deviation from 10 year average is +/- 17%*
Other	-	-	
Objectively reassessed Classification	-	-	*Suburban*

Table F.14		Location 15 Broadmere Ave. (Front Lawn Jnr.)	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Suburban*
Monitoring Target	-	-	*General Exposure in Residential areas North of Havant Town, away from road transport sources, at sensitive receptor*
Distance from Kerb	-	-	27.0m
Distance to Relevant Receptor	-	-	0.0m
Equivalent distance to Relevant Receptor	-	-	0.0m
Period of Available Data	-	-	*192 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	Yes	Members of the public have access, junior school in residential area. Location does not target any specific road traffic source, background site for sense check of NETCEN/DEFRA estimates, and for long-term trends
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	Yes	H&S would apply to staff, but not to pupils / visitors. Representative of wider area.
Location is not within road carriageway(1)	Annex III A.2 (c)	Yes	At sensitive, relevant receptor
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	No	Located for general coverage / to be broadly representative; not targeting worst case exposure conditions.
Area representative of exposure of the general population		Yes	N.B. Interpreting 'general population' as 'of residential areas of Havant'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	Yes	As Above.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	Yes	As Above.
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	Yes	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		Yes	
Tube height between 1.5m & 4.0m		Yes	Tube located at 2.45m height from the footpath surface.
Tube position avoids local point sources		Yes	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		Yes	
Trend Assessment	-	-	*Long-standing monitoring at this location. 2004-2016 R2 = 0.65; good data consistency. Max deviation from 10 year average is +/- 18.5%*
Other	-	-	
Objectively reassessed Classification	-	-	*Urban Background*

Table F.15		**Location 18 Waterlooville Precinct**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Urban Centre*
Monitoring Target	-	-	*General Exposure in Waterlooville Town Centre*
Distance from Kerb	-	-	120.0m
Distance to Relevant Receptor	-	-	0.0m
Equivalent distance to Relevant Receptor	-	-	0.0m
Period of Available Data	-	-	*144 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, pedestrianised retail area. Location does not target any specific road traffic source, background site for sense check of NETCEN/DEFRA estimates and for long-term trends
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	Public Realm Monitoring
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Pedestrianised Area
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**No**	Located for general coverage / to be broadly representative; not targeting worst case exposure conditions.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'visitors to Waterlooville Town Centre'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Non-Targeted Nature of Monitoring Location makes it broadly applicable to (representative of-) town centre locations distanced from principle road traffic sources.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.45m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	~60m from Waterlooville Town Centre Public Car Park
Trend Assessment	-	-	*Long-standing monitoring at this location. 2005-2016 R2 = 0.008; relatively tight data range around long term average (max deviation from 10 year average is +/- 14%, but with inconsistent directionality (static trend)*
Other	-	-	
Objectively reassessed Classification	-	-	*Urban Background*

Table F.16		**Location 19(B)**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	**-**	*Kerbside*
Monitoring Target	-	**-**	*Worst Case Residential Exposure East Side of Langstone Road, Close Havant Bypass Junction, known congested route, key transport link to H.I*
Distance from Kerb	-	-	*1.0m*
Distance to Relevant Receptor	-	-	*7.0m*
Equivalent distance to Relevant Receptor	-		*7.0m*
Period of Available Data	-	**-**	*24 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, footpath on route to town centre footway link. Adjacent public Bus Stop, residential property adjacent.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location is positioned where highest concentrations are likely to occur, but the measurement method is not capable of sufficient resolution for application to an averaging period relevant to the public exposure at the point of point of measurement. Point of estimation does comply with this requirement.
Area representative of exposure of the general population		**No**	See notes below
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**No**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction (Local Source). Tube overhung by trees, though substantially taller canopy than the lamp column. Proximity to junction limits direct representativeness to other locations.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	Unclear. With reference to the notes above, and to previous results from locations 19(A), and 2016 results from locations 1(B) & 12(B) (both taken from within 150m of location 19(B), on the same road); it would appear that there is a specific local influence upon 19(B), and it is therefore unlikely to represent similar locations at an equivalent distance from the carriageway.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.55m height from the footpath surface.
Tube position avoids local point sources		**No**	Unclear. It is possible that location 19(B) is located in a position that directly sample emissions from idling busses serving the stop to which it is adjacent, without adequate mixing with the air so as to be regarded as being representative of 'ambient' air (to which the NAQS objectives apply).
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	Located ~70m from A2149/A3023/A27 junction give-way lines
Trend Assessment	-	**-**	*2014 position change has resulted in substantially & materially elevated average concentrations. Short available monitoring history at present location, no specific value for assessment of long term trends.*
Other	-	**-**	
Objectively reassessed Classification	-	**-**	*Kerbside*

Table F.17		Location 20 Bosmere Junior School	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Urban Centre*
Monitoring Target	-	-	*General Public Exposure in Waterlooville Town Centre, away from road transport sources*
Distance from Kerb	-	-	35.0m
Distance to Relevant Receptor	-	-	0.0m
Equivalent distance to Relevant Receptor	-	-	0.0m
Period of Available Data	-	-	*120 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, junior school in residential area. Location targets A27.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	H&S would apply to staff, but not to pupils / visitors. Representative of wider area.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	At sensitive, relevant receptor
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Located as close as practicable to the A27, down-prevailing wind of the congested A27/A2149/A3023 junction (A27 Havant Bypass Junction), and in an intermediate location between source and the relevant sensitive exposure
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'residents of Havant Town Centre'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Yes, equivalent distance from North Side of A27 where AADT flow is similar, ca. 1.25km segment (between Havant & Emsworth Junctions)
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.35m height from the footpath surface.
Tube position avoids local point sources		**Yes**	Located adjacent to car park, but low turnover, no waiting / idling permitted on premises for school pickup, and at a distance of around 2m from closest parked vehicles. Considered low-to-negligible impact.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	~32m to A27 EB on slip, ~40m to closest kerb to A2149 / A2030 / A27 junction.
Trend Assessment	-	-	*Relatively long-standing monitoring at this location. 2007-2016 R2 = 0.02; with a reasonable fluctuation around long term average (max deviation from 9 year average is +/- 20%). Inconsistent directionality (static trend), possibly reflecting range of meteorological conditions rather than local road traffic emissions - would require study to confirm.*
Other	-	-	
Objectively reassessed Classification	-	-	*Urban Centre*

Table F.18		Location 21 Park Road South (Solent Road)	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside*
Monitoring Target	-	-	*Congestion at principal / nodal road junction linking National Trunk Road Network, Retail Park & Supermarket areas, and Town Centre. Ped / Veh conflict. Peak Flow Impact. High AADT Flows. Adjacent Medical Facility (Mencap)*
Distance from Kerb	-	-	2.0m
Distance to Relevant Receptor	-	-	7.0m
Equivalent distance to Relevant Receptor	-	-	7.0m
Period of Available Data	-	-	*120 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	Yes	Members of the public have access, footpath, close to pedestrian refuge island & signal controlled crossing point. Targets B2149 Park Road South, and associated junction / congestion.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	Yes	H&S would apply to staff at Dolphin Court, but not to patients. Relatively narrowly representative.
Location is not within road carriageway(1)	Annex III A.2 (c)	Yes	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	Proxy	Located as close as practicable to the B2149, in an intermediate location between source and the relevant sensitive exposure. Relevant to target receptor by estimation only.
Area representative of exposure of the general population		Yes	N.B. Interpreting 'general population' as 'Patients and members of the public using the Mencap Building, and pupils of Bosmere Junior School Playing Fields'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	No	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	No	As above - broadly representative of equivalent distance from Park Road South Kerbside, but reference to results from Bulbeck Rd. (position no. 22), it is questionable whether this monitoring location is reliable for comparison to the NAQS objective, particularly at a fine resolution (e.g. at a pass / fail threshold)
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	Yes	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		Yes	
Tube height between 1.5m & 4.0m		Yes	Tube located at 3.0m height from the footpath surface.
Tube position avoids local point sources		No	Located adjacent to idling traffic at signal controlled junction. Monitor positioned at intermediate position between target source and target receptor, but may over-represent true emissions due to proximity bias toward source.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		No	<16m from signal controlled stop line for B2149 / Solent Road Junction, (>35K AADT Flow)
Trend Assessment	-	-	*Relatively long-standing monitoring at this location. 2007-2016 R2 = 0.47; with a reasonable degree of consistency and directionality (max deviation from 9 year average is +/- 17%). Location may be inherently stable with respect to vehicle driving characteristics, therefore representing a better position for assessing trends than might be the case where traffic flows are more erratic.*
Other	-	-	
Objectively reassessed Classification	-	-	*No Classification*

Table F.19		**Location 22 Park Road South (Bulbeck Road)**	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside*
Monitoring Target	-	-	*B2149 Park Road (Principal / Strategic Link), 'free-flowing' traffic, and RH turn conflicts for access to town centre multi-story car parking facilities. High AADT Flows. Adjacent AQ mitigated Residential units at 1st floor level.*
Distance from Kerb	-	-	2.0m
Distance to Relevant Receptor	-	-	50.0m
Equivalent distance to Relevant Receptor	-	-	7.0m
Period of Available Data	-	-	*120 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, footpath, adjacent to retail facilities, between two signal controlled crossing points. Targets B2149 Park Road South, and associated junction / congestion.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Located as close as practicable to the B2149, in an intermediate location between source and what would have been a relevant sensitive exposure were exposure mitigation not in place (Monitoring Commenced Prior to development) Relevant to target receptor(s) by estimation only.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'Visitors to Havant Town Centre' (as indicator benchmark of short term exposure assessment)
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	As above - broadly representative of equivalent distance from Park Road South Kerbside, but reference to results from Solent Rd. & Elm Park Road (position no. 21 & 23), reliability of position no. 22 for comparison to the NAQS objective at other locations is limited.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 3.1m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As Above.
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	~85m / 175m from Solent Road / Elm Lane Junctions (Respectively)
Trend Assessment	-	-	*~10 years monitoring at this location. 2007-2016 R2 = 0.27; with a relatively poor consistency data, and a broadly declining directionality (max deviation from 9 year average is over +/- 20%).*
Other	-	-	
Objectively reassessed Classification	-	-	*Roadside*

Table F.20		Location 23 Park Road South (Elm Lane)	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Kerbside*
Monitoring Target	-	-	*Congestion at principal / nodal road junction linking National Trunk Road Network, through traffic routing to areas East of Havant, Retail Park & Supermarket areas, & Town Centre. Ped / Veh conflict. Peak Flow Impact. Nodal junction to public transport (Bus Station). High AADT Flows. Adj. Residential Receptors.*
Distance from Kerb	-	-	0.25m
Distance to Relevant Receptor	-	-	3.75m
Equivalent distance to Relevant Receptor	-	-	2.25m
Period of Available Data	-	-	*120 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, footpath, close to pedestrian refuge island & common crossing point. Targets B2149 Park Road South and associated junction / congestion.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above - public location, closest receptor is residential at first floor level.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Located as close as practicable to the B2149, in an intermediate location between source and the relevant sensitive exposure. Relevant to target receptor by estimation only.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'i. Visitors to Havant Town Centre, and ii. residents of Cardinal House' (i. as indicator benchmark of short term exposure assessment, and ii. By estimation)
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**No**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**No**	As above
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)			
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 3.0m height from the footpath surface.
Tube position avoids local point sources		**No**	As above - positioned adj. to kerbside, in acceleration zone for all SB movements, emissions are likely to be proportionately higher relative to free-flowing emissions. Proximity (<0.5m kerb) limits dilution. (marginally offset by height).
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**No**	~10m from stop line of B2149 / Park Wy / Elm Ln Junction (~39K AADT)
Trend Assessment	-	-	*Relatively long-standing monitoring at this location. 2007-2016 R2 = 0.47; with a reasonable degree of consistency and directionality (max deviation from 9 year average is +/- 11%). Location may be inherently stable with respect to vehicle driving characteristics (consistently accelerating traffic cohort, signal controlled 'pulse' flow), therefore representing a better position for assessing trends than might be the case where traffic flows are more erratic.*
Other	-	-	
Objectively reassessed Classification	-	-	*No Classification*

Table F.21		Location 25 Stakes Road (Crookhorn)	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside*
Monitoring Target	-	-	*Congestion at nodal road junction on the local strategic road network (non-classified), linking the A3 in the west, to the A3(M), B2150, and B2149 in the East, and the B2177 & A2030 to the South. High AADT Flows (~25-30K), junction strategic to W'ville MDA. Selected as a worst case impact location for Adj Residential Receptors. Nearby non-residential sensitive receptors - School / Playing Field (Crookhorn Community School & Riverside Schools)*
Distance from Kerb	-	-	4.5m
Distance to Relevant Receptor	-	-	24.0m
Equivalent distance to Relevant Receptor	-	-	1.0m
Period of Available Data	-	-	*120 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, footpath on walking route to college facility, common crossing point & residential area. Targets Stakes Road Local Strategic Route and associated junction / congestion, and additional peak flow periods linked to educational timetable.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above - public location, closest line of sight receptor is residential
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Located in an intermediate location between source and relevant sensitive exposure to the North Side of Stakes Rd. Relevant to target receptor by estimation only.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'Crookhorn residents, and pupils of Crookhorn educational facilities)
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Representative of approximately 1.25km section of Stakes Road (West of Junction). Unlikely to be directly representative of nearby residential exposure on the North Side of Purbrook Way, (~ 50m East, +4-8K AADT, and EB acceleration zone)
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.55m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above - (see 'micro-environment' note, above)
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	Dependent on definition applied to "Road Junction". Tube is 35m from Give Way line to Stakes Hill Road / Crookhorn Lane junction
Trend Assessment	-	-	*Relatively long-standing monitoring at this location. 2007-2016 R2 = 0.38; superficially poor data consistency, however, removal of an apparently anomalous result in 2007 improves the R2 to >0.85 (very strong association, declining trend). Max deviation from 9 year average is +/- 18.5%), but the strong declining trend (-3.9% p.a. '08-'16) may explain this (as opposed to the wide variation being due to erratic / widely fluctuating data).*
Other	-	-	
Objectively reassessed Classification	-	-	*Roadside*

Table F.22		Location 26 Ladybridge Road (Purbrook)	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside*
Monitoring Target	-	-	*Congestion at nodal road junction on the National strategic road network (A3). High AADT Flows (~Junction flow 35K), and strategic junction to W'ville MDA (Southern Access).*
Distance from Kerb	-	-	2.0m
Distance to Relevant Receptor	-	-	35.0m
Equivalent distance to Relevant Receptor	-	-	0.25m
Period of Available Data	-	-	*120 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, footpath near local shopping facilities. Targets A3 London Road strategic route and associated junction / congestion.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Located at road junction where highest concentrations likely to occur. No immediately proximal relevant exposure. Relevant to receptors by estimation only, as both a lateral and 'distance-from-source' proxy.
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'residents of Widley & Purbrook'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Broadly representative of around 3.0km segment of the A3 London Road (North of Ladybridge Road of Junction). Concentrations at location no. 8 appear materially different from no. 26, either representing the influence of the bus stop location (of position no. 8) an imbalance in NB/SB flows (asymmetric weighting of AADT flow, or asymmetric propensity for congestion).
Tube positioned with min. 270° unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.65m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above - (see 'micro-environment' note, above)
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**No**	Located <5m from A3 / A3 / Stakes Road Junction (~35K AADT flow)
Trend Assessment	-	-	*Relatively long-standing monitoring at this location. 2007-2016 R2 = 0.21; poor data consistency, probably owing to the influence of the junction (irregular periods & duration of congested conditions). Max deviation from 9 year average is +/- 16%), with a moderate declining trend (-0.9% p.a. '08-'16).*
Other	-	-	
Objectively reassessed Classification	-	-	*No Classification*

Table F.23		Location W10 Compton Court (New Rd. Havant)	
Requirement	Ref:	Met?	Assessment Notes
Site Type (as reported in ASR2017)	-	-	*Roadside*
Monitoring Target	-	-	*Relevant exposure adjacent to measured kerbside exceedance at New Road (B2149), subject to moderate AADT Flows (~18K) but frequent congestion. Also used to sense check applicability of FOWD calculations to local conditions.*
Distance from Kerb	-	-	12.5m
Distance to Relevant Receptor	-	-	0.0m
Equivalent distance to Relevant Receptor	-	-	0.0m
Period of Available Data	-	-	*72 months*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	"Public" being generally limited to local residents of the block - though tube is located in an unrestricted area.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Mounted on a residential building.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**No**	Originally located between a kerbside measured exceedance (of the NO_2 NAQS Objective), and nearest (line of sight, down-diffusion-gradient) relevant receptor. Kerbside position was at road junction where high concentrations were likely, and at a location where college students typically congregate (at crossing / bus stop). AADT flow on the B2149 New Road is est.'d* to be around 60% of that estimated on the B2149 Park Road North. Receptors adjacent to the Park Road North segment of the B2149 are generally spaced at a greater distance from the kerbside; however some receptors are present at equivalent distance from the kerbside (@ around 12.25m) to the roundabout / junction carriageway - arguably 'more likely' to represent worst case exposure.
Area representative of exposure of the general population		**Yes**	
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Unlikely to represent a micro-environment owing to the width of the road, height / massing / building line of property fronting London Road. Positioned 'downstream' of junction with respect to NB traffic, and at the foot of an inclined section of the A3. May be subject to locally elevated levels due to acceleration away from junction. Tube overhung by trees, though substantially taller canopy than the lamp column upon which it is mounted. Proximity to road junction limits direct representativeness to other locations, but as a worst case, is representative of (likely to be greater than) concentrations over an approx. 3.0km section
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Broadly representative of residential exposure on New Rd. East of the West St Level X-in, and West of the Park Road North Junction (ca. 750m)
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing tube (RW downspout), held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**No**	Tube approx. 200mm from building façade.
Tube height between 1.5m & 4.0m		**Yes**	Tube located at 2.35m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above - (see 'micro-environment' note, above)
Tube position at least 25m from busy junction(5) , no more than 10m from the line of free-flowing traffic on a busy road		**Yes**	Depends on junction definition, but ca. 70m from kerbside (limit of free flowing traffic) at nearest road junction.
Trend Assessment	-	-	*Relatively short monitoring at this location. 2012-2016 R2 = 0.62; reasonably consistent date - much stronger trends identified in previous years. Max deviation from 5 year average is +/- 16%), with a strong declining trend (-3.8% p.a. '12-'16).*
Other	-	-	
Objectively reassessed Classification	-	-	*Roadside*

Table F.24		**Location 19 (C) - Langstone Rd. East**	
Requirement	Ref:	Met?	Assessment Notes
Site Type	-	**-**	*Roadside*
Monitoring Target	-	**-**	*Worst Case Residential Exposure East Side of Langstone Road, Close Havant Bypass Junction, known congested route, key transport link to H.I; Ensuring that results can be regarded as representative of ambient, and nearest residential receptors.*
Distance from Kerb	-	-	*3.75m*
Tube Height			*2.5m*
Distance to Relevant Receptor	-	-	*21.0m*
Equivalent distance to Relevant Receptor	-		*3.75m*
Period of Available Data	-	**-**	*N/A*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, footpath on route to town centre footway link. Adjacent public Bus Stop, residential property adjacent.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Proxy**	Location to be positioned as close as reasonably practicable to a busy road junction (exceeding at the kerbside) and for measurement to be considered representative of ambient. Not within building line, so not directly representative of annual mean exposures at relevant locations. Measurement method not capable of sufficient resolution for application to an averaging period relevant to the public exposure at the point of point of measurement (i.e. hourly). Relevant to target receptor(s) by estimation only. Suitable for comparison to hourly objective by benchmarking only.
Area representative of exposure of the general population		**Yes**	Interpreting 'general population' to mean 'residents of Regents Court & Woodbury Avenue)
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Closest Mature Tree @ approx. 5m. Sample located at mid-point between kerbside (carriageway running surface) and building line, adjacent to a minor junction. SB RH turn obstruction is possible at Xyratex / Havant International access road, but this represents the furthest one of 3 SB lanes on this segment of the A3023. Sample located 40 from merging zone (remaining two SB lanes combining to one). Free flowing conditions anticipated on Langstone Road at monitoring point.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	At an equivalent distance from the East side of the A3023 carriageway; should be broadly representative of >1km segment, broadly from A27 junction to Langstone Bridge.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube to be located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	21m from nearest building.
Tube position between 1.5m & 4.0m height		**Yes**	Tube to be located at approximately 2.5m height from the footpath surface.
Tube position avoids local point sources		**Yes**	Deceleration zone for SB LH turn. WB traffic exiting Woodbury & waiting at give way will be located approx. 10m from monitor. Nearest residential building ~20m.
Tube position at least 25m from busy junction(5), no more than 10m from the line of free-flowing traffic on a busy road(5)		**Yes**	Located ~130m from A2149/A3023/A27 junction give-way lines
Trend Assessment	-	**-**	*N/A*
Other	-	**-**	*N/A*

Table F.25		**Location 27 Havant Precinct**	
Requirement	Ref:	Met?	Assessment Notes
Site Type	-	**-**	*Urban Background*
Monitoring Target	-	-	*General Exposure in Havant Town Centre*
Distance from Kerb (of nearest busy Road) [Nearest Road]	-	-	82m [50m]
Tube Height	-	**-**	*2.5m*
Distance to Relevant Receptor	-	-	71m
Equivalent distance to Relevant Receptor	-	-	0.0m
Period of Available Data	-	**-**	*N/A*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access, pedestrianised retail area. Location does not target any specific road traffic source, background site for sense check of NETCEN/DEFRA estimates and for long-term trends
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	Public Realm Monitoring
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Pedestrianised Area
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Located as close as reasonably practicable to a busy road junction (exceeding at the kerbside) and for measurement to be considered representative of ambient
Area representative of exposure of the general population		**Yes**	N.B. Interpreting 'general population' as 'visitors to Havant Town Centre'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	Pedestrianised Frontage ca. 150m
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	Non-Targeted Nature of Monitoring Location makes it broadly applicable to (representative of-) town centre locations distanced from principle road traffic sources.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube to be located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube position between 1.5m & 4.0m height		**Yes**	Tube to be located at ~2.5m height from the footpath surface.
Tube position avoids local point sources		**Yes**	
Tube position at least 25m from busy junction(5), no more than 10m from the line of free-flowing traffic on a busy road(5)		**Yes**	>55m to Havant Bus Station, >65m to Havant Multi-Storey, >55m to Meridian Centre Car Park
Trend Assessment	-	**-**	*N/A*
Other	-	**-**	*N/A*

Table F.26		**Location 28 Park Rd. South (West Street)**	
Requirement	Ref:	Met?	Assessment Notes
Site Type	-	-	*Roadside (Urban Centre)*
Monitoring Target	-	-	*General Ambient Air Quality in vicinity of the B2149 Park Road (North/South) transport corridor, Havant Town Centre. Specifically aiming to represent 100m segment of non-junction adjacent PRS S of Elm Ln. (i.e. Cardinal House)*
Distance from Kerb	-	-	4.75m
Tube Height	-	-	*2.75m*
Distance to Relevant Receptor	-	-	28.0m
Equivalent distance to Relevant Receptor	-	-	-2.0m
Period of Available Data	-	-	*N/A*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath, shopping area). Location is convenient & point of measurement which should be representative of roadside conditions on the East side of PRS. Position is further from carriageway than building line (of closest buildings used for permanent habitation). Positioned away from building to avoid building material and building corner turbulence, for most representative ambient proximal to this principal route traffic emissions source.
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	As above.
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Within the limits of the highway, but not within the vehicular running surface.
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Location is adj. B2149 Park Road South (AADT flow ca. 26K). Intended to measure worst case roadside exposure in Havant Centre. Position is as closely as possible representative of the building line adopted for East side of the route. Relevant exposure represented by 1st floor residential. As with the decommissioned position no. 23 (too close to Elm Ln, junction), this position is within an acceleration zone for SB traffic on PRS existing signal controlled Pedestrian Crossing^
Area representative of exposure of the general population		**Yes**	Location is a 'worst case' ambient adjacent to a principal road, down-prevailing-wind of source / other local sources (e.g. Solent Rd.), in a position broadly representative the building line.
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**Yes**	No overhangs, No trees. ~ 4-5m from kerb .
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	As above.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)		**Yes**	As above.
Tube position between 1.5m & 4.0m height		**Yes**	Tube to be located at around 2.7m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above. Avoiding kerbside positioning is likely to mitigate the 'direct' intake of emissions. Adjacent fast food restaurant could represent additional source, ensure >5m from outlet when positioning tube.
Tube position at least 25m from busy junction(5), no more than 10m from the line of free-flowing traffic on a busy road(5)		**Unclear**	~85m from Park Road N / Park Road S / Elm Lane / Park Wy. Junction; 160m From Park Rd. S / Solent Rd. Junction. Subordinate routes ignored. [^ - if we interpret PRS / West St / PRS Ped X-ing as a signal controlled stop/start junction, measurements from this position should not be regarded as being directly comparable to NAQS objectives]. Location is unrepresentative of 'free-flowing traffic, but free flowing traffic does not characterise this section of the B2149. *Caution defining exceedance from this point.* Note West St. Junction is on the opposite side of the road, and it's give way line is 25m from the anticipated tube position.
Trend Assessment	-	-	*N/A*
Other	-	-	*N/A*

Table F.27		**Location 29 Orchard Rd.**	
Requirement	Ref:	Met?	Assessment Notes
Site Type	-	**-**	***(NTR Adjacent) Suburban***
Monitoring Target	-	-	***General Ambient Air Quality in the vicinity of the A27 Nat. Trunk Road, as a better 'worst case' urban centre / background adjacent to free-flowing traffic on the main carriageway***
Distance from Kerb (of nearest busy Road) [Nearest Road]	-	-	**31m [1.5m]**
Tube Height	-	**-**	***2.5m***
Distance to Relevant Receptor	-	-	**5.7m**
Equivalent distance to Relevant Receptor	-	-	**-9.7m**
Period of Available Data	-	**-**	**-**
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access to Regents Court, but being a cul-de-sac, the road serves only residents of no's. 43-52
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (b)	**Yes**	
Location is not within road carriageway(1)	Annex III A.2 (c)	**Yes**	Adjacent to footpath
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III B.1 (a)	**Yes**	Preferable to position no. 13, closest convenient monitoring position to assess worst case residential adjacent to A27 in a down-wind orientation.
Area representative of exposure of the general population		**Yes**	
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m	Annex III B.1 (b)	**(Yes)**	Yes in respect of topographic features that may influence air flow. Adjacent to residential driveway - depends upon occupant behaviour as a local source - it is not anticipated that idling will significantly influence results, but potential exists.
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (f)	**Yes**	
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III C	**Yes**	
Tube mounted >0.5m from nearest building(4)		**Yes**	
Tube position between 1.5m & 4.0m height		**Yes**	
Tube position avoids local point sources		**(Yes)**	See above Re: Residential parking (warming of engine)
Tube position at least 25m from busy junction(5), no more than 10m from the line of free-flowing traffic on a busy road(5)		**Yes**	
Trend Assessment	-	**-**	
Other	-	**-**	

Table F.28		**Location 30 St. Peters Square**	
Requirement	Ref:	Met?	Assessment Notes
Site Type	-	**-**	*Urban Centre*
Monitoring Target	-	-	*General Exposure in Emsworth Town Centre*
Distance from Kerb	-	-	2.75m
Tube Height	-	-	2.7m
Distance to Relevant Receptor	-	-	0m
Equivalent distance to Relevant Receptor	-	-	0m
Period of Available Data	-	**-**	*N/A*
Public access to monitoring location, or at location of fixed habitation	Annex III A.2 (a)	**Yes**	Members of the public have access (public footpath, shopping area, bus stops, cafe adjacent). Location does not target any specific road traffic source, background site for sense check of NETCEN/DEFRA estimates and for long-term trends
Not a location where Health & Safety at Work provisions apply	Annex III A.2 (a)	**Yes**	Public Realm Monitoring
Location is not within road carriageway(1)	Annex III A.2 (b)	**Yes**	On / Within footpath
Area where highest concentrations occur, where the population is likely to be exposed over an averaging period applicable to the air quality standard.	Annex III A.2 (c)	**Yes**	Location is central, within circulation roads around central island, subject to frequent traffic movements, and high turnover parking / manouevering vehicle & pedestrian conflicts with through traffic.
Area representative of exposure of the general population	Annex III B.1 (a)	**Yes**	N.B. Interpreting 'general population' as 'visitors to Emsworth Town Centre'
Sampling location avoids 'micro-environment'(2), and is representative of a street segment of at least 100m		**Yes**	No overhangs, No trees. ~ 2.75m from roadside. Around 4.5m from parking spaces. Positioned on freestanding pole >1m from nearest structure
Sampling location representative of similar locations not in the immediate vicinity	Annex III B.1 (b)	**Yes**	Non-Targeted Nature of Monitoring Location makes it broadly applicable to (representitive of-) town centre locations distanced from principle road traffic sources.
Tube positioned with min. 270º unrestricted arc free of obstructions that might affect air flow(3)	Annex III B.1 (f)	**Yes**	Tube is located on a free-standing pole, held 100mm from the pole surface.
Tube mounted >0.5m from nearest building(4)	Annex III C	**Yes**	As above.
Tube position between 1.5m & 4.0m height		**Yes**	Tube to be located at around 2.7m height from the footpath surface.
Tube position avoids local point sources		**Yes**	As above.
Tube position at least 25m from busy junction(5), no more than 10m from the line of free-flowing traffic on a busy road(5)		**Yes**	
Trend Assessment		**-**	*N/A*
Other	-	**-**	*N/A*

Table F.29– General Strategy for NO2 Monitoring, and summary of proposed changes (including rationale)			
Aim	**Notes**	**Conclusions/Options**	**Status**
1) Decommission all monitoring locations which are not fully compliant with site classification criteria, or with mandatory directive monitoring location criteria for consideration as 'ambient'	• Tube Position no's 9, 21, 23 & 26 are not classifiable as they fail the requirement to be at least 25m from a major road junction. By definition, monitoring data from non-classifiable locations is not directly comparable to the ambient objective standards.	**Cease Monitoring:** i) Park Road South Solent Road (21), ii) Park Road South Elm Lane (23), iii) London Road Waterlooville (9), and iv) Ladybridge Road (26)	Completed / Implemented
2) Undertake Concurrent Monitoring in the vicinity of tube no. 19B to verify assessment put forward in the 2017 ASR (micro-env.), and replace 19B with more representative location.	• Assessed position 19C on corner of A3023 / Woodbury for possible permanent / long term site. • No suitable street furniture exists upon which to mount a temporary / short-term tube position for the purpose of verifying 19B as unrepresentative. Closest residences are terraced, with no rear access possible without entering dwelling. No suitable street furniture at property frontage. • Tube assessed as 19D (Mounting on property frontage, at regents court). Boiler flue outlets to front, within 5m of all potential mounting positions • Alternative position 19D assessed (Public realm). Not ideal, but useful for context • Alternative Permanent position 19E assessed	i) Establish new tube position on corner of Woodbury immediately. ii) write to occupants of no's 9-11 Regents Court seeking permission to site a tube short term (18 months max.) iii) Establish alternative Monitoring location at roadside of A3023 (East side) for comparative purposes iv) Continue to monitor unrepresentative position 19B in the interests of transparency. v) Review results at 2019 ASR, select representative permanent location, decommission all interims.	i) - iv) Completed / Implemented [v) awaiting]
3) Establish essentially permanent Urban monitoring within all principal urban centres, generally indicative of public exposure.	• Waterlooville position 18 already in place. Only negative siting criteria result is inherent in all background monitoring (i.e. not targeting highest concentrations per-se). Relocation would enhance value of position in that it would represent a worst case Urban background location, but this would break data continuity with respect to trend tracking. R2 poor at this location, so loss may be negligible.	Options – i) Retain existing, for purpose of identifying an emerging pattern from static trend. *Rejected.* ii) Move 18 to Northern end of Ped Frontage, to ensure 'worst case B/G Conditions are being monitored. *Accepted* iii) Decommission the B/G site in favour of an Urb. Centre location, which could be marginally (~5m) closer to the A3 than would be an urban B/G site.] *Dismissed,* on basis that it has few practical benefits over option ii).	Not implemented to date
	• Havant pedestrianised centre - not previously monitored. Meeting all relevant criteria is possible if mounted at the Western End of the pedestrianised frontage on West St, would represent 'highest possible typical / ambient conditions (for area)'.	Site new tube on Western end of the pedestrianised West	Completed / Implemented

Table F.29 Cont'd…			
3) Establish essentially permanent Urban monitoring within all principal urban centres, generally indicative of public exposure. [Continued from previous page]	• One location is viable within Emsworth TC that would comply with the Urb B/G requirements (al-fresco dining, Greenhouse Café), however this may be a location disproportionately affected by smoking activity, and is a location likely to be subject to 'dead air' (being a ~6m wide courtyard between up to 2.5 storey buildings); location likely to represent a 'micro-climate'. Dispersion of cooking fumes from the cafe may also be an issue • Frobisher Gardens could comply as an urban B/G site if we regarded the cul-de-sac not to be a 'road'. However, up to 19 properties are served, and the NatWest Bank has reserved parking spaces here, so road is a de-facto highway (shared access road) • An Urban Centre site is possible at St. Peters Square, Emsworth, which would meet all requirements, other than being 10m from any road / 5m from idling parked cars (regarding waiting at a give way as parked / idling)	Site new tube in Emsworth Urban Centre Location; St. Peters Sq.. Background site not viable.	Completed / Implemented
4) Decommission or remedy any sub-optimal sample location conditions (relative to the 2008/50/EC requirements)	**Compliance with Annex III B.1 (a):** • Position no's 5, 6B, 9, 13, 14, 15, 18, 19B, W10 fail the requirement to represent the *highest concentrations to which the (local) population is likely to be exposed* • alternative locations to W10 either fail the Annex IIIC 'proximity to junction' test, are located at a greater distance from the kerbside, or would be impractical to monitor (locations not publicly accessible). • Positions 9 & 19B also fail other criteria [B.1.b), B.1.f) & C] • Position no's 6B,9,19B fail the requirement to be *representative of relevant exposure within the general (local) population* • Positions 6B & 19B fail both of the above requirements of B.1.a)	i) 5; Propose Decommission ii) 6B; Propose Decommission iii) 13; Propose Reposition to Orchard Road (target A27) iv) 14; Propose retain for trend monitoring purposes v) 15; Propose decommission, and re-locate to alternative site vi) 18; Propose reposition to Northern end of Ped. Frontage vii) 19B; Propose Decommission following period of concurrent monitoring (9-18 months) viii) W10; Conclude retain	i)-v) & viii) implemented vi) not implemented to date vii) awaiting data review
	Compliance with Annex III B.1 (b): • Position no's 5, 9, 19B, 21 & 23 fail the requirement to *avoid monitoring a local micro-environment* and to *be representative of a road segment not less than 100m in length.*	All positions addressed above	Implemented under Aim 1)

Table F.29 Cont'd…			
4) Decommission or remedy any sub-optimal sample location conditions (relative to the 2008/50/EC requirements) [Continued from previous page]	**Compliance with Annex III B.1 (f):** • Position no's 1B, 7B, 9, 12, 19B, 21, 22 & 23 fail the requirement to *be representative of similar locations not in the immediate vicinity.* • Neither position 12B or 1B have particular value v/v trends, 3 yr. average are comparable. Retention of both positions is unnecessarily duplication of sampling effort. • Position 7B is within zone modelled to be impacted by consented STOR development. Retention helpful for impact quantification. • Position 22 is one of few Park Road South locations >25m from busy junctions.	All positions addressed above, except 1B, 12, 7B and 22. ix) Propose retain 12B, helpful to establish differences in east side / west side due to traffic flow imbalance &/or effect of prevailing wind; x) Propose Retain 7B to monitor impact of industrial NO2 Source xi) Propose Retain 22 as general roadside exposures, and for continuity transitioning to new monitoring locations. Reconsider need in 24 months.	ix) - xi) implemented
	Compliance with Annex III C: • Position no's W10, 9, 19B, 21, 23 & 26 fail at least one Annex IIIC Requirement	All positions addressed above	N/A
5) Establish new monitoring positions, targeting locations not previously monitored, using objective criteria & clearly defined monitoring aims.	**General Principals (select locations;)** • Where relevant exposure is within 7.5m of kerbside, • Where roads are anecdotally busy, or flows >10K AADT • To establish an AQ baseline ahead of a significant anticipated change in traffic flows or emissions • That are fully compliant with the monitoring requirements, avoiding where possible 'proxy' locations, to ensure that measured result is broadly applicable without requiring FOWD estimates to be made.	**Potential Target Locations:** • Emsworth STR1 Allocation (neither B2148 nor Denvilles level X-ing previously considered) • Leigh Park; large residential area on busy route • West Leigh residential area, down-prev.-wind of B2149, Industry to the East - relatively high B/G estimate. • Glebe Park / Bedhampton Hill, residents complain of cut through / rat-run; large development East College Rd. may exacerbate. • Residential area East of Farlington (Fortunes Wy / Penk Rdg. / Auriol Drive); high B/G estimate, down-prevailing wind of Portsmouth, A27 & A2030 • A3 Maurepas Way Waterlooville (Adjacent residential & surgery), previously modelled, not 'ground truthed'. • A3 Widley (Dwellings adjacent) • B2150 Hambledon Road Waterlooville - >35K AADT, Industrial, retail & leisure uses nearby, significant residential development to the West. • Wecock residential area • Lovedean residential area	N/A

Table F.29 Cont'd…			
6) Establish priority list for 'roving monitoring tubes', to be deployed for 3-6 month periods, **Aim is to broaden baseline knowledge of AQ within Havant Borough without operating a large number of tubes on a regular basis**	**General Principals:** • respond to complaints / local concerns about air pollution in specific locations. • to ensure (successive) coverage of all residential areas which have a distinct local identity, to better inform local residents & the planning process • site assessment / characterisation criteria to be considered relative to the geographic location (i.e. when considering 'highest concentrations likely to be experienced') • Follow deployment principles outlined in 5) above.	**Potential Target Locations** • Hart Plain (Wecock, Lovedean) • Purbrook (Crookhorn, Portsdown, Widley) • Bedhampton (Farlington), • St. Faiths (Denvilles only) • Emsworth (Southleigh) - [likely to be covered under 5) above] • Warren Park • Battins (Stockheath / Thicket) • West Leigh (Bartons)	N/A
7) Operate a coherent monitoring position numbering policy	• It is desirable not to re-use of numbers, to avoid confusion in the event that repeat monitoring is necessary in future • Positions intended to be short term should be identified with a "T" prefix (a separate sequential list may be operated for "T" positions) • Where it is necessary to reposition a tube, but the tube remains representative of the same road segment, it should retain it's original number, but gain a sequential alphabetical prefix for each subsequent re-position.	• Repositioned tube numbering convention could also apply for grouped positions aiming to represent the same road segment.	Adopted

Appendix G: Hampshire County Council Air Quality in Schools Project

G.1 Hampshire County Schools Air Quality Investigation (Havant Borough, 2018); Phase 1 Summary Report & Results

G.2 Bosmere Junior School Air Quality Campaign Plan, 2018H.2 Bosmere Junior School Air Quality Campaign Plan, 2018

G.3 Hart Plain Junior School Air Quality Campaign Plan, 2018

G.4 Trosnant Federation of Schools Air Quality Campaign Plan, 2018

G.1 Hampshire County Schools Air Quality Investigation (Havant Borough, 2018); Phase 1 Summary Report & Results

A report outlining maps showing the location of diffusion tubes and the levels of nitrogen dioxide measured in the Havant Borough Schools Air Quality Investigation, 2018.

This report shows where diffusion tubes were located to measure the average level of nitrogen dioxide over a month. The EU **annual** mean air quality standard for NO_2 is 40 µg/$m^{3.}$ Our results are for a **monthly** average so are not directly comparable to the statutory limit. However the results will indicate the following about air quality:

- Less than 30 µg/m^3 - good,
- 30-35 µg/m^3 – average
- 36-40 µg/m3 - risks exceeding annual standard
- More than 41 µg/m^3 - likely to exceed annual standard

All the results shown have been adjusted using a local bias adjustment factor of 0.92 and had the laboratory blank subtracted.

Blue results are for a sampling period that includes a school holiday and **green results** for a sampling period that covered only term time. I have taken into consideration the snow days in March.

Table of nitrogen dioxide results for Havant Borough Council Schools Spring 2018							
School	**Location**	**Date Tubes Deployed**	**Total number of days school days/ sampling period including half term break**	**Average level of nitrogen dioxide µg/m³**	**Date Tubes Deployed**	**Total number of school days/ sampling period over term time.**	**Average level of nitrogen dioxide µg/m³**
Barncroft Primary School	School Car Park	9/2/2018	10/25	**23.8**	6/3/2018	14/20	**26.1**
	By entrance to woodland area.			**20.2**			**11.2**
Bosmere Junior School	On fence by sandpit.	1/2/2018	16/33	**21.8**	6/3/2018	14/20	**26.6**
	On fence near school entrance.			**28.2**			**33.8**
Hart Plain Junior School	By Milton Road	31/1/2018	20/32	**21.9**	6/3/2018	14/20	**20.1**
	On back of school building.			**15.2**			**12.6**
Trosnant Junior School	In playing field at back of school	29/1/2018	15/28	**20.8**	26/2/2018	19/28	**19.1**
	Beside car park at entrance to school grounds.			**21.8**			**21.5**

Location of nitrogen dioxide diffusion tubes at Hart Plain Junior School, Waterlooville. Spring Term 2018

Diffusion tube placed 2.25m high and about 7.5m from Milton Road.

Feb: 21.9µgNO$_2$/m^3

Mar: 20.1µgNO$_2$/m^3

Diffusion tube placed 2.4m high.

Feb: 15.2µgNO$_2$/m^3

Mar: 12.6µgNO$_2$/m^3

Location of nitrogen dioxide diffusion tubes at Trosnant Junior School, Havant. Spring Term 2018

Diffusion tube placed 2.4m high and about 3.9m from road into school and 46m from Stockheath Lane.

Feb: 21.8µgNO_2/m^3

Mar: 21.5µgNO_2/m^3

Diffusion tube placed 2.25m high and about 95m from the school buildings.

Feb: 20.8 µgNO_2/m^3

Mar: 19.1µgNO_2/m^3

Location of nitrogen dioxide diffusion tubes at Bosmere Junior School, Havant. Spring Term 2018

Diffusion tube placed 1.94m high and about 25m from the slip road to A27.
Feb: 28.2µgNO_2/m^3

Mar: 33.8µgNO_2/m^3

Diffusion tube placed 1.97m high and about 84m from the B2149
Feb: 21.8µgNO_2/m^3

Mar: 26.6µgNO_2/m^3

Location of nitrogen dioxide diffusion tubes at Barncroft Primary School, Leigh Park. Spring Term 2018

Diffusion tube placed 2.41m high and about 6m from Park Lane.

Feb: 26.1µgNO_2/m^3

Mar: 23.8µgNO_2/m^3

Diffusion tube placed 2.07m high.

Feb: 11.2µgNO_2/m^3

Mar: 20.2µgNO_2/m^3

G.2 Bosmere Junior School Air Quality Campaign Plan, 2018

Air Quality

1. **Name of School**	**BOSMERE JUNIOR**
2. **Name of Team Leader:** **Position of Team leader at School**	**BRIAN SWAN** **SCHOOL GOVERNOR**

3. **What are the goals* of your air quality campaign* (*see Glossary at end of the form) and why?**
E.g. To get fewer cars driving to the school/college.

To increase the awareness of this growing issue.
To clean the air that we breathe.
Encourage more pupils to walk or walk and stride.
Reduce the number of cars in the vicinity of the school.
By reducing pollution this will have a positive on those who suffer from breathing complaints.
Highlight the benefits of walking e.g.: greater fitness levels.

4. **For how long and when will you run your campaign?**

We envisage running this over a two term period Winter/Summer

5. **Who will be your target audience* for your campaign?**

Air Quality

Parents, children car drivers and the general community.

6. **What actions* are you planning to do to make the air cleaner around your school**

Action	Responsibility	Timescale
Posters	[Removed]	Two terms
Open debate on the issue	[Removed]	One term
Switch that engine off!	[Removed]	Ongoing
Survey the parents	[Removed]	One term
Facebook campaign	[Removed]	One term

7. **What resources* will you need for your campaign? How will you get these things?**

   There may be a local business or company who might be interested in sponsoring or supporting your campaign?*

I.T.
Gather evidence to present to the children/parents.
Organise fund raising events to finance the project.
Contact local retailers both for sponsorship and support with a walk to work scheme.
Work with other schools in our cluster to create a wider awareness and work together on a strategy to tackle this increasing problem.
Walking to school stickers to identify the walkers.

8. **How will you measure the success of your campaign?**

   E.g. Measure change in number of cars that idle their engines outside school/college.

Organise a car survey both at the commencement and conclusion of the project, measure the drop in vehicles.

Publish our findings encourage feedback.

Number of children walking by the number of stickers issued.

Glossary

Actions	Things that you plan to do

Air Quality

Campaign	A set of actions or things that you plan to do with a common aim
Goal	Something that the team wants to succeed in doing
Resources	Things that you will need for your campaign and/or money to buy the things that you will need
Sponsoring	A local company may be happy to help you with your campaign by giving money, equipment, food, space for putting up posters or other help that you might need.
Target audience	People that you want to hear your messages and to change how they behave e.g. how they travel

Air Quality

Some ideas on how to plan an air quality campaign

Before you start, you could get your Air Quality (AQ) Team to consider:

A. What are the goals that you would like to achieve from your campaign based on your investigation's findings?

These could include:
- ***long term*** *e.g. to promote switching to electric cars*
- ***medium term*** *e.g. to get more people cycling*
- ***short term*** *e.g. to get families to take different, cleaner routes to school/college*

B. Who would have to be persuaded to change their behaviour to meet these goals?

For instance, the Government, school/college staff, parents or pupils?

C. Would it be helpful for the team to carry out more transport related research to obtain some useful information for planning the campaign?

For example the team could carry out traffic surveys or interview passers-by for their opinion on air pollution.

D. What will be the most effective way to influence, inform or encourage others? :
    - What are your chosen messages?
    - Who is your target audience/s?
    - What type of message will appeal to this group of people? e.g. 'cool', fun, important, interesting, facts/stories/pictures?
    - How will you spread the messages – Power Point presentations, newsletter items, article for local press, leaflets, events, posters?
    - Would offering incentives motivate your target audience?
    - Signing up to initiatives led by other organisations?

E. How will you measure the success of your campaign plan?

By referring to the school's/college's Modeshift STARS online travel planning scheme (see https://www.modeshiftstars.org/) you will be able to see how the AQ campaign affects how staff and students are travelling to your school/college. In addition, by recording all the work that the AQ team does for the AQ project will also contribute to gaining national STARS awards.

Air Quality

Some examples of possible goals and useful links for more information for planning your air quality campaign

To increase active travel at your school/college:

The AQ team could encourage families to travel more actively to improve their health and environment. Leaving cars at home will reduce air pollution as one in five cars on the road during rush hour is taking children to school/college[1].

Encourage walking.

Does your primary school have Junior Road Safety Officers (JRSOs) who could be trained by Hampshire County Council's (HCC) Road Safety Team to promote safe travel to school? Has your secondary school participated in the HCC's Streets Ahead campaign on road safety? More information may be found at http://www3.hants.gov.uk/jrso.

The charity Living Streets campaigns to increase walking and offers school/colleges its Walk Once a Week (WOW) scheme and Free Your Feet campaign to motivate pupils to walk more. See https://myjourneyhampshire.com/education/primary-schools/living-streets-primary and https://myjourneyhampshire.com/education/secondary-schools/living-streets-secondary for more information.

Encourage cycling

The charity Sustrans developed 'Bike It' that helps children get fit and healthy by teaching them the skills to cycle and scoot safely. They offer useful free online resources about active travel which may be found https://myjourneyhampshire.com/bike-it-primary.

Are there any annual or ongoing events or challenges that the AQ Team could link to their campaign with? These may provide useful resources and ideas for the AQ campaign. See https://myjourneyhampshire.com/events for more information about Hampshire travel related events.

Set up a Park & Stride (P&S) site

Finding a car park or an area with safe parking further away from school/college will enable pupils that need to drive to school or college to get some exercise by walking at least part way and reduce the congestion and air pollution immediately outside the school or college. Local supermarkets or pubs may be happy to allow parents to use their parking facilities at the start and end of the day. Be sure to ask their permission

[1] https://www.livingstreets.org.uk/media/1798/walk-to-school/college-with-living-streets-booklet.pdf

before promoting though!
You may find a guide to setting up a P&S at https://www.livingstreets.org.uk/media/2035/park-and-stride-print.pdf.
HCC can provide P&S maps to inform parents about the location of these sites.
Primary schools may download our Basil Bird trail that can be used to launch a new P&S site to families on https://myjourneyhampshire.com/sites/default/files/Basil%27s%20Primary%20School/college%20Clean%20Air%20Trail.pdf

To change the behaviour of families that drive to school/college:

Promote car sharing amongst staff and families

Run a 'no-idling' campaign

This could involve providing pledge cards, stickers or producing banners.

Encourage eco-driving

Drivers could be reminded to be eco-drivers by

- fully inflating car tyres so that they use less fuel,
- ensuring their vehicles are serviced at regular intervals,
- only starting their engines when they are ready to travel,
- turning their engines off when waiting or stuck in a traffic jam,
- driving smoothly to avoid rapid acceleration and heavy braking which both increase fuel consumption and air pollution,
- staying within the speed limit to use less fuel and
- driving less frequently to reduce pollution, particularly for journeys under 2km.

To help people to avoid exposure to air pollution:

Encourage families to choose cleaner routes to school/college

Encourage families to choose quieter routes to school/college that are further away from busy roads to reduce exposure to air pollution. HCC's Travel Planning Team can help you to produce maps to show routes with cleaner air to school/college. If you have to walk along a busy road, walking away from the kerb and closer to the buildings will reduce the air pollution that you'll breathe. It's likely to be safer too!

The Department for the Environment, Food and Rural Affairs (DEFRA) has developed a Daily Air Quality Index (DAQI) that describes the levels of air pollution present around the county, with 1 being low and 10 for high. DEFRA predicts the expected levels of air pollution for the next day and offers health advice in the form of recommended actions you may wish to take according to the air quality (see https://uk-air.defra.gov.uk/forecasting/). If you suffer from asthma or have breathing

problems you should avoid busy roads at rush hour on days when the conditions are right for high levels of pollution.

Southampton City Council and Eastleigh Borough Council also provide an app http://www.airalert.info/Hants/Default.aspx that can be downloaded onto phones and warns when air pollution levels are due to be high.

Introduce more plants to your school/college

Plant hedges or green screens to act as a barrier to air pollution from nearby roads.

Houseplants have been found to purify the air inside buildings by trapping and removing chemicals that are harmful to our health (see https://www.rhs.org.uk/advice/profile?PID=949 for more information).

To save energy at school/college and at home:

Switching on equipment only when its needed, setting thermostats at the lowest comfortable temperature within an average of 18°C and 21°C can reduce the carbon dioxide emitted which contributes to air pollution.

G.3 Hart Plain Junior School Air Quality Campaign Plan, 2018

Air Quality

1. Name of School/College:	Hart Plain Junior School
2. Name of Team Leader: Position of Team leader at School/College:	Mrs Sarah Fennell Class Teacher & Head of School Council
3. Names of team members:	[Removed]
	[Removed]
	[Removed]
	[Removed]
	[Removed]
	[Removed]
	[Removed]
	[Removed]
	[Removed]
	[Removed]

4. **What are the goals* of your air quality campaign* (*see Glossary at end of the form) and why?**
   E.g. To get fewer cars driving to the school/college.

Our main aim is to get more people to walk, scoot or cycle to school. We noticed that lots of people still drive to school, and hardly any children scoot or cycle.

5. **For how long and when will you run your campaign?**

We're going to run it throughout the second half of summer term.

Air Quality

6. **Who will be your target audience* for your campaign?**

We want to target all of the children of the school, plus parents.

7. **What actions* are you planning to do to make the air cleaner around your school/college?**

Action	Responsibility	Timescale
Put posters around the school encouraging people to leave their cars at home (scoot from the boot, park & stride, walk, scoot or cycle.	**School Council and JRSOs to make a put up.**	**Next 2 weeks.**
Have a fancy dress day where children can come to school dressed as brightly as possible. Give a prize for the two best dressed people at the end of the day.	**Mrs Fennell to advertise.**	**Have day in July – Summer fair day?**
Go on the playground after school to give more pledge cards out to try to get more returned (we only had two back).	**Mrs Fennell & JRSOs.**	**Up until end of June.**
Create a park and stride area – paint pebbles on Clean Air Day and arrange them in a chosen Park & Stride area.	**Mrs Fennell, JRSOs & School Council**	**National Clean Air Day (June)**
Interview members of the public to find out where they think a good Park & Stride area would be – parents and members of the general public.	**JRSOs & School Council**	**By the end of June.**

8. **What resources* will you need for your campaign? How will you get these things?**

There may be a local business or company who might be interested in sponsoring or supporting your campaign?*

Air Quality

We will need prizes to give out to the fancy dress competition winners. We will approach the local Co-op (over the road) and ask them to provide a little treat we can give to parents and children on the playground when they take a pledge card.

9. **How will you measure the success of your campaign?**

   E.g. Measure change in number of cars that idle their engines outside school/college.

We will complete a hands up survey next week to see how many people walk to school at the moment.
We will complete another survey in July to see if there has been a change.
Interview members of the public afterwards, to see how they feel the response has been – is their road clearer at key times of the day?

G.4 Trosnant Federation of Schools Air Quality Campaign Plan, 2018

Air Quality

1. Name of School/College:	Trosnant Federation of schools
2. Name of Team Leader: Position of Team leader at School/College:	Lead Clive Mulligan Head of School [Removed] Y6 Pupil leader [Removed] Y6 Pupil leader
3. Number of pupils in the team:	8 pupils

4. **What are the goals* of your air quality campaign* (*see Glossary at end of the form) and why?**
E.g. To get fewer cars driving to the school/college.

To know how air pollution is effecting the world and what could occur in the future if we do not make changes.

Pupils and parents to know what part they can play in reducing the amount of air pollution.

Increase the number of families who walk, ride or scoot to school.

To reduce the number of parents who sit in their cars with the engine running.

To support other schools and site users to reduce the amount of air pollution

5. **For how long and when will you run your campaign?**

A half term focus continuing in September as required

Air Quality

6. **Who will be your target audience* for your campaign?**

- **Pupils to be aware of the dangers of poor air quality and how to make a positive impact**
- **Parents and guardians to have information to enable to make positive choices.**

7. **What actions* are you planning to do to make the air cleaner around your school/college?**

Action	Responsibility	Timescale
Change-maker assembly 1 to introduce the issues with air pollution and how we can make a difference	Change-makers and CM	April 2018
Change-maker assembly 2 to re-visit the issues with air pollution. Focus on how dangerous things could be in the near future and how we can make a difference	Change-makers and CM	May 2018
Change makers to write a weekly paragraph for the schools' newsletter, the Friday flier.	Change-makers and CM	May 2018 onwards
Change makers to run a poster competition across KS2 that uses all the information shared via assemblies.	Change-makers	June 2018
Winning Posters to be displayed around school and near parking areas.	Change-makers	June 2018 onwards
Promote walk to school week and encourage to use bikes, scooters and Park and Walk initiatives across the warm summer months (and beyond).	Change-makers and CM	May 2018 onwards
To visit other site user (Nursery, Builders and the Infant School) to share the message and provide them	Change-makers	June 2018 onwards

with posters to display.		

8. **What resources* will you need for your campaign? How will you get these things?**

   There may be a local business or company who might be interested in sponsoring or supporting your campaign?*

Time out of class
ICT resources
Prizes for competition
Art resources
Time with SLT to write newsletters

9. **How will you measure the success of your campaign?**

   E.g. Measure change in number of cars that idle their engines outside school/college.

Identify the number of children taking part
Increase in knowledge of children and families

Newsletter
Reminding everyone about air pollution and idling cars
The competition
The benefits of walking to school better health, saving money better fitness study better
Park and Stride
Car sharing
Car free day
Saving energy

Appendix H: List of Cycle & Pedestrian Infrastructure Improvement Project List

Table H.1 – Pedestrian & Cycle Infrastructure Improvement Projects

Scheme Name (Ref)	Infrastructure	Organisations involved & Funding Source	Overview	Indicative Value (Ref; £K)	Status
Tournerbury Lane (9.1a) & St Marys Road (9.1.b) junction crossing improvements (Hayling Island)	Pedestrian	HBC, HCC	The speed at which southbound enters Tournerbury Lane as a result of junction configuration affects the ability of pedestrians to cross. There is also insufficient provision at St Marys Road at the junction. Crossing here is important for access to local schools by active modes of travel. Proposed to: • Use available s106 funds for junction realignment to tighten the radii at the Tournerbury Lane bellmouth to reduce turning speeds. • Undertake detailed design for a pedestrian refuge island at St Marys Road junction to improve safety. • Explore opportunities to secure implementation of St. Mary's Road improvements via s278 agreement in connection with development.	9.1a; 40 9.1b; 60	Resolved to: • Proceed to detailed design (9.1 a & 9.1b) • Implement 9.1a • 9.1b deferred
Elm Grove Crossing Upgrade (9.2b, North of Selsmore)	Pedestrian	HBC, HCC	Current rate of PIAs is around 3 x average, and the crossing is important for access to local schools by active modes of travel. • Implement a new Puffin crossing north of Hollow Lane and remove the existing Zebra crossing, to improve safety	9.2b; 60	Resolved to: • Commission detailed design (9.2b) • Reject 9.2a • Implement 9.2b
Upgrade of Bus Service Facilities, Mangham (9.3 alt)	Public Transport	HBC, HCC	Stops serving Mengham shops are among the busiest on Hayling Island, being important for local access to services, and for visitor & tourist access to the seafront. Proposed to: • Upgrade the specification of the bus stop to reflect it's status, to SEHRT BRT standard. • Remove Bus Lay-by to improve pedestrian circulation. • Create a 'bike hub' to facilitate access to this public transport node (and so the wider network via bus / rail stations in Havant-) by sustainable means • Consider provision of real-time bus service information (RTPI)	9.3; 45	Resolved to: • Reject 9.3 • Implement 9.3 alt • Hold on RTPI pending s106 negotiations
Upgrade Footpath (FP) 102 (9.4)	Pedestrian, Cycle	HBC, HCC	Important public right of way for access to services and for leisure, and for safe access to schools. Proposed; • Upgrade FP102 south of FP101, to Rails Lane • Upgrade Sections of Footway in Rails Lane to create a 3m off road shared cycle track • Signpost 'quiet road alternative routes' where footway upgrade is not feasible	9.4a; 3 9.4b; 3 9.4c; 34 9.4d; 85	• Funding approved to Implement • 9.4a-c medium term • 9.4d short-to-medium term delivery timeframe

Table H.1 Continued…					
Improved Pedestrian & Cycle Access to Schools (9.5)	Pedestrian, Cycle	HBC, HCC	Each of the four schools in the study area has a travel plan identifying opportunities for a modal shift from motor-car to walking & cycling, but progress has fallen below expectation. Both the quality of infrastructure and the safety of routes to schools are both considered to be significant contributory factors. Proposed; • Improve northern access to Mengham Junior School (FP101) • Minor improvements to FP88. • Encourage take-up of 'park and stride' etc. arrangements in association with input from the Safe Routes to School team.	9.5a; 50 9.5d; 2	Resolved to: • Proceed to detailed design (9.5a) • Implement 9.5a • Implement 9.5d deferred • No feasible improvements identified at Mengham Infants or Hayling College (9.5b,c)
Upgrade East/West Cycle Route (9.6)	Cycle	HBC, HCC	The existing east/west route (FP89 and FP521) is not well waymarked, and many local people remain unaware of its existence. A significant barrier to this route is the crossing of Manor Road (A3023, 40mph limit). For the purposes of the assessment, the route was divided in to 5 sections, and a sixth alternative (FP's 92, 93 & 94) was also assessed. Proposed; • Improve Churchyard Path due to volume of cyclists using route • Surfacing upgrades on Right of Way though Parkdean Holiday Park, to 2.5m all weather 'bound surface'. • Improve crossing at Manor Road, kerb alignment and markings to reduce approach speed improve safety to accommodated expected growth in usage. • Widen footway on Brights Lane, to create shared surface. • Complete rebuild of FP521 (Denhill Close. to Hayling Billy)	9.6a; 4 9.6b; 40 9.6c; 50 9.6d; 27 9.6e; 16	Resolved to: • Proceed with 9.6b • Proceed with 9.6a • Defer 9.6c, d • Assess Ecological Impact of Detailed designs in connection with 9.6e • Defer 9.6f
Crossing for Hayling Park and Beach Road (9.7)	Pedestrian, Cycle	HBC, HCC	Important crossing point for access to the West Town Shopping area, and leisure facility of Hayling Park. Also an important for access to local schools from new developments on Station Road by active modes of travel. • Two Beach Road crossing options considered, with shared surfacing (9.7a) • Improve Links to residential areas through Hayling Park (9.7b)	9.7b; 60	Resolved to: • Partial Implementation of 9.7b • Defer 9.7a (to follow improvements on St. Mary's Rd.)
St Margarets Road (9.8)	Pedestrian, Cycle	HBC, HCC	St. Margarets Road connects to Mengham Lane for onward travel to the sea front, shops & community centre, and for services to the mainland. However, the connection is via a section of private road which lacks a footway and adequate lighting. Proposed: • Establish a public right of way on private section • Create shared-use footway to join adopted routes on St Leonards Ave. & St. Margarets Road.	9.8; 35	Resolved to: • Commence PRoW Legal Proceedings

Table H.1 Continued …					
Mill Rythe to Copse Lane (9.9)	Pedestrian, Cycle	HBC, HCC, Cycle Hayling, Natural England	Footway on the east side of Havant Road is narrow at this section (<1m), and despite a recent reduction in speed limit on the A3023, a perception persists that driving style remains aggressive, and that traffic passes too close to pedestrians at 'high' speed. Cyclists use the footway in preference to the busy road (19000 AADT), increasing safety risk. An Informal permissive route established to allow cyclists to travel off-road in safety. Proposed: • Complete the off-road permissive route as far north as Mill Rythe Lane • Investigate possibility of upgrading the England Coast Path (once open) to allow use by cyclists.	[Not Costed]	Long-Term delivery Timeframe. Resolved to: • Work with Natural England to ensure co-benefits of the ECP
Sea Front Hayling Island; Solent Way to A3023. (No Ref)	Cycle	HCC, HBC, Lockhams Construction Ltd	• This project aims complete a missing link within the existing cycle network, to provide continuous off-road cycle use along the sea front area of Hayling Island. • Footway widening into the carriageway on the south side of Sea Front is planned between the junctions with Solent Drive and A3023 Beach Road. This will create a shared use footway/cycleway linking to the existing shared use route along the sea front. Resurfacing of existing footway adjacent to match the new footway. • The existing Zebra crossing will be upgraded to a Tiger crossing. • Planned works have been suspended due to issues beyond the Council's control. • Quotations are being sought from alternative contractors to complete the project as soon as possible.	[No Cost Info]	• Detailed design completed, • funding allocated. • Delivery Delayed.
Barncroft Way and New Road (No Ref)	Pedestrian & Cycle	HCC, HBC, Rocon Contractors Ltd.	The Bedhampton to Havant pedestrian and cycle improvements will help enhance connectivity within the local, and wider, cycle network for Havant and Bedhampton. The new route will join an existing shared use path on Park Road North/South and connect via NCN22 and the town centre with the Hermitage Stream Cycle path. This link will further enhance connectivity by active travel modes between the local schools and the joined Havant South downs colleges	[No Cost Info]	• Works Completed (2018)
Langstone Road Cycle Link - Phase 3; Technology Park Access to NCR22	Cycle	Highways England, HCC, HBC	A third stage of the Langstone Road project will infill the gap between the Langstone Technology Park access road and National Cycle Route 22 at the A27 subway by converting the footway alongside Langstone Road and the A27 slip road into a shared cycle track, which will complete the staged build of this important cycle network link.	[No Cost Info]	• Under discussion. • Funding not secured, detailed design not yet complete.

Table H.1 Continued …					
Barncroft Way and New Road, pedestrian and cycle improvements	Pedestrian & Cycle	HCC, Rocon Contractors Ltd.	The new route will join an existing shared use path on Park Road North/South, and will further enhance connectivity within the local-, and wider-, cycle network for Havant and Bedhampton; increasing opportunities to access local schools and the joined Havant South downs colleges by active modes of travel. Proposed; • Footway Widening • Upgrade of Pelican Crossing to Toucan Crossing • Create shared use path between Havant College Entrance to Hermitage Stream Cycleway Link.	[No Cost Info]	• Funding Approved • Contractors Appointed 2018
Harts Farm Way/Southmoor Lane Junction Improvements	Road Vehicles, Pedestrians, Cycle	HCC, HBC, Colas	Junction congestion occurs on the Brockhampton Road approach during on the morning peak, and along Southmoor Lane in the evening peak, with significant queuing. Proposed: • Replace existing mini roundabout with 'full' roundabout to improve traffic flows and reduce vehicle speed • Introduce kerbed refuge islands on all approaches • Revise road & footway alignment to control vehicle speed and improve lane discipline. • Realign road, providing 2 northbound lanes to increase junction capacity • Provide additional on- & off- road cycle facilities on Brookside Road approach to improve the east-west route NCN2, improving safety for both pedestrians and cyclists.	[No Cost Info]	• Works Completed (2018)
Langstone Road Cycle Link - Phase 2; Mill Lane North to the Technology Park Access	Pedestrian & Cycle	HBC, HCC, Lockhams Construction Ltd	• Widen the footway on the approach to Langbrook Close to 3m and remove the northbound entry flare to reduce crossing distance and to improve safety. • Upgrade the Langstone Technology Park crossing point to modern standards to improve safety. • Provide local improvements at The Mallards and Mill Lane to clarify the crossing and access points to improve inter-visibility between pedestrians, cyclists and vehicles.	[No Cost Info]	• Works Completed (2018)
Stakes Hill Road, Waterlooville Pedestrian and Cycle Improvements	Pedestrian, Cycle, Bus	HCC	Facilities along this route are important for access to local schools by active modes of travel. Proposed to: • Extend the existing off road shared use cycleway (part of NCN222), to provide a safer cycle route between Purbrook & Waterlooville, and to directly serve Oaklands & St. Peters Catholic Schools, Springwood Junior, and Crookhorn College. • Widen existing footway sections both sides of Stakes Hill Road to create a new shared use facility • Reconfigure the Southbound Bus lay-by at Oaklands to improve access and safety • Up-grade the existing Toucan Crossing to a Pelican crossing • Provide reflective bollards to enhance visibility of existing school crossing patrol crossing locations	[No Cost Info]	• Works Completed (Summer 2018)

Table H.1 Continued …					
Langstone Road Cycle Link - Phase 1; Langbrook Close to the Technology Park entrance	Pedestrian, Cycle, Bus	HBC, HCC, Rocon Contractors Ltd	• Footway widening to minimum of 3m to allow future designation as a shared cycle track. New kerb alignment & carriageway width reduction designed to assist accessibility for bus passengers. • Provision of bus shelter to improve conditions for waiting passengers. • Upgrade of Langbrook Close crossing to meet modern standards to improve safety. The route will be designated as a cycle track following completion of construction of future planned stages.	[No Cost Info]	• Works Completed (2017)
Emsworth cycling and crossing improvements	Pedestrian & Cycle	HCC,HBC	General scheme of improvements to improve the public realm and increase opportunities to access local schools by active modes of travel. Proposed; • Provision of a new toucan crossing on Horndean Road, directly benefitting St. James's school. • Provision of a signed and marked cycle route (Christopher Way) • Upgrade existing footways to shared use surface (New Brighton Road) • Provision of a new pedestrian link (New Brighton Rd. to Washington Rd.)	[No Cost Info]	• Works Completed (2017)

(note, works completed more than 2 years prior to reporting date are not included in the table)

Appendix I: Havant Borough Council Consultation Responses

I.1 Environmental Control Advisory Committee (ECAC) Joint Consultation Response on '*Draft Revised UK Air Quality Plan for Tackling Nitrogen Dioxide'*

I.2 Havant Borough Council Consultation Response on '*NICE Draft Air Quality Standard'*

I.3 Havant Borough Council Consultation Response on '*Cleaner Domestic Burning of Solid Fuels and Wood'*

I.1 Environmental Control Advisory Committee (ECAC) Joint Consultation Response on '*Draft Revised UK Air Quality Plan for Tackling Nitrogen Dioxide*'

HIOW ECAC AQ sub Group Joint Response

Consultation on a draft revised UK Air Quality Plan for tackling nitrogen dioxide

I am responding to the consultation on behalf of the Hampshire and Isle of Wight, HIOW, Environmental Control and Advisory Committee, ECAC, which is a group representing the Local Authority Environmental Protection Officers in Hampshire and the Isle of Wight.

The Hampshire and Isle of Wight Environmental Control and Advisory Committee comprises:
Basingstoke And Deane Borough Council
East Hampshire District Council
Eastleigh Borough Council
Fareham Borough Council
Gosport Borough Council
Hart District Council
Havant Borough Council
New Forest District Council
Portsmouth City Council
Rushmoor District Council
Southampton City Council
Test Valley Borough Council
Winchester City Council

Neil Scott
Secretary HIOW ECAC.

Questions for consultation
1. How satisfied are you that the proposed measures set out in this consultation will address the problem of nitrogen dioxide as quickly as possible? We are not satisfied that the plan as it stands will meet the objectives in the shortest time. This is because by the plans own modelling the most effective measure, CAZ, are the option of last resort and only to be implemented with Defra approval, this is effectively a hurdle to the use of the most effective measure. The approach to modelling the effectiveness of measures and consequently of the plan are hampered by the model used and approach to modelling taken. For example the requirement to reduce air pollution as quickly as possible (and consequently the effectiveness of measures) cannot be assessed by the use of a model which only looks at 5 year windows. We are also concerned at the veracity of the modelling outputs. Many of the measures other than CAZs are already contained within existing AQAP's, the difficulty in implementing these measures have contributed to the current lack of compliance with national target values. LAs should be given the necessary powers to require compliance with Action Plans

Funding for the implementation of measures needs to be made more widely and more readily available to LAs with AQMAs and not just to those identified by the modelling contained in the plan. Discussions amongst our group have shown that some LAs identified in the plan do not have relevant receptors within the zones identified by modelling, whilst others with ongoing failures of national targets in existing AQMA are not included in the plan. This reinforces our view that the model is not fit for purpose and that an action plan developed on the back of the modelling will consequently also be flawed.

There appears to be no mention of actions taken or could be taken at a national level which would impact on nitrogen dioxide (and Carbon dioxide) levels, e.g. vehicle fuel duty, diesel scrappage, uptake of ULEVs.

The plan delegates much responsibility to LAs to implement the necessary actions, however it is silent in terms of how this will be resourced and how LAs will overcome the limitations of existing powers to require other bodies to take action.

2. What do you consider to be the most appropriate way for local authorities in England to determine the arrangements for a Clean Air Zone, and the measures that should apply within it?

Given the central role that Defra has played over time with air quality management, and in terms of funding projects and research, we would expect a strong lead from Defra in terms of a package of measures, and relevant guidance and tools, which are in effect 'turnkey' to allow LAs to determine the most effective measures for their locality and to implant them quickly and effectively.

Without clear leadership and guidance from Defra it is likely that there will be significant variation in the measures implemented nationally, and locally, which could lead to unnecessary burdens on the public and business, and to unintended consequences where neighbouring LAs take different approaches. There needs to be regional support and guidance to ensure plans are implemented consistently and coherently across conurbations .

There is also some confusion as to whether the plan is requiring LAs to implement a CAZ or not, especially in those districts which previously did not require one, and which may not need to have a future CAZ due to infrastructure projects which are being considered. The approach these LAs should take is unclear.

What factors should local authorities consider when assessing impacts on businesses?

The assessment should follow normal Cost/Benefit approaches

3. How can Government best target any funding to support local communities to cut air pollution? What options should the Government consider further, and what criteria should it use to assess them?

The Government should consider simple to access funding streams for local scrappage, ULEV schemes etc.

Are there other measures which could be implemented at a local level, represent value for money, and that could have a direct and rapid impact on air quality? Examples could include targeted investment in local infrastructure projects.

See above

How can Government best target any funding to mitigate the impact of certain measures to improve air quality, on local businesses, residents and those travelling into towns and cities to work? Examples could include targeted scrappage schemes, for both cars and vans, as well as support for retrofitting initiatives.
How could mitigation schemes be designed in order to maximise value for money, target support where it is most needed, reduce complexity and minimise scope for fraud?

The Government should be leading on this, we would expect that the knowledge gained by them on previous schemes and from grant winning projects should inform guidance and schemes for LAs. This should provide Local authorities with a clear framework for implementing the most efficacious actions.

4. How best can governments work with local communities to monitor local interventions and evaluate their impact?

Existing modelling and assessment tools need to be updated to include most up to date technical and scientific information, e.g. emission factors updated to COPERT 5.

Support for monitoring of air pollutants to verify action effectiveness, recent years have seen funds withdrawn from LAs. Support for mobile monitoring.

Guidance on how LAs are to assess the impacts of interventions, allowing for multiple interventions being implemented at the same time, this is the reality of schemes currently being implemented as a result of the proposed actions contained in the National Action Plan ie

"*The Government and the devolved administrations are committed to an evidence-based approach to policy delivery and will closely monitor the implementation of the plan and evaluate the progress on delivering its objective*. "

5. Which vehicles should be prioritised for government-funded retrofit schemes?

The oldest most polluting vehicles should be targeted, prioritising diesel replacement. Support for upgrading of lorry and bus fleets to Euro 6 / ULEV. Measures to target local delivery vans.

We welcome views from stakeholders as to how a future scheme could support new technologies and innovative solutions for other vehicle types, and would welcome evidence from stakeholders on emerging technologies. We currently anticipate that this funding could support modifications to buses, coaches, HGVs, vans and black cabs.

Focus should be on upgrading fleet to newest standards and not on retrofit.

6. What type of environmental and other information should be made available to help consumers choose which cars to buy?

Real world fuel efficiency and emissions data.

7. How could the Government further support innovative technological solutions and localised measures to improve air quality?

Simplifying the application process for grants, improving / increasing the funding available, providing longer term financial certainty to those involved in R&D.

8. Do you have any other comments on the draft UK Air Quality Plan for tackling nitrogen dioxide?

We are concerned that the modelling used to determine areas for intervention is not fit for purpose, for the reasons highlighted above it has identified locations with no relevant receptor for action, and ignores existing AQMAs (or worse shows locations as compliant which are not). This undermines confidence in the strategy and raises concerns that resources will be mis-directed away from areas where resources are required. Further, we require tools to allow the effectiveness of measures to be assessed over shorter time frames than those used in the modelling for the consultation.

Effective action measures will likely need to be implemented beyond district, county or agglomeration boundaries, there appear to be no plans or guidance on how LAs should proceed in these circumstances and how a 'joined up' approach is best achieved. Defra must be resourced to ensure a greater "hands on" approach going forward to ensure a consistency of approach is taken. The choice of model and data input assumptions are a particular key issue for greater control. There is a case for a centralised approved model to be made available and

staffed to allow Local Authorities to use such expertise at a subsidised cost. This will prevent the continuous “reinventing of the wheel“ that is currently taking place within close geographic locations which are in different Local Authority areas.

There is no detail on how LAs are proceed where they have to implement a CAZ but already have existing AQAP’s with commitment to other solutions for compliance?

I.2 Havant Borough Council Consultation Response on '*NICE Draft Air Quality Standard*'

Air pollution: outdoor air quality and health

NICE National Institute for Health and Care Excellence

Consultation on draft quality standard – deadline for comments 5pm on 19/10/18 **email: QSconsultations@nice.org.uk**

Organisation name – stakeholder or respondent **(if you are responding as an individual rather than a registered stakeholder please leave blank):**	Jonathan Driver [Havant Borough Council, Environmental Health (following consultation with Planning Policy & Urban Design)]
Disclosure **Please disclose any past or current, direct or indirect links to, or funding from, the tobacco industry.**	No professional or personal links with the tobacco industry.
Name of commentator person completing form:	Jonathan Driver
Supporting the quality standard - **Would your organisation like to express an interest in formally supporting this quality standard? More information.**	No (it is understood that Local Authorities are not target supporters)
Type	[office use only]

Comment number	Section	Statement number	Comments Insert each comment in a new row. Do not paste other tables into this table because your comments could get lost – type directly into this table.
Example 1	Statement 1 (measure)		This statement may be hard to measure because…
1	Questions for Consultation	Question 1	Standard focuses upon 3 factors (incremental reductions of local emissions, vulnerable persons avoiding pollution 'episodes', and planning for air quality). The standard does not address vulnerable persons avoiding outdoor air pollution in general (e.g. emissions peaks at compliant locations, or behavioural influence on personal exposures). The Standard also ignores (admittedly by definition) indoor and workplace exposures, and the issue of 'emissions offset' (e.g. avoiding 'local'- whilst at the same time increasing 'national aggregate'- emissions). Provisions with respect to 'Planning for Air Quality' (Statement 2) do not acknowledge or address the limits of local policy as set by National Policy Framework, by top-down development targets (e.g. independently assessed housing need), NGO guidance (e.g. NSCA) on thresholds of triviality, or the potential for inspectorate decisions to undermine these (and local plan) provisions.
2	Questions for Consultation	Question 2	Largely, yes. I have no basis on which to comment Re: Statement 1. Re: Statement 2 [outcome, a)] County have oversight of travel plans agreed under s106, and already collect some of these figures. Census data will also be informative for long-term change. [outcome, b) & c)] – Local Authority (LA) ASR's and AURN monitoring already provide this data.
3	Questions for Consultation	Question 3	I have no basis upon which to make comment, other than to say that the provisions of Statements 2 & 3 are already undertaken, so the answer would have to be 'yes'. Similarly, LA's are already thinking about reducing emissions from vehicle fleets, and making procurements on this basis, so again it would appear feasible.
4	Questions for Consultation	Question 4	My understanding of research into health outcomes is that vulnerable groups are disproportionately affected – either due to the exposure scenario's, or their physical vulnerability. In this sense, I would agree that the most vulnerable groups should be targeted – particularly those with pre-existing chronic cardiovascular or respiratory problems, the elderly, and children aged 0-6 (through the provision of advice to parents)
5	Questions for Consultation	Question 5	I would agree that routine health checks (child, annual reviews) provide appropriate contact opportunities to provide such advice. A patient presenting with exacerbation is more of a clinical matter – I would agree that GP's should consider air quality as a factor when considering why there has been a clinical change; for example, has a behavioural change occurred which has increased personal exposure? Advice would naturally follow where air quality might be a material factor. This strikes me as being more 'case-by-case' however.

6	Quality Statement 1	Rationale	I do not see the relevance of only providing advice to vulnerable groups on days of high ambient or transboundary pollution. This may serve to limit resource requirements, but equally limits achievable outcomes. Personal exposures can be dramatically improved by minor behavioural change, and being a chronic (as well as acute) harm, overall improvements in outcomes (over and above those achievable under the draft Quality Standard) will be possible if all priority vulnerable groups are routinely targeted for provision of advice. This would dispense with the need for a system of notification and serve to embed this element as routine clinical care.
7	Quality Statement 2	Quality Statement	I have been involved with the development of Local Plan policy, with specific regard to air quality & pollution. The current reality of policy development is that it is framed by the 'presumption in favour of sustainable development'; defined in loose terms under national policy, but specifically requiring positive determination (of an individual application, or of a plan against the objectively assessed housing need) unless the impacts of development would *'significantly and demonstrably outweigh the benefits'* (benefits in this context having a broad interpretation including economic- & social-, and not construed simply in environmental- or health- terms) (para.11 b)ii) & d) ii) NPPF 2018). Coupled with the need for a robust evidence base for any adopted local policy provision, and perhaps more critically-, with the requirement for any policy measure to be 'reasonable' (in particular, that it cannot be expected to solve existing problems), these factors conspire to significantly limit the ability of the LPA to impose strict local policy controls. Whilst it is recognised that the local plan forms the 'starting point' for decision-making, the plan-making requirements mean that to seek to impose strict local policy controls (e.g. policy which *does* require development to deliver net benefits to an existing problem-) would necessitate an evidence-based challenge to either or both the National Policy, and NGO guidance, which currently restricts the drafting & interpretation of local policy. This would obviously be outside the scope of the resources available to most Local Authorities, and would only be justifiable at the local level where severe local issues exist (in line with para. 11, NPPF). The result is a drive for 'positively framed' policy which necessarily uses 'soft' language, such as 'would favour', and 'encourage'; rather than more direct provisions such as 'must', or 'will be refused unless…' – whilst not universal, this is certainly true where there lacks a strong legislative- or national policy- basis upon which to take a less permissive stance (as currently in the case of air quality). This language allows a significant degree of leeway for applicants to seek to minimise development provisions for mitigating emissions or for delivering incremental improvements to local air quality (the offering) against the policies that are in place. Lacking a strong (policy-, legislative-, or evidential-) basis upon which to determine that the sustainability credentials or air pollution provisions (particularly with respect of design) are inadequate, the LPA is in a weak position to challenge this. This limits application-, and therefore success- of local policy. It is also true that to tackle air quality effectively through planning requires a coordinated suite of policy covering energy, transport, employment, housing, quality design, landscapes, pollution and health. It has proven extremely difficult to make specific air quality provisions, and I have encountered significant resistance to making design or policy stipulations for air quality purposes. The need for such policy is easy to argue for on a qualitative basis, but

			extremely difficult to quantitatively justify (thus falling at the 'evidence base' hurdle). The breadth of influences upon local air quality means that in order to mobilise all local planning authorities to achieve marginal, incremental and cumulative emissions reductions which stand a realistic prospect of translating into the hoped-for demonstrable real-world improvement in local Air Quality; Air Quality needs to be made a central theme to the development of local plans. A strong stance in National Policy (or additional freedom given to LPA's in plan-making) is required to achieve this, and it may require re-defining fundamental principles of central policy, e.g. re-defining "sustainable development" from something which permits environmental and health harms to be balanced by social gains, to something which requires the balancing of environmental (or health) harms against environmental (or health) gains.
8	Quality Statement 2	Rationale	*("…Strategies and plans should include enabling zero- and low-emission travel…and how to design buildings and spaces to improve air quality…")*. Strategies and plans *a*re appropriate documents within which to set out aspirations. Application in practice (through the planning system, as implied by Quality Statement 3, would require the LPA to be willing (enabled / empowered) to either refuse an otherwise acceptable development on grounds that the design for air quality could be 'improved' (even where it meets all building regulations and design code standards - manual for streets etc.), or to deem it to be unacceptable in planning terms without the imposition of conditions dictating certain aspects of design, or requiting the delivery of certain features, provisions, or mitigation - principally or exclusively for the purpose of improving air quality. This is difficult where the planning system is geared towards thresholds of 'unacceptability', especially where the Government's focus on housing delivery and the need to 'significantly boost housing supply' (as an economic and social benefit) frequently outweighs all other considerations unless constrained by one of the policies in footnote 6 of the NPPF (e.g. SSSI, Green Belt, AONB, national park, designated heritage assets etc.). Within this context, a development which offers 'something' which contributes towards air quality goals (but could, at the expense of the available margin of profit deliver substantially greater contributions to emissions reductions) is very difficult to deem 'unacceptable' unless it fails to meet the broad definition of 'sustainable development', or exceeds some other threshold (e.g. NSCA *'planning for air quality'* significance criteria, which essentially screens out all but the most substantial development projects). In order to secure an improved scheme – whether the LPA is seeking to impose a planning condition or is seeking a fundamental amendment to design - a development is required to be deemed 'unacceptable without improvement'. Even if appropriate policy is in place (which it largely is, and has been for some time), and an LPA is willing to treat it as a 'hard' requirement; planning decisions could still be frustrated by the planning appeals process, competing NGO and industry guidance, and the National Policy standards which are often taken to override local policy (by providing the framework against the local policy wording & phraseology is interpreted). National provisions may also explicitly override local policy where (for example) the objectively assessed housing need determines a 5-year housing supply requirement in excess of that provided for in the local plan, thus invalidating the plan and defaulting to National Policy the determination of applications. In this sense, I would say

			that as an extension to this Quality Statement (2), the provisions need to call for these principles to be embedded at the heart of the NPPF if they are to stand a realistic prospect of achieving substantial aggregate improvements.
9	Quality Statement 2	Equality and Diversity Considerations	This section states that LA's should identify areas where air pollution is *'highest'*. National policy is loosely leaning toward a strategy of 'cumulative incremental improvements', making this Statement provision relevant in theory. In practice however, NGO & Industry guidance commonly referred to sets a high bar for 'significance', and National Air Quality Limits / Objectives (as laid out in EU and Domestic instruments) have explicitly limited application. Generally speaking, *'compliant'* areas (albeit that these may be areas of the *'highest'* air pollution, may materially contribute to poor health outcomes, and may *exceed* National standards *without breaching* them-) are treated as being below the threshold of triviality. This makes it difficult for Planning Authorities to evidence the need for interventions within the local plan process, and thus limits the ability to adopt robust policy. If such policy is not adopted, it cannot be implemented. Even where a LA does not recognise those thresholds of triviality and seeks to unilaterally exercise local policy controls (e.g. to seek air quality improvement within a compliant area); an appeal inspector is nevertheless likely to be sympathetic to such arguments and the LA is consequentially unlikely to be successful at appeal. In line with the comment at 8 above, if national policy incorporated tougher requirements then Planning Authorities would be empowered to be stronger both in the plan-making process, and in determining individual applications.
10	Quality Statement 3	Rationale	This rationale is reliant upon the provisions of Quality Statement 2 having been implemented. The right policy needs to be in place for LA's to exercise. Comments above under 8 & 9 above largely apply. Given the breadth of factors influencing local air quality, exercisable local policy is generally already in place, and LPA's already seek to implement it (albeit for purposes to which air quality is a subordinate, but relevant, factor). In general terms, the provisions of this statement are (therefore) likely to achieve better recording of this activity, but are unlikely to deliver air quality improvements over & above those already being achieved.
11	Quality Statement 4	Rationale	The rationale uses the phrase *"…to address air pollution"*, but does not indicate whether this should be taken to mean *"local air pollution in busy urban centres where national limits may be exceeded"*, or "*aggregate emissions to air on a national basis"*. This is important, as some LEV types may actually use more energy per-average-km than the equivalent conventionally fuelled vehicle. When considering either plug-in-hybrid or electric vehicles, the source of energy is also important, as if this is not an entirely renewable (or low atmospheric pollution option such as nuclear) the emissions are simply offset from one place to another and no overall (national, aggregate) benefit is achieved. It would help guide authorities & NHS fleet emissions strategies if the goal is clear (the goal may of course be both these things, requiring competing requirements be appropriately weighed / balanced; but this should be made clear)
12	Quality Statement 4	Quality Statement, Structure, b), Data Source	Refers to Commissioning Specifications – it might be helpful to expand this concept to make clear that the commissioning specification should respond to vehicle duty & drive cycle, and that organisations should not select a 'one size fits all' specification. The one size option would likely deliver benefits in some circumstances but could represent an increase in emissions (relative to the use of conventional vehicles) in others.

13	Quality Statement 4	Quality Statement, Outcome , b),	Refers to *"overall fuel consumption"*. Care should be taken to ensure that this is representative. There are well documented problems with fuel consumption figures with hybrid & electric vehicles which suit marketing purposes but have little relevance to real world performance. I would recommend that the word *"Fuel"* be substituted for *"Energy"*, as both petroleum fuel and electrical power can be expressed in terms of 'energy per km'. By extension, fleet energy use may be aggregated on this common basis over a given time period and compared on an equivalent basis to previous periods (irrespective of the composition of the fleet in terms of power plant / drivetrain / end-of-pipe abatement).

Insert extra rows as needed

Checklist for submitting comments

- Use this comment form and submit it as a Word document (not a PDF).
- Complete the disclosure about links with, or funding from, the tobacco industry.
- Include section number of the text each comment is about e.g. introduction; quality statement 1; quality statement 2 (measure).
- If commenting on a specific quality statement, please indicate the particular sub-section (for example, statement, measure or audience descriptor).
- Combine all comments from your organisation into 1 response. We cannot accept more than 1 response from each organisation.
- Do not paste other tables into this table – type directly into the table.
- Underline and highlight any confidential information or other material that you do not wish to be made public.
- Do not include medical information about yourself or another person from which you or the person could be identified.
- Spell out any abbreviations you use
- For copyright reasons, comment forms do not include attachments such as research articles, letters or leaflets (for copyright reasons).We return comments forms that have attachments without reading them. The stakeholder may resubmit the form without attachments, but it must be received by the deadline.

You can see any guidance and quality standards that we have produced on topics related to this quality standard by checking NICE Pathways.

Note: We reserve the right to summarise and edit comments received during consultations, or not to publish them at all, if we consider the comments are too long, or publication would be unlawful or otherwise inappropriate.

Comments received from registered stakeholders and respondents during our consultations are published in the interests of openness and transparency, and to promote understanding of how recommendations are developed. The comments are published as a record of the comments we received, and are not endorsed by NICE, its officers or advisory Committees.

I.3 Havant Borough Council Consultation Response on *'Cleaner Domestic Burning of Solid Fuels and Wood'*

Response ID ANON-1WWD-ZWH3-F
Submitted to **Consultation on cleaner domestic burning of solid fuels and wood** Submitted on **2018-09-06 15:53:32**

Introduction

1 What is your name?

Name: Jonathan Driver

2 What is your email address?

Email jonathan.driver@havant.gov.uk

3 What is your organisation?

Organisation: Local authority
If you answered "Other", please include details here: [N/A]

4 Would you like your response to be confidential? No

If you answered Yes to this question please give your reason: [N/A]

5 What is your location?

County: Portsmouth

Wood

6 Volume restriction
Please provide reasons or evidence to support your answer:
If set lower than 2 cu.m, the average domestic wood store could accommodate the volume, and this could create a 'volume-based price point step', where consumers may be encouraged to purchase a given volume on price, but may start to burn the wood immediately. Domestic wood storage structures common in our district tend to have a capacity between 1 & 2 cu.m; so the 2 cu.m threshold seems sensible.

7 Do you think that suppliers and retailers should be given a transition period to use up existing stocks of wet wood or allow time for it to air-dry?
Transition period of 1 year

Please provide reasons or evidence to support your answer:
This seems an odd question - no transition period is required for a supplier to allow their stock to air dry - if they are allowing it to air dry, it is not being offered for sale until it meets the description of 'dry wood'. Whist it seems reasonable to have a transitional period, this could be operated under different labelling rules for small quantities (e.g. stating average moisture content, and indicating that further seasoning is required)

8 Do you think that smaller suppliers and retailers should be given a longer transition period?
Don't know/don't have an opinion

9 Seasoning instructions
Agree

10 Do you agree or disagree that wood fuel suppliers should be required to be members of a certification scheme that provides assurance(via testing and auditing) that the wood is of a moisture content of 20% or less?
Disagree

11 Do you agree or disagree that retailers selling wood should be legally required to store the wood in such a way that it will not becomewet?
Yes

12 In order to comply with the proposal to require all businesses selling wood in volumes under 2m3 to ensure that it is dried to below 20% moisture, what adjustments, if any, would your business need to make?
Other (please specify)

Other::
Not applicable (not a business respondent)

13 Would you like to provide any further comments or evidence on our proposals or the questions in this section?
Further comments or evidence on our proposals:
Q10 - should be a trading standards function, similar to petrol retail dispensing checks.
Q11 - depends on state of wood - unsplit logs will season without cover to a point, split logs (ready for use without further size reduction) will be more susceptible to moisture fluctuation in line with storage conditions. The legal requirement should probably only apply to split logs (e.g. sized for direct use)

Coal

14 Do you agree or disagree that government should phase out the use of traditional house coal for domestic combustion?
Disagree

15 If you agree, what would be the most appropriate end date for phasing out the use of traditional house coal for domestic combustion?
Other

Please provide reasons or evidence to support your answer:
[N/A]

16 In phasing out the use of traditional house coal as a domestic fuel, what do you consider is a reasonable transition period to allowindustry and householders to use up existing stocks?
Don’t know/don’t have an opinion

17 Do you agree or disagree that this policy should apply to all businesses?
Neither agree nor disagree

18 If you disagree, which of the following should apply?
Please provide details of which businesses should be exempt and your reasoning.:
[N/A]

19 In phasing out traditional house coal as a domestic fuel, government is minded to apply the phase-out nationwide across England. Do you agree or disagree?

- Disagree
- Coal sales to be phased out in urban areas only

20 Would you like to provide any further comments or evidence on our proposals or the questions in this section?

Extra comments coal:
Q14 - the preamble appears to be confusing the issue of high carbon fuel, and 'polluting' fuel. Anthracite is low smoke because it is high carbon density/purity. If the goal is carbon reduction, then the Government should look at efficiency (as CO2 emission/BTU), and act accordingly. If the goal is to improve Air Quality, then there is a reduced impetus to restrict use of house coal in rural areas, where background / local ambient levels of air pollution are much lower.
Q19 - see rationale above. If reduction of air pollution is the principle aim, then measures should focus on urban areas where air quality is poorest, and measures will have the greatest beneficial effect.

Manufactured solid fuels

21 Do you agree or disagree that government should introduce a standard for all manufactured solid fuels which confirms they are below 2% sulphur and meet a smoke emission limit of 5g /hr?
Neither agree nor disagree

22 In introducing a sulphur and smoke emission standard, do you consider that there should be a transition period for suppliers and retailers?
Transition period of 1 year

Please provide reasons or evidence to support your answer:
All businesses need time to adjust to a changed regulatory environment, but this should be reasonably limited, so as not to unduly delay realisation of emissions benefits.

23 Do you agree or disagree that, over time, the 2% sulphur limit should be further reduced to 1% sulphur?
Agree – some other percentage (please state below)

Other::
Should avoid setting standards that are so technically challenging to achieve as to be cost prohibitive, as this will directly impact those in fuel poverty who rely upon solid fuels.

24 Do you agree or disagree that government should introduce a clear labelling requirement to demonstrate that fuels meet the standard?
Agree

25 In order to comply with the proposal to phase out traditional house coal and apply sulphur and smoke emissions standards to all solid fuels, what adjustment, if any, would your business need to make?
Other (please specify)

Other::
Not applicable (not a business respondent)

26 Would you like to provide any further comments or evidence on our proposals or the questions in this section?

Extra comments MSF:

Q21 - Proposals are to apply standards to "all solid fuels". How does <20% moisture content wood perform on the smoke test? Unless of a materially different character, smoke emission standards should not create a conceptual 'disparity' between permitted emissions from different fuel types. Clear labelling could allow manufactured fuels to compete on low-smoke as a mark of quality (i.e. leg'n sets min. standard to be achieved [max. smoke], and the market competes on product offerings that better that standard).

Q23 - transition for manufacturers must necessarily be harmonised with, or shorter than that given to retailers, otherwise a situation will be created where there will be a mis-match between permitted production and banned sales (in this market). Longer transition for manufacturers may work if there is export demand.

Carbon reductions

27 Do you agree or disagree that government should, over the longer term, introduce a requirement that all manufactured solid fuels havea minimum 30% biomass content?

Agree – please stage percentage below

Suggested percentage:

Unsure as to % - dependent on technical feasibility and availability of suitable biomass feedstock.

28 For businesses: If government mandated a biomass content how long would it take you to adjust?

Not Answered

29 Would you like to provide any further comments or evidence on our proposals or the questions in this section?

Extra comments biomass:

Support minimum % biomass content for solid fuels; though would be cautious about being too prescriptive if this might discourage manufacturers from bettering that standard, or consumers from purchasing fuels with a greater %biomass. Carbon tax works as a sliding scale, providing an offset to higher manufacturing costs for high biomass products, in comparison to those produced with a greater proportion of cheaper pet-refinery by-products. This suggests that taxation is a suitable, and more flexible means of incentivising innovation.

Exemptions

30 We are interested in your views on how government should support those in fuel poverty with this transition away from high-carbon fossil fuels

Fuel poverty:

Ultimately, I believe that grants for replacement of old / inefficient / dangerous / polluting appliances are likely to be required. Grants should be available to landlords (or installation within tenanted property), and eligible appliances should not include technologies inappropriate to the property (e.g. low output electrical appliances such as air source heat pumps)

31 Would you like to provide any further comments or evidence on this section?
Extra comments exemptions:
Those on low incomes with solid fuel appliances are likely to be burning not only fuels, but also waste. They are also less likely to be in well maintained properties, where chimneys structures are more likely to be defective / compromised, and less likely to be regularly swept. Use of a variety of poor quality fuels (incl. wastes) will exacerbate this. Users in fuel poverty may well be at greater personal risk - and on this basis I would expect that accelerating / facilitating the transition would be preferable to providing exemptions which would serve to delay it.

Implementation

32 What do you think would be an appropriate level of fixed penalty related to the sale of domestic burning products?
Other (please specify)

Other::
Businesses engaged in such retail activity are likely to be 'micro scale' & / or opportunistic in nature (e.g. traders of diverse product range), and may (therefore) have poor technical knowledge in this area, and may 'inadvertently' contravene regulations. Given this, FPN should be a deterrent but not ruinous (e.g. if unable to pay, significant inflation could occur through debt collection proceedings). Perhaps £250?

33 Do you think that local authorities should be required to use any funds from this for a specific purpose?
No

Please specify::
I would expect the amount of revenue to be low, so ring-fencing likely ineffective (unless permitted expenditure is for inexpensive items, procurable to a value < the value of 1 no. FPN.

34 Do you agree or disagree that this will deliver our objective of establishing a clear and straightforward enforcement policy, minimising burdens for Local Authorities?
Yes

Please suggest any alternative proposal that you consider to be more effective in delivering our objectives:
Yes insofar as retail sale. I would consider that steps should be taken to improve enforcement of fuel 'use', complementary to those outlined for fuel 'retail' **35**

Government will provide advice and guidance to retailers selling domestic burning products. What format should this take?
Information provided with the product

Other::
Probably all of the above, but on the retail packaging of manufactered fuels means the informaiton will be available everywhere that fuel is offered for sale.

Information

36 What information do you think would be helpful to enable householders to reduce their impact from domestic burning?

Impact reduction information:
- The advice given in the Burn Right video tutorial is not in the leaflet - this could helpfully be added.
- Some basic information on fuel species would also be helpful - e.g. avoid oak, horse chestnut and lime as energy yield/volume is poor, woods are smoky, or tend to self extinguish at low temperatures. Could also provide advice on woods that are potentially harmful to chimney linings due to sap content or tendency to produce smut.

37 What do you think would be the most effective way of communicating information to householders?
- Through retailers, Appliance manufacturers, Fuel suppliers,
- Chimney sweeps, Social media, Doctors surgeries

Other: [N/A]

38 For householders: Where do you buy your fuel?

Other::

Additional suggestions

39 Do you have any additional comments/views that you wish to provide on the content of this consultation?

Consultation feedback:
1) Air pollution reduction measures should be targeted at locations where air pollution is a problem - e.g. domestic fuel burning in densely populated urban environments, and not in sparsely populated rural locations where the net actual impact of domestic solid fuel is substantially less (albeit that it may make a high proportional contribution to very low levels of local emissions)
2) Measures should be compatible with climate change carbon reduction targets - I would not wish carbon neutral fuels to be pushed out of the market, ordiscouraged from entry, on the basis of marginal failure to meet an inflexible emissions performance standard (which may ignore non-pollutant benefits, such as diverting waste from landfill, neutral carbon, local source etc.). This consultation places air quality as the primary risk to human health, but it should be acknowledged the EU recognises Climate Change to be a superlative concern - in terms of it's impact on health, the environment, property and the economy. The harmful impact of climate change could dwarf the harms of locally poor ambient air quality.
3) This consultation does not address the users of fuel. Revised nuisance guidance (for example) could serve to empower local authorities to act more decisivelyin response to a problem caused by inappropriate use of a solid fuel appliance, where the fuel may be compliant.

Appendix J: DEFRA Commentary on HBC ASR2017

Table J.1 – Havant Borough Council Response to technical comments / queries

ASR17-106 Comment Ref	DEFRA Comment / Query (HBC Clarification in sq. brackets '[]')	Havant Borough Council Comment / Response
5	It is not clear where the [Nitrogen Dioxide Diffusion Tube] bias adjustment figure [Factor] has been taken from	It is unclear why this is in question - the source of the bias factor is stated clearly on p39 note (1) - "...using the average correction factor from National Bias Adjustment Correction Data (v0317v2)"
6	According to given numbers, for site 5 (the only site requiring annualisation), the raw annual mean of 25.2µg/m³ should have been bias adjusted (multiplied by 0.94) and annualised (multiplied by the ratio of 1.09 provided in C.3), to give a corrected annual mean of 25.82µg/m³, rather than the 25.94µg/m³ figure presented in Table B.1.	This apparent discrepancy is due to a rounding error. DEFRA has used the reported, rounded value of 1.09, however the calculated annualisation value is 1.09479188(…), and reported figures were based upon the value calculated by formula (unrounded). This explains the slight discrepancy noted. It is considered valid to undertake statistical adjustment of measured means for sites with any periods of missing data. It should be noted that this exercise has resulted in both upward- & downward- revision of mean values, and it's aim is to improve the accuracy of the estimate, not to reduce the apparrent measured value.
7	Figures presented in Table C.4 for "Distance between measurement and kerb", do not appear to match figures presented in Table A.1 within the "Distance [of site] to kerb of nearest road" column. Please ensure these figures match and are correct.	In some cases the distances quoted "measurement to kerb", and Table A.1 'Nearest Road" refer to different points – the 'nearest' kerbside is not necessarily the nearest busy road (predominant source), or the kerb may not represent the line of free-flowing traffic on the highway. This is true at junctions, and at locations where the source road is a national trunk road (e.g site 2) There appears to have been an error relating to one site only – position 1, Langstone Road – resulting in a slight under-estimation presented in the report, which does not alter the material conclusion(s)
8	Distance corrected results should be presented in the final results Table A.2. It is unnecessary to have two separate final results tables presenting uncorrected and corrected results	This was done in the interests of transparency, and clarity for the reader

Local Authority:	**Havant Borough Council**
Reference:	**ASR17-106**
Date of issue	**September 2017**

Annual Status Report

The Report sets out the Annual Status Report, which forms part of the Review & Assessment process required under the Environment Act 1995 and subsequent Regulations.

Havant Borough Council has no AQMA and consequently no associated air quality action plan. Nitrogen dioxide has been passively monitored across a network of 23 diffusion tubes sites in 2016. There has been one measured exceedance of national air quality objectives, of 41.7µg/m^3 at site 19(B), which is located close to a bus stop. The council has conducted an assessment at this site, and believe it not to be representative of air quality within the surrounding area. Additional monitoring is to be undertaken to confirm or reject this.

The local authority have taken forward a number of actions in the last year to improve local air quality, including a new link and bus gate, a new signalised roundabout at a principal junction, pedestrian and cycling strategies, and the promotion of low emissions transport, public transport, car sharing and home working.

On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants, with the provisos listed in the commentary below.

The next step for Havant Borough Council is to submit an Annual Status Report in 2018.

Commentary

The report is detailed, and provides the information specified in the Technical Guidance TG(16). The following comments are made to inform future reports.

1. It is noted that the council plan to undertake further monitoring near site 19B to investigate whether the exceedances of the NO2 objective is representative of the surrounding area.

2. This is welcomed, and we additionally suggest this diffusion tube should be relocated. Due to its current position adjacent to a bus stop, monitoring here is not representative of public exposure. The tube should be relocated to a residential building facade or as close as possible (see Technical Guidance TG(16)).

3. All monitoring positions should be considered in relation of being representative of relevant (population) exposure. This is normally considered as including all locations where members of the public might be regularly exposed, including building façades of residential properties, schools, hospitals, care homes etc. (see definition within LAQM TG(16)).

4. Annual mean objectives do not generally apply at:
   Building façades of offices or other places of work where members of the public do
   not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term. [Ref LAQM TG(16) Box 1.1]

5. It is not clear where the bias adjustment figure has been taken from. Following the latest technical guidance TG(16), national bias adjustment factors should be taken from the National bias adjustment factor database, available on the Defra website.

6. Annualisation should only be conducted for sites where the data capture rate is less than 75%. Additionally, we suggest the council provide further details on how they have used the annualisation method. According to given numbers, for site 5 (the only site requiring annualisation), the raw annual mean of 25.2µg/m³ should

have been bias adjusted (multiplied by 0.94) and annualised (multiplied by the ratio of 1.09 provided in C.3), to give a corrected annual mean of 25.82µg/m³, rather than the 25.94µg/m³ figure presented in Table B.1

7. Figures presented in Table C.4 for "Distance between measurement and kerb", do not appear to match figures presented in Table A.1 within the "Distance [of site] to kerb of nearest road" column. Please ensure these figures match and are correct.

8. Distance corrected results should be presented in the final results Table A.2. It is unnecessary to have two separate final results tables presenting uncorrected and corrected results.

This commentary is not designed to deal with every aspect of the report. It highlights a number of issues that should help the local authority either in completing the Annual Status Report adequately (if required) or in carrying out future Review & Assessment work.

Issues specifically related to this appraisal can be followed up by returning the attached comment form to Defra, Welsh Assembly Government, Scottish Government or DOE, as appropriate.

For any other queries please contact the Local Air Quality Management Helpdesk:
Telephone: 0800 0327 953
Email: LAQMHelpdesk@uk.bureauveritas.com

Glossary of Terms

Abbreviation / Term / Ref	Description
AEI	Average Exposure Indicator – a metric representative of the exposure of the average resident of a given area. Calculated Nationally.
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
BRT	Bus Rapid Transit - a bus-based public transport system designed to improve capacity and reliability relative to a conventional bus system. Typically, a BRT system includes roadways that are dedicated to buses, and gives priority to buses at intersections
'Community'	In the context of Legislation or Guidance, this term refers to the European Community.
DECC	Department for Energy & Climate Change
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
'Domestic'	In the context of Legislation or Guidance ultimately governed by community legislation, this term refers to the body of UK legislation, guidance or instruments which transpose and enact Community obligations. Domestic instruments may include UK's interpretation of terms, concepts or standards where the Community instrument is either not explicit, or devolves decision-making / interpretation.
ECJ	European Court of Justice
ECP	England Coastal Path
EU	European Union

FDMS	Filter Dynamics Measurement System
GPDO	General Permitted Development Order (England); legislation governing deemed consent for certain types of development. 1995 (SI No. 418), and 2015 (SI No. 596), as amended.
HBC	Havant Borough Council
LAQM	Local Air Quality Management
LES / LEZ	Low Emission Strategy / Low Emission Zone
LEV / ULEV (EV)	Low Emission Vehicle / Ultra-Low Emission Vehicle (Electric Vehicle). ULEV may refer to electric vehicles or other vehicles with alternative power-trains, EV refers to vehicles with 100% electric motor propulsion (battery or Hydrogen)
Linked Trip(s)	Refers to a journey taken by any travel mode (but usually referring to journeys by private motor car) where more than one reason for travel (purpose) may be conveniently accommodated at the destination. With reference to journeys by car, a trip is 'linked' if at least two trip purposes may be served without the need to move the vehicle from the initial parking location. If the vehicle needs to be moved, access to the secondary destination is a 'pass-by' trip. Referred to in the context of parking policy, and co-location of facilities & services.
LZC	Low or Zero Carbon (energy source / generation, or 'low energy demand' technology relative to conventional technology)
NCN	National Cycle Network
NERT	National Exposure Reduction Target - concentration reduction target, relative to concentrations for a specific base year.
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework – Central Government policy framework which guides formulation of the local plan and the interpretation of terms used in local planning policy.
OAN	Objectively Assessed Need (Housing Target)
PCC	Portsmouth City Council
Personal Health	The health of an individual within the population
PIA	Personal Injury Accident – the levels of recorded PIA's is relevant to the need for transport infrastructure upgrades

PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
PRoW	Public Right of Way
Public Health / Public Health Efffect	'Public Health' refers to the health of a population-group (in this report, typically referring to the residents of the Borough), as an aggregate of average personal health. 'Public Health effect' would refer the overall effect within a population against a population level health or cost metric – e.g. population level excess mortality, or the aggregate cost associated with treating arising minor health impacts upon individuals.
QA/QC	Quality Assurance and Quality Control
RTPI	Royal Town Planning Institute
SEHRT	The South East Hants Rapid Transit Board - comprising the Local Transport Authorities (county & unitary), and public transport operators First, and Stagecoach.
S106	Refers to Section 106 of the Town & Country Planning Act 1990 c.8 (as amended). S106 agreements are a mechanism which make a development proposal acceptable in planning terms, that would not otherwise be acceptable. They are focused on site specific mitigation of the impact of development.
S278	Refers to Section 278 of the Highways Act 1980 c.66 (as amended). S278 provides a mechanism for developers to enter into a legal agreement with the council to make alterations or improvements to a public highway, as part of a planning application.
SO_2	Sulphur Dioxide
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance (Document)
STOR	"Short Term Operating Reserve" power generation – small power plants (typically containerised generator sets) that can be quickly brought on-line to manage peak local power demands, and plug shortfalls caused by unreliable renewable power inputs to the local grid.
Tiger Crossing	Like a zebra crossing, but with cycling permitted.

References

LAQM Policy, Procedural Guidance, Plans, Tools & Data Resources

Abatement cost guidance for valuing changes in air quality, DEFRA, May 2013
(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197898/pb13912-airquality-abatement-cost-guide.pdf)

Air Pollution Alert Service (DEFRA, Met Office)
(https://uk-air.defra.gov.uk/)

Air Quality Plan for the achievement of EU air quality limit value for nitrogen dioxide (NO_2) in Portsmouth Urban Area (UK0012), DEFRA. 2015 [Withdrawn]
(https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2015-zone-plans)

Air Quality Plan for the achievement of EU air quality limit value for nitrogen dioxide (NO2) in SouthEast (UK0031), DEFRA. 2015 [Withdrawn]
(https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2015-zone-plans)

Air quality plan for nitrogen dioxide (NO2) in UK (Overview, Detailed, Technical) (DEFRA, DfT, July 2017) (https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017)

Draft Clean Air Strategy 2018
(https://consult.defra.gov.uk/environmental-quality/clean-air-strategy-consultation/)

Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations (DEFRA, DfT, Oct 2018)
(https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746100/air-quality-no2-plan-supplement.pdf)

Automatic Urban & Rural Network Data Downloads (DEFRA, Web Resource)
(https://uk-air.defra.gov.uk/data/data_selector)

Automatic Urban & Rural Network Monitoring Location Context / Details Search Tool (DEFRA, Web Resource)
(https://uk-air.defra.gov.uk/networks/network-info?view=aurn)

Local Air Quality Management Policy Guidance (PG 16), DEFRA, April 2016
(https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf)

Local Air Quality Management Technical Guidance (TG 16), DEFRA, April 2016
(https://laqm.defra.gov.uk/technical-guidance/index.html)

National Atmospheric Emissions Inventory (Website)
(http://naei.beis.gov.uk/)

National Modelled Background Ambient Air Pollution (DEFRA)
(https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html)

Non-Network Automatic Air Pollution Data Downloads (Sussex Area, Website)
(http://www.sussex-air.net/Default.aspx)

Environment Bill: Policy Paper, DEFRA, Dec 2018
(https://www.gov.uk/government/publications/draft-environment-principles-and-governance-bill-2018/environment-bill-policy-paper)

Environmental Accreditation Schemes for Business

Carbon Architecture 'Green Mark' Scheme for Businesses (Website)
(http://www.greenmark.co.uk/)

Institute of Environmental Management & Assessment Eco-Management and Audit Scheme (EMAS, Website)
(http://ems.iema.net/emas)

Investors in the Environment Accreditation Scheme & Green Business Directory (iiE, Website)
(https://www.iie.uk.com/)

Air Quality Campaign Information

10:10 Climate Action environmental protection NGO (Third Party Website)
(https://1010uk.org/)

Friends of the Earth - environmental protection NGO (Third Party Website)
(https://friendsoftheearth.uk/clean-air)

Global Action Plan National Clean Air Day; 21st June (Third Party Website)
(https://www.cleanairday.org.uk/)

Global Action Plan Clean Air Day 2018 Impact Report
(https://www.cleanairday.org.uk/Handlers/Download.ashx?IDMF=88367ca5-e3df-45a6-86bf-9d9f62496f3e)

Greenpeace - environmental protection NGO (Third Party Website)
(https://www.greenpeace.org.uk/what-we-do/climate/airpollution/)

Living Streets, Charity for Everyday Walking; information, tips & resources for residents and campaigners (Third Party Website)
(https://www.livingstreets.org.uk/)

UKGBC Open Letter to Secretaries of State for HCLG, and BEIS (UK Green Building Council, Mar 2018)
(https://www.ukgbc.org/wp-content/uploads/2018/03/Letter-to-Secretaries-of-State.pdf)

Product Information for Consumers, Grant Schemes & Other Information for Local Residents & Businesses

Authorised Fuels for Solid Fuel Appliances (Government Web Publication)
(https://smokecontrol.defra.gov.uk/fuels.php)

Burnright - consumer information on fuel and woodburner use (Third-Party Web Resource)
(https://burnright.co.uk/)

Chartered Institute of Personnel and Development (Third-Party Website)
(https://www.cipd.co.uk/news-views/policy-engagement/flexible-working)

Energy Saving Trust, energy-saving tips (Third-Party Web Resource)
(https://www.energysavingtrust.org.uk/home-energy-efficiency/energy-saving-quick-wins)

Hampshire County Council Recycling Centre Locator (Local Authority Web Publication)
(https://www.hants.gov.uk/wasteandrecycling/recyclingcentres)

Havant Borough Council Green Waste Collection Service (Local Authority Web Publication)
(https://www.havant.gov.uk/garden-waste)

Low Emission Vehicles 'Plug-in' grant information (Government Web Publication)
(https://www.gov.uk/plug-in-car-van-grants/what-youll-get)

Quora Consumer Information Report / Article – Indoor Air Purifiers (Third-Party Web Resource)
(https://www.quora.com/Do-air-purifiers-remove-PM2-5)

Ready to Burn - consumer information on fuel and woodburner use (Third-Party Web Resource)
(https://www.readytoburn.org/defra-wood-burning-guide/)

WhatCar? Consumer Information Database (Third-Party Web Resource)
(https://www.whatcar.com/truempg/mpg-calculator)

Woodsure 'Ready to Burn' accreditation scheme for domestic fuel (wood) (Third-Party Web Resource)
(https://www.readytoburn.org/)

Travel Planning Information & Sustainable Travel Discount Schemes

CycleStreets Cycle Network Journey Planner – with Distance, Journey Time and Elevation Profiles, CO_2 Savings & Calorie Calculator (Third Party Web Resource)
(https://www.cyclestreets.net/)

Hampshire County Council Travel Planning Information for Businesses (Local Authority Web Publication)
(https://www.hants.gov.uk/transport/developers/travelplans)

Living Streets Park & Stride Scheme
(https://www.livingstreets.org.uk/media/2035/park-and-stride-print.pdf)

Modeshift Stars – Best Practice in Sustainable School Travel (Local Authority Supported Web Resource)
(https://www.modeshiftstars.org/)

MyJourney Hampshire – Multi-Modal Travel Information and Journey Planner –with Distance, Journey Time, Cost, Calorie, and CO2 calculator (walking, cycling, bus, rail, ferry & car) (Local Authority Supported Web Resource)
(https://myjourneyhampshire.com/)

National Rail Journey Planner & Engineering Works Checker (Third Party Web Resources)
(http://www.nationalrail.co.uk/service_disruptions/currentAndFuture.aspx)

Travel Green Network Easit Travel Discount Scheme for Businesses (Third Party Website)
(https://www.easit.org.uk/)

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(https://www.havant.gov.uk/hayling-island-pedestrian-cycle-and-access-improvements)

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(https://laqm.defra.gov.uk/documents/0802141004_NO2_WG_PracticalGuidance_Issue1a.pdf)

Energy and Climate Change Public Attitudes Tracker: Wave 21 (Official Government Statistics)
(https://www.gov.uk/government/statistics/energy-and-climate-change-public-attitude-tracking-survey-wave-21)

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(http://jech.bmj.com/content/59/11/948)

Havant Borough Sustainability & Energy Information (Local Authority Web Resource)
(https://www.havant.gov.uk/sustainability-and-energy)

Havant Masterplan, Denvilles & Emsworth Strategic Development Website (Includes outcomes from Design Workshops)
(https://denvillesemsworth.commonplace.is/schemes/denvillesemsworth/overview/details)

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(https://www.gov.uk/government/consultations/a-future-framework-for-heat-in-buildings-call-for-evidence)

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(https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2016_issue_2.pdf)

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Objectively Assessed Need and Housing Targets: Technical advice note (2nd Ed.) (Planning Advisory Service, Peter Brett Associates, Jul 2015)
(https://www.local.gov.uk/sites/default/files/documents/objectively-assessed-need-9fb.pdf)

The Clean Growth Strategy: Leading the way to a low carbon future (BEIS, Oct 2017/Apr 2018)
(https://www.gov.uk/government/publications/clean-growth-strategy)

The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy (DfT, July 2018)
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