Southampton City Council

2020 Air Quality Annual Status Report (ASR)

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

September 2020

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Executive Summary: Air Quality in Our Area

Air Quality in Southampton

Southampton is a major coastal city located on the South Coast of England. It is the largest city in Hampshire, covering an area of 52 km^2. Southampton has a population of 269,781 (2018 estimate). The city is served by numerous transport infrastructure links, including a regional airport just outside the city's northern boundary, the M3 and M27 Motorways, a major cruise, container and vehicle port and a main line railway to London and along the south coast.

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. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

As a result of identified local air quality issues through continued monitoring and assessment, Southampton has declared 10 Air Quality Management Areas (AQMAs) to date. The location of these AQMA's is shown in figure 1.

The AQMA's have been declared for exceedances of the UK objective for annual mean nitrogen dioxide (NO_2) (40µg/m^3). Southampton also monitors particulate matter (both PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2) and ozone (O_3). Please see below a link to the SCC website which has maps of the AQMAs and descriptions.

http://www.southampton.gov.uk/planning/air-quality-planning/air-quality-management-areas.aspx

AQMAs are also discussed further in section 2.1 of this document.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

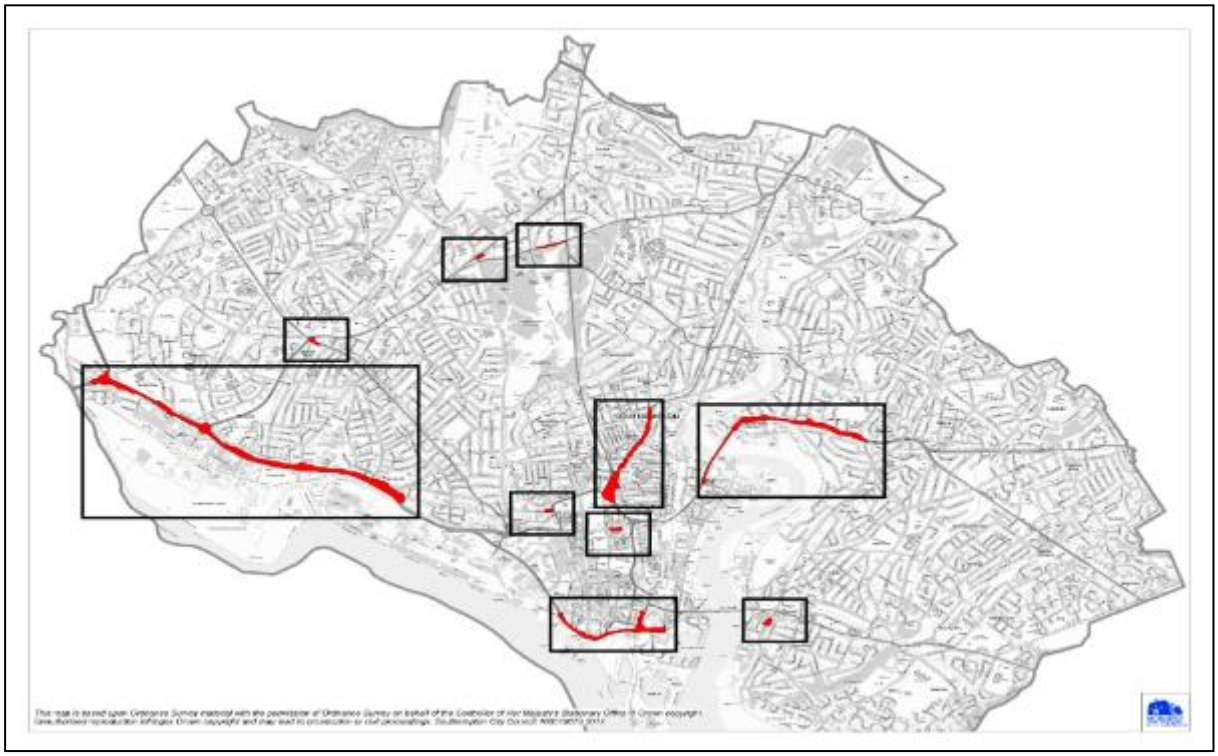


Figure 1 SCC Air Quality Management Areas

Air Quality Management in Southampton

Local Air Quality Management (LAQM) is overseen by SCC's Scientific Service, including monitoring pollution, bidding for funds from Defra and other sources and implementing air quality improvement measures.

SCC is a unitary authority and therefore the local transport authority. SCC's Scientific Service works closely with the Strategic Transport department to ensure that actions to improve the local transport network considers improvements in air quality and to identify opportunities to introduce new, innovative measures that will reduce emissions and promote active and sustainable travel.

Sources of Pollution

In 2018, SCC undertook a Clean Air Zone feasibility study which identified the sources that contribute to nitrogen oxide concentrations at various locations across the city. Figure 2 demonstrates how the contribution to road transport NO_x emissions, a precursor for the pollutant nitrogen dioxide (NO_2), varies across the city. Private diesel vehicles contribute most significantly across the city, therefore enabling and encouraging people to walk and cycle, use public transport or low emission vehicles will therefore contribute the most to improving local air quality in Southampton. Improvements from other sources can also be achieved through reductions in emissions from other transport modes such as shipping and rail and reducing emissions from industry, cleaning the local bus fleet, encouraging freight consolidation and more sustainable logistics practices and a drive toward low emission business fleets in the city.

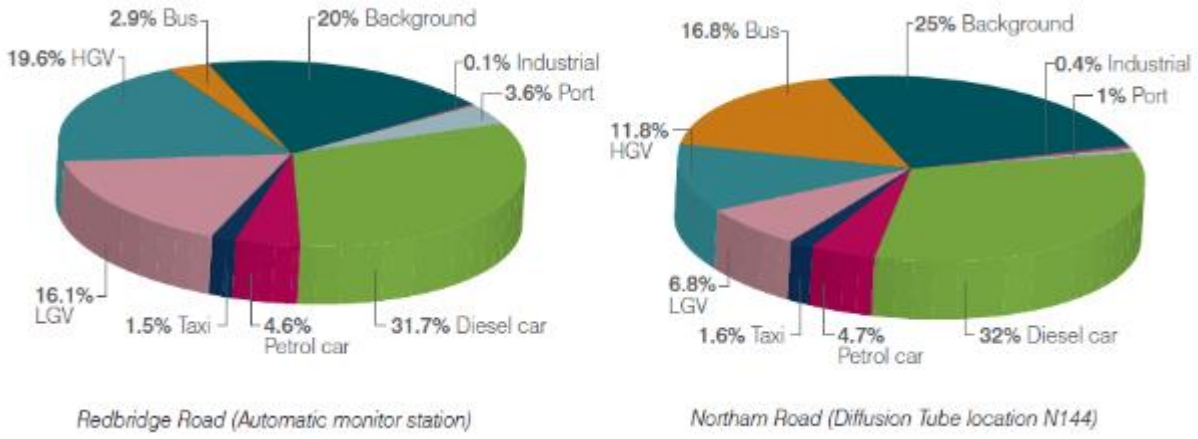


Figure 2 Modelled NO_x source apportionment at two monitoring locations (% contribution, 2015)

Strategies

Clean Air Strategy

SCC introduced the Clean Air Strategy 2016-2025 in November 2016. The strategy details the ways SCC works together with partners including neighbouring local authorities, public transport operators and local businesses and organisations to identify ways to improve air quality and support ongoing improvements in air quality

across the city. This Strategy was updated in January 2019 to account for the completion of the Local NO_2 Plan.

Cycling Strategy

In 2017, the SCC Cycling Strategy 2017-2027 was launched which outlines the work that has already been undertaken, sets out a plan of proposed improvements to the cycle network and identifies initiatives to realise the benefits that cycling can bring to the city. This strategy is accompanied by a three year delivery plan, setting out how SCC intends to spend confirmed funds and resources on the activities and schemes in the Strategy.

Electric Vehicle Action Plan

SCC are implementing an electric vehicle action plan which will see a citywide network of electric vehicle charging infrastructure deployed at key locations to support and facilitate the use of electric vehicles by the public. Over 40 fast charge points are now in operation across 5 multi-story car parks. SCC are also introducing electric vans into the fleet as part of the plan with the aim for 90% of the fleet to consist of ultra-low emission vehicles by 2030

Figure 3 SCC fleet electric vehicle and two electric vehicle charge points at Grosvenor Square multi-storey car park

Local Transport Plan

Connected Southampton 2040 was published and adopted in March 2019. It sets out an ambitious long term strategy supported by a short-term Implementation Plan. The Plan aims to ensure that our transport policies, strategy and delivery plans better reflects and support bold and ambitious goals for sustainable and clean growth over the next twenty years, including:

- A Zero Emission City

- The Southampton Mass Transit System
- A liveable city centre
- Active Travel Zones
- A network of Park and Ride sites
- Better connectivity.

The plan aspires help in transforming public transport in the city and create active travel zones where short journeys made by walking and cycling will be the norm. More information can be found at the Southampton transport website[4].

Figure 4 show the links between the council's strategies that support delivery of air quality improvements in the city.

Figure 4 Relevant strategies and plans for managing air quality in Southampton

[4] https://transport.southampton.gov.uk/

Actions to Improve Air Quality

Local NO_2 Plan

In 2017, SCC received a Ministerial Direction requiring the council to submit to the Secretary of State a full business case, as part of the UK Plan for tackling roadside nitrogen dioxide concentrations, to ensure the EU legal limit for nitrogen dioxide is achieved in the shortest possible time (the Local NO_2 Plan). Air quality modelling demonstrated NO_2 compliance will be achieved at all locations in Southampton in 2020. The highest baseline (i.e. no intervention) concentration of NO_2 on the A3024 Northam Bridge is modelled to be 38 µg/m^3 in 2020. To support the CAZ feasibility study, SCC undertook as 12 week consultation which received over 9,300 responses and helped to refine the feasibility study prior to submission of the Full Business Case to the Secretary of State[5]. Measures are to be implemented in 2019 that can achieve reductions in NO_x emissions, and can be delivered in 2019, to increase the likelihood of compliance and reduce exposure of residents to pollutants. These are:

- Support for delivery service planning and freight consolidation for Heavy Goods Vehicle and logistical operations in Southampton.
- Introduction of citywide traffic regulation condition requiring a minimum euro VI standard for all operational buses.
- The introduction of new taxi and private hire vehicle licensing conditions requiring a minimum euro 6 diesel/euro 4 petrol for newly licensed vehicles in 2020 and for all licensed taxis and private hire vehicles to meet this standard by 2023.
- Targeted promotion of active and sustainable travel on the A3024 (location of highest modelled NO_2 concentrations in 2020) through MyJourney.
- Expansion of low emission taxi incentive scheme for Southampton licensed taxi and private hire vehicles.
- A free trial scheme for taxi and private hire operators to consider the benefits of electric vehicles.
- Introduction of rapid charging points to support uptake of electric vehicles within the taxi and private hire fleet.

The Local NO_2 Plan was approved by the Secretary of State in early 2019 and is being delivered in accordance with the implementation plan. It will include further

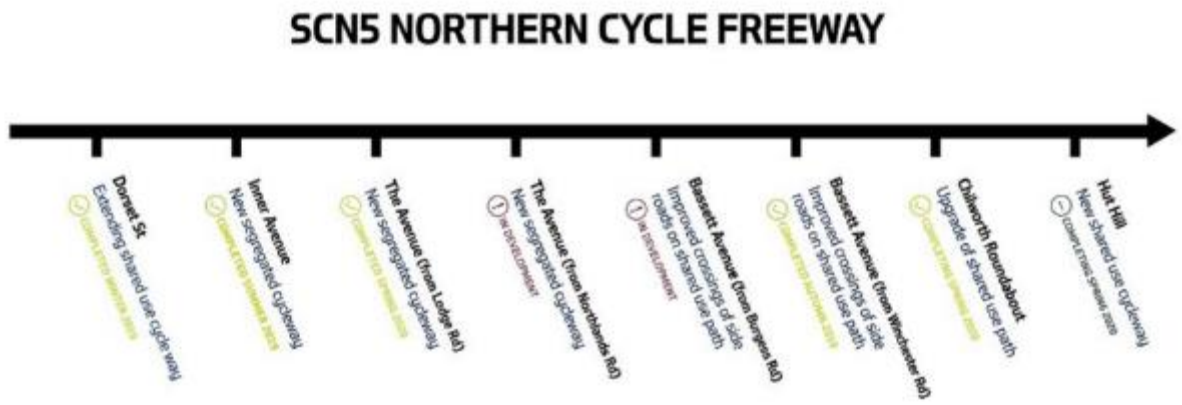
[5] https://www.southampton.gov.uk/images/clean-air-zone-consultation-feedback_tcm63-404512.pdf

monitoring and evaluation of air quality and improvement measures to ensure that the NO_2 plan achieves the desired outcomes and risks to delivery of these outcomes are identified and mitigated against.

Other Measures

In addition to the Local NO_2 Plan, SCC has implemented a number of other measures to improve air quality in the city, including:

- Funding secured to deliver SCN 1, 3 and 5 cycle routes. SCN 1 has been completed with 5, 3 and 5 well underway.



- Successfully secured £2.7m funding to retrofit Southampton's operational buses with Clean Vehicle Retrofit Accreditation Scheme (CVRAS) accredited technology. Bus operators in the city have match funded this work with £815,680. 101 buses have been retrofitted in 2019 with 44 remaining retrofits to be completed in early 2020.
- Continuing the Low Emission Taxi Incentive Scheme in partnership with Eastleigh Borough Council, replacing older, more polluting taxis with hybrid and electric vehicles. A total of 104 grants have been awarded to drivers licensed in Southampton and 19 in Eastleigh.
- Continued investment in our fleet of electric vehicles with 35 in total expected in early 2020 and an aim for 90% of the fleet to be ultra-low emission vehicles by 2030.
- Installing electric charge points for our electric fleet with 27 points active or being commissioned.
- Installing 44 new public EV charge points in city centre multi-storey car parks as well as a taxi and private hire vehicle exclusive rapid charger and additional fast chargers with another set due to be completed in early 2020.
- Offering charging for electric vehicles on the public network, currently free of charge.
- 90% discount on city centre parking season ticket.
- Free passage on the Itchen Toll Bridge for EVs.

- Extending the age limit for hybrid private hire and hackney carriage vehicles licensed in Southampton from 9 years to 12.
- Allowing smaller electric vehicles to be licensed as private hire and hackney carriages to encourage uptake of EV's in the city's fleet.
- Continuation of the air alert pollution forecasting and alert system.
- MyJourney engagement with communities, businesses and residents throughout 2019 to encourage active and sustainable travel.
- Monitoring air quality at 4 automatic stations across the city and approx. 90 diffusion tubes.
- Launching the Green City Charter and developing the Green City Plan which aims to go beyond statutory requirements and aim for long term goals in air quality and public health and other environmental topics including sustainable transport and climate change.

Conclusions and Priorities

Conclusions of ASR 2020 – Air Quality Monitoring

The 2020 Annual Status Report concludes there were 4 monitored exceedances of the annual mean NO_2 objective at relevant receptor locations, within 4 existing AQMAs in 2019. There were no monitored exceedances outside any of the existing AQMAs once adjusted for distance to relevant exposure. 6 of the existing 10 AQMAs did not record any exceedance of the annual mean NO_2 objective at relevant receptor locations in 2019. SCC will consider revoking these 6 AQMAs in the future once the medium to long-term trend of reducing NO_2 is confirmed by monitoring in future ASRs. It would be inappropriate to revoke them in this 2020 ASR until we can be certain that the downward trend is sustained over the medium-long term.

In 2018 there were 8 exceedances of the annual mean NO_2 objective at relevant receptor locations. Exceedances halved from 8 in 2018 to only 4 in 2019 at relevant receptors.

Priorities for 2020

In 2020, SCC will revise the existing AQAP to supplement the Local NO_2 Plan and align with further aspirations set in the Green City Charter.

Implementing remaining measures set in the Local NO_2 Plan will be key in 2020 to ensure compliance with the EU Ambient Air Quality Directive be met within the shortest possible time.

SCC will aim to go beyond meeting legal limits through the Green City Charter which aims to maintain momentum from the Local NO_2 Plan and deliver continual improvements to air quality and human health alongside other environmental themes.

Transforming Cities

The Southampton City Region has been successful in becoming one of the Transforming Cities Fund (TCF) City Regions. This means we are in a position to receive a share of £1.28bn funding over the next five years to allow us to progress our transport plans and meet aspirations set in our Local Transport Plan. SCC plan to do this by:

- Accelerating the delivery of the Southampton Cycle Network so that cycle routes are safe and convenient and we can become a true cycling city.
- Developing the Southampton Mass Transit System so we can encourage people to use public transport with priority for buses, new Park & Rides and reducing delays for everyone by using smart technology.
- Starting to change the city centre by making it a better place to walk and cycle, and by creating our gateways into the city at stations, the airport and ferry terminals. This will mean people can easily get between train, ferry, bus, plane, car and cycles.

SCC have developed the business case for a programme of schemes worth up to £100m which has been submitted to the Government for approval in early 2020. To date, Southampton has received £5.7m to support existing investment in bus priority and cycle lanes.

If successful, this will help Southampton deliver on its plans to think differently about transport and meet the challenges of the future. More information can be found on SCC's transport website.

Local Engagement and How to Get Involved

As private vehicles contribute the most to poor air quality in the city, the most effective way for the public to get involved with improving air quality in Southampton is to choose active and sustainable travel where possible. More information on this can be found at the MyJourney website which gives information on public transport, walking and cycling and other opportunities. For specific air quality inquiries please contact air.quality@southampton.gov.uk.

You can also get in touch with the following groups that are actively promoting improvements in air quality and the environment more generally in the area:

- Clean Air Network CleanAirNetwork@southampton.gov.uk
- Southampton Travel Planners Network (via MyJourney) https://myjourneysouthampton.com/workplaces/travel-plan-networks-0
- The Environment Centre: http://www.environmentcentre.com/about-us/contact-us/
- Sustrans: https://www.sustrans.org.uk/
- Clean Air Southampton: https://cleanairsouthampton.com/

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1 Local Air Quality Management

This report provides an overview of air quality in Southampton during 2019 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 Southampton City 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.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures

A summary of AQMAs declared by Southampton City Council can be found in Table 2.1.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online https://www.southampton.gov.uk/environmental-issues/pollution/air-quality/air-quality-management-areas.aspx

– see full list at **https://uk-air.defra.gov.uk/aqma/list>.** Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Since the last ASR was completed in 2019:

- SCC considered slightly increasing the size of AQMA 10 to include N172.

  4 New Road (N172) has slightly exceeded the annual mean NO2 for 5 years from 2015-2019. However, in 2019 it reduced to 40.2 ug/m^3, very slightly above the standard. 4 New Road is still currently a commercial premises, a Beauty Parlour, not residential. SCC decided to leave AQMA 10 as it is currently.

- SCC considered slightly increasing the size of AQMA 5 Redbridge Road, to incorporate the School fence line rather than the kerb of the main road. The NOx tube, N101 Redbridge School fence, exceeded the standard from 2016-2018. However, in 2019 the NO2 annual mean was 39.2 ug/m^3, below the standard. It would not have served any purpose to expand AQMA5, as the action plan would have remained the same as before. AQMA 5 will not be changed at this present time.

SCC’s network of approx. 90 diffusion tubes and 4 automatic monitoring stations enables us to evaluate the success of these measures and whether changes need to be made to AQMA boundaries in the future.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
No. 1 Bevois Valley	Declared July 2005	NO2 Annual Mean	Southampton	An area including a number of properties from Charlotte Place Roundabout to Bevois Valley Road	NO	50	µg/m3	**44.9**	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma%201_tcm63-363287.pdf
No. 2 Bitterne Road West	Declared July 2005, extended in 2012	NO2 Annual Mean	Southampton	An area including a number of properties from Northam Road and along Bitterne Road West	NO	37	µg/m3	**40.6**	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma%202_tcm63-363288.pdf

No 3. Winchester Road	Declared July 2005, reduced in size in 2006 after Further Assessment	NO2 Annual Mean	Southampton	An area including residential properties at the Winchester Road/Hill Lane Junction	NO	35	µg/m3	36.4	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma3_tcm63-363289.pdf
No. 4 Town Quay to Platform Road	Declared July 2005, increased in size in 2006 after Further Assessment	NO2 Annual Mean	Southampton	An area including a number of properties from Town Quay to Platform Road	NO	48	µg/m3	35.1	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma%204_tcm63-363310.pdf
No. 5 Redbridge to Millbrook Road West	Declared July 2005, merged into one AQMA in 2012 after Further Assessment	NO2 Annual Mean	Southampton	An area including a number of properties along Redbridge/ Millbrook Road	YES	45	µg/m3	40.9	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma%205%20(1%20of%203)_tcm63-363311.pdf
No. 6 Romsey Road	Declared July 2005, increased in size in 2012 after a Detailed Assessment	NO2 Annual Mean	Southampton	An area including a number of properties along Romsey Road from Teboura Way to Shirley High Street	NO	44	µg/m3	38	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma%206_tcm63-363314.pdf

No. 8 Commercial Road	Declared July 2008	NO2 Annual Mean	Southampton	An area including a number of properties along Commercial Road at the junction with Cumberland	NO	45	µg/m3	39.8	µg/m3	SCC AQAP	Adopted 2008	https://www.southampton.gov.uk/images/aqma%208_tcm63-363315.pdf
No. 9 Burgess Road	Declared April 2012	NO2 Annual Mean	Southampton	An area including a number of properties along Burgess Road at the junction with The Avenue	NO	47	µg/m3	**43.1**	µg/m3	SCC AQAP	Adopted 2012	https://www.southampton.gov.uk/images/aqma%209_tcm63-363316.pdf
No. 10 New Road	Declared April 2012	NO2 Annual Mean	Southampton	An area including a number of properties along New Road	NO	42	µg/m3	33.7	µg/m3	SCC AQAP	Adopted 2012	https://www.southampton.gov.uk/images/aqma%2010_tcm63-363317.pdf
No. 11 Victoria Road	Declared April 2012	NO2 Annual Mean	Southampton	An area encompassing a number of properties along Victoria Road at the junction with Portsmouth Road	NO	43	µg/m3	36	µg/m3	SCC AQAP	Adopted 2012	https://www.southampton.gov.uk/images/aqma%2011_tcm63-363318.pdf

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

2.2 Progress and Impact of Measures to address Air Quality in Southampton City Council

Defra's appraisal of last year's ASR concluded:

" In 2018 there was a total of 10 concentrations above the annual mean NO2 objective. Eight of these were exceedances at relevant receptor locations. One of these exceedances is at N172 (4 New Road - 41.3µg/m^3), which is currently outside of any AQMAs. A second exceedance outside of existing AQMAs is at N101 (Redbridge School Fence - 42.4µg/m^3). Due to persistent exceedance at these locations, SCC will consider amending the existing AQMAs to include N172 (AQMA No. 10) and N101 (AQMA No. 5). Other locations that exceed 40µg/m^3 but are not considered representative of relevant receptors are N152 (M271) and N185 (Redbridge Causeway. The maximum NO_2 concentration recorded at a relevant receptor was at N138 within AQMA No. 9, where the concentration was monitored as 47.3µg/m^3."

Since the last ASR was completed in 2019:

- SCC considered slightly increasing the size of AQMA 10 to include N172.

  4 New Road (N172) has slightly exceeded the annual mean NO_2 for 5 years from 2015-2019. However, in 2019 it reduced to 40.2 ug/m^3, slightly above the standard. 4 New Road is still currently a commercial premises, a Beauty Parlour, not residential. SCC decided to leave AQMA 10 as it is currently.

- SCC considered slightly increasing the size of AQMA 5 Redbridge Road, to incorporate the School fence line rather than the kerb of the main road. The NOx tube, N101 Redbridge School fence, exceeded the standard from 2016-2018. However, in 2019 the NO_2 annual mean was 38.1 ug/m^3, below the standard. It would not have served any purpose to expand AQMA5, as the action plan would have remained the same as before. AQMA 5 will not be changed at this present time.

Defra's appraisal of last year's ASR concluded:

"Southampton City Council last published an Air Quality Action Plan in 2008, as such three of their AQMAs do not have an action plan. The Council state that they are revising their new AQAP, however the Council has also been directed to complete a Local NO_2 Plan, as part of which a number of measures to improve air quality are being progressed, including a Clean Air Zone feasibility study. This work also provides more detailed information on air quality, including source apportionment, which is referenced within the ASR."

Southampton City Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures in 2019 are:

- Completed SCN 1 with 5 and 3 near completion.
- Retrofitted 101 buses with Clean Vehicle Retrofit Accreditation Scheme (CVRAS) accredited technology.
- Continuing the Low Emission Taxi Incentive Scheme in partnership with Eastleigh Borough Council, replacing older, more polluting taxis with hybrid and electric vehicles. 52 grants were awarded to drivers in 2019. 34% of taxis and private hire vehicles in SCC's fleet are at least hybrids.
- Installed 14 new public EV charge points in city centre multi-storey car parks as well as a taxi exclusive rapid charger and additional fast chargers with another set under construction.
- Continued to offer other EV incentives including 90% discount on city centre parking season ticket and free passage on the Itchen Toll Bridge for EVs.
- Consulted on the introduction of bus lane authorisation for SCC taxis and private hire vehicles.
- Published Connected Southampton 2040, SCC's current Local Transport Plan which strives for a zero emission city.
- Launched the Green City Charter.

- Submitted a bid for Transforming Cities Funding to make large scale improvements to sustainable travel infrastructure.

The continuation of MyJourney through the Access Fund engaged residents, business and communities throughout 2019, including:

- In 2019-20, 484 separate community events have been delivered to help residents explore more sustainable options to travel across the city. These included large events including ‘Cycle September’ and ‘Walktober’ and smaller regular events including bike doctor sessions.
- City wide behaviour change campaigns highlighted new infrastructure and encouraged residents to walk and cycle. Surveys and cycle counts show that following the campaign 38% of respondents said they would cycle more as a result of the campaign (the other 62% already cycle 2 times or more per week) and cycle counts identified an increase in the number of cyclists using the route compared to this time last year. Highest rate of increase during the campaign.

Southampton City Council expects the following measures to be completed over the course of the next reporting year:

- Updated Air Quality Action Plan
- Bus lane enforcement alternative implemented
- Quality bus partnership agreement adopted
- Remaining bus retrofits completed
- EVolve trials undertaken
- Completion of cycle routes SCN3 and 5
- Introduction of Air Quality planning guidance to deliver air quality improvements through development control
- Outcome of Transforming Cities Bid and, if successful,
- Adoption of the Green City Plan and implementation of related measures
- Supplementary Planning guidance published
- Sustainable Distribution Centre framework agreement adopted

- All delivery and Service Planning contracts signed and implemented
- Evaluation of CAZ feasibility study work undertaken

Southampton City Council's priorities for the coming year are to introduce the CAZ measures and ensure legal compliance with the EU Ambient Air Quality Directive is achieved within the shortest possible time, and to monitor and evaluate its success.

In light of the implementation of the Local NO_2 Plan, it is essential that the council continues to maintain momentum from improvements made to meet expectations of the city's residents and businesses towards improving air quality. SCC will use this as an opportunity to review and update the Air Quality Action Plan to identify measures that were not included with the non-charging scheme, but may be more appropriate for delivery on a more localised scale to ensure improvements are delivered across the 10 AQMAs.

The principal challenges and barriers to implementation that Southampton City Council anticipates facing are delivering improvements in air quality with increasing demand on the local road network and continued development and regeneration of the city. The council is also mindful of increasing levels of housebuilding outside of the city and it is hoped to mitigate this through the Local NO_2 Plan, Air Quality Action Plan, emerging Green City Charter and continued Access Fund/MyJourney delivery for sustainable and active travel in and around the city.

A further challenge is ensuring all residents and organisations in Southampton understand the role that they play in reducing air pollution. Whilst the council are able to influence air quality to some extent, it is important that the population seek active and sustainable travel options where possible to reduce their impact. Signatories to the Green City Charter will sign up to the vision of a greener city and, with support of the council, will be encouraged use their own control and influence to deliver improvements towards air quality.

Southampton City Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in all AQMAs by 2021-2023.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Clean Air Zone (Local NO2 Plan)	Promoting Low Emission Transport	Low Emission Zone (LEZ)	SCC, Defra, JAQU, DfT, New Forest District Council. Funded by JAQU	2018-2019	2019-2022	1. Achieve EU Directive 2. Accelerated uptake vehicles compliant with euro 6 emission standard	Compliance annual mean EU Ambient Air Quality Directive (40 µg/m3 at EU Directive locations)	Feasibility study and consultation complete. Full Business Case approved by Defra to implement a non-charging CAZ and Local NO2 Plan measures	2022	Significant engagement with consultation aided finalisation of Full Business Case (FBC) and preferred option identification. Concentrations of NO2 lower in local model than national model predicted, difference likely due to localised assumptions used in feasibility study. FBC sets out implementation plan for non-charging measures (which are included individually as measures in this update where they did not already exist).
2	Quality bus partnership agreement and minimum emission standard for buses	Promoting Low Emission Transport	Low Emission Zone (LEZ)	SCC, Local bus operators, DfT	2017 - 2019	2020	"Compliant" operation buses (meeting minimum Euro VI engines or Clean Vehicle Retrofit Accredited equivalent)	Up to 99 % reduction in NOx and PM emissions. Source apportionment of bus/coach estimated up to 38% in some locations with the highest bus movements (based on CBTF upgrades to SCC vehicle fleets). Purpose of condition is to maintain these improvements beyond 2020.	The Quality bus partnership agreement will require vehicles to meet Euro VI equivalent diesel standards in order to use the bus priority network in the city. The agreement will be adopted and funded through SCC and Hampshire County Council's Transforming Cities work.	2020	TRO funded through CAZ FBC. Informal consultation raised that implementing minimum emission standards through a TRO would be problematic. The agreement approach provides an opportunity to maintain the public transport service as alongside other routes for pollution reduction including the requirement for monitored anti-idling policies.
3	My Journey	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	DfT, SCC, Hampshire County Council, Portsmouth City Council, Eastleigh Borough Council	2016	2017-2020	Reduction in car journeys in the city	Indiscernible (note: work is underway to develop a method of estimating AQ improvement from Access Fund measures with the University of Southampton)	see details above	2020	

4	Local planning policies (citywide)	Policy Guidance and Development	Air Quality Supplementary Planning Guidance	SCC	August 2016 – March 2017	April –May 2017	Impact of development on local air quality	Indiscernible (note: Aim to reduce emissions and concentrations from future development)	Funding received to implement. Draft air quality planning document complete.	2020/21	Delayed publication due CAZ feasibility work. Deemed appropriate to implement as informal guidance in Summer 2020 before adopting formally as part of the upcoming Local Plan.
5	Cycle Lane/ Routes Provision	Transport Planning and Infrastructure	Cycle network	SCC	2012	2013-2020	Use of cycle route, private vehicles removed from road	< 1µgm3	SCC has committed to building 9 Southampton Cycle Network (SCN) routes. To date: -SCN1 and SCN3 are complete. - SCN4 is underway. - SCN5 The Avenue and Chilworth roundabout are complete and designs for The Avenue between Northam Road and Burgess Road are being developed.	The Cycling Strategy spans 2017 to 2027 and is supported by 3-year Delivery Plans.	A 10 year cycle strategy has been adopted identifying the investment required along the key cycle commuter routes into the city centre.
6	Freight consolidation and efficiency	Freight and Delivery Management	Freight Consolidation Centre	SCC, JAQU	2012	2014-2020	Reduction in HGV movements in the city. Use of SDC. Reduction in emissions from HGVs operating in Southampton.	Approx. 0.68 tonnes of NOx in 2020 if CAZ feasibility study consolidation is implemented. Approx. 0.18 tonnes of PM in 2020. Emission reductions would continue beyond 2020.	Freight consolidation, delivery and service planning and fleet accreditation measures approved in FBC. Planning stages of freight consolidation centres and 5 delivery and service plans underway. Sustainable Distribution Centre contract awarded and signed, to commence operation Q1 2020.	2022-2029 (dependent on funding)	Existing framework ends from 2019. A long term framework (up to 10 years) should be established to provide confidence to users that long term provision is available. Additional costs for double-handling of some goods will require subsidy to encourage uptake.
7	Shore power for cruise ships	Promoting Low Emission Transport	Other	SCC, ABP	2018/19	2019/20	Number of cruise ships using facility. Pollutant emissions from cruise ships at berth.	If 20% cruise ships plug in by 2020, 12.1% reduction in NOx emissions estimated (based on 90% reduction in NOx emissions when ships accessing shore power), saving 8.34 tonnes of NOx and 0.31	Business case made as part of CAZ feasibility study for shore-side power facilities to be integrated into the port of Southampton.	2020-21	Limited impact on EU relevant receptors for NO2 despite modelled improvements in emissions savings. Business case focuses on reduced exposure of Southampton population and therefore improve

								tonnes of PM in 2020.			public health rather than NO2 EU compliance. Bid unsuccessful. ABP currently bidding for funding to deliver shore-side power through the 'Solent Local Enterprise Partnership'.
8	Electric Vehicle Action Plan (EVAP)	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	SCC, DfT	2016	2017	Number of new public charging points installed over life of programme. Number of electric vehicles in SCC Fleet	Private vehicle and SCC fleet NOx, PM emission reductions	6 x 22kW 32A Type 2 Mennekes installed at 5 multi-storey car parks in city centre (free charging). Charging currently free. First fleet vehicles delivered and operational. 1 rapid charger installed with another under way, both with two co-located fast chargers Electric vehicles receive 90% discount in city centre car parks. Itchen Toll bridge free for electric vehicles.	2019/20	City wide Electric Vehicle Action Plan will see a network of charge points installed at city car parks, destinations and SCC properties. Currently identifying opportunities for on-street charging and further SCC depot charge points.
9	Taxi licensing conditions	Promoting Low Emission Transport	Taxi Licensing conditions	SCC	2018/19	2019 - 2023	Number of licensed taxi and private hire vehicles	Approx. 1.24 tonnes of NOx emissions reduced in 2020. Emission reductions would continue beyond 2020.	Newly licensed vehicles must meet Euro 6 diesel/4 petrol by 2020 and all vehicles by 2023. This will be consulted on in 2019 if the CAZ FBC is approved.	2019/20 (phase 1), 2022/23 (phase 2)	This will be supported by revised bus lane authorisations allowing only SCC licensed vehicles to access bus lanes. This will encourage operators to remain licensed in Southampton and meet the emission standards required rather than license elsewhere with no minimum emission standard.
10	Low emission taxi incentive scheme	Promoting Low Emission Transport	Taxi emission incentives	SCC, Eastleigh Borough Council, Defra AQ Grant	2015/16	2016 - 2021	Alternatively fuelled vehicles in SCC and EBC fleet	The existing scheme has £254,880 of Defra Air Quality Grant funding which at the time of scheme inception was anticipated to deliver 1681.5 Kg of NOx per year across Southampton and	47 grants issued in 2019 to SCC drivers for hybrid electric vehicles replacing euro 5 or older diesel vehicles. 5 grants issued in Eastleigh. Additional funding received through Clean Air Fund to expand the scheme	2021	Unable to licence smaller EVs in SCC due to space requirements. Licensing condition changed to allow vehicles that carry 3 passengers to be permitted only if EV. State aid considerations taken into account meaning

								Eastleigh (£151,624 per tonne NOx per year), a total of 19.2% reduction in estimated total taxi emissions. If the award of £164,250 was successful we could expect (based on the existing scheme assumptions) to achieve 1.08 tonnes of NOx per year reduced emissions.	and to allow vehicles carrying 5-8 passengers or wheel chair accessible to upgrade to Euro 6 diesel (SCC only).		incentives can only be offered for operating costs rather than to contribute toward the purchase cost of a vehicle.
11	Support ABP's Clean Air Strategy	Policy Guidance and Development Control	Low Emissions Strategy	Associated British Ports Southampton	2018	2018-2023	Emissions from activity within the Port (i.e. shipping, NRMM) and traffic accessing the Port (i.e. freight, cruise traffic).	Measures within strategy have significant potential to deliver emissions reductions for NOx and PM.	ABP supported in developing a port emissions inventory for the Clean Air Zone feasibility study. ABP have published their own Clean Air Strategy listing 19 measures that they aspire to implement by 2023.	2023	National Clean Air Strategy consultation includes a potential need for all ports to undertake an Air Quality Strategy. This does not include any requirements or targets for emissions reductions. Implementing measures is beyond SCC's control and relies on partnership work with ABP.
12	Straddle Carrier to Trial and monitor hybrid power	Promoting Low Emission Plant	Other measure for low emission fuels for stationary and mobile sources	SCC	2015	2016-17	1 Straddle Carrier fitted with hybrid technology, report produced	Allows DP World to target fleet of straddle carriers for NOx, NO2, PM emission reductions	Study complete and has created an inventory of all straddle carriers operating at the Port for DP World. NOx emissions from this study for DP World which measured NOx and NO2 emissions for six types of non-road mobile machinery (NRMM) straddle carrier diesel engines in use at the port of Southampton has been used to inform the CAZ feasibility study. From these measurements it generated total annual emission estimates for the fleet, accounting for each emission	Complete	Used portable emission measurement to understand emissions from various straddle carrier engines/technologies. During 2019 DP World had 24 Hybrid Straddle carriers delivered, which helped achieve the 50% reduction in NOx emissions since 2016 and reduced fuel consumption.

									standard of straddle carrier.		
14	Port booking scheme to incentivise low emission trucks	Promoting Low Emission Transport	Priority parking for LEV's	ABP.DP world	2017	2018-20	Emissions reductions from port related HGVs	CAZ feasibility study will establish concentrations attributable to HGV's associate with port activity.	Port booking system established including ANPR cameras, charging more polluting vehicles more for delivery slots.	2020	As from 1 January 2020 trucks with a licence plate of '08' or older (EURO IV class) will be charged £ 5.00 per visit to promote the use of newer trucks.
13	Cleaner Air Strategy publication	Policy Guidance and Development Control	Low Emissions Strategy	SCC	2016	2016	Publication date	N/A	Clean Air Strategy adopted in November 2016 and published on the council website.	2016	Published
15	Eastern Access Highway Scheme	Transport Planning and Infrastructure	Other	SCC, DfT	2016-18	2020-22	Scheme complete	TBC	2019	Q4 2022	
16	Millbrook Round about A33/ A35 Capacity	Transport Planning and Infrastructure	Other	SCC. DfT	20	2017/18	Traffic flow/capacity in roundabout vicinity. Monitored NO2 levels.	TBC	Scheme to improve capacity at A33/A35 Millbrook roundabout at the Redbridge Road/Millbrook Road AQMA on the Western Approach with anticipated benefits for air quality was completed in April 2019.	2018/20	Includes improved access to dock gate.
17	Bus Priority measures	Traffic Management	Bus route improvements	SCC	2014	2015-2017	Bus time reliability/Bus patronage	Indiscernible	Bus priority programme in progress with 42 junction improvements identified continue to be delivered. Junction improvements and virtual priority measures along A3024 between Botley Road and Bitterne Road East were complete December 2019. Measures along Portswood Road to be developed as part of multi-modal study in 2020. .	Ongoing	Investment in measures on high frequency city corridors that reduce journey times for buses and design out delays including bus lanes, bus gates, changes to traffic signals and "virtual" priority measures. To be built upon by Transforming Cities work (see below).
19	Retrofit for buses: SCRT for older	Vehicle Fleet Efficiency	Vehicle	SCC, DfT/JAQU	2015-16	2019	Trial result published, commitment from	Up to 99 % reduction in NOx and PM emissions. Source	Clean Bus Technology Fund successful. 101 out	2020	Upcoming bus partnership agreement will ensure these

	buses. Thermal management for Euro V						bus operators to retrofit	apportionment of bus/coach estimated up to 38% in some locations with the highest bus movements.	of 145 buses retrofitted.		standards are maintained by requiring all operational buses in Southampton to meet Euro VI standards in order to use the bus priority network.
20	Procure low emission vehicles in Council and partner fleets	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	SCC	Oct-Dec 2016	2017-20	Number of Low Emission Vehicles in council Fleet	Reduce NOx/PM emissions from SCC fleet vehicles	20 EV vans currently in SCC fleet. 8x EV charge points installed at West Park Car Park for SCC EV Fleet vehicle use. Order for 15 more to be delivered early 2020.	Ongoing replacement	SCC properties located across Southampton with differing power/capacity availability and requirements. Site surveys due to commence in 2019 to accommodate EV chargers for further fleet procurements.
21	Low emission vehicles supported in DSP work	Freight and Delivery Management	Delivery and Service plans	SCC	2016	2017	Electric delivery vehicle in use	Dependent on uptake	Funding received for DSPs as part of CAZ FBC. 5 to be provided to university, cruise ship operator and NHS premises. Currently working with operators to identify how they will promote the use low emission vehicles and cargo-bikes.	2018-20	Funding requested through CAZ Full Business Case to deliver 10 DSPs per year for 3 years in combination with fleet accreditation and freight consolidation.
22	Establish Clean Air Network	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	SCC, The Port, business stakeholders, Southampton University, local air pollution pressure groups, Environment Centre	December 2016-July 2017	2018	Organisations signed-up to CAN and pledges made and delivered. Events held.	Indiscernible	Events held throughout 2019 including national Clean Air Day.	Completed. Continued promotion and activity throughout 2018/19.	To be combined with an upcoming Green City Network which aims to meet the same outcomes across a broader set of environmental topics.
23	National Clean Air Day	Public Information	Other	SCC, Global Action Plan	Jan-June 2017	2018	Number of engagements during campaign	Private vehicle NOx, PM emission reductions	SCC hosted activities for the third National Clean Air Day in June 2019	2017 (First NCAD), 2018 (Second), 2019 (Third)	Hosted launch event of The Green City Charter.
24	airAlert	Public Information	Other	SCC, Sussex-air, Kings College London	2009	2010-2016	Users, alerts issued, satisfaction survey.	Reduced exposure by susceptible and/or vulnerable service users	568 users subscribed to the service in November 2019 28 airAlerts issued in	Complete. Ongoing promotion.	

									2019, 1 "High", 27 "Moderate".		
25	M271 Redbridge junction capacity work	Traffic Management	Strategic highway improvements	Highways England	2016	2019	Traffic flow improved		Scheme underway, due for completion Summer 2020	2020	Includes improved shared paths, shrub planting and resurfacing with low-noise material.
26	EV parking discounts	Promoting Low Emission Transport	Other	SCC	2017/18	2018	Number of EV parking permits issued	Reduced emissions from private vehicles	Discounts launched in 2018. 14 permits issued by December 2018.	Ongoing	
27	Itchen Toll EV Concessions	Promoting Low Emission Transport	Other	SCC	2017/18	2018	Number of EV pass transactions and smart cities cards issued for EV use	Reduced emissions from private vehicles	62 smart cards were issued in 2019 for EVs (dedicated SCC smart card for transport). Total of 8941 crossings during 2019.	Ongoing	
28	EV car clubs	Alternatives to private vehicle use	Car Clubs	SCC	2016	2017-18	Usage of cars	Dependent on uptake	Discussion with Enterprise Car Rentals over the deployment of EV's as part of the existing car club fleet continue. SCC seeking opportunities to align EV car club with internal car rental requirements for staff.	2019/20	On street infrastructure will need to be provided and managed. This is under review as part of EVAP for 2019 and as an element the Council's bid for Transforming Cities Funding
29	City Car Club	Alternatives to private vehicle use	Car Clubs	SCC	2014	2015-2018	usage of car club	Indiscernible	Over the course of the My Journey programme, 3 separate direct mail promotional campaigns advertising the Car Club and offering discounted membership have been run. Workplace travel officer is working to promote car club to employers	Ongoing	
30	ULEV Trials for Taxi and Private Hire Vehicles	Promoting Low Emission Transport	Taxi emission incentives	SCC	2018/19	2019/20	Number of ULEV trial participants	Reduced emissions from taxi and private hire vehicles	Funded through CAZ FBC. Two instillation days carried out with limited engagement with trade. To work with partner on an alternative approach in 2020.	2019/20	1 taxi exclusive rapid charger operational with another to be available early 2020 to support any uptake.

31	Anti-idling campaign / enforcement	Traffic Management	Anti-idling enforcement	SCC, The Environment Centre, JAQU/Defra	2017	2018	Number of engagements during campaign	Emissions reduced at point of idling (indiscernible reduction)	Campaign held in February - May 2018. Proposed requirement for bus operators to maintain an anti-idling policy as part of the bus partnership agreement.	Ongoing (2018 Campaign complete). Partnership agreement Summer Q3 2020.	Exploring options to implement no idling policy and enforcement supported by additional communication campaign including signage focussed in AQMAs
32	Eco Driver Training and telematics for Council Fleet	Vehicle Fleet Efficiency	Driver training and ECO driving aids	SCC	2016	2017-19	reduce fuel usage by 10%	TBC following scheme design/planning	Eco driving measure to be delivered in 2020 as part of fleet management and modernisation plan.	2020	SCC fleet upgrades will require drivers to operate electric vehicles. It is considered more effective to align this proposal with EV training rather than focus on diesel efficiency given this direction. Training has been given to new EV drivers. Use of telematics has been delayed due to concerns raised by trade unions.
33	Workplace and School Travel Plan	Promoting Travel Alternatives	School Travel Plans	SCC	2010	ongoing	100% of schools have travel plans in place	< 1µgm3	2 FTE workplace travel advisors in post from October 2017 1.6 FTE School Travel Plan Coordinators in post from July 2017 developing, monitoring and evaluating school travel plans using the STARS accreditation online toolkit.	Ongoing	61 organisations with a reach of over 44,000 staff have been helped to review staff travel, write a travel plan and deliver interventions which enable and encourage active travel. Workplace surveys show that the proportion of those using active travel for commuting increased from 19.1% to 26.0%.In the last year, officers have delivered 263 events in schools including scooter training, assemblies, cycle training, competitions and lessons have been delivered by the team, engaging with 11,469 individual pupils and 23029 engagements In Southampton, the proportion of pupils cycling and scooting

											to/from school has been increasing year-on-year over the last 3 years in engaged schools there has been a 9.4% increase in active travel to 78.5%.
34	Website and comms	Public Information	Via the Internet	SCC	2016	2017	Comms plan published	N/A	Ongoing website updates with information on CAZ consultation and local NO2 plan measures.	Ongoing	Air quality pages will be linked with a new Green City site which will also provide updated on relevant initiatives across the city.
35	City-wide fleet compositio n survey	Vehicle Fleet Efficiency	Other	SCC	Q1-3 2016	December 2016	Survey completion	N/A	ANPR camera survey completed in December 2016 to calculate emission standard of current vehicles using main roads	Complete (2017)	Survey has informed CAZ feasibility study.
36	Domestic solid fuel burning engageme nt programme	Public information	Other	SCC, third party partner	2020	2021	Number of leaflet drops, number of face to face engagements,	Targets emissions of PM, likely indiscernible	Bid submitted to Defra. Awaiting response.	2021	
37	Green Wall Alongside A33	Other	Other	SCC, Freight Liner	2016	2018-20	Impact on cycle rates (due to improved aesthetics). NO2 concentrations.	Indiscernible	Options still being considered by SCC and adjacent land owner.	2020	Barrier to implementation: Land ownership issues. Resource dedicated to overcoming this issue.
38	Green City Charter (GCC) and Green City Plan	Other	Other	SCC, Green City signatories	2018-2019	2020-2030	Implementation of Green City Plan. KPIs given in plan. Number of signatories.	Indiscernible. Series of projects.	GCC launch held during national clean air day 2019. Number of large businesses signed up to the charter. SCC's Green City Plan being drafted, to be published and adopted early 2020.	2030	The GCC came about as a result of the CAZ consultation where a large appetite for collective action towards improving various aspects of the environment was identified. The Charter includes a series of commitments SCC has for air quality alongside other relevant themes including sustainable transport and climate change. The Green City plan sets out further measures we will take to achieve them

39	Transforming Cities	Traffic management, Promoting Low Emission Transport, Promoting alternatives to private vehicles	Strategic Highways improvement	SCC, Hampshire County Council	2018-2020	2020	Implementation of measures as set out in bid.	TBC. Likely significant long-term benefit	£5.7m awarded in January 2019 as part of Tranche 1 and a further £57m in March 2020 in Tranche 2	2023	The bid sets out our aims to improve sustainable and active travel infrastructure by creating four radial bus corridors, park and ride facilities, local mobility hubs, smart technology, improvements to the SCN, active travel zones and improved bus interchanges.

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Southampton City Council is taking the following measures to address $PM_{2.5}$:

Southampton City Council is taking the following measures to address $PM_{2.5}$:

- The airAlert service that warns registered users of predicted moderate/high air pollution alerts helps Southampton residents with respiratory disease to reduce their exposure to pollution, including particulates. The service was developed with Sussex Air and Kings College London, with the support of our public health colleagues and the NHS.
- Southampton also works closely with the Port operator and its customers to identify and support initiatives that will reduce emissions. The Clean Air Network will develop over the coming years to engage with the key stakeholders in the city, including the port.
- The Clean Air Zone feasibility study will include estimated emissions for larger particulates (PM_{10}) from activity in the city which can be used as a proxy for determining the scale of $PM_{2.5}$ emissions.
- $PM_{2.5}$ is monitored in Southampton at the City Centre AURN Urban Centre station. $PM_{2.5}$ decreased substantially in 2019 compared to previous years. In 2011 it was 16 µg/m^3 but it has decreased steadily to 9.6 µg/m^3 in 2019.

$PM_{2.5}$ and Health

Based on national estimates, exposure to particulate matter in Southampton is estimated to contribute to 110 early deaths each year. Public Health England provide a Public health Indicator for $PM_{2.5}$ at a local authority level as a fraction of the mortality attributable to particulate air pollution. This enables local authorities to assess their local figure and take appropriate action to try to reduce it.

In Southampton Public Health England estimated the fraction of mortality at 6.2% attributable to particulate air pollution. This was slightly higher than the South East England figure of 5.2% and Hampshire at 5%. As a regional city the slightly higher figure is to be expected, compared to rural Hampshire.

Local hot-spots

Background pollutant maps provided electronically by Defra also give a basic local background concentration for $PM_{2.5}$. This information may show areas of higher $PM_{2.5}$ concentrations which Southampton City Council could assess to determine if there are local particulate issues where specific measures could be implemented to reduce particulate emissions.

The above noted methods will be used to establish local $PM_{2.5}$ annual mean concentrations, identify the local health burden of particulate matter and identify any local hot spot areas for particulate matter that have not been identified to date. This will enable Southampton City Council to establish baseline figures for $PM_{2.5}$ with the aim to improve on the established baseline, including the possibility of setting targets for a measured reduction in the near future, and to target resources to assess and improve any identified hot spot areas for $PM_{2.5}$. This data will be updated on an annual basis, and therefore provide some guidance of whether implemented measures are reducing local $PM_{2.5}$ concentrations.

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

This section sets out what monitoring has taken place and how it compares with objectives.

Southampton City Council undertook automatic (continuous) monitoring at 4 sites during 2019 Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/

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

Data from the automatic monitoring sites in Southampton can be found at: http://www.ukairquality.net

3.1.2 Non-Automatic Monitoring Sites

Southampton City Council undertook non- automatic (passive) monitoring of NO_2 at 89 sites during 2019, an increase from 64 sites in 2018. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C. Southampton City Council has developed its own excel spreadsheet to calculate distance correction using our in-house NO_2 diffusion tube input table.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[6], "annualisation" (where the data capture falls below 75%), and distance correction[7]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

There were 4 monitored exceedances of the annual mean NO_2 objective at relevant receptor locations, within 4 existing AQMAs in 2019. There were no monitored exceedances outside any of the existing AQMAs once adjusted for distance to relevant exposure. 6 of the existing 10 AQMAs did not record any exceedance of the annual mean NO_2 objective at relevant receptor locations in 2019.

The Exceedances listed below are all within the existing AQMAs

- N107 Cranbury Place -AQMA 1 Bevois Valley (corrected for distance, 44.9µg/m^3)

[6] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[7] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

- CM4 Onslow Road - AQMA 1 Bevois Valley Automatic Monitoring Station (not at a relevant receptor 41.4 µg/m^3 , on opposite side of the road from the residential receptors, adjacent to the Royal South Hants Hospital Staff car park)
- N138 66 Burgess Road - AQMA 9 (42.3 µg/m^3)
- N174 166A Bitterne Road West – AQMA 2 (40.6 µg/m^3)
- N201 289 Millbrook Road West – AQMA 5 (40.9 µg/m^3), although this new site only had 50% data capture for 2019, so had to be annulised and corrected for the 6.8 metre distance from the residential receptor, adding considerable uncertainty to the measurement. All the other monitoring locations within AQMA 5 were below the 40 µg/m^3 objective, including the Automatic AURN Station, which has far greater accuracy.

Other locations that exceed 40 µg/m^3 but are not considered representative of relevant receptors is N172 4 New Road, N185 Redbridge Causeway 1, N202 Redbridge Causeway North, N191 Marlands House, N192 Above Bar Bus Stops, N194 Vincents Walk Bus Stop

No annual means greater than 60 µg/m^3 were measured, which is used to indicate that an exceedance of the 1-hour mean objective is likely at the sites.

There were no exceedances of the NO_2 1 hour mean at any of the automatic sites in 2019.

All monitoring data presented has been ratified and corrected for bias. See Appendix C for further information on quality assurance/quality control.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year. There are no exceedances of the UK objective for the annual mean or daily mean PM_{10} in 2019. All monitoring data

presented has been ratified and corrected for bias. see appendix C for further information on quality assurance/quality control.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years. The annual mean PM_{10} Concentration in 2019 was 9.6 µg/m^3 . All monitoring data presented has been ratified and corrected for bias. see appendix C for further information on quality assurance/quality control.

3.2.4 Sulphur Dioxide (SO_2)

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2019 with the air quality objectives for SO_2. There were no exceedances of the UK objectives for SO_2 in 2019.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Southampton Centre AURN	Urban Centre	442579	112248	NO2, PM10 (FDMS), PM2.5 (FDMS), SO2, Benzene, O3	NO	Chemiluminescence (NO2), FDMS//Optical light-scattering (PM10 and PM2.5), ultra-violet fluorescence (SO2), pumped diffusion tube sampler (benzene)	27	20.7	2.5
CM4	Onslow Road	Roadside	442304	112771	NO2	YES	Chemiluminescence	n/a	2	1.3
CM6	Victoria Road	Roadside	443751	111123	NO2	YES	Chemiluminescence	1	3	1.3
CM7	A33 AURN	Roadside	437809	113560	NO2, PM10	NO	Chemiluminescence, FDMS TEOM	14.8	5.1	2.5

Notes:

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

(2) N/A if not applicable

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
N100	6 Sandringham Road	Urban Background	444387	114453	NO2	NO	N/A	N/A	NO	1
N101	Redbridge School Fence	Roadside	437548	113719	NO2	NO	0	6.3	NO	2.3
N103	485 Millbrook Road	Roadside	438808	112903	NO2	YES	0	12.1	NO	1.6
N104	Regents Park Junction	Roadside	439222	112850	NO2	YES	2.4	12	NO	3
N106	2 Romsey Road, Oakhill	Roadside	439752	113984	NO2	NO	0	4.4	NO	2.6
N107	Cranbury Place	Roadside	442364	112890	NO2	YES	0.5	1.8	NO	2.1
N109	72 Bevois Valley	Roadside	442585	113248	NO2	YES	0.5	3.6	NO	2.4
N110	Brintons Road 1	Urban Background	442579	112248	NO2	NO	27	20.7	YES	3.2
N111	Brintons Road 2	Urban Background	442579	112248	NO2	NO	27	20.7	YES	3.2
N112	Brintons Road 3	Urban Background	442579	112248	NO2	NO	27	20.7	YES	3.2
N113	206 Bitterne Road	Roadside	444124	113288	NO2	YES	0.7	5.1	NO	2.2
N114	Bitterne Library	Roadside	444131	113322	NO2	YES	1.9	3.2	NO	3.2
N115	54 Redbridge Road	Roadside	437939	113474	NO2	YES	0	8.7	NO	1.7
N116	57 Redbridge Road	Roadside	437952	113407	NO2	YES	0	12.9	NO	1.8

N117	Victoria Road (Lamp Post)	Roadside	443752	111121	NO2	YES	0.8	2.8	NO	2.7
N118	3 Rockstone Lane	Roadside	442472	113065	NO2	YES	3.7	3.8	NO	2.4
N120	6-9 Canute Road	Roadside	442716	111019	NO2	YES	0	3.8	NO	2.6
N122	151 Paynes Road	Roadside	440000	112633	NO2	YES	0	12.7	NO	1.7
N123	102 St Andrews Road	Roadside	442348	112305	NO2	NO	0	3.5	NO	3.3
N124	305 Millbrook Road	Roadside	439741	112753	NO2	YES	0	9.5	NO	2
N125	Princes Court	Roadside	443125	112641	NO2	YES	0	5.7	NO	2.5
N126	107 St Andrews Road	Roadside	442365	112286	NO2	NO	1.7	2	NO	2.7
N129	South West House	Roadside	442554	111021	NO2	YES	0	2.5	NO	2.9
N130	367A Millbrook Road	Roadside	439346	112821	NO2	YES	0	8.1	NO	2.3
N131	142 Romsey Road	Roadside	439378	114185	NO2	YES	0	4.8	NO	2.1
N133	539 Millbrook Road	Roadside	438609	113020	NO2	YES	0	33	NO	1.8
N134	435 Millbrook Road West Ladbrokes	Roadside	438980	112861	NO2	YES	0	11.5	NO	3.2
N138	66 Burgess Road	Roadside	441697	115288	NO2	YES	0	2.3	NO	1.5
N140	5 Commercial Road	Roadside	441628	112332	NO2	YES	2.4	2.2	NO	3.2
N141	Town Quay Road	Roadside	441923	110990	NO2	YES	0	3.2	NO	2.6
N143	102 Romsey Road	Roadside	439457	114150	NO2	NO	0	5.8	NO	1.9
N144	208 Northam Road	Roadside	443147	112709	NO2	NO	0	5	NO	2.5

N146	222 Northam Road	Roadside	443164	112741	NO2	NO	0	11.5	NO	1.8
N149	44B Burgess Road	Roadside	441552	115247	NO2	YES	0	2.6	NO	2.2
N151	134 Romsey Road	Roadside	439394	114176	NO2	YES	0	5	NO	1.8
N152	M271	Roadside	437327	113848	NO2	YES	18	4.8	NO	2.5
N158	24 Portsmouth Road	Roadside	443807	111123	NO2	NO	0	4.7	NO	2.6
N159	35 Portsmouth Road	Roadside	443740	111147	NO2	NO	0	3.2	NO	2.7
N161	30 Addis Square	Roadside	442705	114129	NO2	NO	0	6	NO	2.7
N162	263A Portswood Road	Roadside	442872	114336	NO2	NO	0	3.7	NO	2.6
N164	168 Portswood Road(Int.Food)	Roadside	442809	114241	NO2	NO	0	5.3	NO	2.9
N165	8 The Broadway	Roadside	442766	114181	NO2	NO	0	5.5	NO	2.6
N166	14 New Road	Roadside	442251	112129	NO2	YES	0	1.5	NO	2.8
N167	13 Romsey Road	Roadside	439759	114011	NO2	NO	0	5.8	NO	2.5
N168	23 Romsey Road	Roadside	439737	114025	NO2	NO	0	4.5	NO	1.8
N169	150 Romsey Road	Roadside	439361	114195	NO2	YES	0	4.4	NO	0.9
N170	Union Castle House (2)	Roadside	442482	111003	NO2	YES	NA	2.6	NO	2.5
N172	4 New Road	Roadside	442207	112126	NO2	NO	0	2	NO	2.9
N174	166A Bitterne Road West	Roadside	443959	113315	NO2	YES	0	6.7	NO	2.7
N175	38 Shirley High Street	Roadside	439959	113737	NO2	NO	0	8.8	NO	2.6
N176	Salisbury Arms, Shirley High Street	Roadside	439772	113952	NO2	NO	0	13.3	NO	2.2

N177	95 Shirley High Street (Windsor Castle Pub)	Roadside	439844	113907	NO2	NO	0	4.5	NO	2.6
N178	2 Gover Road	Roadside	437265	113682	NO2	NO	0	8.8	NO	2.1
N180	Opposite 5 Commercial Road	Roadside	441633	112318	NO2	YES	1	2.9	NO	2.4
N184A	Redbridge AMS (A)	Roadside	437811	113557	NO2	NO	16	14.6	YES	2.7
N184B	Redbridge AMS (B)	Roadside	437811	113557	NO2	NO	16	14.6	YES	2.7
N184C	Redbridge AMS (C)	Roadside	437811	113557	NO2	NO	16	14.6	YES	2.7
N185	Redbridge Causeway 1	Roadside	437167	113713	NO2	NO	29.2	2.4	NO	2.5
N186	Redbridge Causeway 2	Roadside	437126	113701	NO2	NO	7.5	2.9	NO	2.3
N187	Cobden Avenue	Roadside	444102	113872	NO2	NO	0	7	NO	0.75
N188	Blechynden Terrace, Taxi	Roadside	441300	112233	NO2	NO	NA	4	NO	2.4
N189	Cumberland House	Roadside	441790	112465	NO2	NO	0	2.1	NO	2.5
N190	Brunswick Apartments	Roadside	442024	112553	NO2	NO	0	5.1	NO	2.5
N191	Marlands House	Roadside	441915	112097	NO2	NO	2	1.3	NO	2.6
N192	Above Bar Street Bus Stop	Roadside	441961	112029	NO2	NO	NA	1.3	NO	2.6
N193	Above Bar Street Taxi Rank	Roadside	441975	112031	NO2	NO	NA	4.25	NO	2.6
N194	Vincents Walk Bus Stop	Roadside	442090	111775	NO2	NO	NA	4	NO	2.65
N195	Bargate Street	Roadside	441945	111655	NO2	NO	NA	0.65	NO	2.45
N197	351 Winchester Road	Roadside	440957	115151	NO2	YES	0	5.45	NO	2.65

N198A	Onslow Road (A)	Roadside	442304	112771	NO2	YES	NA	2.6	YES	1.8
N198B	Onslow Road (B)	Roadside	442304	112771	NO2	YES	NA	2.6	YES	1.8
N198C	Onslow Road (C)	Roadside	442304	112771	NO2	YES	NA	2.6	YES	1.8
N199	Dorset Street/Charlottes Place Crossing	Roadside	442210	112583	NO2	YES	16.5	3.5	NO	2
N200	Northam Bridge South	Roadside	443160	112765	NO2	NO	13.85	4	NO	2
N201	289 Millbrook Road West	Roadside	439759	112738	NO2	YES	6.8	1.2	NO	2
N202	Redbridge Causeway North	Roadside	437166	113755	NO2	NO	NA	1.2	NO	2.2
N204	6 Lodge Road	Roadside	442542	113261	NO2	NO	2.15	2.1	NO	2.55
N205	Stags Gate, Lodge Road	Roadside	442101	113438	NO2	NO	4.1	1.95	NO	2.35
N206	Charlottes Place	Roadside	442265	112516	NO2	YES	5	2.2	NO	2
N207	205 Waterhouse Lane	Roadside	439698	112806	NO2	NO	3.5	4	NO	2.5
N208	Sherwood Close	Roadside	441365	115202	NO2	NO	11.7	1.85	NO	1.45
N209	40 Burgess Road	Roadside	441246	115138	NO2	NO	2.2	1.55	NO	2.45
N210	18 Burgess Road	Roadside	441122	115118	NO2	NO	4	1.65	NO	2.45
N211	4 Coniston Road	Roadside	437332	113873	NO2	YES	0	4.15	NO	1.5
N213	277 Portswood Road	Roadside	442935	114374	NO2	NO	0	9.5	NO	2.2
N214	64 Burgess Road 2019	Roadside	441677	115280	NO2	YES	0	5.2	NO	2.1
N216	73 Lodge Road	Roadside	442352	113486	NO2	NO	1.4	4.3	NO	2.5
N217	11 Saxon Road	Roadside	440751	112188	NO2	NO	3	1.3	NO	2
N218	112 St Denys Road	Roadside	443547	114101	NO2	NO	0.5	1.2	NO	2.4

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
CM1	Urban Centre	Automatic	Urban Centre	Automatic	99	99	32	33	29.6	28.9	27.8
CM4	Roadside	Automatic	Roadside	Automatic	95	94.5	39.6	**45.7**	**43**	39.9	41.4
CM6	Roadside	Automatic	Roadside	Automatic	44	44.2	**42**	**43.4**	**42.2**	37.0	36.0
CM7	Roadside	Automatic	Roadside	Automatic	96	96		43	39.9	35.0	32.5
N100	Urban Background	Diffusion Tube	Urban Background	Diffusion Tube	100	100	17.2	18.6	18.6	17.1	18.1
N101	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100		54.3	54.3	42.4	39.2
N103	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	31.7	33.7	33.7	32.0	29.8
N104	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	38.4	**40.3**	**40.3**	36.4	34.0
N106	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	37.9	39.9	39.9	37.0	35.4
N107	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**53.7**	**52.7**	**52.7**	**48.0**	**46.5**
N109	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	37.2	**40**	**40**	39.3	38.0
N110	Urban Background	Diffusion Tube	Urban Background	Diffusion Tube	100	100	25.4	26.5	26.5	29.5	27.8
N111	Urban Background	Diffusion Tube	Urban Background	Diffusion Tube	100	100	25.9	27	27	29.5	28.1
N112	Urban Background	Diffusion Tube	Urban Background	Diffusion Tube	100	100	26.1	26.2	26.2	28.8	28.7
N113	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	34.9	38.2	38.2	32.9	32.7

N114	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	32.8	35.9	35.9	33.7	32.8
N115	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	36.4	38.4	38.4	34.4	32.8
N116	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	38.1	**40.5**	**40.5**	34.3	32.5
N117	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	36.4	36.1	36.1	33.3	33.7
N118	Roadside	Diffusion Tube	Roadside	Diffusion Tube	83	83	34.8	37.1	37.1	36.2	35.0
N120	Roadside	Diffusion Tube	Roadside	Diffusion Tube	75	75	38	**40.3**	**40.3**	37.2	35.8
N122	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	31.5	32.8	32.8	28.2	31.2
N123	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	32.8	35.5	35.5	34.2	32.7
N124	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	37.3	**40.2**	**40.2**	34.8	34.7
N125	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	35.3	38.7	38.7	36.2	37.0
N126	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	32.8	36.4	36.4	35.9	32.4
N129	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	28.8	30.7	30.7	28.9	29.5
N130	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**44.8**	**44.9**	**44.9**	**42.3**	39.2
N131	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	37.9	38.2	38.2	37.8	36.5
N133	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	30.7	31.4	31.4	27.7	28.0
N134	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	37.6	**41.2**	**41.2**	38.0	33.8
N138	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**43.8**	**46.8**	**46.8**	**47.3**	**43.1**
N140	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**49.6**	**49**	**49**	**45.2**	**44.5**

N141	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	30.5	36.8	36.8	35.2	33.2
N143	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	34.4	37.3	37.3	35.5	35.0
N144	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	31.8	36.4	36.4	32.5	30.3
N146	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	28.7	30.5	30.5	27.8	28.1
N149	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	32.5	31.4	31.4	31.5	29.7
N151	Roadside	Diffusion Tube	Roadside	Diffusion Tube	83	83	37.4	**40**	**40**	37.0	36.7
N152	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**49.1**	**52.2**	**52.2**	**42.2**	39.9
N158	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	36.6	**40.4**	**40.4**	34.8	34.6
N159	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	25.9	32.7	32.7	32.1	32.1
N161	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	32.5	35.4	35.4	33.0	28.5
N162	Roadside	Diffusion Tube	Roadside	Diffusion Tube	67	67	37.7	37.1	37.1	37.5	35.1
N164	Roadside	Diffusion Tube	Roadside	Diffusion Tube	83	83	32.3	35.7	35.7	34.2	29.5
N165	Roadside	Diffusion Tube	Roadside	Diffusion Tube	75	75	32.3	34	34	32.6	30.9
N166	Roadside	Diffusion Tube	Roadside	Diffusion Tube	67	67	38.1	39.8	39.8	35.9	33.7
N167	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	33.5	36.3	36.3	35.1	35.0
N168	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	36.4	**40.6**	**40.6**	36.5	35.1
N169	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**40.6**	**42.5**	**42.5**	**42.8**	38.9
N170	Roadside	Diffusion Tube	Roadside	Diffusion Tube	83	83	38.7	41.7	41.7	39.0	37.0

N172	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	**42.9**	**45.1**	**45.1**	**41.3**	**40.2**
N174	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	37.6	**42.8**	**42.8**	**41.5**	**40.7**
N175	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	39	0	0	38.3	35.5
N176	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100	38	43.1	43.1	35.6	32.1
N177	Roadside	Diffusion Tube	Roadside	Diffusion Tube	92	92	36.7	38.8	38.8	38.6	35.2
N178	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100				24.3	24.0
N180	Roadside	Diffusion Tube	Roadside	Diffusion Tube	83	83				**40.5**	39.3
N184A	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100					36.2
N184B	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	83					33.5
N184C	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	83					34.5
N185	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100				**53.9**	**43.0**
N186	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100				39.0	35.2
N187	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	100					32.7
N188	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	92					32.6
N189	Roadside	Diffusion Tube	Roadside	Diffusion Tube	91	83					36.3
N190	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	92					39.0
N191	Roadside	Diffusion Tube	Roadside	Diffusion Tube	82	75					**42.5**
N192	Roadside	Diffusion Tube	Roadside	Diffusion Tube	91	83					**41.9**

N193	Roadside	Diffusion Tube	Roadside	Diffusion Tube	91	83	-				35.3
N194	Roadside	Diffusion Tube	Roadside	Diffusion Tube	91	83	-				**43.6**
N195	Roadside	Diffusion Tube	Roadside	Diffusion Tube	91	83	-				37.7
N197	Roadside	Diffusion Tube	Roadside	Diffusion Tube	90	75	-				37.5
N198A	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	83	-				33.4
N198B	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	83	-				33.0
N198C	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	83	-				33.9
N199	Roadside	Diffusion Tube	Roadside	Diffusion Tube	78	58	-				35.8
N200	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	75	-				30.2
N201	Roadside	Diffusion Tube	Roadside	Diffusion Tube	56	42	-				**55.9**
N202	Roadside	Diffusion Tube	Roadside	Diffusion Tube	89	67	-				**46.5**
N204	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	75	-				35.6
N205	Roadside	Diffusion Tube	Roadside	Diffusion Tube	78	58	-				38.4
N206	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	75	-				39.4
N207	Roadside	Diffusion Tube	Roadside	Diffusion Tube	89	67	-				33.5
N208	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	75	-				32.6
N209	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	75	-				31.7
N210	Roadside	Diffusion Tube	Roadside	Diffusion Tube	89	67	-				38.1

N211	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	92	-				26.5
N213	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	92	-				28.8
N214	Roadside	Diffusion Tube	Roadside	Diffusion Tube	91	83	-				33.0
N216	Roadside	Diffusion Tube	Roadside	Diffusion Tube	78	58	-				37.8
N217	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	67	-				33.6
N218	Roadside	Diffusion Tube	Roadside	Diffusion Tube	100	33	-				36.4

☒ **Diffusion tube data has been bias corrected (confirm by selecting in box)**

☒ **Annualisation has been conducted where data capture is <75% (confirm by selecting in box)**

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

Notes:

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

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

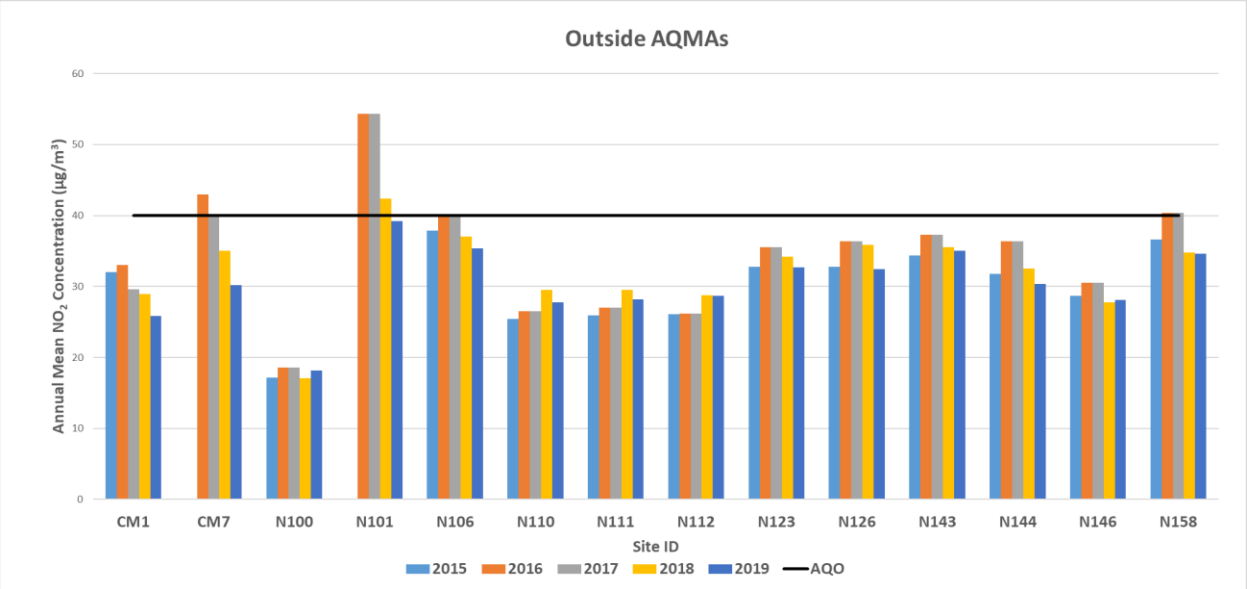
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

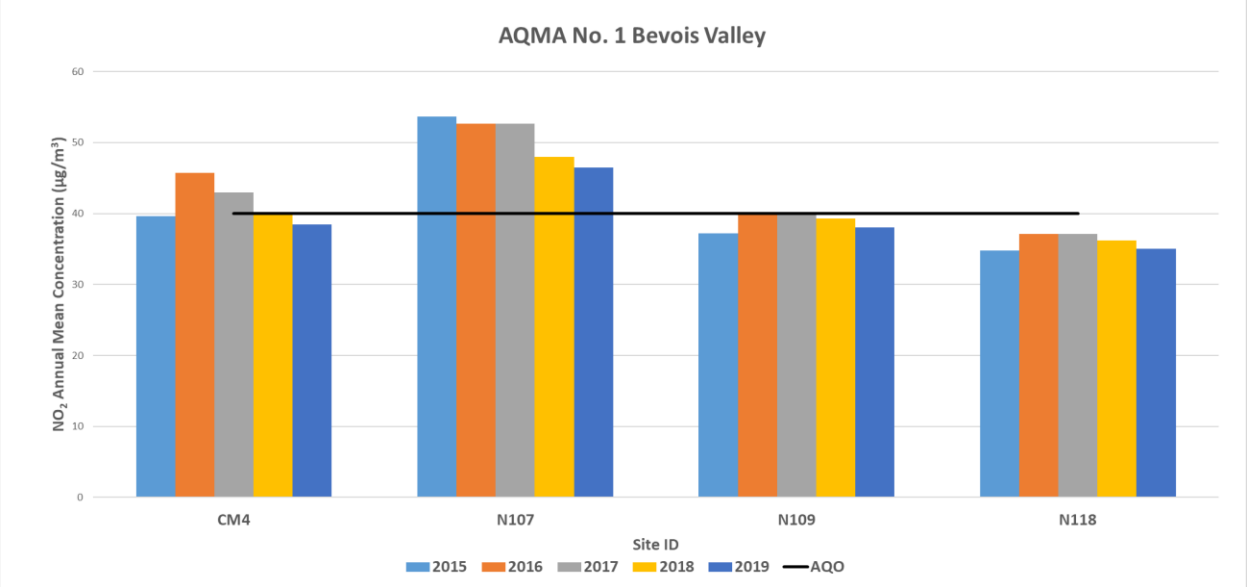
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

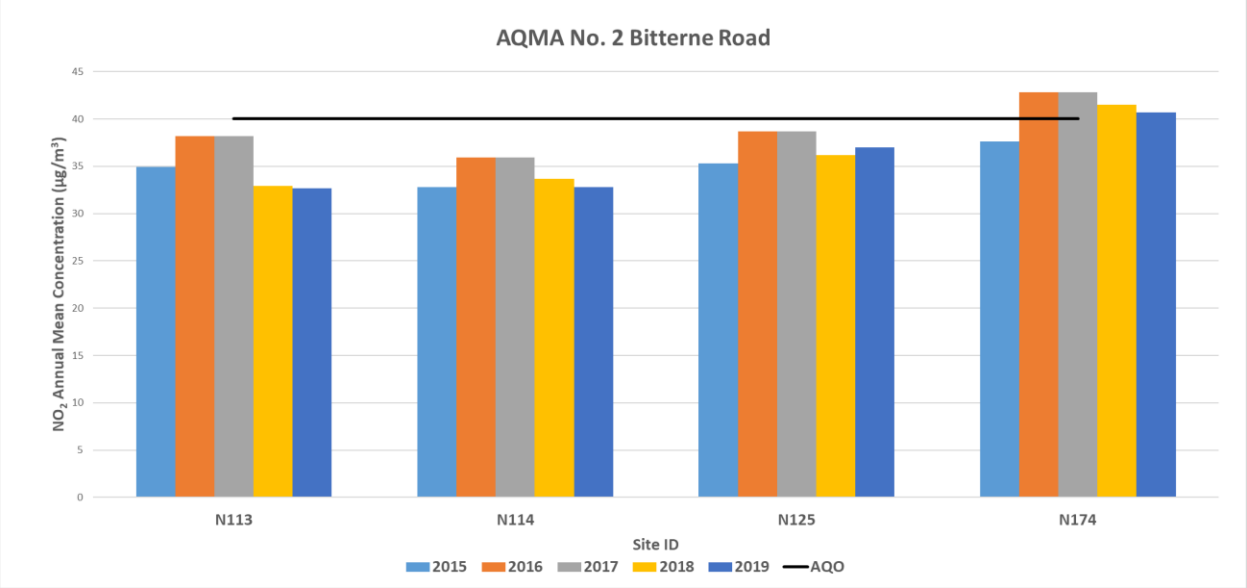
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

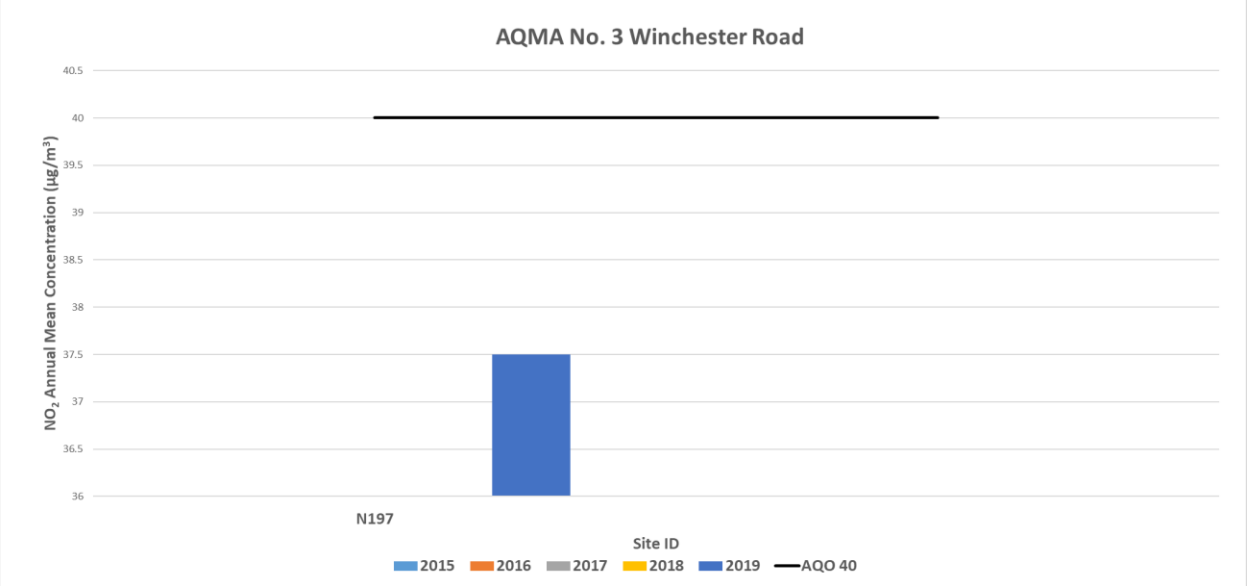
(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

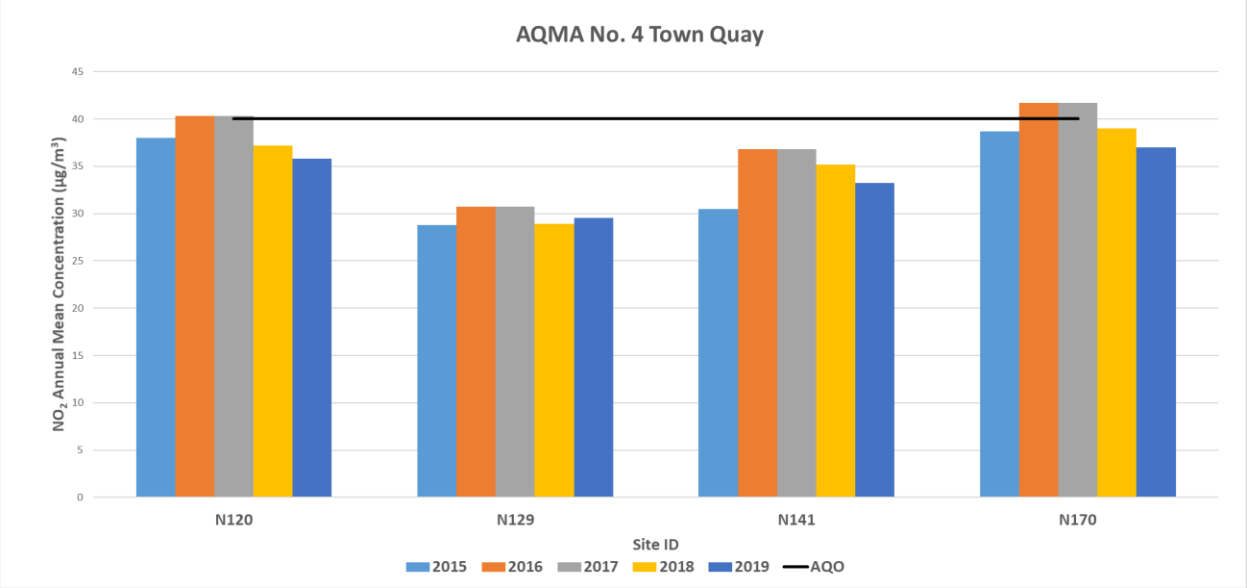
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

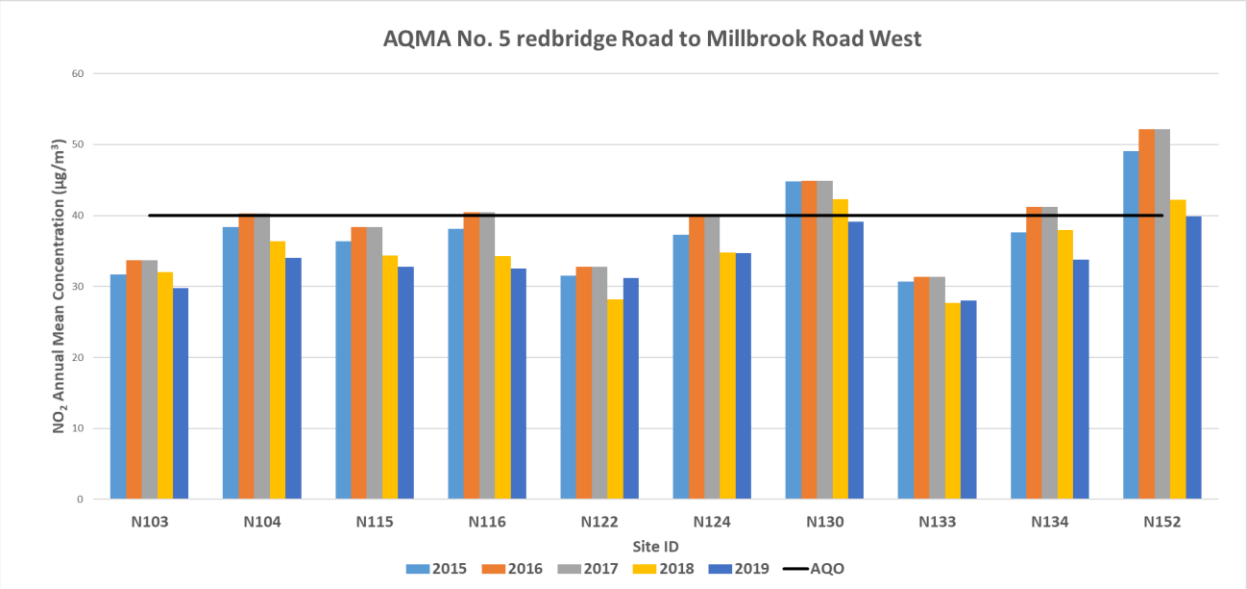


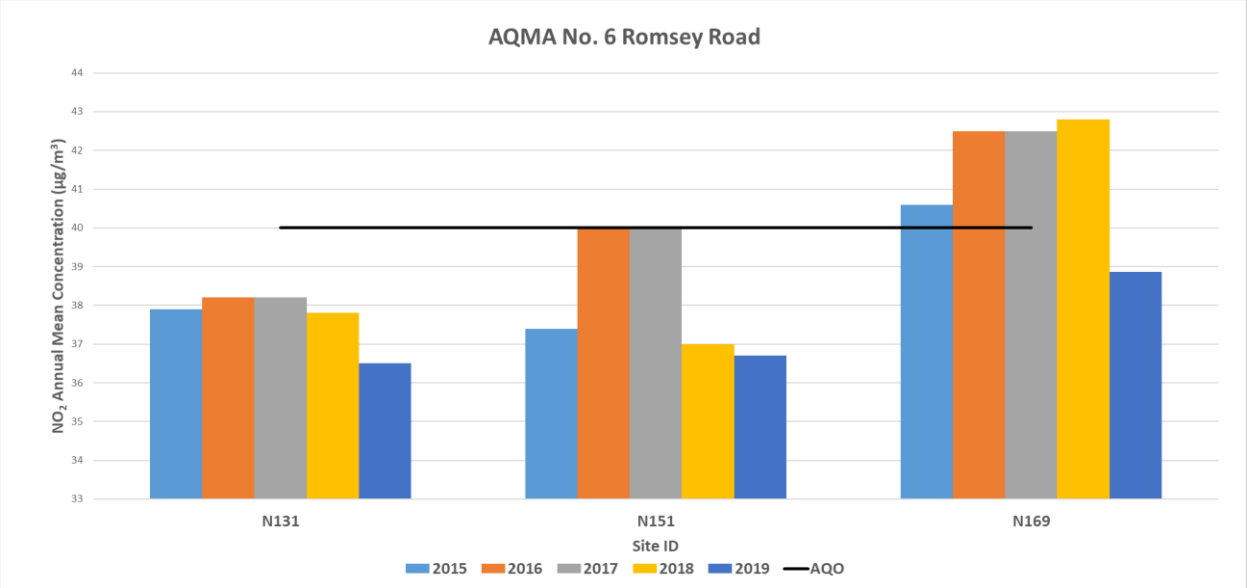


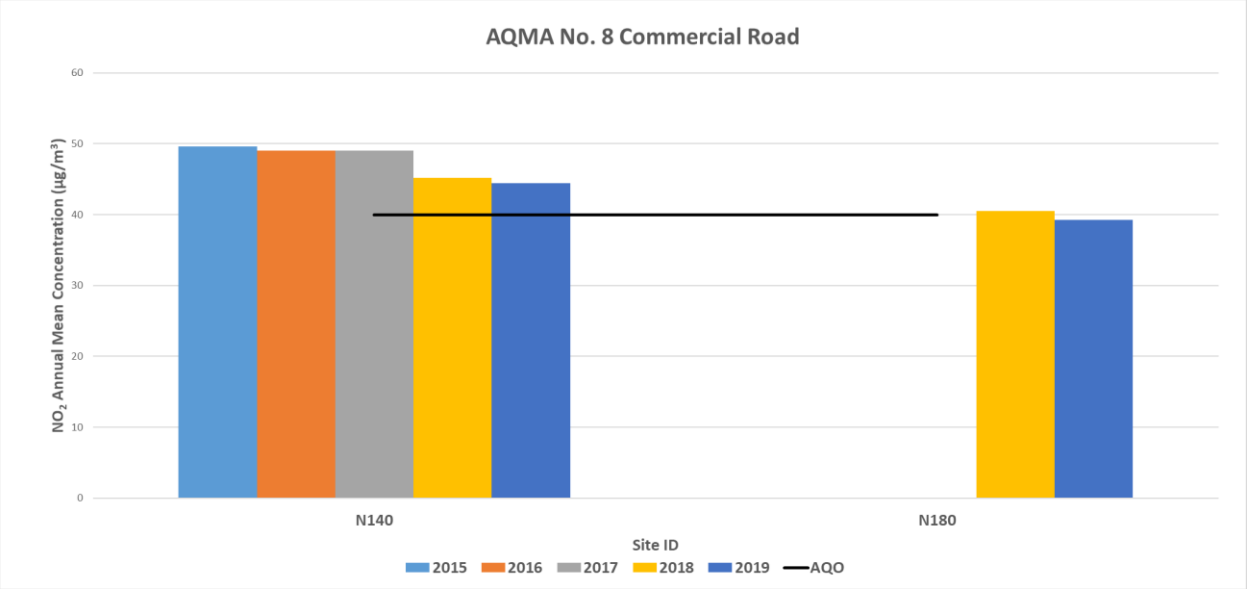

AQMA No. 2 Bitterne Road
NO2 Annual Mean Concentration (µg/m³)
45
40
35
30
25
20
15
10
5
0
N113
N114
N125
N174
Site ID
2015
2016
2017
2018
2019
AQO

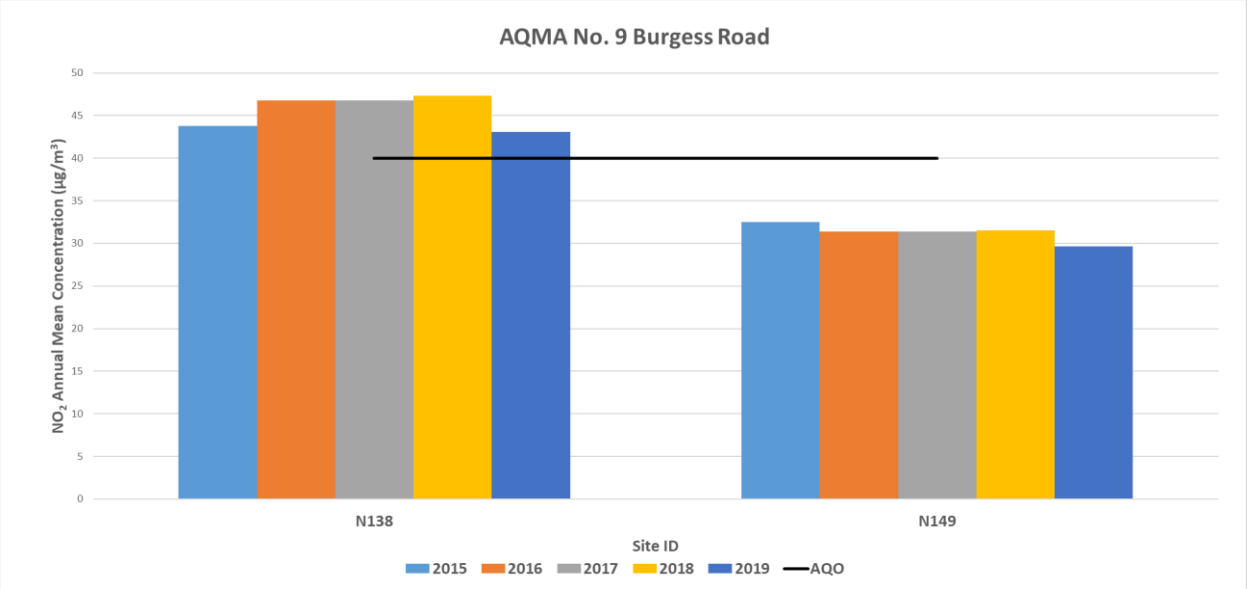

AQMA No. 3 Winchester Road
NO2 Annual Mean Concentration (µg/m³)
40.5
40
39.5
39
38.5
38
37.5
37
36.5
36
N197
Site ID
2015
2016
2017
2018
2019
AQO 40

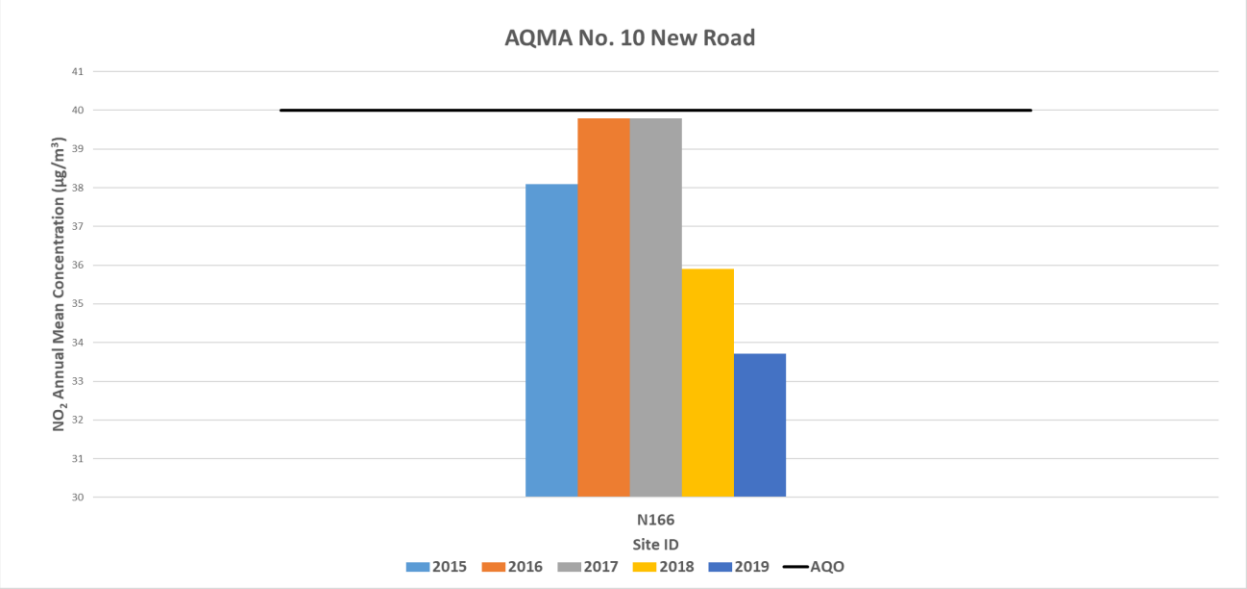

AQMA No. 4 Town Quay
NO2 Annual Mean Concentration (µg/m³)
45
40
35
30
25
20
15
10
5
0
N120
N129
N141
N170
Site ID
2015
2016
2017
2018
2019
AQO

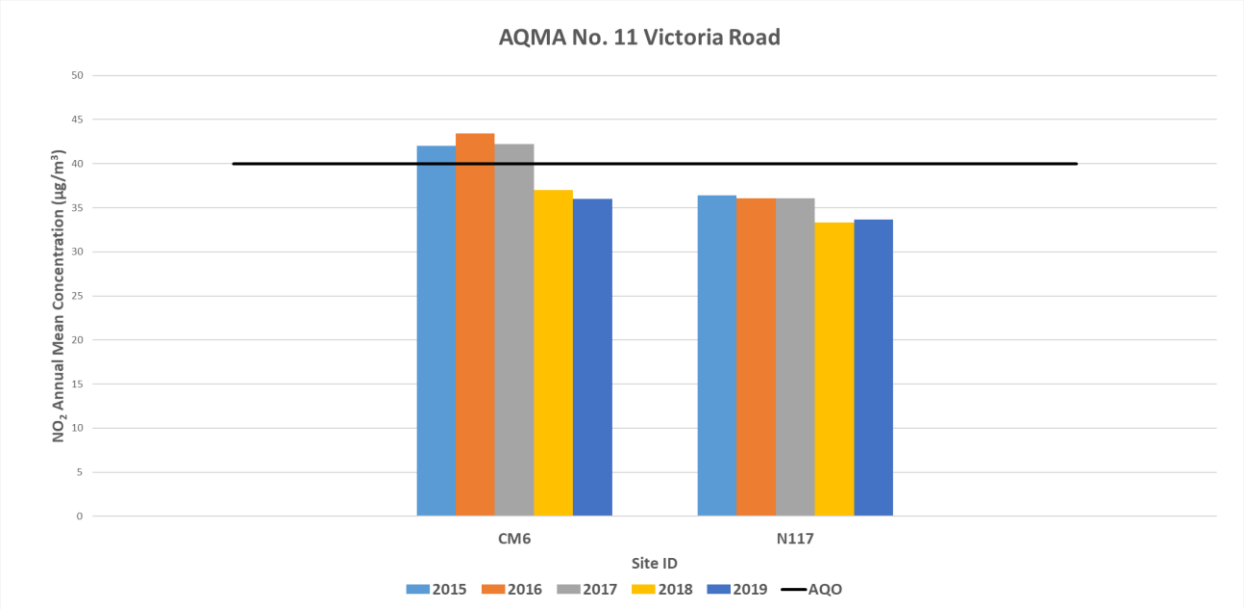

AQMA No. 5 redbridge Road to Millbrook Road West
NO2 Annual Mean Concentration (µg/m³)
60
50
40
30
20
10
0
N103
N104
N115
N116
N122
N124
N130
N133
N134
N152
Site ID
2015
2016
2017
2018
2019
AQO


AQMA No. 6 Romsey Road
NO2 Annual Mean Concentration (µg/m³)
44
43
42
41
40
39
38
37
36
35
34
33
N131
N151
N169
Site ID
2015
2016
2017
2018
2019
AQO


AQMA No. 8 Commercial Road
NO2 Annual Mean Concentration (µg/m³)
60
50
40
30
20
10
0
N140
N180
Site ID
2015
2016
2017
2018
2019
AQO


AQMA No. 9 Burgess Road
NO2 Annual Mean Concentration (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
N138
N149
Site ID
2015
2016
2017
2018
2019
AQO


AQMA No. 10 New Road
NO2 Annual Mean Concentration (µg/m³)
41
40
39
38
37
36
35
34
33
32
31
30
N166
Site ID
2015
2016
2017
2018
2019
AQO



Please note the data presented in the graphs above show monitored NO_2 annual means before the adjustment factor for distance correction to the relevant receptor has been undertaken

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
CM1	Urban Centre	Automatic	Urban Centre	Automatic	99	99	**3**	**0 (111)**	**0**	**0**	**0**
CM4	Roadside	Automatic	Roadside	Automatic	94	94	**0 (118)**	**6**	**0**	**0**	**0**
CM6	Roadside	Automatic	Roadside	Automatic	76	76	**5**	**8 (185)**	**9 (178)**	**0**	**0(133)**
CM7	Roadside	Automatic	Roadside	Automatic	97	97		**0**	**0**	**0**	**0**

Notes:

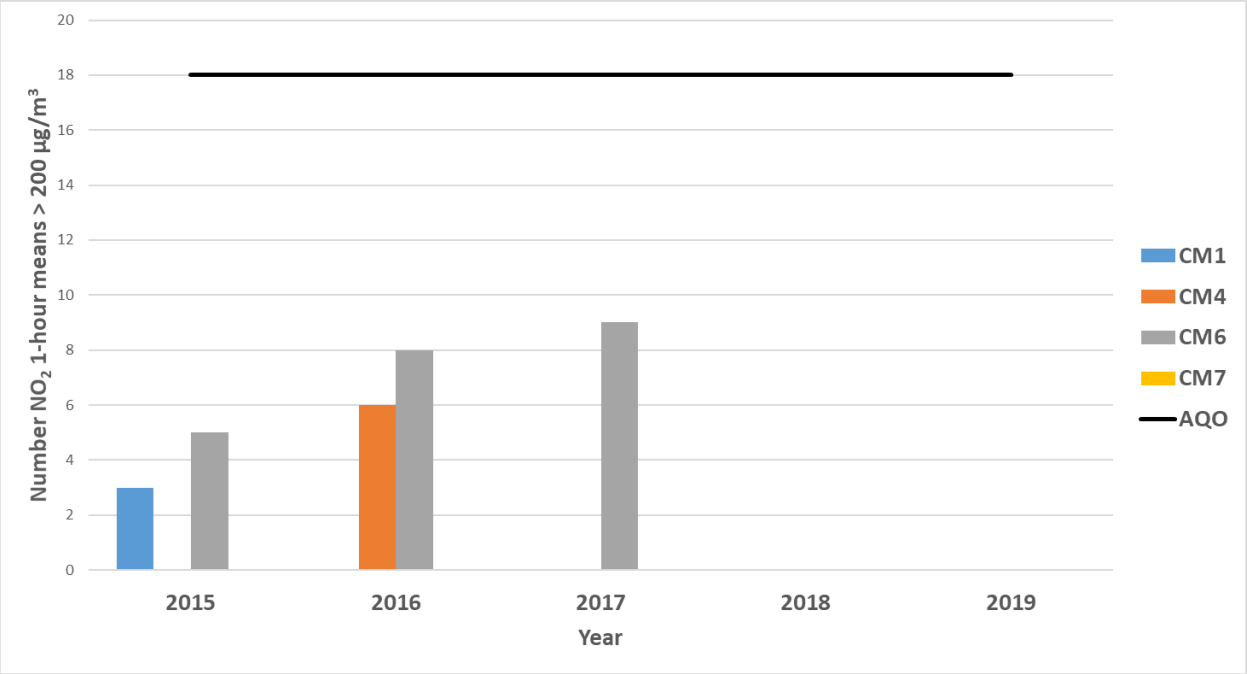
Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3



There were no 1 Hour Mean Exceedances monitored in 2018 and 2019.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
CM1	442579	112248	Urban Background	97	97	16.4		16.8	19.5	17.1
CM7	437809	113560	Roadside	90	90		21.7	19.4	17.4	16.6

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold.**

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.3 – Trends in Annual Mean PM_{10} Concentrations

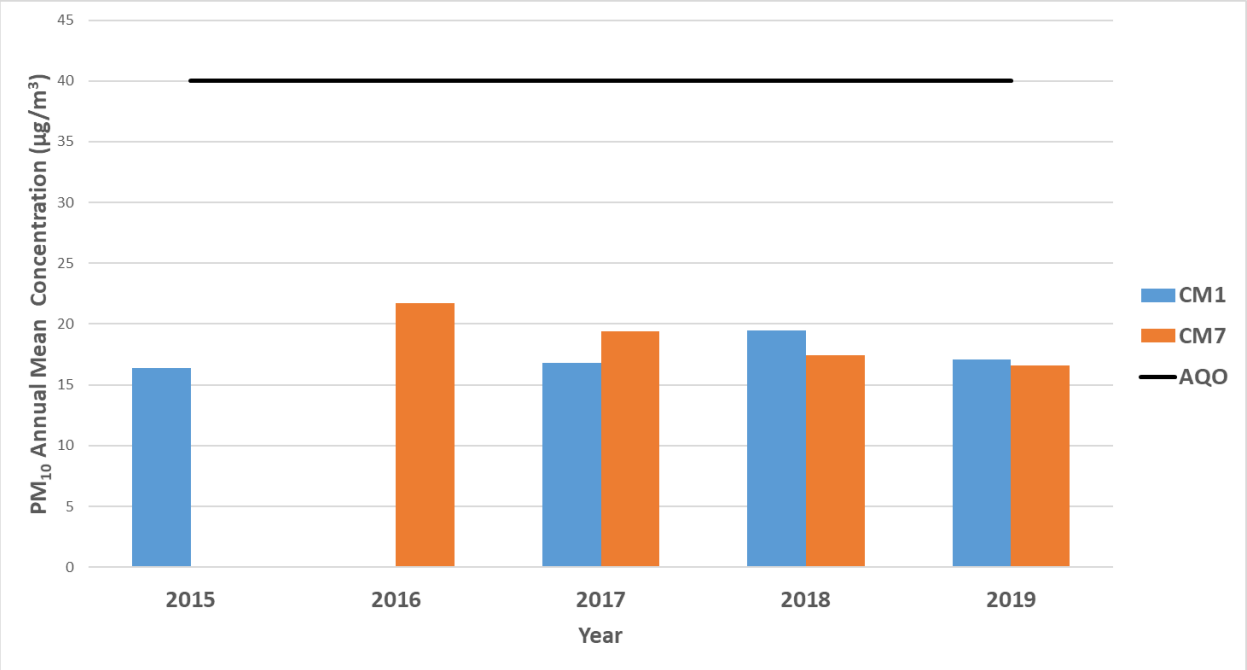


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m³ (3)				
						2015	2016	2017	2018	2019
CM1	442579	112248	Urban Background	96	96	4	0 (26.6)	1	1 (31.0)	2
CM7	437809	113560	Roadside	88	88		2 (33.2)	2	0 (27.8)	2

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3

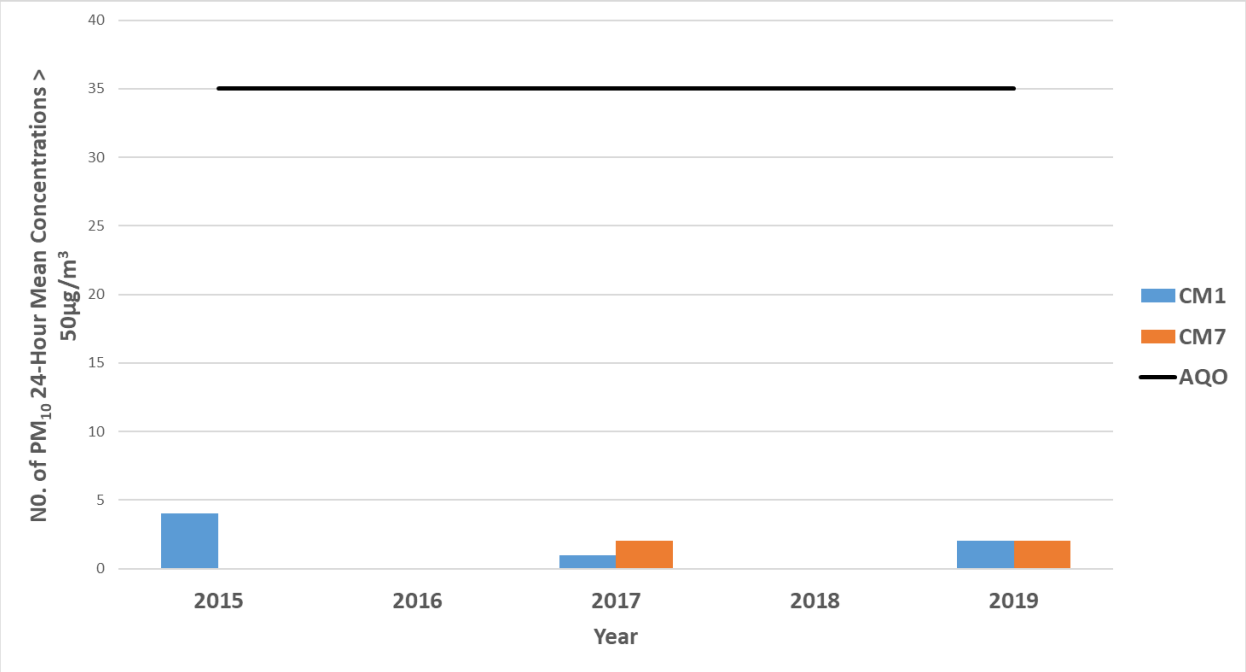


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
						2015	2016	2017	2018	2019
CM1	442579	112248	Urban Background	96	96	10		11.2	13.3	9.6

In 2016 the monitoring station was offline for the majority of the year when a new cabin replaced the old one.

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.5 – Trends in Annual Mean $PM_{2.5}$ Concentrations

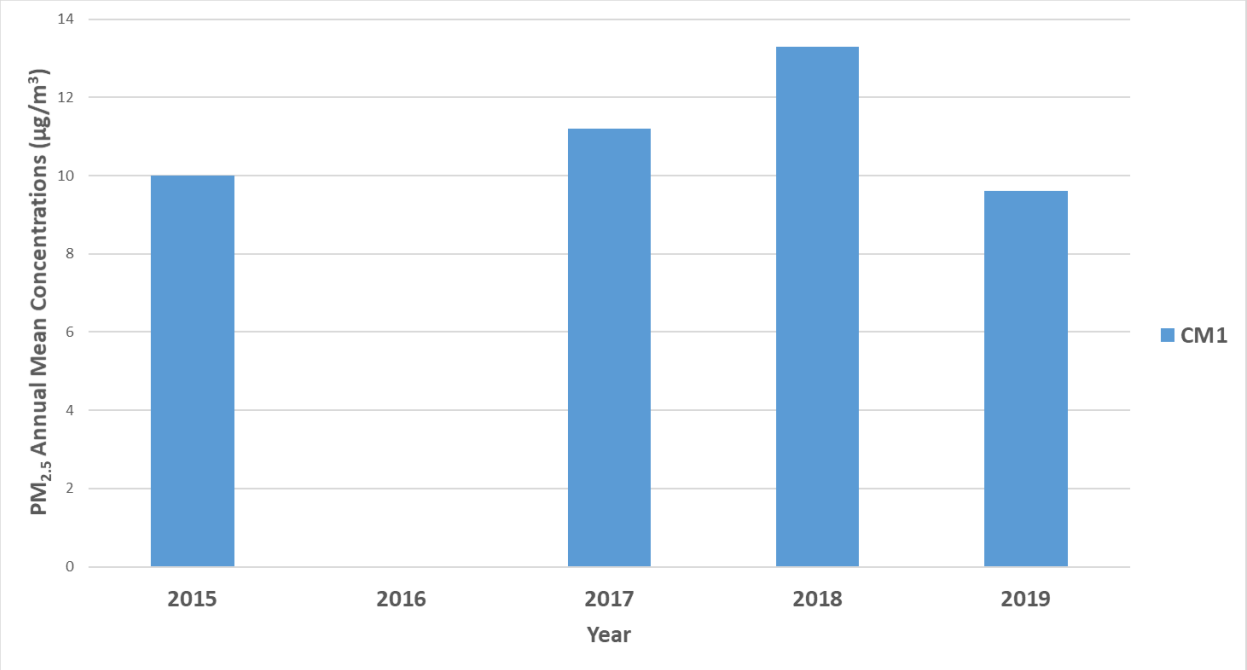


Table A.8 – SO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	Number of Exceedances 2019 (percentile in bracket) [3]		
						15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
CM1	442579	112248	Urban Background	98	98	0	0	0

Notes:

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

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

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

(3) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
N100	444387	114453	20.2	27.0	19.4	15.8	13.3	13.9	13.0	29.9	16.4	20.4	24.5	19.9	19.5	18.1	-
N101	437548	113719	54.5	55.0	43.2	42.9	36.3	30.2	38.9	39.5	32.2	36.9	50.3	45.7	42.1	39.2	-
N103	438808	112903	40.8	47.1	32.7	31.3	25.7	26.7	29.2	25.0	24.2	30.1	37.6	34.2	32.0	29.8	-
N104	439222	112850	38.9	57.9	34.8	22.1	32.0	30.1	38.2	30.2	33.5	35.6	43.6	41.7	36.6	34.0	32.8
N106	439752	113984	47.3	51.1	-	34.8	31.7	31.5	35.9	33.7	31.2	35.2	44.6	41.4	38.0	35.4	-
N107	442364	112890	60.6	65.2	61.3	41.4	47.1	44.8	40.5	43.5	36.7	53.5	54.0	51.2	50.0	**46.5**	**44.9**
N109	442585	113248	46.5	55.6	38.8	37.7	32.8	39.2	32.5	30.2	35.3	45.9	46.6	49.3	40.9	38.0	37.3
N110	442579	112248	33.0	44.6	32.3	28.8	13.1	23.7	23.5	27.8	27.7	32.7	37.1	34.0	29.9	27.8	-
N111	442579	112248	29.0	46.8	32.2	29.5	24.6	24.8	22.2	27.7	26.6	32.4	37.3	30.1	30.3	28.1	-
N112	442579	112248	34.5	46.3	32.1	27.4	24.9	23.3	25.0	27.0	26.6	31.6	38.5	33.0	30.9	28.7	-
N113	444124	113288	41.1	38.4	42.3	33.6	27.8	34.6	26.1	33.0	33.2	36.3	39.5	36.0	35.1	32.7	32.1
N114	444131	113322	37.3	44.2	39.5	41.0	30.8	29.8	32.3	31.9	29.0	29.5	38.7	39.1	35.2	32.8	31.0
N115	437939	113474	50.3	46.0	36.3	33.2	29.8	30.2	28.4	27.3	28.0	34.0	42.5	37.0	35.3	32.8	-
N116	437952	113407	44.7	40.5	32.7	38.3	32.5	29.7	-	28.8	29.0	32.0	43.8	32.4	35.0	32.5	-
N117	443752	111121	44.5	44.2	38.8	38.2	30.2	33.0	29.1	28.5	30.8	33.9	46.4	37.0	36.2	33.7	32.7

N118	442472	113065	44.1	52.9	-	39.2	-	31.0	26.9	31.0	28.3	39.9	44.1	39.2	37.7	35.0	31.9
N120	442716	111019	-	-	49.2	44.2	31.7	39.1	34.4	37.5	30.3	35.6	44.2	-	38.5	35.8	-
N122	440000	112633	37.7	42.0	33.3	30.8	-	25.6	30.4	31.2	30.4	28.3	37.0	42.3	33.5	31.2	-
N123	442348	112305	-	47.8	33.7	38.3	29.9	30.2	27.7	27.9	33.1	37.3	47.3	33.8	35.2	32.7	-
N124	439741	112753	44.5	52.5	35.9	34.0	-	31.3	36.0	29.7	31.3	34.3	44.0	36.9	37.3	34.7	-
N125	443125	112641	40.2	43.2	38.4	48.2	33.3	36.7	32.7	23.3	29.2	52.6	48.7	51.0	39.8	37.0	-
N126	442365	112286	39.9	50.1	37.2	36.9	30.0	26.5	29.4	28.2	29.2	-	40.7	35.4	34.9	32.4	30.4
N129	442554	111021	35.3	38.0	35.9	34.1	-	30.1	26.3	28.3	21.2	30.9	39.2	29.7	31.7	29.5	-
N130	439346	112821	45.9	56.8	42.9	40.8	37.5	38.8	43.2	41.3	33.8	37.3	43.7	43.5	42.1	39.2	-
N131	439378	114185	43.9	50.1	38.5	39.4	32.4	35.8	37.2	36.9	-	34.6	44.6	38.2	39.2	36.5	-
N133	438609	113020	38.1	45.2	29.1	25.9	24.2	22.2	25.8	27.4	25.5	27.6	36.9	33.3	30.1	28.0	-
N134	438980	112861	43.6	49.0	37.7	35.2	29.8	32.8	34.1	29.1	30.8	30.0	45.0	38.3	36.3	33.8	-
N138	441697	115288	46.8	65.8	46.8	56.0	27.8	44.8	44.1	36.9	39.8	46.1	53.0	48.6	46.4	**43.1**	-
N140	441628	112332	49.2	65.9	43.6	49.1	39.2	43.4	43.7	39.9	38.0	48.7	59.6	53.5	47.8	**44.5**	39.8
N141	441923	110990	40.9	36.5	39.5	48.1	34.7	36.1	34.2	27.9	28.6	32.6	39.6	29.9	35.7	33.2	-
N143	439457	114150	46.0	51.8	38.5	35.5	37.4	32.4	33.0	33.6	29.5	34.7	39.9	39.8	37.7	35.0	-
N144	443147	112709	34.1	44.7	35.3	31.7	25.6	29.1	26.6	23.3	29.5	41.2	33.9	36.5	32.6	30.3	-
N146	443164	112741	34.2	38.7	32.0	32.0	23.7	26.1	25.1	26.2	25.4	30.4	34.6	34.5	30.2	28.1	-
N149	441552	115247	32.4	53.8	33.5	29.2	27.1	24.2	26.7	23.6	25.3	36.0	37.7	33.3	31.9	29.7	-
N151	439394	114176	43.9	49.2	-	36.3	35.1	33.0	37.8	36.0	-	35.2	44.8	43.5	39.5	36.7	-
N152	437327	113848	49.1	57.0	41.5	31.8	35.6	41.6	43.0	40.6	36.9	42.0	47.5	48.0	42.9	39.9	-
N158	443807	111123	44.5	48.2	39.1	41.4	34.1	33.9	33.8	26.6	29.9	36.3	-	41.5	37.2	34.6	-
N159	443740	111147	36.8	40.7	35.9	35.1	28.0	33.6	31.2	29.9	29.8	37.2	42.8	33.6	34.5	32.1	-
N161	442705	114129	38.5	40.5	34.8	30.4	28.4	27.2	26.7	16.8	21.1	36.2	35.0	32.1	30.6	28.5	-
N162	442872	114336	44.3	51.6	-	33.3	-	36.0	-	-	28.2	40.1	36.3	45.4	39.4	35.1	-
N164	442809	114241	38.0	43.8	33.9	34.2	27.7	30.2	27.7	22.4	26.7	33.0	-	-	31.7	29.5	-

N165	442766	114181	34.1	-	32.0	37.4	-	30.8	-	26.1	31.8	38.2	36.4	32.0	33.2	30.9	_
N166	442251	112129	40.5	54.1	-	37.1	28.3	-	-	30.5	30.8	41.4	46.0	-	38.6	33.7	_
N167	439759	114011	48.4	45.3	35.5	43.5	29.6	31.1	28.1	21.0	-	48.5	47.9	34.9	37.6	35.0	_
N168	439737	114025	51.9	48.2	36.2	45.9	34.8	33.5	26.1	28.9	27.2	30.9	54.0	35.8	37.8	35.1	_
N169	439361	114195	45.3	55.2	39.4	38.7	41.7	39.0	32.6	41.0	35.8	40.2	48.1	44.7	41.8	38.9	_
N170	442482	111003	40.0	-	49.8	40.2	36.5	36.5	44.7	33.3	31.4	-	44.7	40.3	39.8	37.0	_
N172	442207	112126	42.0	57.0	46.0	40.3	37.3	40.0	37.3	43.2	37.8	38.5	47.7	51.5	43.2	**40.2**	_
N174	443959	113315	48.3	60.4	48.5	47.2	34.8	41.7	39.4	43.1	36.1	37.6	43.2	45.1	43.8	**40.7**	_
N175	439959	113737	43.7	50.2	38.1	32.6	33.1	30.8	33.4	35.2	-	32.0	46.4	44.8	38.2	35.5	_
N176	439772	113952	41.3	46.1	33.2	44.5	31.7	31.9	23.9	23.9	27.3	29.1	45.6	35.5	34.5	32.1	_
N177	439844	113907	41.6	54.7	38.9	37.1	-	**33.7**	32.2	28.7	27.6	33.3	49.8	38.3	37.8	35.2	_
N178	437265	113682	29.4	33.4	23.6	32.0	22.0	23.0	22.3	19.4	20.7	25.2	31.9	26.9	25.8	24.0	_
N180	441633	112318	47.8	67.9	38.4	41.8	29.3	38.2	38.5	34.2	35.1	-	51.0	-	42.2	39.3	37.7
N184A	437811	113557	45.3	52.7	39.9	41.4	34.9	34.6	33.9	33.8	29.0	30.6	45.9	44.9	38.9	36.2	30.3
N184B	437811	113557			38.2	35.8	32.2	28.8	32.5	31.4	33.0	35.2	47.7	45.4	36.0	33.5	28.5
N184C	437811	113557			44.6	36.2	32.1	33.4	36.8	33.9	31.9	34.4	43.9	43.9	37.1	34.5	29.2
N185	437167	113713	57.3	62.1	43.4	44.8	30.9	50.3	46.1	46.0	40.1	43.3	43.8	46.3	46.2	**43.0**	_
N186	437126	113701	42.1	40.1	58.5	39.6	32.8	35.0	36.7	30.0	29.1	32.8	44.3	33.2	37.9	35.2	_
N187	444102	113872	40.9	50.1	43.2	28.4	32.3	29.4	31.2	24.5	30.4	37.3	38.0	35.8	35.1	32.7	_
N188	441300	112233		46.1	36.4	45.0	31.4	30.8	27.1	12.9	25.5	36.3	53.4	40.3	35.0	32.6	_
N189	441790	112465		54.8	Error	43.4	36.0	36.3	30.0	33.9	30.9	39.3	48.0	38.1	39.1	36.3	_
N190	442024	112553		54.1	38.7	45.7	30.4	39.2	29.2	43.4	38.5	44.6	53.7	43.9	41.9	39.0	_
N191	441915	112097		-	51.3	-	39.0	40.1	39.7	44.3	41.8	48.1	49.5	57.1	45.7	**42.5**	37.6
N192	441961	112029		60.4	55.9	46.8	48.5	36.4	42.0	31.3	39.1	49.4	40.3	-	45.0	**41.9**	_
N193	441975	112031		54.0	41.9	38.8	28.4	28.0	27.1	40.1	31.0	35.8	54.7	-	38.0	35.3	_
N194	442090	111775		68.6	66.5	52.1	47.6	46.0	-	34.7	34.3	51.1	55.8	12.2	46.9	**43.6**	_

N195	441945	111655		53.3	42.5	51.4	35.3	37.9	30.6	29.5	41.3	43.8	-	39.8	40.5	37.7	
N197	440957	115151			35.3	44.9	35.3	45.0	-	34.7	33.5	45.5	50.5	38.2	40.3	37.5	
N198A	442304	112771			43.7	34.6	34.0	33.6	30.8	29.3	30.7	37.4	43.1	41.8	35.9	33.4	
N198B	442304	112771			44.1	33.5	32.8	32.3	28.3	32.2	31.1	41.9	37.0	41.8	35.5	33.0	
N198C	442304	112771			48.9	36.1	33.2	33.1	30.7	30.0	31.4	41.5	37.8	41.9	36.5	33.9	
N199	442210	112583				43.1	40.6	-	-	23.8	27.9	37.9	47.1	51.1	38.8	35.8	27.5
N200	443160	112765				35.5	26.0	29.2	30.1	30.0	27.5	36.6	35.4	41.9	32.4	30.2	25.1
N201	439759	112738				58.6	-	59.8	-	-	51.1	48.9	70.2	-	57.7	**55.9**	**40.9**
N202	437166	113755				48.3	-	43.8	49.5	54.1	38.8	52.3	56.8	56.3	50.0	**46.5**	
N204	442542	113261				38.7	46.0	33.4	30.4	31.8	34.0	46.0	41.9	42.1	38.2	35.6	
N205	442101	113438				41.1	28.5	35.3	33.3	34.2	34.8	-	-	47.9	36.4	38.4	33.5
N206	442265	112516				46.0	31.6	43.9	37.8	36.7	40.5	46.0	54.2	44.3	42.3	39.4	
N207	439698	112806				35.1	24.6	-	32.8	34.2	33.4	36.0	41.4	41.2	34.8	33.5	30.8
N208	441365	115202				38.5	29.6	31.8	31.2	25.5	32.0	42.2	44.6	39.8	35.0	32.6	
N209	441246	115138				33.5	29.5	26.7	29.0	28.1	35.3	38.4	48.1	38.4	34.1	31.7	
N210	441122	115118				43.3	36.0	-	33.6	32.3	35.3	44.7	48.0	44.0	39.7	38.1	38.1
N211	437332	113873		38.6	23.9	31.9	22.8	26.3	24.5	23.0	26.6	31.4	33.7	30.8	28.5	26.5	
N213	442935	114374		43.3	33.6	27.0	26.4	25.9	25.2	25.5	31.5	33.8	32.8	35.2	30.9	28.8	
N214	441677	115280		-	35.4	41.5	34.4	31.3	30.2	30.7	31.5	39.9	43.0	36.9	35.5	33.0	
N216	442352	113486				-	23.8	34.3	-	32.6	34.1	44.5	42.8	44.6	36.7	37.8	37.8
N217	440751	112188					28.9	29.9	31.1	34.9	30.5	34.5	42.7	39.7	34.0	33.6	33.6
N218	443547	114101									38.1	41.0	50.0	35.0	41.0	36.4	36.4

☐ **Local bias adjustment factor used (confirm by selecting in box)**

☒ **National bias adjustment factor used (confirm by selecting in box)**

☒ **Annualisation has been conducted where data capture is <75% (confirm by selecting in box)**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column (confirm by selecting in box)**

Notes:

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

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

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of Diffusion Tube Monitoring

The determination of NO_2 diffusion tube precision is usually obtained from the triplicate site on the sample inlet roof of the Brintons Road AURN Station.

Southampton use Gradko International Ltd for the supply and analysis of diffusion tubes. They are a UKAS accredited laboratory and has been rated 'good' through the Workplace Analysis Scheme for Proficiency (WASP) as determined by the health and safety laboratory. Gradko International Ltd. also follows procedures set out in the Technical Guidance LAQM.TG16.

Locations, distances from nearest receptors and distances to relevant receptors for diffusion tubes are annually reviewed to ensure that GIS locations and measurements are accurate and up-to-date.

QA/QC of Automatic Monitoring

CM1 and CM7 are part of the Automatic Urban and Rural Network (AURN). Details of quality assurance/control at AURN sites can be found at Defra's webpages[8].

CM4 and CM6 are supported by Kings College London's (KCL) Environmental Research Group which includes six-monthly UKAS-accredited, to ISO 17025, independent equipment audits by NPL which exceed AURN standards. Audit results used extensively in measurement ratification. King's sub-contracts this specialist work to The National Physical Laboratory (NPL), the national measurement standards laboratory for the UK. NPL currently carries out around 180 audits per year under King's contracts. NPL is a world-leading centre of excellence in developing and applying accurate measurement standards. In addition to fulfilling the recommendations of LAQM TG16, NPL's audits meet the testing requirements for air quality measurement methods stipulated in the CEN standards (for example, NO_2 and NO_x: EN 14211:2005) which are specified for compliance with the EU ambient air quality directive (2008/50/EC). This arrangement also ensures equipment testing that is completely independent of the data management unit, the Local Site Operators and

[8] https://uk-air.defra.gov.uk/assets/documents/Data_Validation_and_Ratification_Process_Apr_2017.pdf

the Equipment Support Unit. NPL is accredited by UKAS to ISO 17025 for these measurements (Certificate 0478). The accredited activities at NPL are also covered by the lab-wide Quality Management System which has been certified by Lloyds Register Quality Assurance as conforming to ISO 9001:1994 since June 1996 (Certificate 938168). Their UKAS certificate for this work can be found at the following link:

https://www.ukas.com/wp-content/uploads/schedule_uploads/00001/0478Calibration%20Multiple.pdf

NPL audits comprise:

- Single-point zero and span tests using scrubbed zero air, certified gas cylinders, an ozone generator and reference photometer.
- Multi-point assessment of analyser linearity using diluted high concentration gases, an ozone generator and reference photometer.
- Measurement of NO_X converter efficiency using gas phase titration. NPL is the only UK organisation to hold UKAS accreditation for this test.
- Assessment of analyser zero and span noise.
- Hydrocarbon interference test for SO_2 analysers.
- Drift tests and certification of on-site gas standards. NPL is the only UK organisation to hold UKAS accreditation for this test.
- Leak tests.
- Multi-point verification of micro-balances for TEOMs and FDMSs using four pre-weighed filters.
- Flow checks for particulate analysers.
- Sampling system testing to assess any ambient sample loss in manifolds and inlet lines, as necessitated by recent revisions to CEN standards. NPL is the only UK organisation to hold UKAS accreditation for this test.

KCL also carry out measurement ratification where measurements collected over a long time period are subject to additional checks; previous validation decisions are reviewed with the benefit of hindsight and using a greater pool of information such as service records, calibration records and the results of intercalibration/audit. Measurement ratification is in accordance with LAQM TG16.

Local Site Operation (LSO) duties are undertaken by trained SCC staff including fortnightly site visits to perform calibrations and onsite fault investigation.

Data is disseminated via www.southampton.my-air.uk. AURN data and information can be found here: https://uk-air.defra.gov.uk/networks/network-info?view=aurn.

Diffusion Tube Bias Adjustment Factors

The nitrogen dioxide diffusion tubes were supplied and analysed by Gradko International Ltd. The preparation method used for the diffusion tubes was 20% TEA (triethanolamine) in water. The national bias adjustment factor for Gradko using the preparation method of 20% TEA in water (2019) was 0.93. The use of the national bias adjustment was chosen as it is consistent with previous Southampton City Council ASR reporting.

The Local bias adjustment factor calculated using the AURN Brintons Road Automatic Station Co-Location Triplicate Tube Study was 0.92, very similar to the National Factor. The National Factor is slightly more conservative than the local factor, reducing NO_2 levels slightly less.

Annualisation

Sites where there is less than 75% data capture require annualization
Annualisation has been undertaken in accordance with LAQM TG box 7.9 and 7.10
See calculations below for the diffusion tube sites where data capture was less than 75%

N162

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N162	Brintons Rd when N162 is available	6 Sandringham Rd when N162 is available
Jan	**09/01/2019**	**06/02/2019**	33.93	20.21	44.31	33.93	20.21
Feb	**06/02/2019**	**05/03/2019**	38.52	27.05	51.62	38.52	27.05
Mar	**05/03/2019**	**03/04/2019**	28.72	19.42			
Apr	**03/04/2019**	**02/05/2019**	29.29	15.77	33.28	29.29	15.77
May	**02/05/2019**	**06/06/2019**	22.50	13.34			
Jun	**06/06/2019**	**05/07/2019**	21.20	13.91	35.96	21.20	13.91
Jul	**05/07/2019**	**08/08/2019**	19.69	13.00			
Aug	**08/08/2019**	**06/09/2019**	23.54	29.87			
Sep	**06/09/2019**	**02/10/2019**	24.37	16.35	28.16	24.37	16.35
Oct	**02/10/2019**	**07/11/2019**	29.75	20.45	40.09	29.75	20.45
Nov	**07/11/2019**	**06/12/2019**	33.47	24.54	36.26	33.47	24.54
Dec	**06/12/2019**	**09/01/2020**	30.14	19.92	45.45	30.14	19.92
Average			27.93	19.49	39.39	30.08	19.77

Brintons Road Ratio	0.92833349
6 Sandringham Rd Ratio	0.98538418
Average Ratio	0.95685883

Annualised Average	37.69
Annualised (Bias Adjusted) Average	35.05

N166

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N166	Brintons Rd when N166 is available	6 Sandringham Rd when N166 is available
Jan	**09/01/2019**	**06/02/2019**	33.93	20.21	40.53	33.93	20.21
Feb	**06/02/2019**	**05/03/2019**	38.52	27.05	54.15	38.52	27.05
Mar	**05/03/2019**	**03/04/2019**	28.72	19.42			
Apr	**03/04/2019**	**02/05/2019**	29.29	15.77	37.08	29.29	15.77
May	**02/05/2019**	**06/06/2019**	22.50	13.34	28.30	22.50	13.34
Jun	**06/06/2019**	**05/07/2019**	21.20	13.91			
Jul	**05/07/2019**	**08/08/2019**	19.69	13.00			
Aug	**08/08/2019**	**06/09/2019**	23.54	29.87	30.46	23.54	29.87
Sep	**06/09/2019**	**02/10/2019**	24.37	16.35	30.77	24.37	16.35
Oct	**02/10/2019**	**07/11/2019**	29.75	20.45	41.35	29.75	20.45
Nov	**07/11/2019**	**06/12/2019**	33.47	24.54	45.96	33.47	24.54
Dec	**06/12/2019**	**09/01/2020**	30.14	19.92			
Average			27.93	19.49	38.58	29.42	20.95

Brintons Road Ratio	0.94921768
6 Sandringham Rd Ratio	0.93024983
Average Ratio	0.93973376

Annualised Average	36.25
Annualised (Bias Adjusted) Average	33.71

N199

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N199	Brintons Rd when N199 is available	6 Sandringham Rd when N199 is available
Jan	**09/01/2019**	**06/02/2019**	33.93	20.21			
Feb	**06/02/2019**	**05/03/2019**	38.52	27.05			
Mar	**05/03/2019**	**03/04/2019**	28.72	19.42			
Apr	**03/04/2019**	**02/05/2019**	29.29	15.77	43.14	29.29	15.77
May	**02/05/2019**	**06/06/2019**	22.50	13.34	40.63	22.50	13.34
Jun	**06/06/2019**	**05/07/2019**	21.20	13.91			
Jul	**05/07/2019**	**08/08/2019**	19.69	13.00			
Aug	**08/08/2019**	**06/09/2019**	23.54	29.87	23.78	23.54	29.87
Sep	**06/09/2019**	**02/10/2019**	24.37	16.35	27.91	24.37	16.35
Oct	**02/10/2019**	**07/11/2019**	29.75	20.45	37.92	29.75	20.45
Nov	**07/11/2019**	**06/12/2019**	33.47	24.54	47.06	33.47	24.54
Dec	**06/12/2019**	**09/01/2020**	30.14	19.92	51.12	30.14	19.92
Average			27.93	19.49	38.80	27.58	20.03

Brintons Road Ratio	1.01259335
6 Sandringham Rd Ratio	0.97261959
Average Ratio	0.99260647

Annualised Average	38.51
Annualised (Bias Adjusted) Average	35.81

N201

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N201	Brintons Rd when N201 is available	6 Sandringham Rd when N201 is available
Jan	09/01/2019	06/02/2019	33.93	20.21			
Feb	06/02/2019	05/03/2019	38.52	27.05			
Mar	05/03/2019	03/04/2019	28.72	19.42			
Apr	03/04/2019	02/05/2019	29.29	15.77	58.64	29.29	15.77
May	02/05/2019	06/06/2019	22.50	13.34			
Jun	06/06/2019	05/07/2019	21.20	13.91	59.82	21.20	13.91
Jul	05/07/2019	08/08/2019	19.69	13.00			
Aug	08/08/2019	06/09/2019	23.54	29.87			
Sep	06/09/2019	02/10/2019	24.37	16.35	51.07	24.37	16.35
Oct	02/10/2019	07/11/2019	29.75	20.45	48.89	29.75	20.45
Nov	07/11/2019	06/12/2019	33.47	24.54	70.20	33.47	24.54
Dec	06/12/2019	09/01/2020	30.14	19.92			
Average			27.93	19.49	57.72	27.62	18.20

Brintons Road Ratio	1.01127612
6 Sandringham Rd Ratio	1.07039327
Average Ratio	1.04083469

Annualised Average	60.08
Annualised (Bias Adjusted) Average	55.88

N205

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N205	Brintons Rd when N205 is available	6 Sandringham Rd when N205 is available
Jan	09/01/2019	06/02/2019	33.93	20.21			
Feb	06/02/2019	05/03/2019	38.52	27.05			
Mar	05/03/2019	03/04/2019	28.72	19.42			
Apr	03/04/2019	02/05/2019	29.29	15.77	41.08	29.29	15.77
May	02/05/2019	06/06/2019	22.50	13.34	28.47	22.50	13.34
Jun	06/06/2019	05/07/2019	21.20	13.91	35.28	21.20	13.91
Jul	05/07/2019	08/08/2019	19.69	13.00	33.29	19.69	13.00
Aug	08/08/2019	06/09/2019	23.54	29.87	34.19	23.54	29.87
Sep	06/09/2019	02/10/2019	24.37	16.35	34.80	24.37	16.35
Oct	02/10/2019	07/11/2019	29.75	20.45			
Nov	07/11/2019	06/12/2019	33.47	24.54			
Dec	06/12/2019	09/01/2020	30.14	19.92	47.94	30.14	19.92
Average			27.93	19.49	36.44	24.39	17.45

Brintons Road Ratio	1.14500867
6 Sandringham Rd Ratio	1.11655925
Average Ratio	1.13078396

Annualised Average	41.20
Annualised (Bias Adjusted) Average	38.32

N207

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N207	Brintons Rd when N207 is available	6 Sandringham Rd when N207 is available
Jan	09/01/2019	06/02/2019	33.93	20.21			
Feb	06/02/2019	05/03/2019	38.52	27.05			
Mar	05/03/2019	03/04/2019	28.72	19.42			
Apr	03/04/2019	02/05/2019	29.29	15.77	35.10	29.29	15.77
May	02/05/2019	06/06/2019	22.50	13.34	24.60	22.50	13.34
Jun	06/06/2019	05/07/2019	21.20	13.91			
Jul	05/07/2019	08/08/2019	19.69	13.00	32.77	19.69	13.00
Aug	08/08/2019	06/09/2019	23.54	29.87	34.25	23.54	29.87
Sep	06/09/2019	02/10/2019	24.37	16.35	33.37	24.37	16.35
Oct	02/10/2019	07/11/2019	29.75	20.45	36.03	29.75	20.45
Nov	07/11/2019	06/12/2019	33.47	24.54	41.37	33.47	24.54
Dec	06/12/2019	09/01/2020	30.14	19.92	41.24	30.14	19.92
Average			27.93	19.49	34.84	26.59	19.16

Brintons Road Ratio	1.05013966
6 Sandringham Rd Ratio	1.01726716
Average Ratio	1.03370341

Annualised Average	36.01
Annualised (Bias Adjusted) Average	33.49

N216

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N216	Brintons Rd when N216 is available	6 Sandringham Rd when N216 is available
Jan	**09/01/2019**	**06/02/2019**	33.93	20.21			
Feb	**06/02/2019**	**05/03/2019**	38.52	27.05			
Mar	**05/03/2019**	**03/04/2019**	28.72	19.42			
Apr	**03/04/2019**	**02/05/2019**	29.29	15.77			
May	**02/05/2019**	**06/06/2019**	22.50	13.34	23.76	22.50	13.34
Jun	**06/06/2019**	**05/07/2019**	21.20	13.91	34.31	21.20	13.91
Jul	**05/07/2019**	**08/08/2019**	19.69	13.00			
Aug	**08/08/2019**	**06/09/2019**	23.54	29.87	32.61	23.54	29.87
Sep	**06/09/2019**	**02/10/2019**	24.37	16.35	34.10	24.37	16.35
Oct	**02/10/2019**	**07/11/2019**	29.75	20.45	44.53	29.75	20.45
Nov	**07/11/2019**	**06/12/2019**	33.47	24.54	42.81	33.47	24.54
Dec	**06/12/2019**	**09/01/2020**	30.14	19.92	44.58	30.14	19.92
Average			27.93	19.49	36.67	26.43	19.77

Brintons Road Ratio	1.05684617
6 Sandringham Rd Ratio	0.9856927
Average Ratio	1.02126944

Annualised Average	37.45
Annualised (Bias Adjusted) Average	34.83

N217

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N217	Brintons Rd when N217 is available	6 Sandringham Rd when N217 is available
Jan	**09/01/2019**	**06/02/2019**	33.93	20.21			
Feb	**06/02/2019**	**05/03/2019**	38.52	27.05			
Mar	**05/03/2019**	**03/04/2019**	28.72	19.42			
Apr	**03/04/2019**	**02/05/2019**	29.29	15.77			
May	**02/05/2019**	**06/06/2019**	22.50	13.34	28.89	22.50	13.34
Jun	**06/06/2019**	**05/07/2019**	21.20	13.91	29.92	21.20	13.91
Jul	**05/07/2019**	**08/08/2019**	19.69	13.00	31.12	19.69	13.00
Aug	**08/08/2019**	**06/09/2019**	23.54	29.87	34.86	23.54	29.87
Sep	**06/09/2019**	**02/10/2019**	24.37	16.35	30.50	24.37	16.35
Oct	**02/10/2019**	**07/11/2019**	29.75	20.45	34.52	29.75	20.45
Nov	**07/11/2019**	**06/12/2019**	33.47	24.54	42.69	33.47	24.54
Dec	**06/12/2019**	**09/01/2020**	30.14	19.92	39.74	30.14	19.92
Average			27.93	19.49	34.03	25.58	18.92

Brintons Road Ratio	1.09161786
6 Sandringham Rd Ratio	1.02976618
Average Ratio	1.06069202

Annualised Average	36.10
Annualised (Bias Adjusted) Average	33.57

N218

	Start Date	End Date	Brintons Rd	6 Sandringham Road	N218	Brintons Rd when N218 is available	6 Sandringham Rd when N218 is available
Jan	**09/01/2019**	**06/02/2019**	33.93	20.21			
Feb	**06/02/2019**	**05/03/2019**	38.52	27.05			
Mar	**05/03/2019**	**03/04/2019**	28.72	19.42			
Apr	**03/04/2019**	**02/05/2019**	29.29	15.77			
May	**02/05/2019**	**06/06/2019**	22.50	13.34			
Jun	**06/06/2019**	**05/07/2019**	21.20	13.91			
Jul	**05/07/2019**	**08/08/2019**	19.69	13.00			
Aug	**08/08/2019**	**06/09/2019**	23.54	29.87			
Sep	**06/09/2019**	**02/10/2019**	24.37	16.35	38.08	24.37	16.35
Oct	**02/10/2019**	**07/11/2019**	29.75	20.45	40.98	29.75	20.45
Nov	**07/11/2019**	**06/12/2019**	33.47	24.54	49.96	33.47	24.54
Dec	**06/12/2019**	**09/01/2020**	30.14	19.92	34.96	30.14	19.92
Average			27.93	19.49	41.00	29.43	20.32

Brintons Road Ratio	0.94888493
6 Sandringham Rd Ratio	0.95914589
Average Ratio	0.95401541

Annualised Average	39.11
Annualised (Bias Adjusted) Average	36.37

CM6

	CM6	Chilbolton Observatory	Portsmouth	Chilbolton Observatory when CM6 is available	Portsmouth when CM6 is available
Average	39.75	8.88	17.47	9.36	20.29
Ratio		87.49	99.61	0.95	0.86

Average Ratio	0.91
Annualised Annual Mean	36.0
200 Exceedances 99.8	133.3

Distance Correction

Paragraph 7.78 of the LAQM technical guidance requires the use of the NO_2 fall-off with distance from calculator available at the LAQM website[9] where diffusion tubes do not represent exposure. All locations that are above annual objective and are not representative of exposure should be corrected for distance. It is also recommended that locations within 10% of the annual objective (i.e. above 36 µg/m^3) and are not representative of exposure should be corrected for distance. The following sites for 2019 require correction for distance:

- N104 Regents Park Junction - Within 10% of the annual objective and not representative of exposure.
- N107 Cranbury Place - Above annual objective and not representative of exposure.
- N109 72 Bevios Valley – Within 10% of the annual objective and not representative of exposure.
- N118 3 Rockstone Lane - Within 10% of the annual objective and not representative of exposure.
- N140 5 Commercial Road - Above annual objective and not representative of exposure.

[9] https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

- N180 Opposite 5 Commercial Road - Above annual objective and not representative of exposure (note: this location also required annualisation introducing additional uncertainty).

- N191 outside Marlands House Above annual objective and not representative of exposure.

- N201 289 Millbrook Road - Above annual objective and not representative of exposure (note: this location also required annualisation introducing additional uncertainty, data capture only 56%).

- N216 Lodge Road - Within 10% of the annual objective and not representative of exposure.

- N218 St.Denys Road Within 10% of the annual objective and not representative of exposure.

- N152 M271 has not been corrected for distance to relevant exposure as the distance is above 20m and between the two locations is a verge, fence and trees. It is therefore not considered appropriate to apply this calculation.

- N170 Union Castle House and N184 Redbridge Road Automatic Monitoring Station have not been corrected for distance as there is no relevant exposure within 20m.

- N185 Redbridge Causeway 1 has not been corrected for distance as the relevant exposure is at a different elevation to the diffusion tube and is beyond 20m.

- N186 Redbridge Causeway 2 has not been corrected for distance due to the difference in elevation of the tube and the relevant exposure. There is also a row of trees between the two locations.

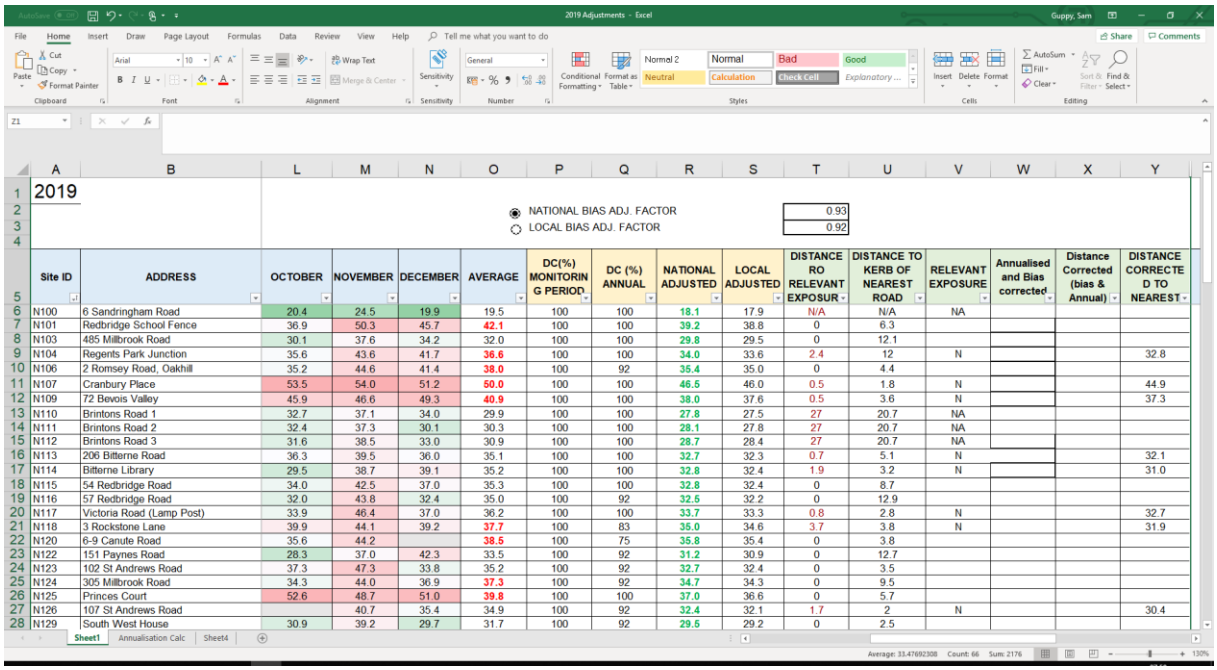
- N194 Vincents Walk has not been corrected for distance as there is no relevant exposure within 20m, this tube was established to monitor buses using the bus stops at the back of the High Street shops.

The background value used for the corrections is 25.9 µg/m^3 (99% data capture) from the City Centre AURN urban background 2019 annual mean as this site is similarly

located on the west side of Southampton and best represents background conditions. The AURN background NO_2 concentration is higher than the LAQM background maps for all locations corrected and therefore also represents a worst- case scenario.

The distance calculation algorithm was built into a new Master excel spreadsheet SCC developed in 2019 to manage all our NO_2 diffusion tube data. This new Excel spreadsheet calculates the bias adjustment, distance correction and adds the annualization. It will be submitted along with the ASR on the DEFRA submission website.

A Screenshot of the bespoke SCC Spreadsheet is shown below



2019

NATIONAL BIAS ADJ. FACTOR 0.93
LOCAL BIAS ADJ. FACTOR 0.92

Site ID	ADDRESS	OCTOBER	NOVEMBER	DECEMBER	AVERAGE	DC(%) MONITORING PERIOD	DC (%) ANNUAL	NATIONAL ADJUSTED	LOCAL ADJUSTED	DISTANCE RO RELEVANT EXPOSUR	DISTANCE TO KERB OF NEAREST ROAD	RELEVANT EXPOSURE	Annualised and Bias corrected	Distance Corrected (bias & Annual)	DISTANCE CORRECTED TO NEAREST
N100	6 Sandringham Road	20.4	24.5	19.9	19.5	100	100	18.1	17.9	N/A	N/A	NA			
N101	Redbridge School Fence	36.9	50.3	45.7	42.1	100	100	39.2	38.8	0	6.3				
N103	485 Millbrook Road	30.1	37.6	34.2	32.0	100	100	29.8	29.5	0	12.1				
N104	Regents Park Junction	35.6	43.6	41.7	36.6	100	100	34.0	33.6	2.4	12	N			32.8
N106	2 Romsey Road, Oakhill	35.2	44.6	41.4	38.0	100	92	35.4	35.0	0	4.4				
N107	Cranbury Place	53.5	54.0	51.2	50.0	100	100	46.5	46.0	0.5	1.8	N			44.9
N109	72 Bevois Valley	45.9	46.6	49.3	40.9	100	100	38.0	37.6	0.5	3.6	N			37.3
N110	Brintons Road 1	32.7	37.1	34.0	29.9	100	100	27.8	27.5	27	20.7	NA			
N111	Brintons Road 2	32.4	37.3	30.1	30.3	100	100	28.1	27.8	27	20.7	NA			
N112	Brintons Road 3	31.6	38.5	33.0	30.9	100	100	28.7	28.4	27	20.7	NA			
N113	206 Bitterne Road	36.3	39.5	36.0	35.1	100	100	32.7	32.3	0.7	5.1	N			32.1
N114	Bitterne Library	29.5	38.7	39.1	35.2	100	100	32.8	32.4	1.9	3.2	N			31.0
N115	54 Redbridge Road	34.0	42.5	37.0	35.3	100	100	32.8	32.4	0	8.7				
N116	57 Redbridge Road	32.0	43.8	32.4	35.0	100	92	32.5	32.2	0	12.9				
N117	Victoria Road (Lamp Post)	33.9	46.4	37.0	36.2	100	100	33.7	33.3	0.8	2.8	N			32.7
N118	3 Rockstone Lane	39.9	44.1	39.2	37.7	100	83	35.0	34.6	3.7	3.8	N			31.9
N120	6-9 Canute Road	35.6	44.2		38.5	100	75	35.8	35.4	0	3.8				
N122	151 Paynes Road	28.3	37.0	42.3	33.5	100	92	31.2	30.9	0	12.7				
N123	102 St Andrews Road	37.3	47.3	33.8	35.2	100	92	32.7	32.4	0	3.5				
N124	305 Millbrook Road	34.3	44.0	36.9	37.3	100	92	34.7	34.3	0	9.5				
N125	Princes Court	52.6	48.7	51.0	39.8	100	100	37.0	36.6	0	5.7				
N126	107 St Andrews Road		40.7	35.4	34.9	100	92	32.4	32.1	1.7	2	N			30.4
N129	South West House	30.9	39.2	29.7	31.7	100	92	29.5	29.2	0	2.5				

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

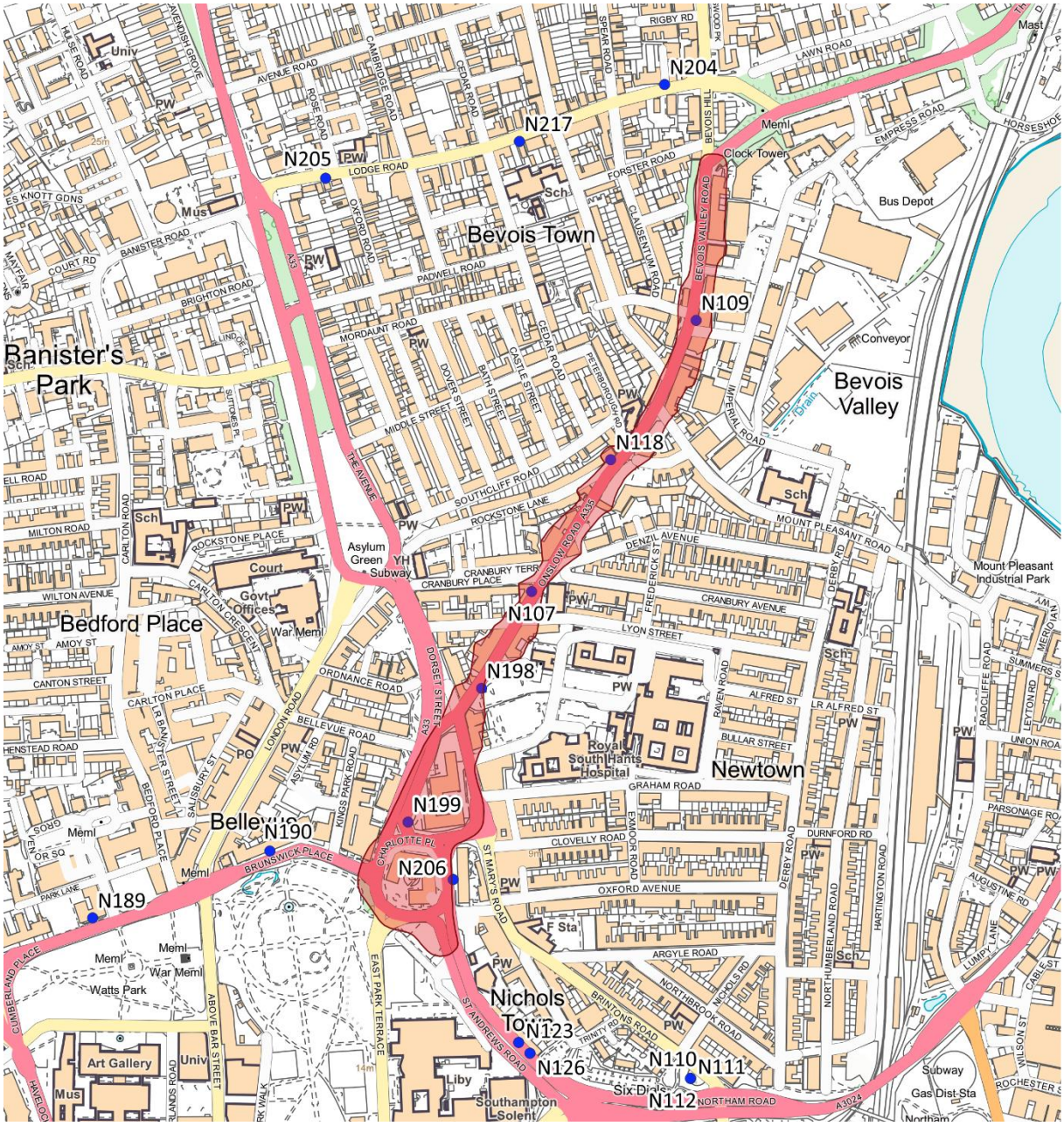


Figure 12 AQMA 1 Bevois Valley and NO_2 diffusion tube monitoring locations

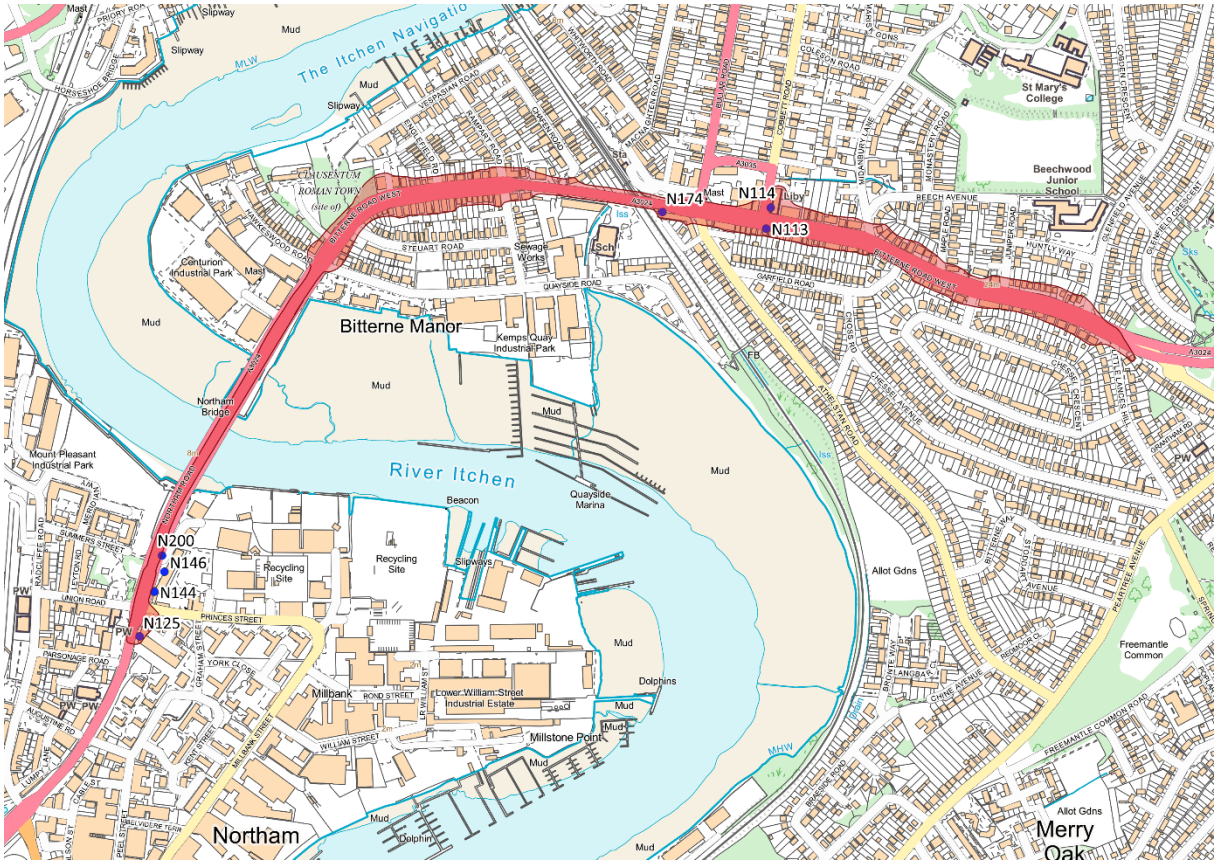


Figure 13 AQMA 2 Bitterne Road and NO_2 diffusion tube monitoring locations

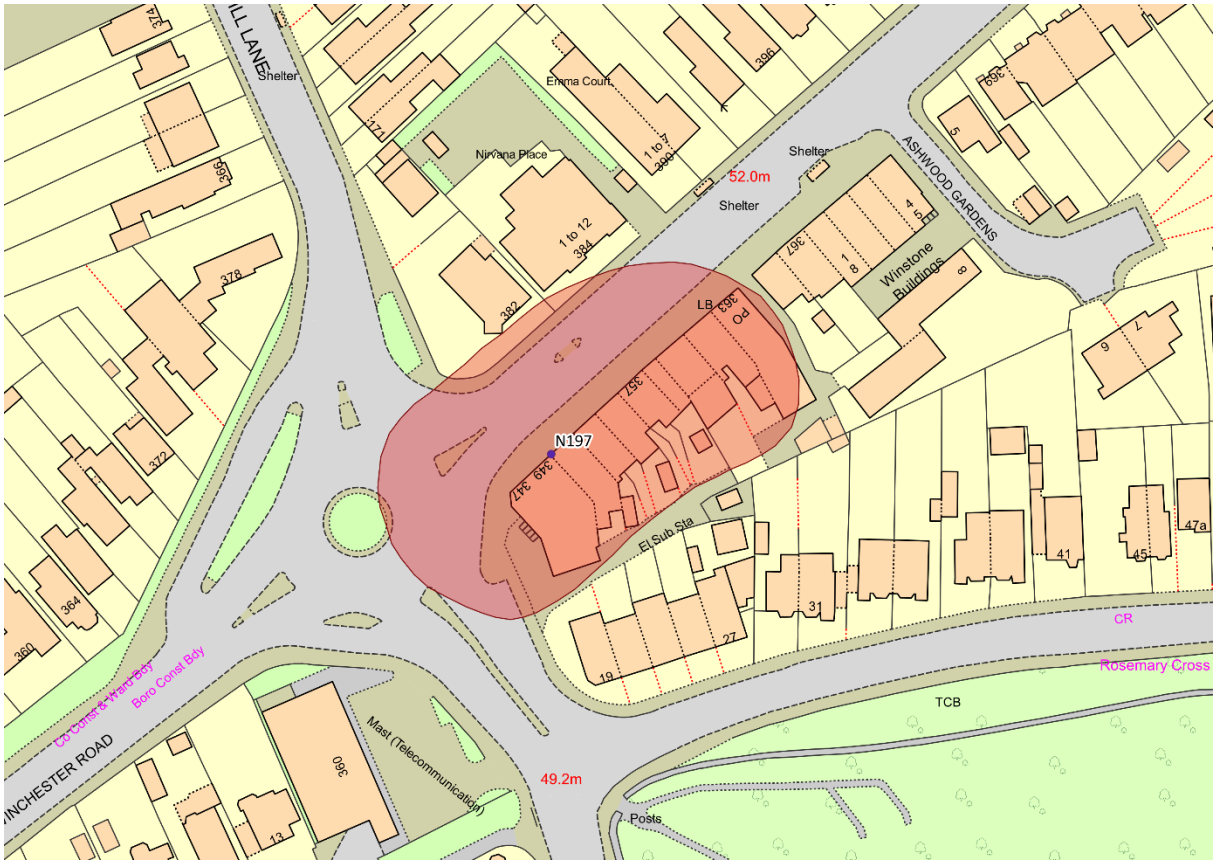


Figure 14 AQMA 3 Winchester Road and NO_2 diffusion tube monitoring locations

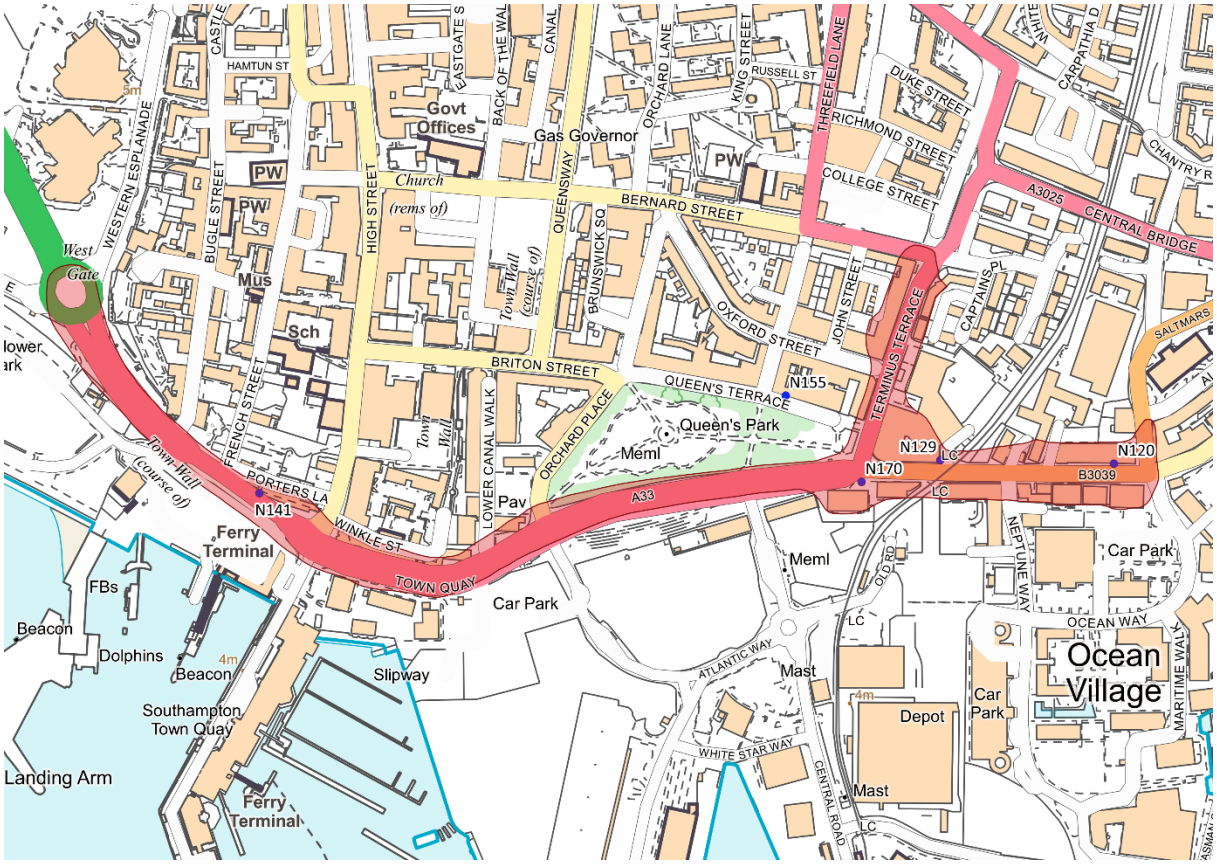


Figure 15 AQMA 4 Town Quay Road and NO_2 diffusion tube monitoring locations

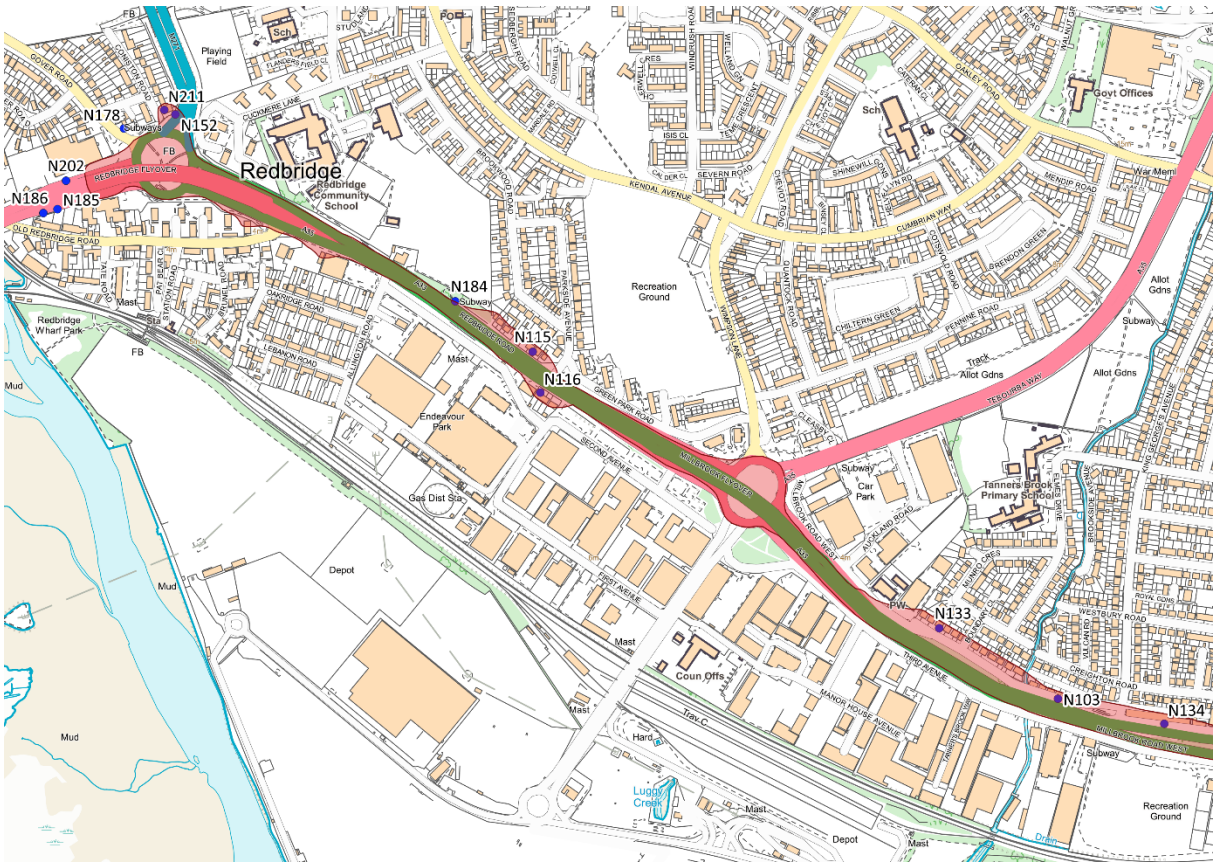


Figure 16 AQMA 5a (western section) Redbridge Road and NO_2 diffusion tube monitoring locations

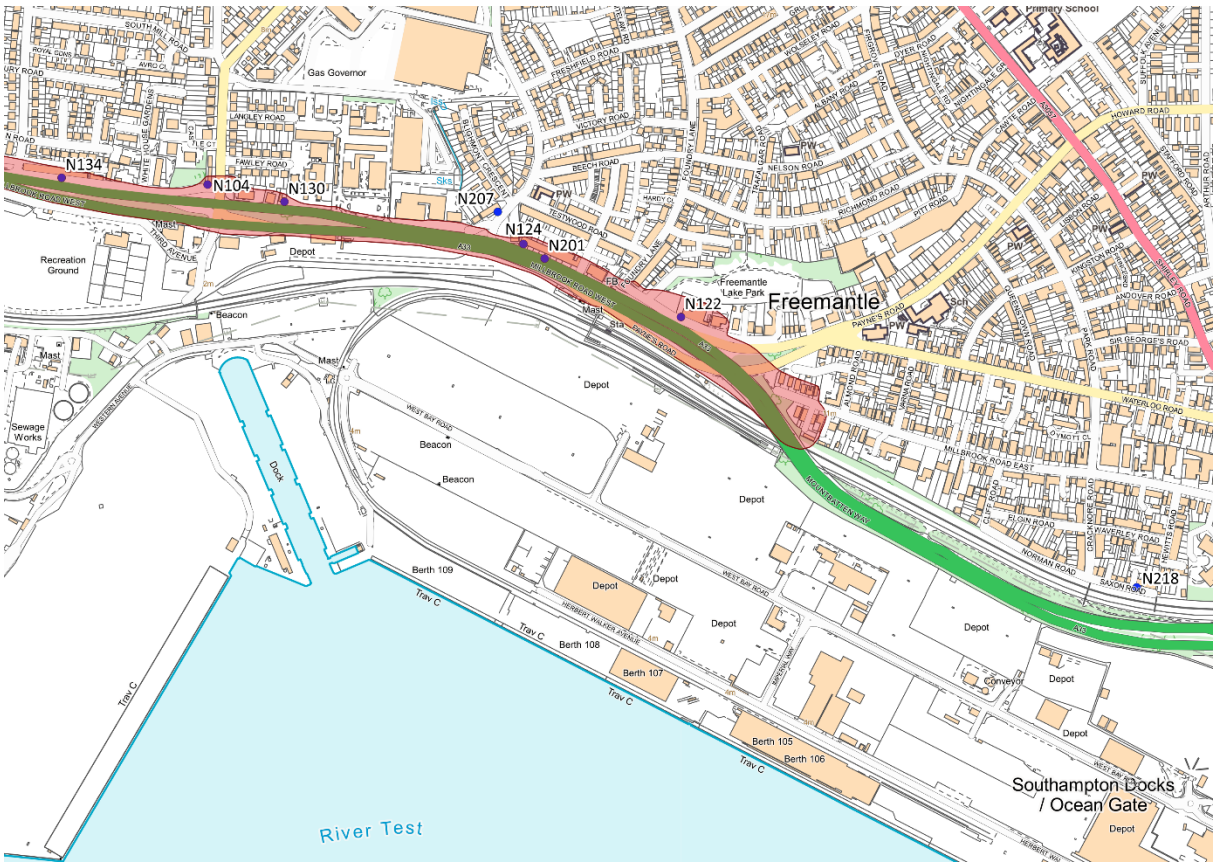


Figure 17 AQMA 5b (eastern section) Redbridge Road and NO_2 diffusion tube monitoring locations

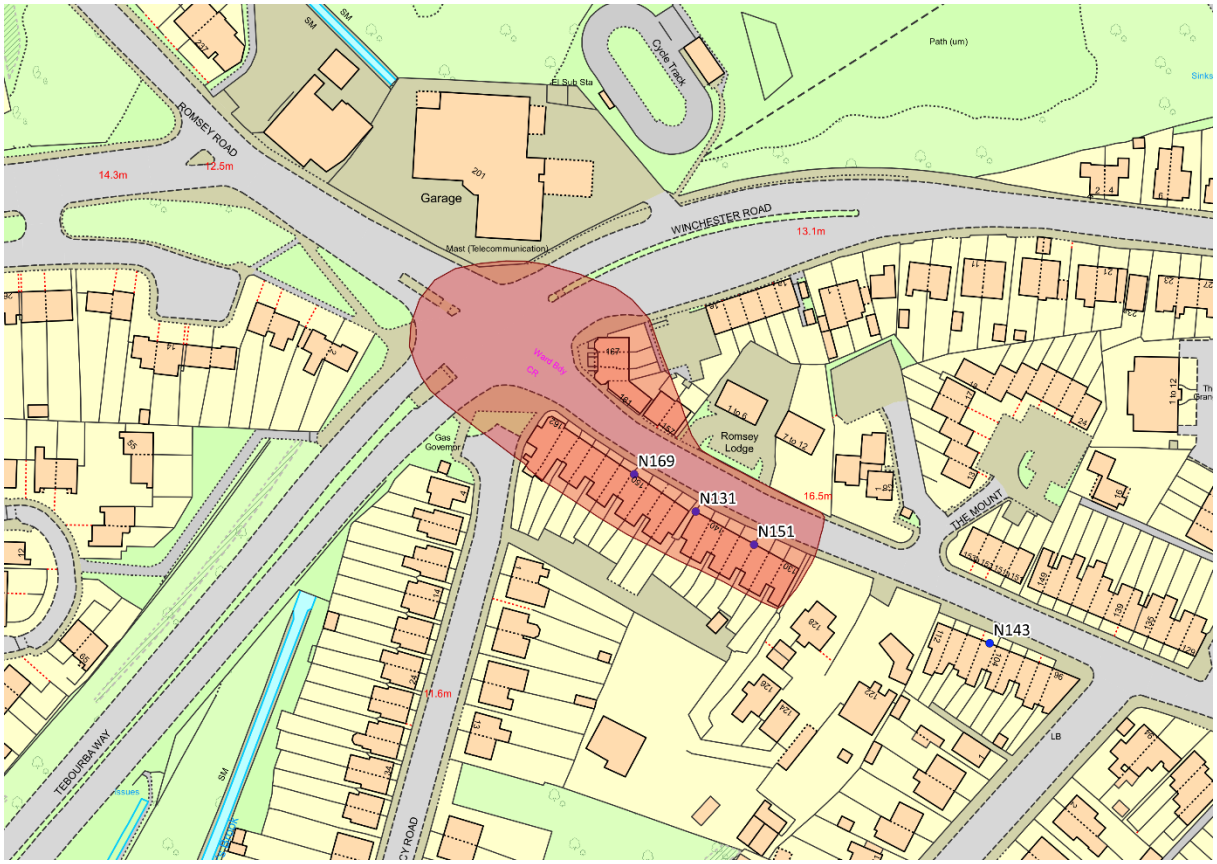


Figure 18 AQMA 6 Romsey Road and NO_2 diffusion tube monitoring locations

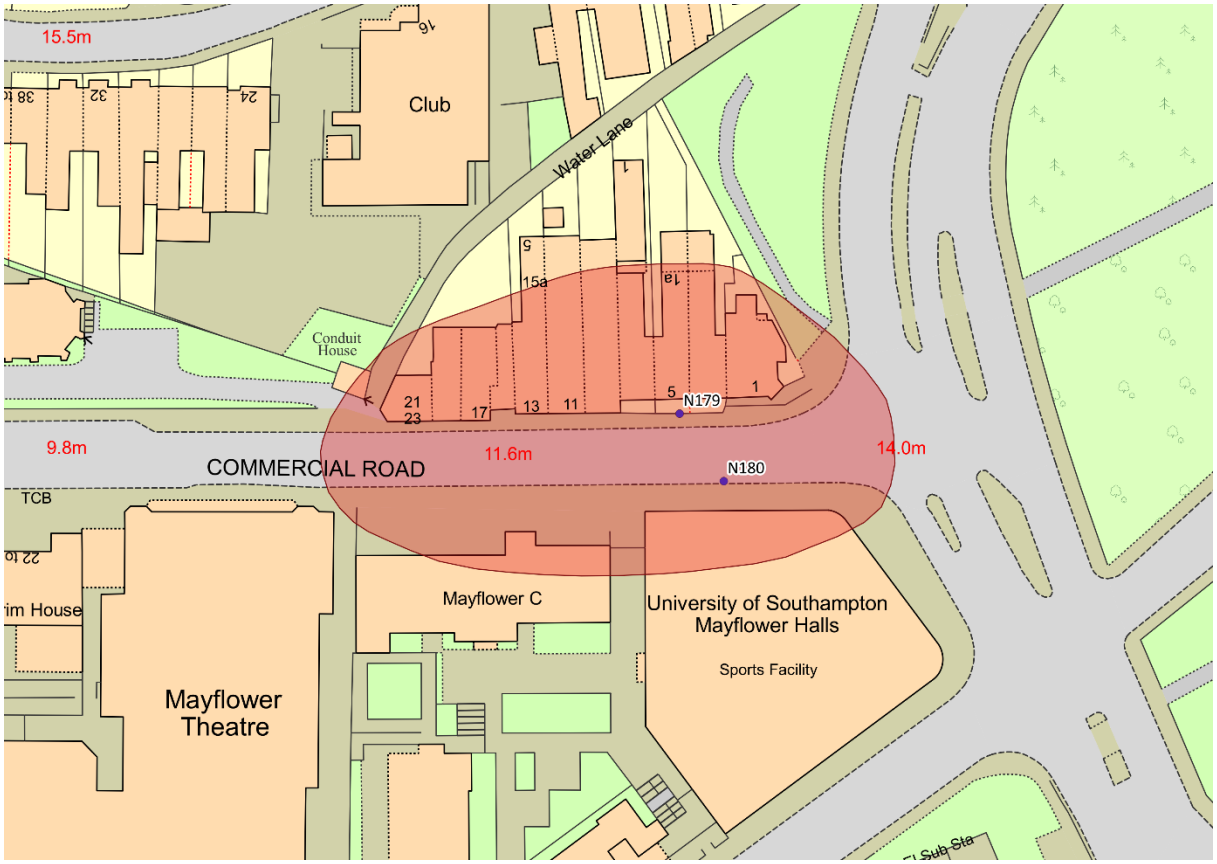


Figure 19 AQMA 8 Commercial Road and NO_2 diffusion tube monitoring locations

Figure 20 AQMA 9 Burgess Road and NO_2 diffusion tube monitoring locations

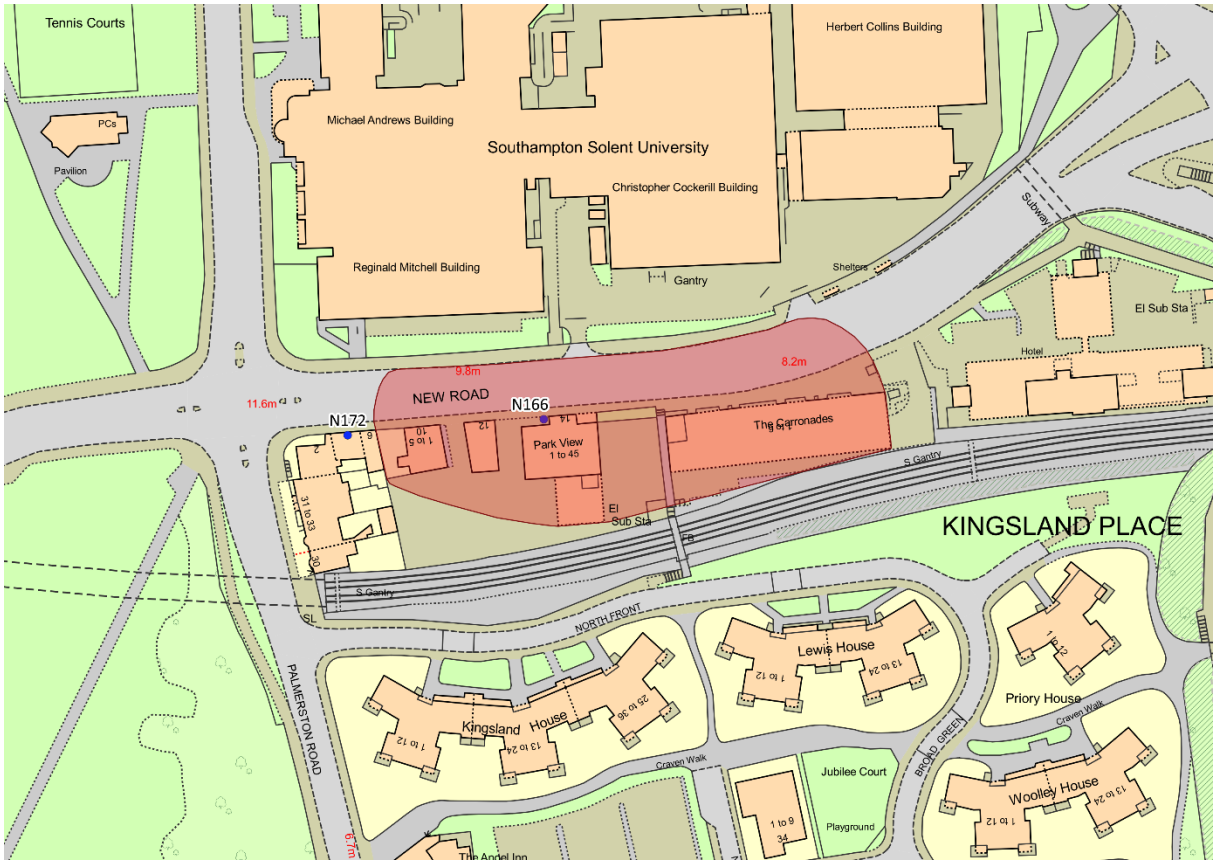


Figure 21 AQMA 10 New Road and NO_2 diffusion tube monitoring locations

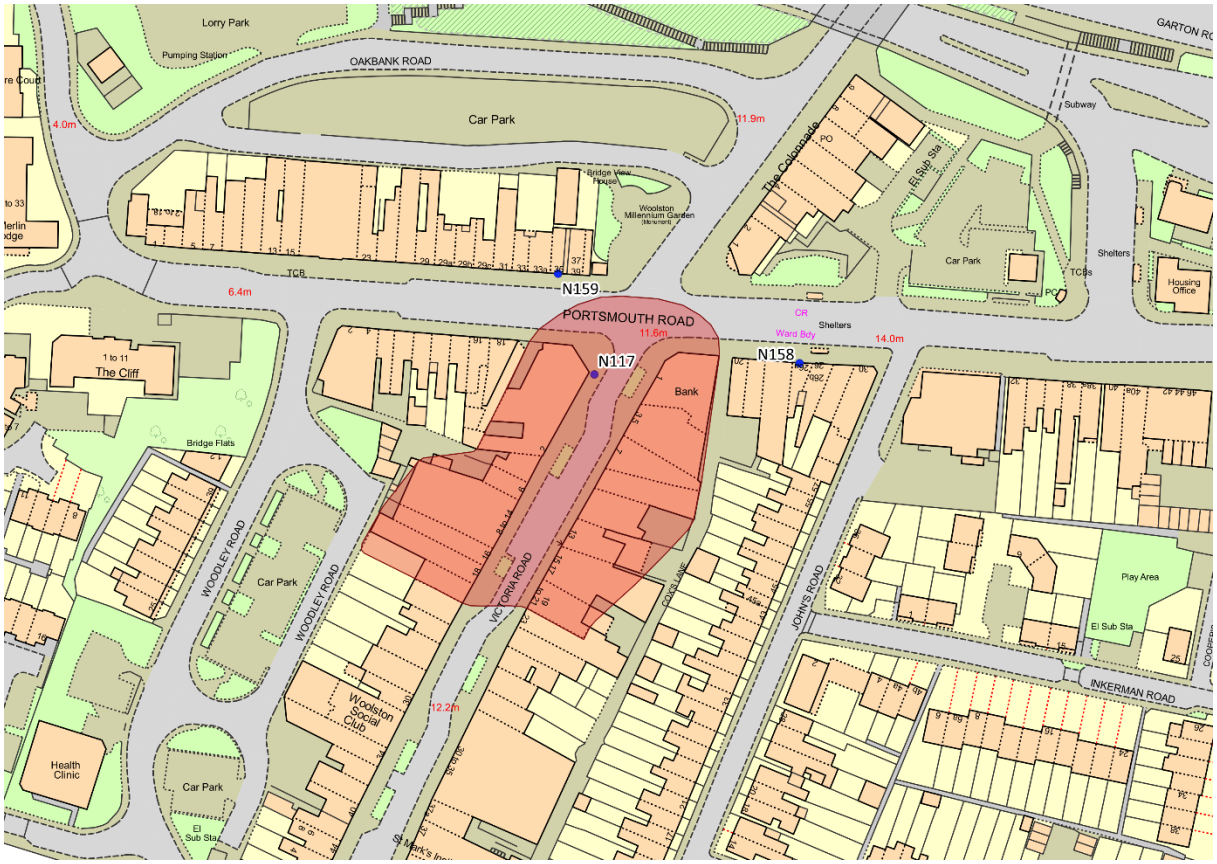


Figure 22 AQMA 11 Victoria Road and NO_2 diffusion tube monitoring locations

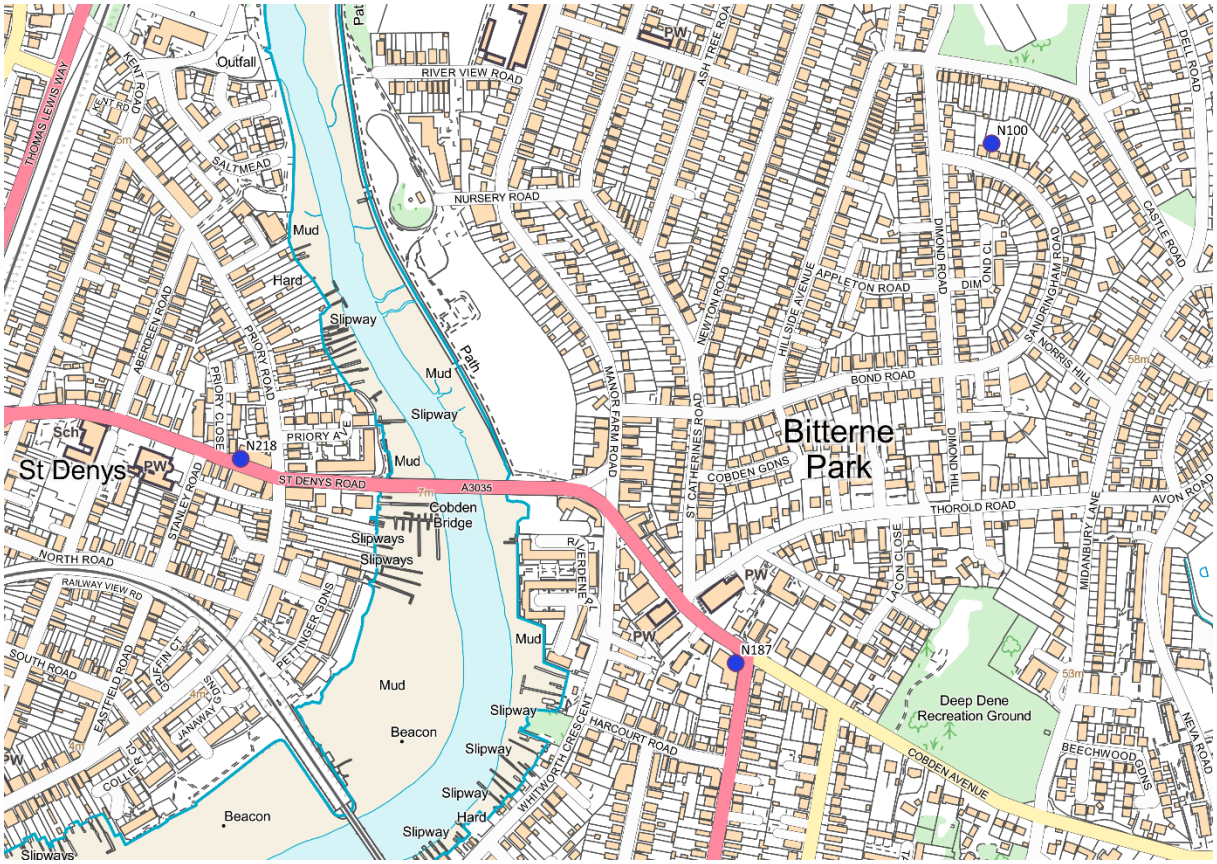


Figure 23 Bitterne Park and NO_2 diffusion tube monitoring locations

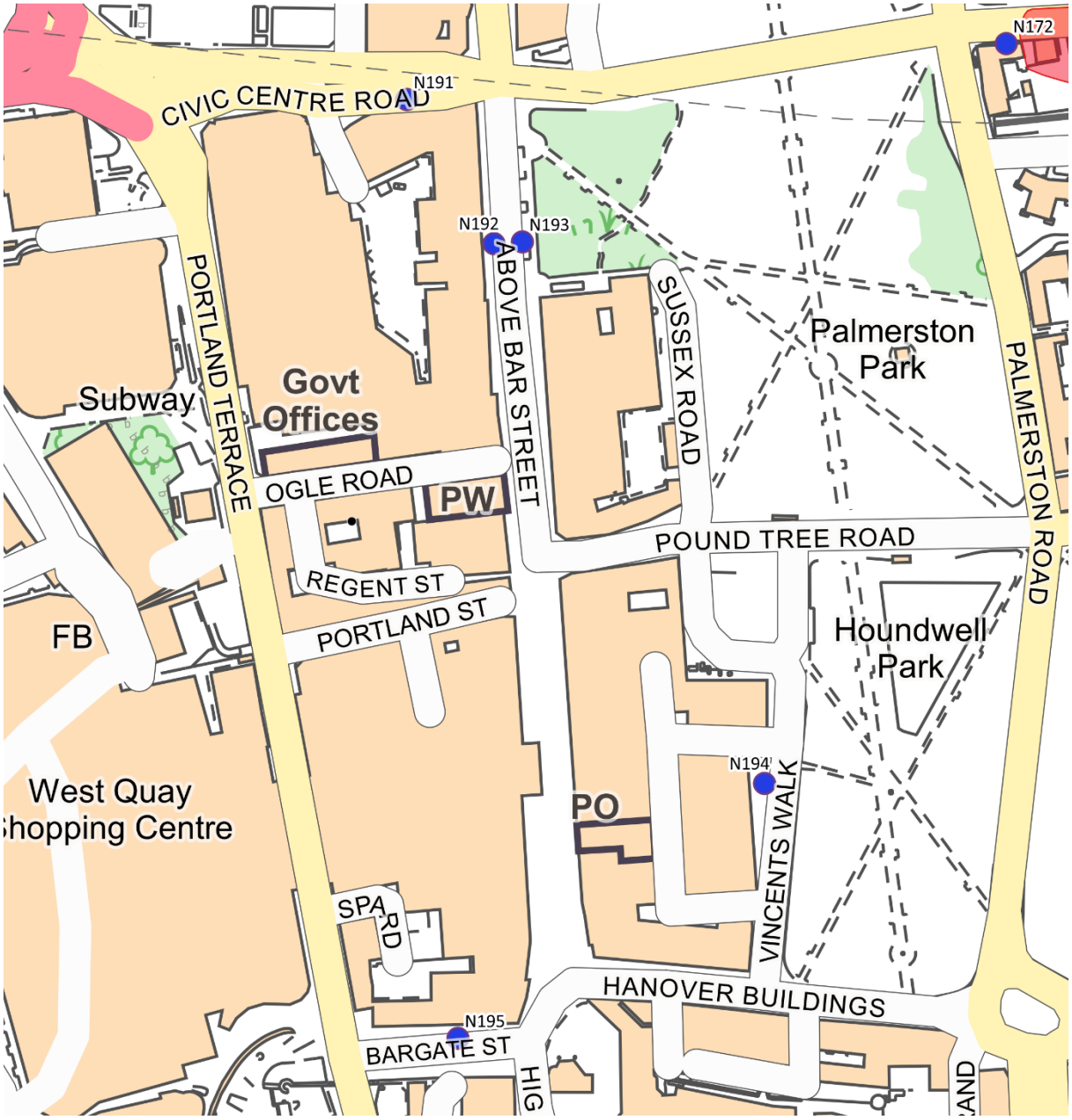


Figure 24 City Centre and NO_2 diffusion tube monitoring locations

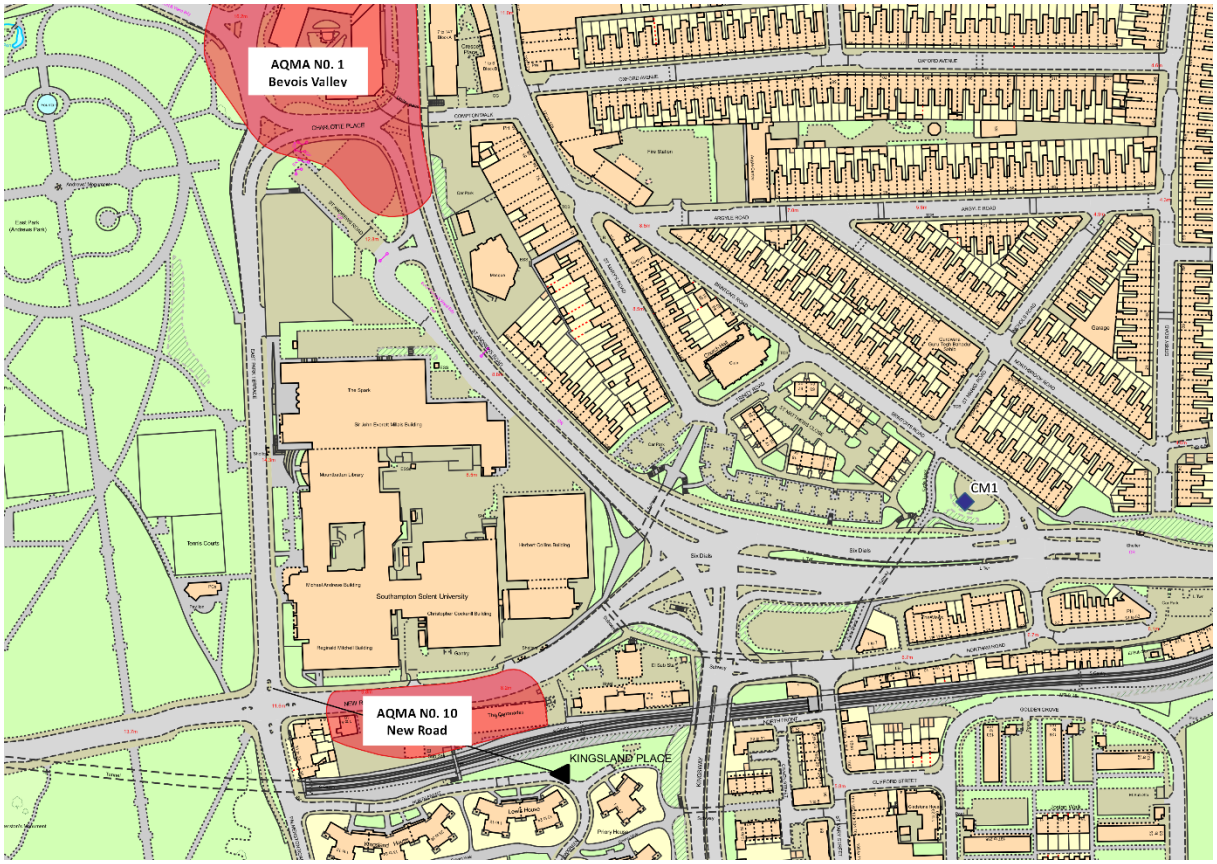


Figure 25 City Centre and Continuous Monitoring Station (CM1) location

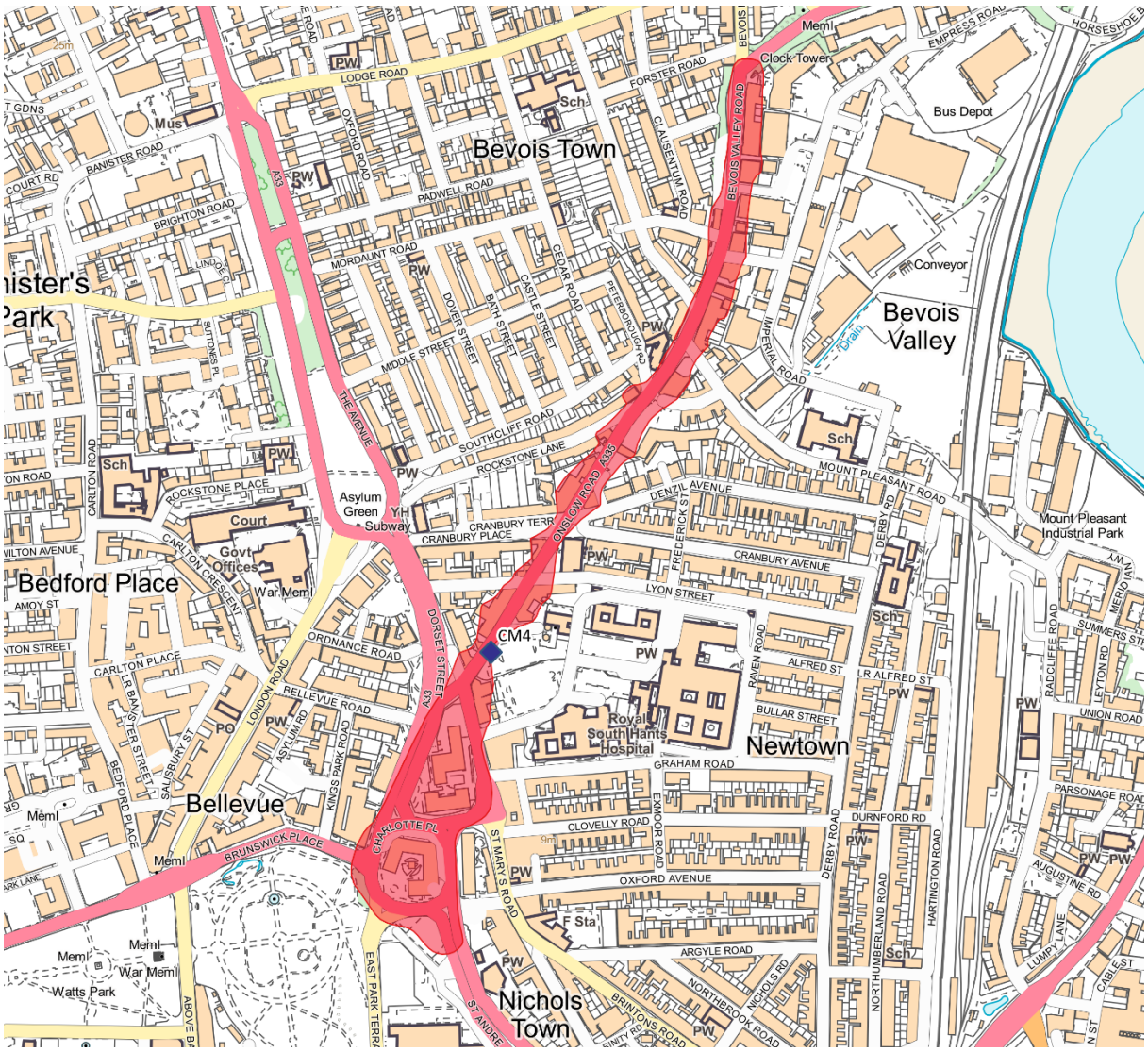


Figure 26 Bevois Valley and Continuous Monitoring Station (CM4) location

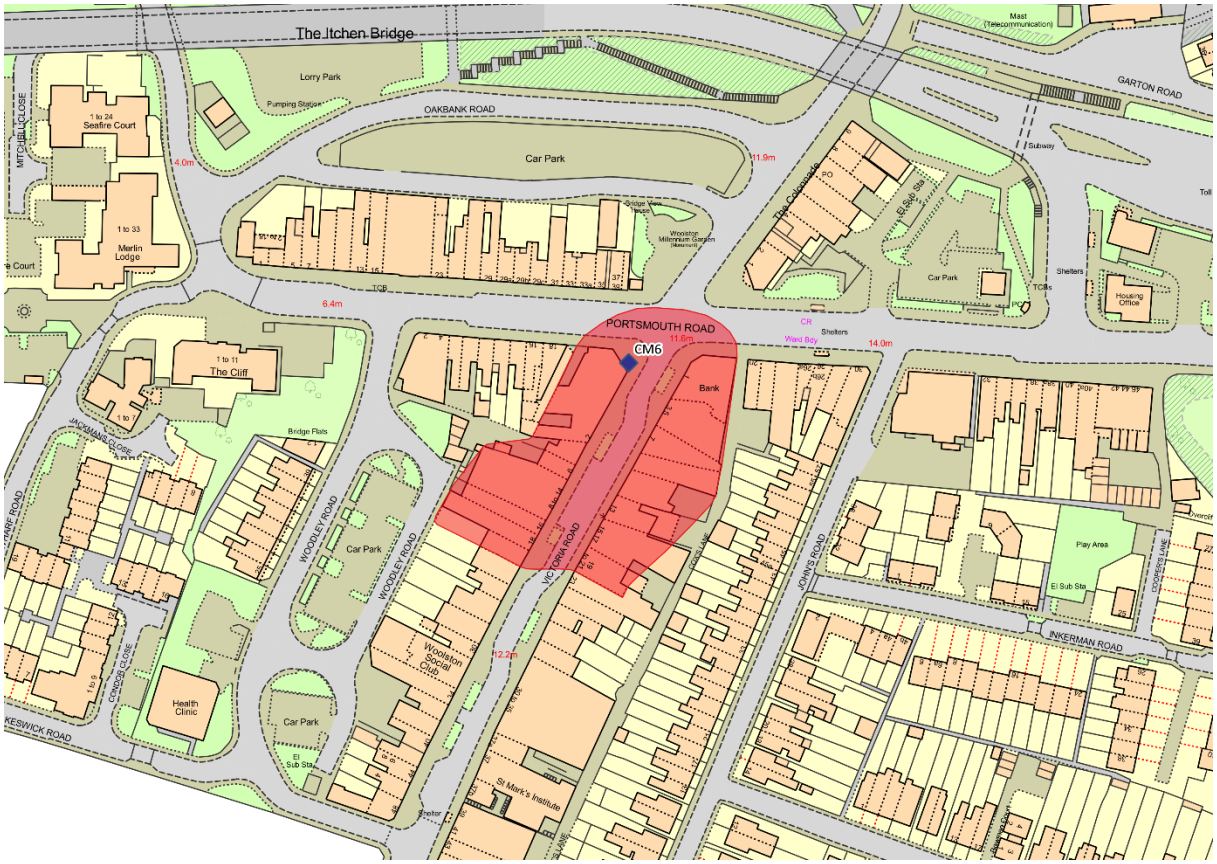


Figure 27 Victoria Road and Continuous Monitoring Station (CM6) location

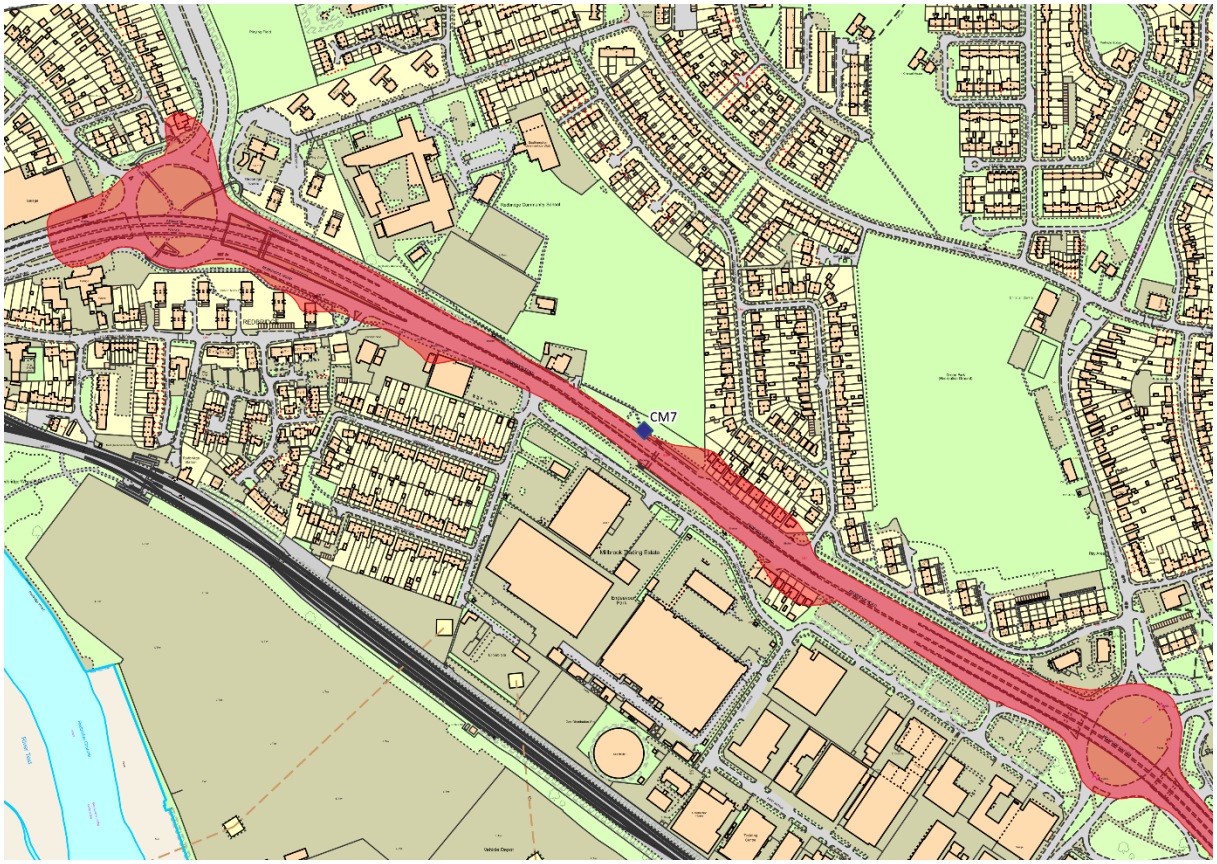


Figure 28 Redbridge Road and Continuous Monitoring Station (CM7) location

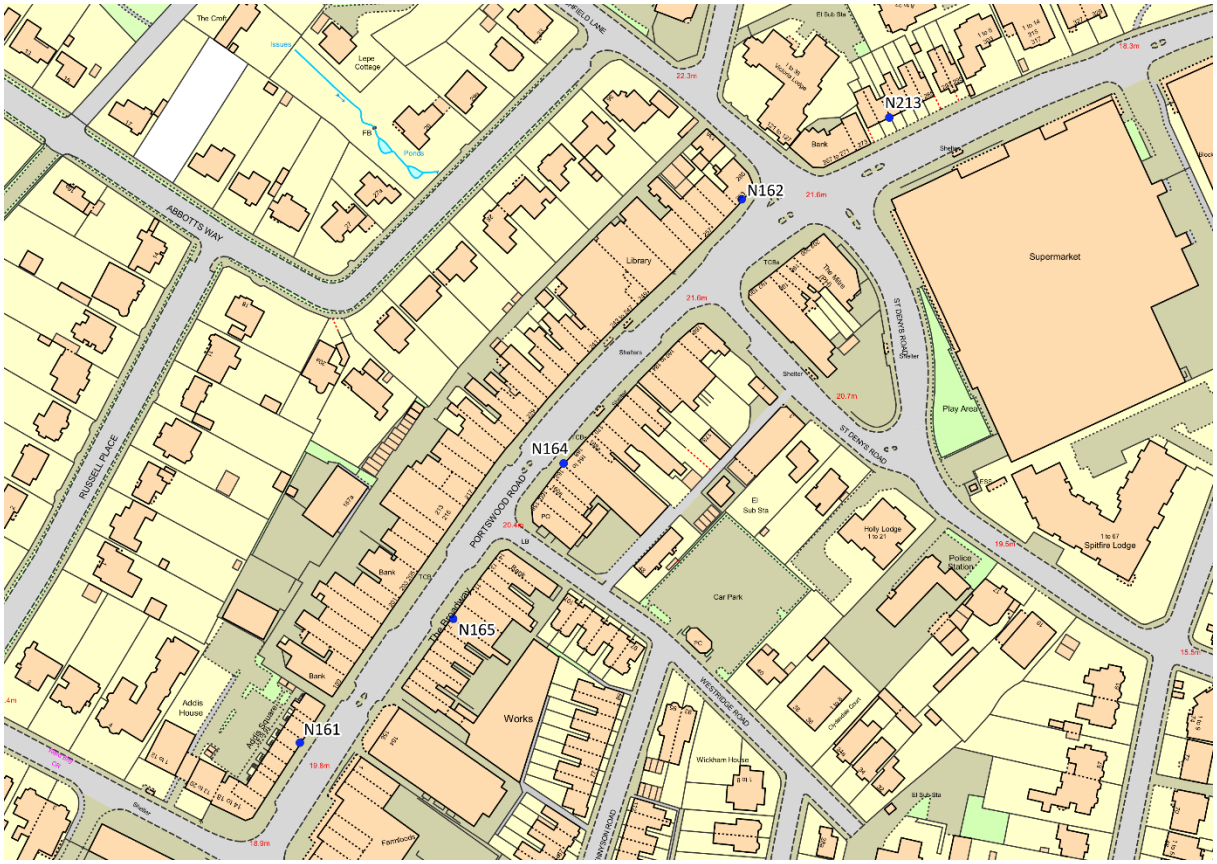


Figure 29 Portswood Road NO_2 diffusion tube monitoring locations

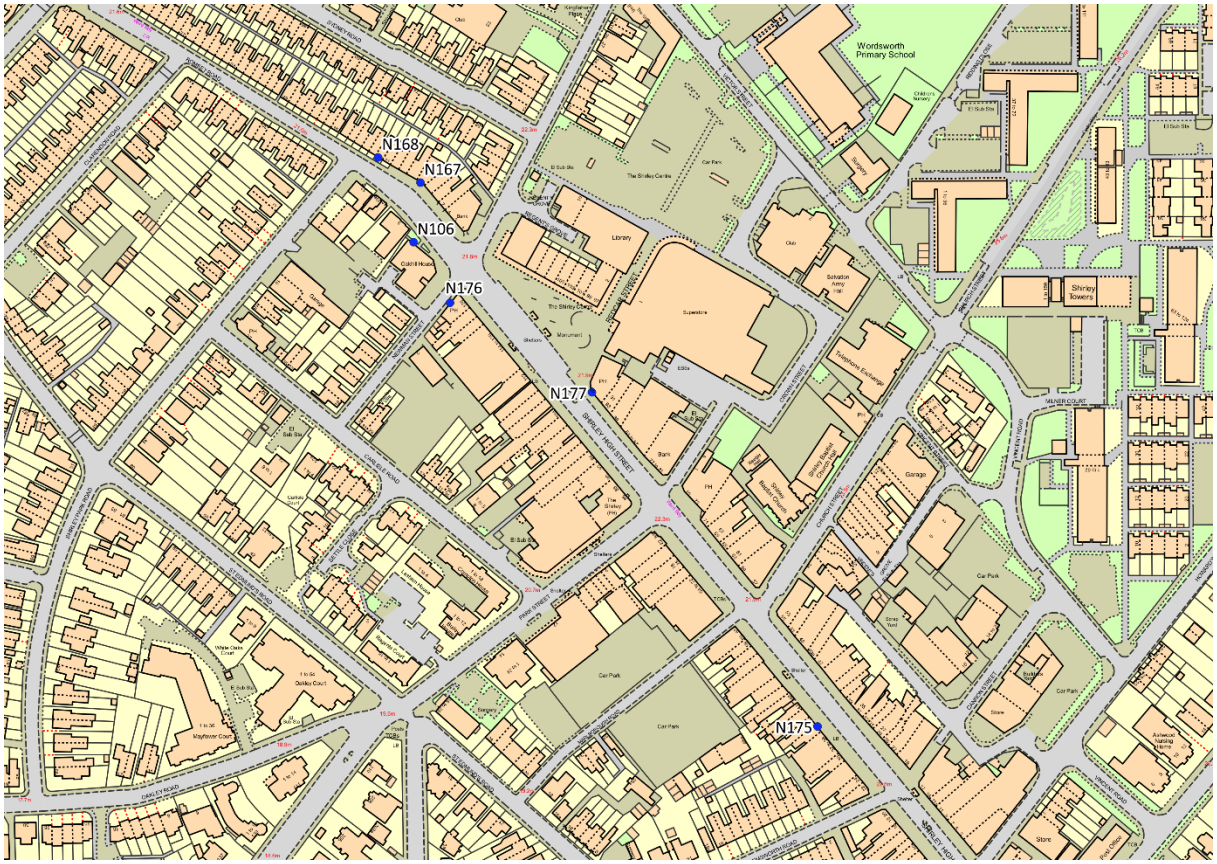


Figure 30 Shirley High Street/Romsey Road NO_2 diffusion tube monitoring locations

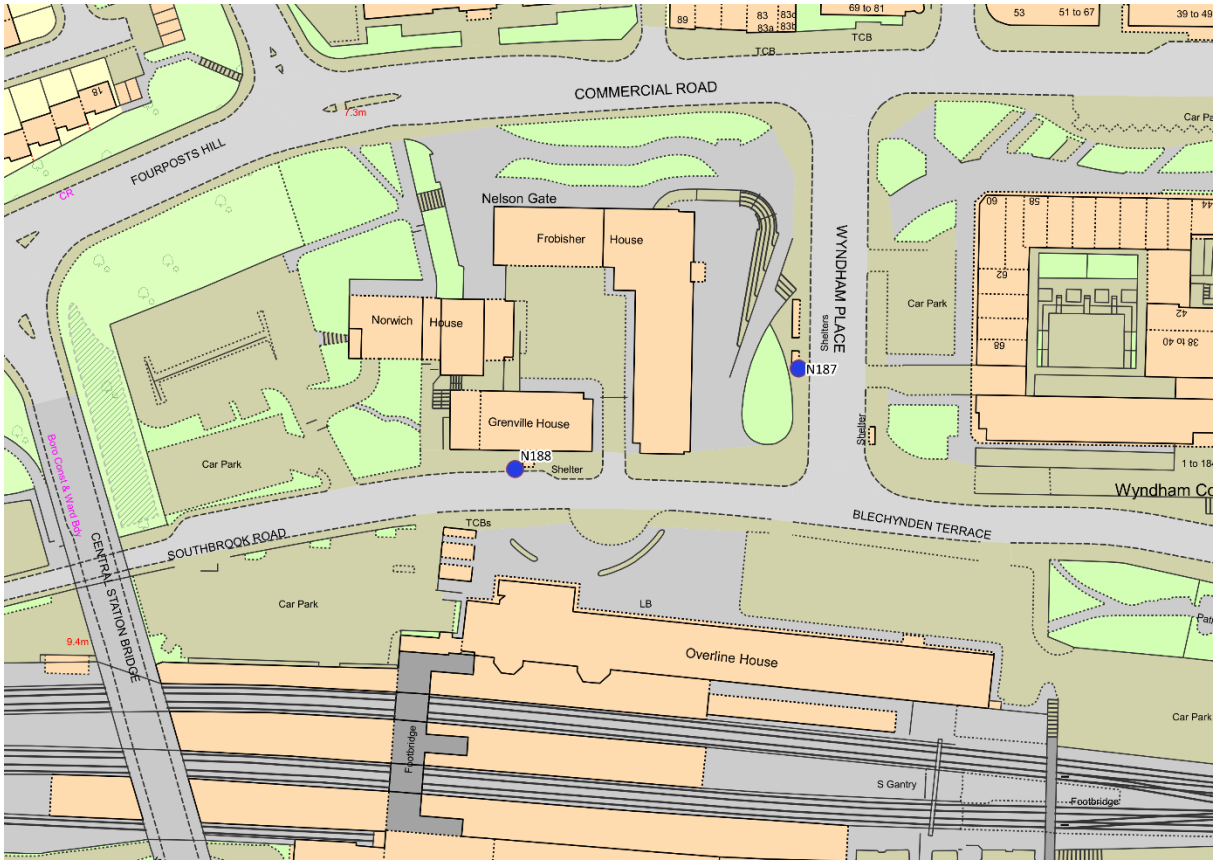


Figure 31 Blechynden Terrace (Central Train Station) NO_2 diffusion tube monitoring locations

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[10]	
	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

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

Glossary of Terms

Abbreviation	Description
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
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
…	…