Annex A

2017 Air Quality Annual Status Report (ASR)

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

June 2017

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Executive Summary: Air Quality in Our Area

Air Quality in York

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].

City of York Council has declared three Air Quality Management Areas (AQMAs) where the health based national air quality objectives for nitrogen dioxide (NO_2) are currently exceeded. These AQMAs are located in the city centre, in Fulford and along Salisbury Terrace. City of York Council has a statutory duty to try to reduce NO_2 concentrations within these AQMAs and additional obligations in relation to the protection of public health and reduction of greenhouse gas emissions. The main air pollutants of concern in York are NO_2 and particulate matter (PM). Typically traffic is responsible for around 50-70% of the total NO_2 at any particular location in the city, although the exact amount varies according to proximity to roads and other emission sources.

Recent air pollution monitoring data for York (2016) indicates that the annual average air quality objective for NO_2 is still being breached at a number of locations around the inner ring road (within the city centre AQMA). Whilst average concentrations across the majority of technical breach areas increased marginally in 2016 compared with 2015, there is evidence of a steady downward trend in nitrogen dioxide concentrations over the last 7 years. The only technical breach areas

[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

currently considered to be within health-based standards are Salisbury Terrace and Fulford Main Street[4].

Based on current guidance, it is considered that at least 1 additional year of monitoring in Fulford is needed (demonstrating that levels of NO_2 are consistently well under the health based annual mean objective) before revocation of the Fulford AQMA could be considered.

Concentrations of NO_2 monitored in the Salisbury Terrace AQMA in 2016 were all well below the annual mean objective of 40µg/m^3. Annual mean concentrations (and upper confidence limits) at all monitoring locations within the Salisbury Terrace technical breach area have been below the health based annual mean objective for the last 4 years. On this basis, the AQMA (AQMA Order No.3) is recommended for revocation. This change to the AQMA boundary is subject to a City of York Council Executive Member Decision Session in August 2017.

On the basis of recent monitoring, the existing City Centre AQMA (AQMA Order No.4) boundary may require amending to include Coppergate and the buildings either side of the road. From the end of 2016 there have been a number of changes affecting traffic movements on Coppergate that are likely to have a significant positive impact in terms of air quality. Since January 2017, traffic restrictions have now been reinstated on Coppergate. Only buses and permit holders are now allowed to use the road between 8am to 6pm, while between 10am and 4pm the area is only open for loading and unloading. In addition, from December 2016, various bus services have been upgraded (Coastliner service), rerouted or discontinued and no longer use Coppergate. On the advice of DEFRA, the air quality impacts of these changes will be evaluated before the city centre AQMA boundary is amended

National air quality objectives for PM_{10} are currently met in York. Health based objective levels for ultra-fine particulates have not yet been set for local authorities to meet. The EU limit value for $PM_{2.5}$ is 25µg/m^3 as an annual average with an additional requirement to reduce average urban background concentrations by 15% by 2020 (against a 2010 baseline). In 2016, the annual average $PM_{2.5}$

[4] The maximum annual mean NO_2 concentration at a relevant location was below the annual mean objective of 40µg/m^3 at 4 of the 8 technical breach areas. However, based on the precision analysis carried out on the diffusion tube results, the upper 95% confidence limits from 2 additional areas (Prices/Nunnery Lane and Fishergate) were 39 and 40µg/m^3 respectively (i.e. close to the annual mean objective level).

concentrations measured at York's three monitoring stations were 9.8µg/m^3, 12.0µg/m^3 and 9.0µg/m^3 and were therefore well within the EU limit value.

DEFRA predict that the Yorkshire and Humberside Zone (which includes York) is expected to meet the EU limit values by 2020 (assuming Euro VI diesel engines perform as expected and all local Air Quality Action Plans within the zone are fully delivered). Air quality monitoring and modelling work undertaken by City of York Council indicates that with the proposed third Air Quality Action Plan (AQAP3) measures in place, the health based national air quality objectives for NO_2 will be met in all the current air quality technical breach areas in York by 2021.

Actions to Improve Air Quality

City of York Council has previously produced two AQAPs in 2004 and 2006. These previous plans were primarily modal shift and congestion reduction based plans, with emphasis on reducing vehicle trips across the city.

Despite the introduction of two AQAPs, air quality in York continued to deteriorate between 2004 and 2010. In response, York developed an overarching Low Emission Strategy (LES) in 2012 to tackle the issue. This document was the first of its kind in the UK and set out a new approach to local air quality management based on reducing emissions from all sources, including tailpipe emissions from individual vehicles and encouraging the uptake of alternative fuels and low emission vehicle technologies. The Low Emission Strategy has proved particularly effective at tackling emissions from essential service vehicles such as buses, taxis and HGVs, which fall outside the scope of trip reduction based modal shift measures.

Modal shift and congestion reduction measures remain fundamental to the delivery of air quality improvement and emission reduction in York. The primary local delivery programmes for these measures are the Local Transport Plan (LTP3) and the i-Travel York programme. These programmes include many measures to encourage the uptake of walking, cycling, and public transport in the city. They are supported by planning policies that ensure sustainable travel is embedded into all new development in York.

City of York Council's third Air Quality Action Plan (AQAP3), adopted December 2015[5], sets out how York intends to continue to deliver its ambitious and pioneering overarching Low Emission Strategy (LES) and to work towards becoming an internationally recognised ultra-low emission city.

York's overarching LES (October 2012) has already changed the way York delivers public transport and plans for future transport trips. Since the publication of the LES, York has:

- Delivered a new fully electric Park & Ride (P&R) site at Poppleton Bar and introduced electric buses at the existing Monks Cross Park & Ride site. As part of the new P&R contract, starting in early 2018, CYC has secured electric buses for three of the six P&R routes, with brand new Euro 6 diesel buses completing the fleet.

- Retrofitted the world's first electric double-decker sightseeing bus. Transdev is currently working in partnership with City of York Council to convert a further five existing diesel vehicles to full electric drive. The buses are due to be completed by September 2017.

- Converted around 13% *(figure correct as of April 2017)* of the taxi fleet (~99 vehicles) to low emission alternatives (Euro 5+ hybrid or electric); most of these were converted through our innovative CYC taxi incentive grant scheme. We have also implemented a new taxi licensing policy, specifying minimum emission standards for new or replacement taxis.

- Implemented an extensive 'pay as you go' fast charge public electric vehicle recharging network in addition to 11 publicly accessible rapid chargers across the city. The number charging sessions per month is currently 1500 and is rising on as monthly

[5] AQAP3 available online at http://www.jorair.co.uk/index.php?page=reports

basis (this figure includes charging session by electric buses).

- City of York Council has been awarded £816,000 from the Office of Low Emission Vehicles (OLEV) after becoming the only Yorkshire location out of eight in the country to achieve 'Go Ultra Low' city status. The money will be used to fund a city-wide network of hubs, providing ultra fast, reliable and convenient electrical charging. The first 'hyper-hubs' are due to be installed in January 2018 (new 'hyper' speed standard). City of York Council is currently finalising the locations for the new hyper-hubs and evaluating options for 'off-grid' energy production.

- Developed Low Emission Planning guidance
- Taken part in National Clean Air Day and undertaken a campaign to promote anti-idling with bus operators, taxis, LGVs and private motorists.

At the same time, York continues to deliver on walking, cycling and public transport improvements, maintaining its national reputation as a leader in sustainable transport.

York already has much to celebrate in relation to reducing emissions and protecting and improving the health of its residents. However, with an increasing population and thriving local economy, preventing further emission growth and improving air quality remain significant and difficult challenges for the foreseeable future.

Measures in AQAP3 are intended to build upon (but not replace) the modal shift based measures included in previous AQAPs, and are intended to support other emission reduction measures in the Climate Change Framework and Action Plan (CCFAP) and the Local Transport Plan (LTP3).

Conclusions and Priorities

Key findings and conclusions from this year's Annual Status Report

- Whilst average concentrations across the majority of air quality technical breach areas increased marginally in 2016 compared with 2015, there is evidence of a steady downward trend in nitrogen dioxide concentrations over the last 7 years.

- On the basis of recent monitoring, the existing **City Centre AQMA** (AQMA Order No.4) boundary may require amending to include Coppergate and the buildings either side of the road. However, on the advice of DEFRA[6], prior to making this amendment it is proposed to evaluate the impact of a number of changes affecting traffic movements along this street. These changes are anticipated to have a significant positive impact in terms of local air quality.
- The **Fulford AQMA** (AQMA Order No.2) needs to be retained until monitored levels of NO_2 are consistently well below the health based annual mean objective level. It is considered that a further year of monitoring is required in this area.
- The **Salisbury Terrace AQMA** (AQMA Order No.3) is recommended for revocation as levels of nitrogen dioxide have been below the health based annual mean objective for the last 4 years.

Local Priorities for City of York Council

City of York Council's priorities for the coming year are:

- **Reducing emissions from buses through development of a Clean Air Zone (CAZ)** - Agree responsibility for delivering key elements of the CAZ and agree on an enforcement mechanism.
- **Introducing anti-idling measures** - Roll-out of anti-idling measures via permanent signage and a new anti-idling enforcement policy.
- **Reducing emissions from taxis** – via implementation of a new taxi licensing policy specifying minimum emission standards for new or replacement taxis, together with consideration of an age limit for vehicles.
- **Further delivery of strategic EV charging network** - City of York Council's successful Low Emission City bid will allow the installation of York's first 'hyper-hubs', providing ultra-fast, reliable and convenient electrical recharging. The hyper-hubs are due to be installed in January 2018.
- **Continuing to reduce emissions from new development** – by continuing to require electric vehicle recharge infrastructure, Construction Environmental

[6] *Email correspondence with Max Nancarrow (LAQM Helpdesk) on 24th May 2017 and subsequent email correspondence with Olawale Ladapo (DEFRA) on 30th May 2017*

Management Plans (CEMPs), and emissions mitigation plans on new developments.

- **Continued to reduce CYC 'grey fleet' trips** - by working in partnership with City Car Club to provide a pool of low emission cars for exclusive use by CYC staff during office hours.
- **Reducing emissions from the council's fleet** – by switching from diesel to low and zero emission alternatives wherever practical.
- **Increasing awareness of the impact of air pollution of public health** – via an improved marketing and communications strategy focussed on health impacts of air pollution.
- **Attracting low emission industries, businesses and jobs to York** – by developing a 'green business' hub and working towards development of a freight transhipment centre.
- **Continued modal shift and network improvement measures** – via both the LTP3 capital programme and LSTF programme
- **Parking Policy** - City of York Council is currently reviewing its parking policy, specifically the discounts available for low emission vehicles.

Challenges faced by City of York Council

There are a number of challenges faced by City of York Council, and indeed the UK, with respect to air quality improvement measures and the ability of local authorities to meet health based air quality objectives in their areas. These include:

- The failure of current vehicle emission standards to deliver reductions in NO_x emissions. There is still considerable uncertainty about the on-road performance of Euro VI diesel vehicles (as highlighted by the recent VW scandal). If Euro VI vehicles do not perform as expected, the number of UK zones and agglomerations exceeding the EU limit values in 2020 may be greater than the number currently predicted by central government.
- The increasing number of diesel vehicles in York (which have increased primary emission of NO_2 and carcinogenic diesel particulate)

- Development related 'emissions creep' through increased development in the city.
- Unnecessary vehicle idling in the city, particularly amongst heavy diesel vehicles

The above factors are thought to be responsible for the continued existence elevated levels of NO_2 concentrations in York and are considered to be the main reasons for the current AQMA designations.

Local Engagement and How to get Involved

Further information can be obtained from the air quality pages of City of York Council's main website https://www.york.gov.uk/airquality, or from City of York Council's dedicated air quality website http://www.jorair.co.uk

If you have any queries on Local Air Quality Management in York, please contact us using the details below:

Email: public.protection@york.gov.uk

Phone: 01904 551525

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1 Local Air Quality Management

This report provides an overview of air quality in City of York Council's area during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by City of York 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 it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by City of York Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=63. 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).

Throughout 2017 we propose to evaluate the impact of a number of changes affecting traffic movements on Coppergate. Should these changes not result in an improvement in recorded annual mean levels of NO_2 in this area, the City Centre AQMA (AQMA Order No. 4) will be amended to include this street and the buildings either side of the road (see monitoring section for further details).

We propose to revoke the Salisbury Terrace AQMA (AQMA Order No.3) as concentrations of NO_2 are now well below the annual mean objective for this pollutant (see monitoring section for further details). This change is subject to a City of York Council Executive Member decision session in August 2017. The outcome of this decision session will be reported to DEFRA at the earliest opportunity.

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 (inc. date of publication)
						At Declaration	Now	
City Centre AQMA (AQMA Order No.4)	September 2012 (supercedes AQMA Order No. 1 declared Jan 2002)	NO_2 Annual Mean & NO_2 Hourly Mean	York (City Centre)	Inner ring road and properties included within 6 areas of technical breach	NO	62µg/m^3	54µg/m^3	AQAP3 Published Sept 2015 (available online at: http://www.jorair.co.uk)
Fulford AQMA (AQMA Order No. 2)	March 2010	NO_2 Annual Mean	York (Fulford Village)	A19 corridor between Fishergate and the Outer Ring Road. Includes properties on Fulford Main Street only.	NO	56µg/m^3	35µg/m^3	AQAP3 Published Sept 2015 (available online at: http://www.jorair.co.uk)
Salisbury Terrace AQMA (AQMA Order No.3)	April 2012	NO_2 Annual Mean	York (Leeman Road Area)	Parts of Water End and the Leeman Road area. Includes properties on Salisbury Terrace only.	NO	40µg/m^3	35µg/m^3	AQAP3 Published Sept 2015 (available online at: http://www.jorair.co.uk)

City of York 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 York

Defra's appraisal of last year's ASR concluded that the Fulford Road and Salisbury Terrace AQMAs should be reviewed and considered for revocation as concentrations of NO_2 monitored in these areas had been below health based objectives for a number of years. It was also highlighted that consideration should also be given to whether the boundary of the city centre AQMA should be extended to include new relevant exposure for the annual mean objective in Coppergate. Finally, comments were invited in the 2017 Annual Status Report regarding ways in which colleagues in Public Protection have been working together with the Director of Public Health to deliver continued improvements in air quality.

- **Potential revocation of Fulford Road and Salisbury Terrace AQMAs** – further detailed analysis and commentary is provided in section 3.2.1. In summary it is not currently considered appropriate to revoke the Fulford AQMA at this time based on insufficient evidence that NO_2 annual mean objective is being met. However, based on monitoring results over the last few years it is considered the Salisbury Terrace AQMA can be revoked. This is subject to a City of York Council Executive Member decision session in August 2017.
- **Review of City Centre AQMA to include relevant exposure on Coppergate** – based on current diffusion tube monitoring results it is considered likely that the annual mean NO_2 objective is being exceeded at one relevant location on the street, and possibly others. However, from the end of 2016 there have been a number of changes affecting traffic movements on Coppergate that are likely to have a significant positive impact in terms of air quality. Since January 2017, traffic restrictions have now been reinstated on Coppergate. Only buses and permit holders, including taxis and private hire vehicles, are now allowed to use the road between 8am to 6pm, while between 10am and 4pm the area is only open for loading and unloading. In addition, from 4 December 2016, various bus services have been upgraded (Coastliner service upgraded to Euro 6), re-routed or discontinued and no longer use Coppergate. On the advice of DEFRA, the air quality impacts of these changes will be evaluated before the city centre AQMA boundary is amended. Monitoring data for 2017 will be considered in the 2018 ASR and further commentary will be provided in that report.

- **Comments in relation to joint working with Public Health** – the links between Public Protection and Public Health have strengthened considerably over the last 12 months since the appointment of a new Director of Public Health. In March 2017 the Council's Public Protection Manager and the Assistant Director of Public Health gave a joint presentation to CYC members outlining the detailed work currently being undertaken by officers on air pollution and health. Public health staff also helped to support National Clean Air Day activities in York. Synergies between these work areas have been identified and links between teams continue to evolve and strengthen.

City of York Council has taken forward a number of direct measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in City of York Council's third Air Quality Action Plan (AQAP3), available online at http://www.jorair.co.uk/index.php?page=reports .

Key completed measures and progress include:

- CYC have been involved in a number of promotional events aimed at raising public awareness of air quality issues, including:
    - The Air We Share event (Fri 10 Feb 2017, St Sampsons Square) - Clean Air Roadshow hosted by National Centre for Atmospheric Science. The event was aimed at helping members of the public to find out about what's in the air and what causes it to become polluted.
    - Making the Invisible Visible event (Sat 18 March 2017, York Explore Library) – for members of the public to find out about data available in relation to air quality monitoring, how they can lower their exposure to air pollution and learn about how they can become involved in air pollution monitoring.
    - National Clean Air Day – promoting anti-idling practices with bus operators, taxis, LGVs and private motorists
- Further development of the LES based Planning Guidance has been achieved via promotion of a standardised approach to assessing and mitigating emissions from

new developments across the Yorkshire and Humber region. This has been achieved through a series of workshops undertaken throughout the year by City of York Council at the YALPAG (Yorkshire and Lincolnshire Pollution Advisory Group) Air Quality forum.

- Continued roll-out of the new taxi licensing policy, that specifies minimum emission standards for new or replacement taxis. This new policy, in addition to our earlier support for local taxi drivers through the Low Emission Taxi Incentive Scheme, has resulted in 13% of local taxis upgraded to petrol hybrid or electric vehicles to date.
- Continued delivery of the Strategic Electric Vehicle fast charge network in the city. The number charging sessions per month is currently 1500 and is rising on a monthly basis (this figure includes charging session by electric buses). City of York Council was awarded 'Go Ultra Low' city status in 2016 and awarded funding from the Office of Low Emission Vehicles (OLEV). The money will be used to fund a city-wide network of hubs, providing ultra fast, reliable and convenient electrical charging. The first 'hyper-hubs' are due to be installed in January 2018 (new 'hyper' speed standard). City of York Council is currently finalising the locations for the new hyper-hubs and evaluating options for 'off-grid' energy production.
- Continued to reduce CYC 'grey fleet' trips by working in partnership with City Car Club to provide a pool of low emission cars for exclusive use by CYC staff during office hours. In addition to promoting the use of low emission car clubs, CYC has also leased a further electric vehicle for 3 years as part of its pool fleet at the Hazel Court Eco Depot.
- Continuation of the York ECO Stars fleet recognition scheme. Funding was identified to support further growth of the scheme until May 2017. There are currently 83 members of the scheme (as of March 2017) and membership continues to rise as York benefits from membership in other ECO Stars areas across the region. The number of vehicles covered by the York scheme has increased to over 5,300.
- Low Emission Parking Policy – City of York Council is currently reviewing its parking policy, specifically the discounts available for low emission vehicles.

Residents and visitors with a low emission vehicle are currently entitled to a discount of 50% on the price of a parking permit if the vehicle meets specific requirements, see: https://www.york.gov.uk/info/20102/parking_permits/1381/low_emission_vehicle_parking_discounts. New discounts are currently being worked up for ultra low emission vehicles producing < 75g CO_2 per km.

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

- Further development of a bus based Clean Air Zone (CAZ) in the city centre
- Additional electric buses on the Park & Ride service (and upgrading of the remaining P&R fleet to Euro 6)
- Implementation of anti-idling measures via signage and a new Anti-Idling Enforcement Policy.
- Further development of local incentives for low emission vehicles and alternative fuel use.
- Further modal shift and network improvement measures.

City of York Council's priorities for the coming year are:

- Clean Air Zone - Agree responsibility for delivering key elements of the CAZ and agree on an enforcement mechanism.
- Anti-idling Measures - Roll-out of anti-idling measures via signage and a new anti-idling enforcement policy.
- Planning and delivery of strategic EV charging network - City of York Council's successful Low Emission City bid will allow the introduction of solar charged EV points at P&R sites and regional expansion of the York EV charging network.

Progress on the following measures has been slower than expected due to:

- Development of a Clean Air Zone (CAZ) for buses in York city centre has been delayed due to unforeseen delays associated with awarding a new contract for provision of Park and Rude bus services in the city.

- Planning and delivery of CNG refuelling infrastructure (and freight consolidation centre). Whilst a feasibility study was completed in 2015, additional work considered necessary to address deliverability, environmental and design issues and, where relevant, Green Belt purposes.
- LES Marketing and Health Promotion, including website review. Whilst considerable progress has been made in terms of delivery of many of the measures in City of York Council's Low Emission Strategy (LES), a formal LES marketing strategy and website review has not been progressed as per the original plans and timescales due to staff resources in Public Protection. However, we have regularly updated our existing website, undertaken presentations and awareness raising for councillors and residents and used social media to promote air quality and health messages. We have also undertaken an anti-idling campaign as part of National Clean Air Day.

City of York Council anticipates that the measures stated above and in Table 2.2 will help achieve compliance in all but one of the current AQMA technical breach areas by 2021. This is based on modelling work undertaken for City of York Council's third Air Quality Action Plan (AQAP3) that assumed that all measures were delivered in full. The possible exception to this was Nunnery Lane, where modelling suggested that the low emission measures in AQAP3 would not be enough to completely offset the predicted development led traffic growth in this area (expected under the Local Plan proposals as they stood at the end of 2014). It is proposed to revisit this modelling work when the draft Local Plan has been finalised and the revised traffic growth data for the city becomes available.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
AQAP3 (1)	Clean Air Zone (CAZ)	Promoting Low Emission Transport	Low Emission Zone	CYC	2016/17	2018	Number of ultra low emission buses operating within York Inner Ring Road	Every electric bus introduced into the CAZ will remove local emissions of NO_2 and PM_{10} and reduce CO_2 emissions by approx 35 tonnes.	Supporting feasibility studies completed. Electric buses secured for 3 P&R sites from early 2018 (with remaining P&R fleet being upgraded to Euro 6). A funding bid to support purchase of additional electric P&R buses has been submitted and result expected in 2017	2018-19	Individual buses crossing the inner ring road proposed to be ultra low emission from 2018. The main costs are associated with new buses (cost to third party operators)
AQAP3 (2)	Anti-idling measures	Traffic Management	Anti-idling enforcement	CYC	2014/15	2017	N/A	From feasibility report done by TTR Ltd - at 5 busiest service bus locations, estimated savings per annum of 1,526kg NO_x, 36kg PM_{10}, 46,555kg CO_2,and 17,949 litres of fuel.	Draft Enforcement Policy developed and a survey of potential 'no-idling' sign locations has been completed. Anti-idling exercise with buses, taxis, LGVs and private motorists and media campaign undertaken to promote National Clean Air Day	2018	Main cost is signage. May be some additional staffing and legal costs to be met.
AQAP3 (3)	Further development of ECO-Stars Fleet Recognition Scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	CYC / DEFRA grant funded	2013/14	2013 - 2017	Number of operators signed up to the scheme	A typical van operator could see its annual output of carbon dioxide fall by six tonnes per year (see http://www.ecostars-uk.com/about-eco-stars/why-join/)	Eco-Stars scheme launched March 2013. Currently 83 members (as of end of March 2017)	Funding identified to allow scheme to run until June 2017	The possibility of a local 'procurement' standard for vehicles used by, or to supply, CYC services is being investigated

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
AQAP3 (4)	Planning and delivery of CNG refuelling infrastructure	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV charging, Gas fuel recharging	CYC and third party investment (to be identified)	ongoing	To be determined	To be determined	A vehicle running on CNG has significantly lower emissions of NO_2, PM_{10} and CO_2 compared with a diesel equivalent. Detailed emission savings to be determined at planning application stage	CNG feasibility study completed in 2013, potential site identified. No investor identified to date.	Depends on external investment and planning process	Third party investment opportunities currently being explored
AQAP3 (5)	Freight delivery and service plan for key city centre retailers and streets.	Freight and delivery management	Delivery and service plans	CYC	ongoing	ongoing	N/A	N/A	Freight improvement study undertaken in 2013	Currently on hold due to lack of staff resources.	Depends on external investment and planning process.
AQAP3 (5a)	Freight consolidation Centre	Freight and delivery management	Freight consolidation centre	CYC and third party investment (to be identified)	ongoing	To be determined	Number of city centre businesses using consolidation centre.	To be determined	Possible site located. Further work necessary before proposals can be included in the Local Plan.	To be determined	Third party investment opportunities currently being explored
AQAP3 (6)	Development and implementation of LES based planning guidance	Policy guidance and development control	Air quality planning and policy guidance	CYC	2015	2016	Number of publically Accessible EV parking bays available in York (some deliverable via planning process/condition)	Aims to minimise additional emission impact of development. Emission savings generally calculated and reported per	LES planning principles embedded into draft Local Development Plan. LES planning guidance included as Annex to AQAP3 and being actively implemented. This is being promoted	ongoing	Developers may be required to off-set large emission damage costs via provision of on-site or off-site facilities and/or contribution towards wider LES measures in York.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
								development.	through YALPAG (Yorkshire and Lincolnshire Pollution Advisory Group)		
AQAP3 (7a)	Reducing emissions from taxis (financial incentive for low emissions taxi purchase)	Promoting low emission transport	Taxi emission incentives	CYC	2014	2015 - present	Number of low emission taxis purchased through the local grant scheme	A hybrid taxi produces approx 8 tonnes per annum of CO_2 less than a diesel equivalent and has considerably lower emissions of NO_x and PM_{10}.	50 low emission taxis purchased through the scheme to date.	Funding for local scheme expired March 2016.	Alternative funding currently being sought to support further implementation of the scheme.
AQAP3 (7b)	Reducing emissions from taxis (taxi licensing emissions controls)	Promoting low emission transport	Taxi licensing conditions	CYC	2016	2017	Number of low emission taxis present in the CYC taxi fleet		New Taxi Licensing Policy approved April 2016	Conditions apply from 1 June 2017 for replacement hackney carriage vehicles, and from 1 Nov 2017 for replacement private hire vehicles.	Following conditions approved by licensing committee in April 2016: Vehicles applying to be licensed as taxis must meet a minimum Euro 5 emission standard for petrol, Euro 6 for diesel, or be ultra low emission vehicles from 1 June 2017 for replacement hackney carriage vehicles, and from 1 November 2017 for replacement private hire vehicles. Operators may experience some increased vehicle replacement costs.
AQAP3 (8)	Planning and delivery of strategic	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure	CYC	ongoing	ongoing	Number of publically Accessible EV parking bays	N/A	EV charging provided at 12 hotels in conjunction with Zero Carbon World	ongoing	The money secured through the ELEC bid will be used to fund a city-wide network of

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
	EV charging network		to promote Low Emission Vehicles, EV charging, Gas fuel recharging				available in York		Public Pay as You Go EV charging network implemented in CYC car parks and 3 rapid charging points deployed. Successful Ultra Low Emission City bid Jan 2016 will provide further charging hubs		hubs, providing ultra fast, reliable and convenient electrical charging. The first 'hyper-hubs' are due to be installed in January 2018 (new 'hyper' speed standard). City of York Council is currently finalising the locations for the new hyper-hubs and evaluating options for 'off-grid' energy production.
AQAP3 (9a)	Reducing CYC 'grey fleet' trips	Alternatives to private vehicle use	Car clubs	CYC	ongoing	ongoing	Reduction in annual business mileage	-	In 2014, CYC was awarded the Energy Saving Trust's 'Fleet Hero' award for reducing annual business travel mileage by 20%, CO_2 emissions by 23% and number of vehicles used by 21% (based on 2013 figures).	ongoing	Achieved via a comprehensive suite of green fleet measures. CYC membership of car club has significantly reduced the number of people using their own private vehicles on CYC business.
AQAP3 (9b)	Introduction of low emission vehicles into CYC fleet	Promoting Low Emission Transport	Company vehicle procurement – prioritising uptake of low emission vehicles	CYC	ongoing	ongoing	Number of full electric and electric hybrid vehicles in CYC fleet	-	As well as promoting use of low emission car clubs, Public Protection have also recently leased an electric vehicle for a 3 year period for business use	ongoing	The bulk of the LCV fleet is currently mid-life, so it will be 2018/19 before any potential electric vans could replace the current diesel vehicles.
AQAP3 (9c)	CYC Eco-driver training and vehicle emission controls	Vehicle Fleet Efficiency	Driver training and Eco aids	CYC	ongoing	ongoing	Number of CYC staff obtaining ECPO driver training	-	Lightfoot trial completed Fuel additive trial completed	ongoing	-

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									Programme of mandatory HGV driver training being undertaken (including eco-driving element)		
AQAP3 (10)	Marketing and Communication Strategy	Public Information	Via the Internet	CYC	2014-2016	2017	Number of visitors on upgraded JorAir website per annum	N/A	Ad hoc public communication work ongoing. Participated in Clean Air Day 2017. JorAir website to be updated with health information.	ongoing	CYCs involvement in National Clean Air Day involved a city-wide programme of anti-idling initiatives An upgrade to the JorAir website is still planned but has been delayed due to staff resources. The main improvements will include better data dissemination, improved health advice and use of social media
AQAP3 (11a)	Local incentives for low emission vehicles and alternative fuel use – EV chargers and business demonstrators	Promoting Low Emission Transport	Company Vehicle Procurement – Prioritising the uptake of low emission vehicles	CYC	2015	2016	Number of businesses that have installed EV charging and trialled demonstrator vehicle per annum	-	Nissan Leaf electric vehicle leased for 3 years until May 2019, EV charged at 6 business premises during 2016	ongoing	Additional funding currently being explored for second demonstrator vehicle
AQAP3 (11b)	Local incentives for low emission vehicles and	Promoting Low Emission Transport	Priority parking for LEVs	CYC	ongoing	ongoing	Number of low emission permits issued	-	A total of 1401 Low Emission Permits were issued in 2016. (included 893 Household Low Emission Vehicle	ongoing	York residents have previously been entitled to a discount of 50% on the price of parking permit if they

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
	alternative fuel use – Priority parking / reduced parking fees for low emission vehicles								Permits)		operate a low emission vehicle. From 01/04/2017, only vehicles emitting less than or equal to75g CO2 will be eligible. City of York Council is currently reviewing its parking policy, specifically the discounts available for low emission vehicles.
AQAP3 (12)	Attracting Low Emission industries, businesses and jobs to York	Policy guidance and development control	Other policy	CYC	ongoing	ongoing	-	Not quantifiable	TBA	ongoing	Will support wider air quality improvement measures
AQAP3 (13a)	Modal shift and network improvement measures (i-Travel York campaign)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	CYC	ongoing	ongoing	% mode split or walking/cycling/bus vs conventional car drivers and car passengers % trips into city centre	Hard to precisely quantify but target to increase modal shift away from conventional car	Ongoing delivery and funding of I-travel York sustainable travel programme	ongoing	Subject to ongoing funding
AQAP3 (13b)	Modal shift and network improvement measures (Bus Improvements)	Transport planning and infrastructure	Public transport improvements interchanges, stations and services	CYC	ongoing	ongoing	National Annual Passenger satisfaction survey	Aim to increase uptake of public transport	Bus improvements in progress, including Rougier Street	2018	-
AQAP3 (13c)	Modal shift and network improvem	Transport planning and infrastruct	Other	CYC	ongoing	ongoing	Concentration reduction target in LTP3	-	See https://www.york.gov.uk/info/20108/local_transport_plan/1430/lo	ongoing	CYC's third Local Transport Plan (LTP3), covering the period to 2031, sets out the

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
	ent measures (Other LTP measures)	ure					and AQAP3		cal_transport_plan_2011-2031		transport policies and measures that will contribute to the city's economic prosperity over the next 20 years, whilst meeting challenging national and local targets for reducing emissions.
AQAP3 (14)	Other air quality improvement measures (non-transport sources)	Environmental Permits	Introduction/Increase of Environment charges through permit systems and economic instruments	CYC	ongoing	ongoing	Number of scheduled inspections completed per annum		Enforcement of relevant air quality legislation is currently undertaken by Regulatory Support and Advice unit	ongoing	Scheduled inspections undertaken by CYC public protection staff.
AQAP3 (15)	Provide more green infrastructure	Policy Guidance and Development Control	Other policy	CYC	ongoing	ongoing	tba	-	Committed to developing a Green Infrastructure Strategy for York and good progress in being made. Green Infrastructure Forum held November 2014, with further stakeholder workshop sessions in January 2015. Consultants AMEC have been commissioned to help carry out the Green Infrastructure Strategy project in partnership with CYC. Further information on progress can be found here: https://www.york.gov.		The Strategy will support policies in the Local Plan and the Council Plan, whilst being a focus for partnership working across York. The Strategy will establish a long term vision for the planning and management of Green Infrastructure across York, identifying where the protection and enhancement of green spaces and natural elements can be achieved, improvements in connectivity between places realised, and focal points for community and business involvement

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									uk/info/20051/planning_policy/637/green_infrastructure_gi_strategy		established.
Additional measures not specifically in AQAP3											
16	Further conversion of diesel double decker tour buses to electric	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	CYC / Grant Funding	2015	2017	Number of buses converted to electric	Conversion to electric drive will remove bus tailpipe emissions	One demonstration bus converted, 5 more currently being converted to electric drive and expected to be in operation for the summer 2017 season	2017	-
17	Retrofitting of school buses	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	CYC / Grant funding	2015	2017	Number of retrofitted school buses		28 buses to be retrofitted pending outcome of current school bus procurement exercise	End 2017	Cleaner bus technology funding £308K obtained to support this
18	Solar panels at electric P&R sites	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	CYC	2016	2017	Amount of energy generated by solar panels	-	Funding awarded	2018	Supply of green energy to encourage the uptake of EVs
19	Hyper Hubs	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	CYC	2016	2018 onwards	Number of charging episodes at hyper hubs	-	Funding awarded through Ultra Low Emission Cities Scheme	2020	The money secured through the ULEC bid will be used to fund a city-wide network of hubs, providing ultra fast, reliable and convenient electrical charging. The first 'hyper-hubs' are due to be installed in January 2018 (new 'hyper' speed standard). City of York Council is currently finalising the

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
											locations for the new hyper-hubs and evaluating options for 'off-grid' energy production.

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. The impact of public exposure to particulate matter alone has been estimated to reduce average life expectancy in the UK by around six months and imposes a cost to public health of over £16 billion a year.

Air Pollution and Health in York

Based on national estimates, pro rata, between 94 and 163 people die prematurely in York each year due to the impacts of poor air quality. This is more than the combined estimate of those who die prematurely from obesity and road accidents. Public health framework indicator 3.01 states that the fraction of mortality in York attributable to anthropogenic (man-made) $PM_{2.5}$ particulate air pollution is 4.8% of all deaths (82 deaths). The average for this indicator across England is 5.1%.

It is widely accepted that fine particulate matter has a significant impact on both morbidity and mortality and diesel emissions have been classified as carcinogenic by the International Agency for Research on Cancer (part of the World Health Organisation). There is particular concern about the 'black carbon' fraction of particulate matter due to its health impacts, and its strong ability to absorb light energy and increase global warming. Black carbon emissions in urban environments arise predominantly from diesel transport, but are also a product of biomass combustion, used increasingly for energy production and space heating.

Emissions of oxides of nitrogen (NO_x) and man-made particulate must be reduced to meet the health based national air quality objectives in York and improve public health. The main source of NO_x and man-made particulate in York is traffic, particularly diesel vehicles.

Policy Guidance LAQM.PG(16) acknowledges that many local authorities will consider how to address $PM_{2.5}$ alongside other pollutants when tackling their own fleets and services and/or work with communities and business to achieve

improvements in air quality and that few standalone $PM_{2.5}$ measures will be chosen (unless in order to address a very specific local problem).

To date CYC has produced two trip reduction / modal shift based Air Quality Action Plans (AQAPs) and has recently adopted a third Action Plan (AQAP3) focussing on reducing vehicle tailpipe emissions from the remaining vehicle fleet through the use of low emission technologies.

AQAP3 is the main delivery document for York's overarching Low Emission Strategy (LES) (adopted in October 2002). York's LES was the first document of its kind in the UK. It aims to reduce all emissions to air in the city as far as practicable and recognises that there are no 'safe' limits for particulate emissions, particularly $PM_{2.5}$.

Further air quality improvement measures are also included in the Local Transport Plan and the draft Local Plan.

City of York Council is demonstrating a commitment to addressing $PM_{2.5}$ through measures in its third Air Quality Action Plan. Some specific items related directly to reducing fine particulate emissions (and indeed related to reducing exposure to such emissions) are described below.

- **Exposure Reduction through the Planning Process *[Measure AQAP3(6)]*** - Air quality staff routinely comment on planning applications to ensure that new developments are designed in a way which minimises exposure to air pollution and further emission growth. The most recent approach requires developers to calculate the damage cost of the additional emissions that their developments will cause and to mitigate this using a range of sustainable transport and low emission vehicle measures. Such measures must be considered reasonable and proportional, relative to the damage costs associated with the development.

  Pre-planning advice is often provided on locations for key exposure sites (e.g. housing, schools, sports facilities, medical facilities etc) and the use of biomass heating systems is generally discouraged in urban areas and near sensitive receptors.

- **Policy Led Exposure Reduction *[Links to various AQAP3 measures]*** – City of York Council's Public Protection team work alongside other council departments to have joint inputs into key council policies that can impact on air quality and

exposure reduction. Examples of previous joint policies include the Local Transport Plan, Local Plan, Climate Change Strategy, Air Quality Action Plan and Low Emission Strategy. Work is now being undertaken to strengthen links between air quality and the Health and Well Being Strategy. The Joint Strategic Needs Assessment (JSNA) already recognises the importance of good air quality in delivering a number of key health outcomes, see http://www.healthyork.org/what-its-like-to-live-in-york/environment.aspx

- **Information Led Exposure Reduction *[Measure AQAP3(10)]*** - at the present time there is no single marketing and communications strategy at either a national or local level to deal with dissemination of public information on the links between health, air quality and transport. Within Public Health England (PHE) there is currently increasing interest in developing a national campaign and there are opportunities for York to get involved in the early stages of this via the PHE Air pollution and public health advisory group which is already attended by one of the York air quality officers.
- **Low Emission Vehicle Upgrades *[AQAP3 Measures 16 & 17]*** - Five more of York's City Sightseeing buses will be converted to electric, following the launch of the world's first retrofitted electric-powered double-decker bus to the service in 2014. City of York Council is working in partnership with Transdev using £475,000 of DfT funding. York has also secured £308k from Department for Transport's Clean Bus Technology Fund to retrofit 28 school buses used in around York with the latest Selective Catalytic Reduction (SCR) exhaust technology. The new electric sightseeing buses are due to be completed for the summer 2017 season.
- **Clean Air Zone *[Measure AQAP3(1)]*** – York is working towards the delivery of a Clean Air Zone (CAZ) which will aim to ensure that the most frequent diesel based bus services in the city utilise the latest engine technology. Two Park and Ride routes have already been converted to mainly electric buses. Low emission buses will considerably reducing the amount of fine particulate (as well as NO_x) emitted in the city. From early 2018, 3 P&R services will operate using electric buses, with the remaining P&R fleet being upgraded to Euro 6.
- **Low Emission Taxis *[Measure AQAP3(7)]*** – York has pioneered a taxi grant scheme aimed at encouraging taxi drivers to move away from diesel to petrol

hybrid taxis. Through this scheme, the number of petrol hybrid taxis in the York fleet has been increased to around 13%. Petrol hybrid cars produce significantly less $PM_{2.5}$ emissions than diesel equivalents. York has also recently updated its taxi licensing policies to encourage new vehicles entering the fleet to be mainly hybrid vehicles meeting ultra low emission vehicle standards.

- **Low Emission Vehicle Events** – In the past, York has held Low Emission Vehicle events for the public at the McArthur Glen Designer Outlet
    - April, 2013 – 'Electric Vehicle Show' at Designer Outlet, York
    - April, 2016 – 'Greenwheels Event' at Designer Outlet, York

  Following on from the success of these events, the city has aspirations to open a publically accessible electric vehicle demonstration centre in the city (but funding has not yet been secured). Promotional activities are currently being focused on a number of local businesses where electric vehicle recharging points have recently been installed by the council. A demonstration electric vehicle has been purchased by the council.

- **Smoke Control Areas** – Under the requirements of the Clean Air Act, certain areas of York have been designated Smoke Control Areas (SCAs), where emissions of smoke from chimneys of domestic properties are prohibited.

Future Opportunities for $PM_{2.5}$ measures

Over the coming years it is hoped to deliver improvements in the following areas. All such areas will assist in reducing exposure to particulate matter.

- Better dissemination of information to the public on the causes and effects of poor air quality and improved access to air quality data for their locality. Research is also planned into the level of local demand for a public air pollution alert system and methods of delivery (we currently have some capital funding from DEFRA to support this work but not enough staff resource to take it forward). Both these projects will allow members of the public to make more informed choices about where they live and how and when they travel.

- An improved local approach to Health Impact Assessment (HIA) for key programmes and policies. The wider use of HIA at a local level will help to ensure

that changes in emissions to air and the subsequent impact on local health outcomes is given greater consideration within the local decision making process.

- Links between Public Protection and Public Health have strengthened significantly over the last 12 months and synergies between these work areas have been identified and links between teams continue to evolve and strengthen. There are aspirations to provide a greater role for the Director of Public Health and colleagues in the Public Health team in the development and delivery of air quality improvement measures, including full involvement in any future air quality steering group activities for the city.

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

3.1 Summary of Monitoring Undertaken

Since 1999, real-time monitoring of nitrogen dioxide and other pollutants has been undertaken at a total of 14 locations across York. Details regarding these sites have been documented in previous air quality reports submitted to DEFRA and the details of current monitoring are provided in Appendix A.

In addition to real time monitoring, City of York Council has also historically undertaken nitrogen dioxide diffusion tube monitoring at up to 340 locations in the city. Results from this diffusion tube monitoring programme were last reported in the Annual Status Report (June 2016)[7]. City of York Council currently undertakes diffusion tube monitoring at 233 sites in the city.

There have been no significant changes to City of York Council's overall monitoring strategy in the last 12 months.

3.1.1 Automatic Monitoring Sites

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

City of York Council undertook automatic (continuous) monitoring at 9 sites during 2016. 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 online at http://uk-air.defra.gov.uk/data/.

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

3.1.2 Non-Automatic Monitoring Sites

City of York Council undertook non- automatic (passive) monitoring of NO_2 at 233 sites during 2016. Table A.2 in Appendix A shows the details of the sites.

[7] Annual Status Report (2016) available online at http://www.jorair.co.uk/index.php?page=reports

Maps showing the location of the monitoring sites are provided online at http://www.jorair.co.uk/index.php?page=stations. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, "annualisation" and distance correction. 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.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

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. The only breaches of the hourly limit value in the last 5 years were at Lawrence Street in 2015, where 2 breaches of the 200µg/m^3 were recorded.

Annual mean nitrogen dioxide concentrations monitored in 2016 (at real-time monitoring locations) increased at Bootham *(+12.8%)*, Fishergate *(+6%)*, Nunnery Lane *(+10.6%)*, Heworth Green *(+1.0%)* and Fulford Road *(+0.9%)*, and decreased at Holgate *(-4.3%)*, Gillygate *(-1.6%)* and Lawrence Street *(-3.4%)*, when compared to levels monitored in 2015. Figure A.1 in Appendix A shows trends in the annual mean NO_2 concentrations as monitored at continuous monitoring sites over the last 5 years. There appears to be a general downward trend in concentrations between 2012 and 2016.

With respect to the **City Centre AQMA** (AQMA Order No.4), exceedances of the health based annual mean NO_2 objective (40µg/m^3) were monitored in the Gillygate, Holgate, Lawrence Street and Rougier Street/George Hudson Street technical breach areas in 2016. Whilst maximum concentrations of NO_2 monitored in the

Nunnery Lane/Prices Lane and Fishergate technical breach areas were below the objective at 36.9µg/m^3 and 37.5µg/m^3 respectively, they are still considered elevated. The existing city centre AQMA is considered necessary and the existing boundary is still considered accurate.

Whilst CYC has monitored concentrations above the annual mean objective for nitrogen dioxide, recorded values are currently below the level that would be indicative of breaches of the hourly mean objective (60µg/m^3). Should concentrations of nitrogen dioxide below 60µg/m^3 continue to be monitored in 2017, the city centre AQMA will need amending accordingly (this area is currently declared on the basis of both the annual mean and hourly mean NO_2 objective). The highest annual mean concentration of nitrogen dioxide recorded by a diffusion tube in this area during 2016 was 49.9µg/m^3 (Tube D19 at the Bridge St / Micklegate junction).

Concentrations of NO_2 monitored in the **Fulford Road AQMA** in 2016 were elevated but below the annual mean objecitve of 40µg/m^3. The highest recorded levels of NO_2 were monitored at site C58, near the junction of Fulford Main Street and Heslington Lane (northbound carriageway) and were 35µg/m^3. This site has consistently exhibited the highest NO_2 concetrations in the Fulford AQMA technical breach area for a number of years. The bias corrected annual mean results from this site for the last 5 years are shown below. Upper confidence limits are also shown for information, which indicate the maximum potential concentration of NO_2 recorded in this location, given the precision of monitoring technique.

Table 3.1: Monitoring results at site reference C58

Tube Ref: C58	2012	2013	2014	2015	2016
Annual Mean NO_2 Concentration (µg/m^3)	**43.2**	36.3	39.5	36.8	35.5
Upper Confidence Limit (µg/m^3)	**46.6**	37.7	**41.5**	38.4	37.2

Pollutant concentrations will vary from year to year due to the influence of meterological conditions and DEFRA guidance makes it clear that authorities should avoid cycling between declaring, revoking and declaring again simply due to these variations. For this reason, it is expected that authorities will need to consider measurements carried out over several years or more, national trends in emissions

as well as local factors that may affect the AQMA, including measures introduced as part of the Air Quality Action Plan, together with information on high and low pollution years.

The result obtained from tube C58 in 2014 is still of concern. The 'true' value of this tube, based on accuracy of monitoring technique, is considered to be between 37.4 – 41.5µg/m^3 (mean of 39.5µg/m^3). As the upper confidence limit is still above 40µg/m^3 it is not considered appropriate to revoke Fulford AQMA at this time. It is considered that at least 1-2 additional years of monitoring (demonstrating that levels of NO_2 remain well under the annual mean objective) would be needed in this area before revocation could be considered.

Concentrations of NO_2 monitored in the **Salisbury Terrace AQMA** in 2016 were all well below the annual mean objective of 40µg/m^3. The highest recorded level of NO_2 within the area of technical breach was 34.6µg/m^3 (tube reference 'A20'). Annual mean concentrations (and upper confidence limits) at all monitoring locations within the Salisbury Terrace techncial breach area have been below the health based annual mean objective for the last 4 years. On this basis, the AQMA (AQMA Order No.3) will be recommended for revocation. This is subject to a City of York Council Executive Member decision session in August 2017. The outcome of this decision session will be reported to DEFRA at the earliest opportunity.

In City of York Council's last Annual Status Report, submitted to DEFRA in June 2016, it was highlighted that consideration should also be given to extending the city centre AQMA to include new relevant exposure for the annual mean objective in Coppergate. Current and historical monitoring results on Coppergate are summarised in table 3.2 below.

Table 3.2: Monitoring on Coppergate

Tube reference	Location	Bias Corrected Annual Mean NO_2 (µg/m^3)			
		2013	2014	2015	2016
D50	Drainpipe at side of card shop, Coppergate	**42.8**	**44.3**	**41.9**	**40.3**
D56	Three Tuns Pub, 12 Coppergate	-	-	**51.7 (estimate)**	**47.4**

D57	Lamppost 4, Pedestrian Crossing, Coppergate	-	-	37.1 (estimate)	35.7 (estimate)
D58	Traffic lights, opposite Duttons, Coppergate	-	-	**44.0 (estimate)**	38.9

The Three Tuns Pub (on which tube D56 is located) is considered to be a relevant location as there is living accomodation at first floor and above. The tube is located on a drainpipe on the pub facade between ground and first floor level and has indicated an exceedence of the annual mean NO_2 objective for the last 2 years. Based on these diffusion tube monitoring results it is considered likely that the annual mean NO_2 objective is being exceeded at one or more relevant locations on the street. However, from the end of 2016 there have been a number of changes affecting traffic movements on Coppergate that are likely to have a significant positive impact in terms of air quality. Since January 2017, traffic restrictions have now been reinstated on Coppergate. Only buses and permit holders, including taxis and private hire vehicles, will be allowed to use the road between 8-6pm, while between 10am and 4pm the area will only be open for loading and unloading. In addition, from 4th December 2016, various bus services have either been re-routed or discontinued and no longer use Coppergate. On the advice of DEFRA[8], the air quality impacts of these changes will be evaluated before the city centre AQMA boundary is amended. Monitoring data for 2017 will be considered in the 2018 ASR and further commentary will be provided in that report.

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. Trends in annual mean PM_{10} concentrations are shown in Figure A.3 and demonstrate that PM_{10} concentrations have generally fallen at roadside locations (Fishergate, Holgate and Plantation Drive) over the last 5 years. Concentrations of PM_{10} monitored at the Bootham background site have increased since 2012, but have remained consistent since 2014.

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

[8] *Email correspondence with Max Nancarrow (LAQM Helpdesk) on 24th May 2017 and subsequent email correspondence with Olawale Ladapo (DEFRA) on 30th May 2017*

to be exceeded more than 35 times per year. Trends in the number of exceedences are shown in Figure A.4.

Tables A.5 and A.6 demonstrate that there were no exceedances of the annual mean or daily mean PM_{10} objectives in York during 2016. This has been the case since monitoring of PM_{10} was established in the city.

3.2.3 Particulate Matter ($PM_{2.5}$)

Although not explicitly required under the Local Air Quality Management regime, where Local Authorities undertake $PM_{2.5}$ monitoring they are encouraged to report it as part of the Annual Status Report. Micro-particulate, or $PM_{2.5}$, is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes framework (PHOF) indicator is based.

City of York Council monitors $PM_{2.5}$ at three locations in the city, namely Bootham (urban background site), Fishergate (roadside site) and Gillygate (roadside site). Monitoring of $PM_{2.5}$ at Fishergate and Bootham is carried out as part of DEFRA's Automatic and Rural Monitoring Network (AURN). Monitoring at Gillygate was established by City of York Council as a result of the growing concerns over the health impacts of $PM_{2.5}$.

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years. Figure A.4, also in Appendix A, demonstrates trends in annual mean $PM_{2.5}$ concentrations over the same period. Concentrations of $PM_{2.5}$ appeared to be relatively consistent over the last 5 years, appearing to show a minor peak in 2014 and then decreasing since that date. Annual mean concentrations of $PM_{2.5}$ were virtually unchanged between 2015 and 2016. No exceedances of the annual mean $PM_{2.5}$ objective have been recorded to date since monitoring of $PM_{2.5}$ was established. It should be noted that as the Volatile Correction Model (VCM) has not yet been proven to work for $PM_{2.5}$, all data remains as '$PM_{2.5}$ TEOM data' and has not been corrected using this approach.

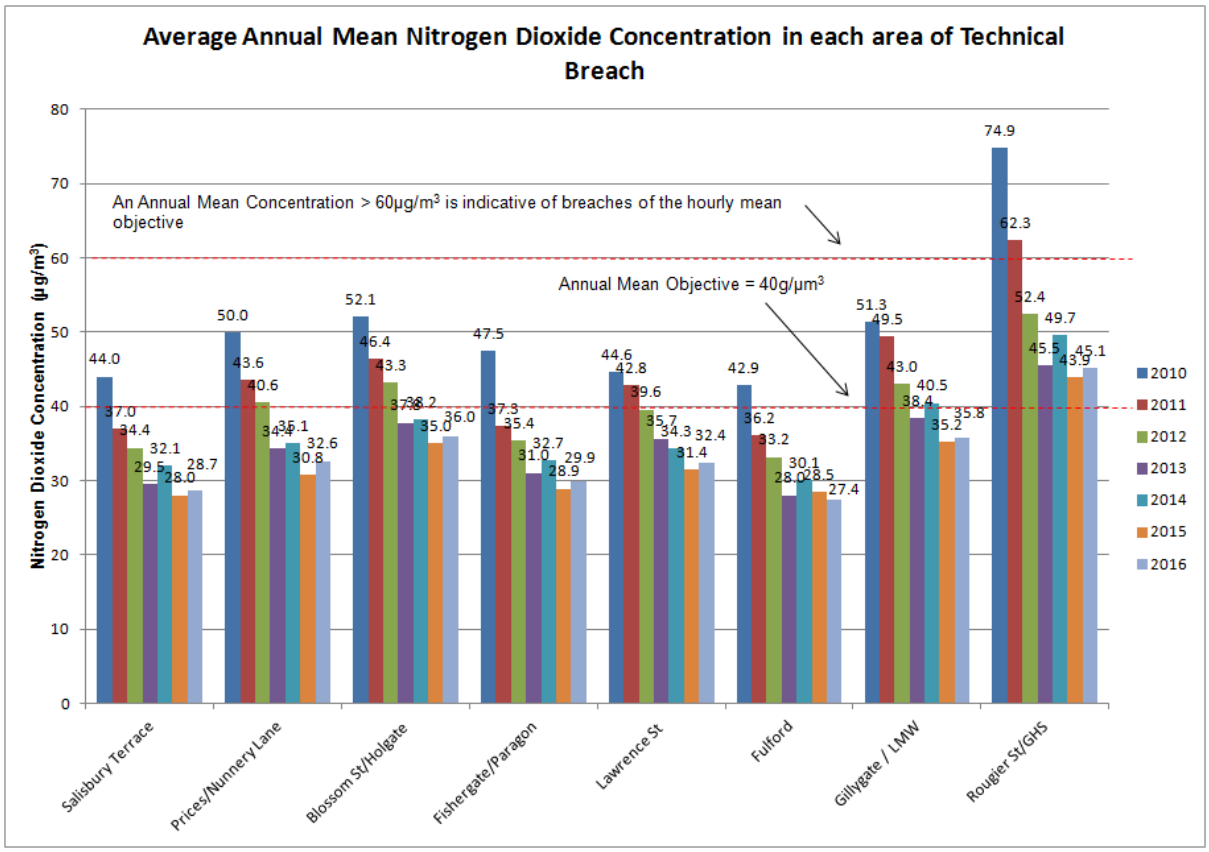
3.3 Air Quality Indicators

3.3.1 Council Plan Air Quality Indicators

Two air quality indicators have been developed for City of York Council's 'Council Plan' that are used to look at trends in air quality across AQMAs/technical breach areas as follows:

CAN027 *– Average Annual mean Nitrogen Dioxide Concentration in each area of Technical breach.* This indicator provides an average nitrogen dioxide concentration based on all monitoring undertaken in each area of technical breach. Monitoring results include bias corrected diffusion tube data and data from continuous monitors (if applicable). Trends in recent years are shown in figure 3.1 below.

Figure 3.1: Indicator CAN027 – Trends in average annual mean nitrogen dioxide concentration in each area of technical breach



Whilst average concentrations across the majority of technical breach areas increased marginally in 2016 compared with 2015, there is evidence of a steady downward trend in nitrogen dioxide concentrations over the last 7 years.

CAN028 - *Maximum Nitrogen Dioxide Concentration (at relevant location) in each area of Technical Breach. This indicator provides a maximum recorded annual mean nitrogen dioxide concentration in each area of technical breach. This only considers monitoring at relevant locations and thus is useful to look at the validity of existing AQMA boundaries year to year.*

Figure 3.2: Indicator CAN028 – Maximum nitrogen dioxide concentration (at relevant location) in each area of technical breach

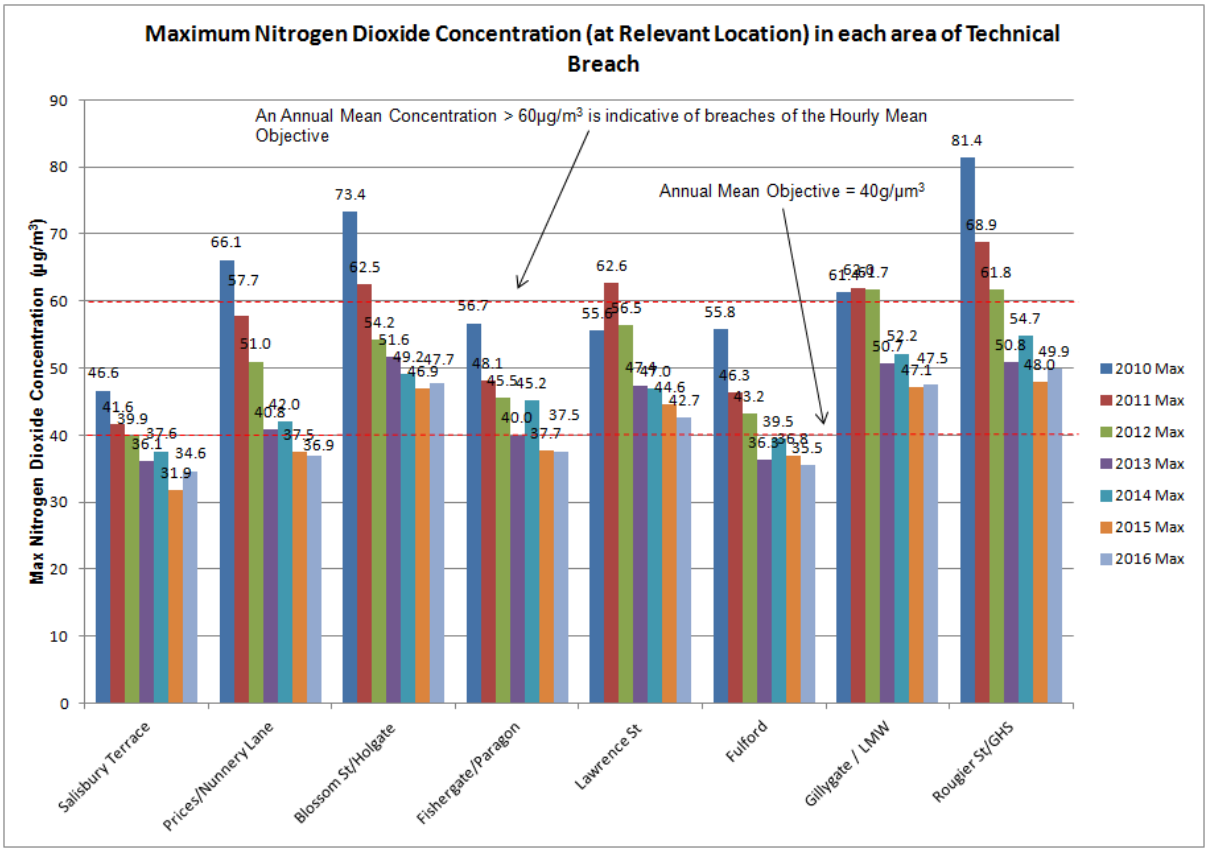


Figure 3.2 above demonstrates that the maximum annual mean nitrogen dioxide concentration at a relevant location was below the annual mean objective of 40µg/m^3 at 4 of the 8 areas of technical breach. However, based on the precision analysis carried out on the diffusion tube results, the only technical breach areas considered to be currently below the annual mean objective are Salisbury Terrace and Fulford Main Street. Monitoring results (upper 95% confidence limits) from the Prices/Nunnery Lane and Fishergate were 39 and 40µg/m^3 respectively (i.e. at, or almost at, the objective level).

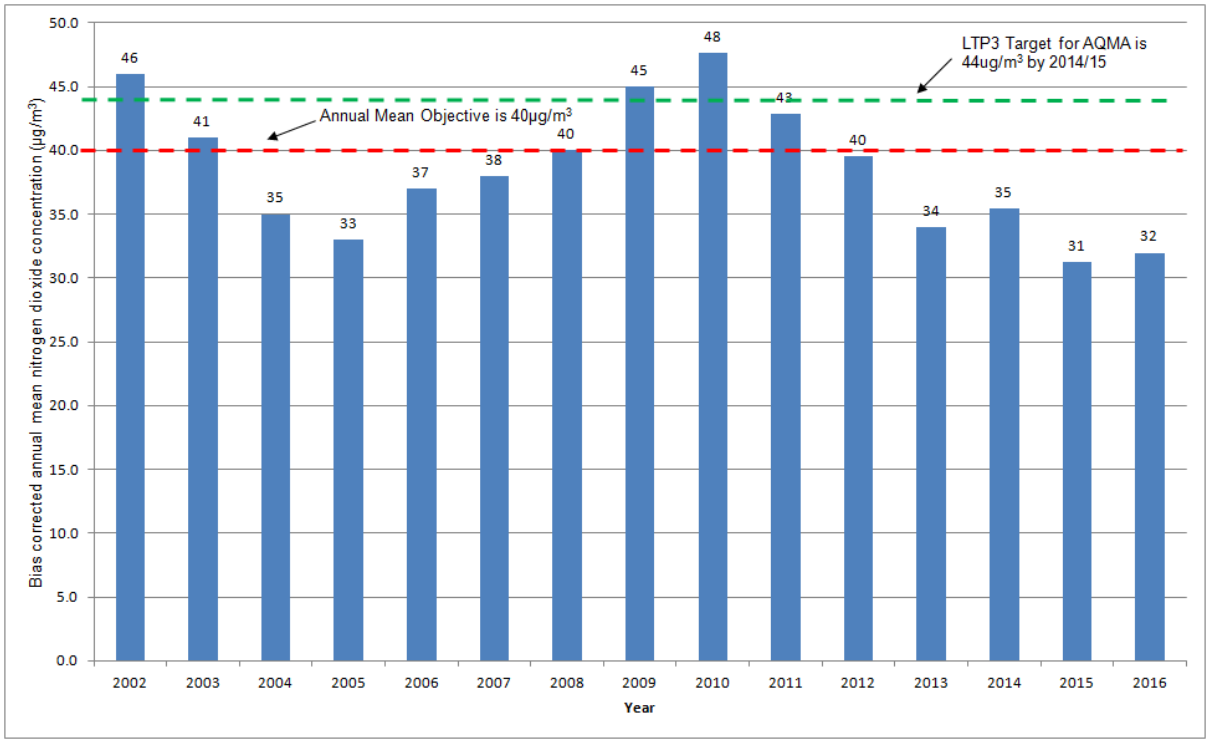
Further commentary on the Salisbury Terrace and Fulford AQMA's is provided in section 3.2.1.

3.3.2 Local Transport Plan

For the purpose of monitoring the impact of York's Local Transport Plan (LTP) a local air quality indicator has been established. This indicator measures the mean of annual average results obtained from 35 diffusion tubes located within York's city centre AQMA.

Figure 3 below shows the results from this indicator for the period 2002 to 2016. As can be seen from figure 3, nitrogen dioxide concentrations across the city were in general decline between 2002 and 2005. This was followed by a steady increase in concentrations between 2006 and 2010. Between 2010 and 2016 concentrations of nitrogen dioxide within the city centre AQMA improved again, with levels of nitrogen dioxide across all the sites used for the indicator falling to 32µg/m^3 in 2016. This is a slight increase on 2015, but not statistically significant based on the precision of the diffusion tube monitoring technique.

Figure 3.3: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites.



4 Planning Application Review

The land-use planning system is recognised to play an integral part in improving air quality. This requires close co-operation between planners and environmental health practitioners.

City of York Council regularly reviews applications with respect to potential air quality and other environmental impacts. Table 4.1 provides a list of those planning applications that have been considered in relation to air quality by City of York Council's Public Protection team since the last Air Quality Progress report in June 2016. A formal air quality impact assessment has been requested for some of these applications. Where applications listed in the June 2016 ASR were marked as' awaiting decision', and update has been provided in the table.

The Annual Status report provides an opportunity to keep a record of such applications to provide a picture of where changes in air quality may occur in the future. The information presented is also useful to identify where combined impacts of several developments may become important.

It should be noted that electric vehicle recharging is now requested for all residential properties where secure parking is provided (secure parking is defined as a house with a garage or private driveway). Due to the large number of applications that this applies to, these have been omitted from the table below.

Table 4.1: Planning Applications Considered since June 2016 (since submission of last ASR)

Planning Reference	Description	Type	Comments	Status
14/02789/OUTM	Outline application for the development of the former British Sugar site	Outline Application	Recommended conditions regarding CEMP and EV charging. Comments also made in relation to the Travel Plan provided for the site. Contribution sought for continued air quality monitoring in the vicinity of the site.	Awaiting decision *(13/6/2017)*
15/00166/FULM	Development of 188 dwellings	Full Application	Conditions suggested regarding the provision of electric vehicle recharging on the site. Emissions mitigation statement requested for the site.	Awaiting decision *(13/6/2017)*
15/00167/FULM	Development of 69 dwellings	Full Application	Conditions suggested regarding the provision of electric vehicle recharging on the site. Emissions mitigation statement requested for the site.	Awaiting decision *(13/6/2017)*
15/00183/FULM	Residential development of 130 dwellings with associated public open space and allotments, Land At Boroughbridge Road To The South West Of Former Civil Service Club and Trenchard Road	Full Application	Recommended condition regarding CEMP, electric vehicle recharging and emission mitigation package	Awaiting decision *(13/6/2017)*

Planning Reference	Description	Type	Comments	Status
15/00758/FULM	Erection of 175 bed care home and play area following demolition of Red Lodge, former library and tennis clubhouse building	Full Application	Recommended condition regarding electric vehicle recharging	Approved on 21/02/2017 Condition attached to approval requiring the installation of 2 electric vehicle charging points *(see condition 33 & 34)*
15/01709/OUTM	Hungate Development Site, Hungate, York	Outline Application	Suggested conditions regarding CEMP, ventilation strategy / non-opening windows and electric vehicle recharging	Approved on 25/04/2017 Conditions attached regarding provision of 12 electric vehicle charging points *(condition 39)*, and additional monitoring of nitrogen dioxide to inform the need for mechanical ventilation *(condition 40).*
15/01891/FULM	Partial conversion of ground and first floor offices into 37 residential apartments	Full Application	Suggested conditions regarding CEMP and electric vehicle recharging	Approved on 6/12/2016

Planning Reference	Description	Type	Comments	Status
				Suggested conditions not attached by Planning Department
15/02155/FULM	Demolition of buildings in the conservation area and erection of 9 houses and 2-storey restaurant with 5 flats above. Former Fire Station, 18 Clifford Street, York	Full Application	Suggested condition regarding electric vehicle recharging	Approved on 2/9/2016 Condition attached to approval requiring each of the car parking spaces to be fitted with an electric vehicle charging point *(see condition 20)*
15/02321/FULM	Erection of 109 bedroom hotel, Former Unit A1 Parkside Commercial Centre, Terry Avenue, York	Full Application	Suggested condition regarding electric vehicle recharging	Approved on 28/10/16 Condition attached to approval requiring an electric vehicle recharge point to be provided *(see condition 15).* A Construction Environmental

Planning Reference	Description	Type	Comments	Status
				Management Plan (CEMP) was also required *(see condition 7)*
15/02833/FULM	Change of use of existing building to form convenience store at ground floor, 2 flats at first floor and erection of four storey extension to rear to accommodate 14 flats with associated car and cycle parking. Groves Chapel, Union Terrace, York, YO31 7WS	Full Application	The building is set back from the road and all residential aspects are to the rear of the building, away from the road. It was not considered that the development would introduce new opportunities for relevant exposure in this area. It was not considered that the levels of traffic associated with the development would result in any further deterioration in air quality. A condition was recommended regarding electric vehicle recharging	Approved on 28/10/2016 Condition attached to approval requiring electric vehicle charging point *(see condition 15)* and a Construction Environmental Management Plan (CEMP) *(see condition 7)*
15/02517/FUL	Change of use of upper floors and ground floor retail store to 4no. residential units, The Art Shack 4 - 6 Gillygate, York, YO31 7EQ	Full Application	Site located within Air Quality Management Area. A mechanical ventilation strategy and non-opening windows were recommended, unless it could be demonstrated through site specific monitoring that concentrations of nitrogen dioxide at the proposed property facades are below health based	Approved on 08/12/2016 Condition attached to approval requiring all windows to habitable rooms facing onto Gillygate to be non-opening, with

Planning Reference	Description	Type	Comments	Status
			standards.	ventilation provided through continuous mechanical supply and extract to the rear of the building *(see condition 3)*
16/00665/FULM	Land To The South Of Partnership House, Monks Cross Drive, Huntington, York, Mixed use development including retail store, workshop, storage and offices and a drive-through restaurant	Full Application	Conditions recommended regarding provision of electric vehicle recharging (2 points) and a Construction Environmental Management Plan	Approved on 13/06/2016 Condition attached to the approval requiring two electric vehicle recharge points to be installed prior to first occupation of the site *(see condition 12)*

Planning Reference	Description	Type	Comments	Status
16/00999/EIASN & 16/00998/EIASP	Screening opinion / Scoping Opinion in relation to the operation of an aggregates manufacturing facility	Screening Opinion / Scoping Opinion	The site will be subject to an EA permit that will contain conditions regarding dust management and mitigation.	An Environmental Impact Assessment (EIA) is considered necessary for this development. This was decided on 26/05/2016.
16/01976/FULM	Change of use from offices to hotel and serviced suites/apartments and six storey extension to rear/southwest. Aviva Yorkshire House, 2 Rougier Street, York, YO1 6HZ	Full Application	Conditions recommended regarding provision of electric vehicle recharging (2 points) prior to first occupation of the development	Approved on 20/1/2017 Condition attached to approval requiring the installation of one electric vehicle recharging point *(condition 15)*

Planning Reference	Description	Type	Comments	Status
16/02022/ORC	Proposed change of use from offices to 73 apartments (General Permitted Development)	General Permitted Development	The development was thought to be beneficial in transport and highways terms. An air quality assessment was not considered necessary. A condition was recommended regarding the provision of an electric vehicle recharging point	Approved on 23/12/2016
16/02434/ORC (Revised Application)	Proposed change of use from offices to 66 apartments. Aviva Yorkshire House, 2 Rougier Street, York, YO16HZ	General Permitted Development	Concerns were raised regarding the potential for creating new opportunities for exposure along Rougier Street. Site specific air quality monitoring requested, along with provision of electric vehicle recharging facilities. This could not be conditioned on the basis of the type of application (General permitted development), however, an informative was placed on the decision notice that highlighted the air quality concerns.	Approved on 13/12/2016 Informative provided on decision notice with respect to recommended ventilation requirements and charging facilities for electric vehicles.

Planning Reference	Description	Type	Comments	Status
15/02941/FUL	Construction of egress route from car park to rear of presbytery and church hall, relocation of gate posts and erection of gates. English Martyrs Roman Catholic Church, Dalton terrace, York, YO24 4DA	Full Application	The application was reviewed on the basis of it potentially changing traffic movements in the general area. As traffic already exists on the network and trip generation for the site is was not proposed the change, no air quality assessment was requested. Public Protection did ask, however, that some consideration was given to how any dust impacts would be mitigated during construction phases.	Awaiting decision *(13/6/2017)*
16/02545/FUL	Change of use from warehouse to gym. London Ebor Developments Plc, Millfield Business Centre, Millfield Lane, Nether Poppleton, York, York, YO26 6PB	Full Application	Conditions recommended regarding provision of at least one electric vehicle recharging point on the site	Awaiting decision *(13/6/2017)*

Planning Reference	Description	Type	Comments	Status
16/02501/FUL	Two storey side extension and reinstatement of car parking. Wolfson Atmospheric Chemistry Research Centre, Innovation Way, Heslington, York, YO10 5DD	Full Application	Conditions recommended regarding provision of at least one electric vehicle recharging point on the site	Approved 28/12/2016 Condition attached for provision of outdoor socket for charging electric vehicles (see condition 10)
16/01698/FUL	Catering Support Centre, St Maurice's Road, York, Conversion of existing building to 7 dwellings and 2 office suites	Full Application	Concerns raised regarding the introduction of new opportunities for exposure. As such, it was recommended that a mechanical ventilation strategy should be designed for the development and this should be installed alongside non-opening windows *(unless it can be demonstrated through site specific air quality monitoring that concentrations of nitrogen dioxide at the property facade were below health based objective levels).*	Approved 14/11/2016 A condition was attached to the approval requiring all habitable rooms facing onto St Maurice's Road be non-opening, with ventilation provided through continuous mechanical supply and extract to the rear of the building) *(see condition 9)*

Planning Reference	Description	Type	Comments	Status
16/02653/FUL	Two storey extension with associated demolition works to provide new laboratories etc. Bootham School, 51 Bootham, York, YO30 7BT	Full Application	Comments raised in relation to the installation of a biomass boiler and the potential impact on local air quality in the vicinity of the site. Air quality screening assessment requested to assess the impact on local air quality.	Awaiting decision *(23/5/2017)* Biomass boiler considered acceptable in terms of air quality impacts, subject to conditions regarding type of boiler used and stack height of at least 11.8m
16/02840/PREAPP	Erection of 11 dwellings with associated highway and landscaping works. Poppleton Garden Centre, Poppleton, York	Pre-Application Advice	Conditions recommended regarding provision of at least one electric vehicle recharging point on the site	Formal planning application not yet submitted
16/02763/FUL	Change of use of ground floor retail with associated alterations to form a health clinic and one self contained apartment. Nostalgia Publications, 91-93 Nunnery Lane, York, YO23 1AH	Full Application	Public Protection had previously commented on an application for the same site. As the development was well set back from Nunnery Lane and none of the windows to habitable rooms will face the road, it was now considered that any specific air quality mitigation was required.	Approved 23/2/2017 No specific air quality mitigation considered necessary

Planning Reference	Description	Type	Comments	Status
16/02815/FUL	Construction of access road with associated landscaping and highway works, The Cocoa Works, Haxby Road, York, YO31 8TA	Full Application	As it is the conversion of the factory buildings rather than the creation of the road itself that will generate additional vehicular movements, specific comments in relation to air quality and low emissions mitigation measures will be provided at a later stage in response to future applications for the site. A Construction Environmental Management Plan (CEMP) was requested for the current application to indentify steps and procedures that will be implemented to minimise the creation and impact of noise, vibration and dust during construction phases of the access road.	Awaiting decision *(13/6/2017)*
16/02856/FUL	Change of use to extend the range of flexible uses at ground and lower ground floor to include D2 (leisure and assembly) uses.	Full Application	This application only sought to extend the range of flexible uses at ground floor and lower ground floor to include D2 (leisure and assembly) uses. There were no changes or external alternations associated with this latest application, over and above those secured through	Approved 6/2/2017 Condition attached to the approval requiring the installation of at least two electric vehicle charging

Planning Reference	Description	Type	Comments	Status
			16/01003/FUL (granted approval 10th Oct 2016).	points prior to occupation of the dwellings
17/00355/PREAPP	Pre-application advice regarding construction of student accommodation. 1 Redeness Street, York.	Pre-Application Advice	Pre-application advice regarding the construction of student accommodation	Formal planning application not yet submitted
17/00284/FULM	17/00284/FULM - The Cocoa Works, Haxby Road, York, YO31 8TA. Conversion and extension of the former Almond and Cream blocks to form 263no. Apartments	Full Application	Application for conversion and extension of the former almond and cream blocks to form 263 apartments	Awaiting decision *(13/6/2017)*
17/00329/PREAPP	Pre-application enquiry regarding removal of condition 4 (mechanical ventilation within the building) attached to planning permission 14/01080/FUL	Planning Advice	Latest monitoring data for the application site reviewed. Advised that it would not be appropriate to remove condition and that non-opening windows and a mechanical ventilation strategy for habitable rooms would still be required to make the development acceptable in air quality terms.	-
16/02710/ORC	Mack & Lawler Builders Ltd, 2A Low Ousegate, York, YO1 9QU. Proposed change of use from offices to flats (use class C3)	General Permitted Development	Air quality informative provided outlining methods of mitigating air quality impacts and exposure in an area of poor air quality.	Approved with no objections

Planning Reference	Description	Type	Comments	Status
12/01749/REMM	Reserved matters application for Germany Beck Site, East Of Fordlands Road, York	Reserved Matters	Review of updated Environmental Statement (updated from 2012 Environmental Statement)	Awaiting decision *(13/6/2017)* Comments made in relation to emissions assessment and electric vehicle recharging provision on the site
15/00524/OUTM	Outline application for the development of the site comprising up to 1,100 residential units, community uses and new public open space. British Sugar Corporation Ltd, Plantation Drive, York, YO26 6XF	Outline Application	As a result of updated traffic data associated with the scheme and access arrangements there is the potential for air quality impacts to occur at locations that are different to that reported in the original air quality chapter of the Environmental Statement. Revised air quality modelling work was therefore carried out to determine if there were any impacts over and above that shown in the previous Environmental Statement submitted in support of the scheme.	Awaiting decision *(13/6/2017)* Annual mean and short term mean concentrations of NO_2 and PM were predicted to be below the relevant air quality objective values in all scenarios considered. Air quality impacts were therefore not considered to be significant.

Planning Reference	Description	Type	Comments	Status
17/00580/FULM	Conversion of ground floor pub to retail with new shop front and change of use of first and second floors to 18 studio apartments with two storey rear extension. The Fleeting Arms, 54 Gillygate, York, YO31 7EQ	Full Application	A condition was requested regarding the provision of non-opening windows and mechanical ventilation to all habitable rooms facing on to Gillygate. This was requested on the basis of nearby nitrogen dioxide diffusion tube monitoring indicating breaches of the annual mean NO_2 objective to the front of the development.	Awaiting decision *(13/6/2017)*

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Bootham	B	460,022	452,777	NO_x, PM_{10}	No	C, FDMS	Y (0m)	49.6	3.04
CM2	Fishergate	R	460,746	451,038	NO_x, PM_{10}	Yes	C, FDMS	Y (10m)	3.2	2.66
CM3	Holgate	R	459,512	451,282	NO_x, PM_{10}	Yes	FDMS	Y (12m)	2.5	1.65
CM4	Nunnery Lane	R	460,068	451,199	NO_x	Yes	C	Y (4m)	1.7	1.65
CM5	Gillygate	R	460,147	452,345	NO_x, $PM_{2.5}$	Yes	C, TEOM	Y (3m)	2.1	2.5
CM6	Lawrence Street	R	461,256	451,340	NO_x	Yes	C	Y (5m)	3.2	1.65
CM7	Heworth Green	R	461,126	452,602	NO_x	No	C	Y (3m)	1.2	1.53
CM8	Plantation Drive	R	457,428	452,620	PM_{10}	No	TEOM	Y (17m)	1.0	~1.65
CM9	Fulford Road	R	460,937	449,464	NO_x	Yes	C	Y(19m)	5.0	~1.65

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	Y OS Grid Ref	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)
5	Lamp post 15 Forge Close, Jockey Lane	Roadside	462040	454883	NO_2	NO	16.9	1.9	N	~2.75
6	Lamp post top of Nunnery Lane Car Park	Roadside	459777	451406	NO_2	YES	7.7	2.8	N	~2.75
7	Gillygate opposite Portland Street	Roadside	460217	452421	NO_2	YES	2.3	0.3	N	~2.75
8	Portland Street - triplicate	Urban Background	460163	452468	NO_2	NO	3.7	1.8	N	~2.75
9	Portland Street - triplicate	Urban Background	460163	452468	NO_2	NO	3.7	1.8	N	~2.75
11	Holly Bank	Urban Background	458846	450946	NO_2	NO	7.7	0.7	N	~2.75
13	Papillion hotel, Gillygate	Roadside	460176	452377	NO_2	YES	0.1	1.5	N	~2.75
14	Gillygate Surgery	Roadside	460167	452347	NO_2	YES	0.2	2.3	N	~2.75
15	Foss Islands Rd	Roadside	461105	451458	NO_2	YES	1.9	1.9	N	~2.75
16	Price's Lane	Roadside	460160	451152	NO_2	YES	2.5	1.2	N	~2.75
17	Drainpipe of house 18 Queen St	Roadside	459646	451500	NO_2	YES	0.2	1.3	N	~2.75
18	Lamp post4 Haxby Road	Roadside	460457	452903	NO_2	YES	3.3	1.9	N	~2.75
25	Heworth Road - Lamppost 6	Roadside	461721	452709	NO_2	NO	7.2	1.4	N	~2.75
26	Haley's Terrace (previously Longwood Road)	Roadside	460829	453524	NO_2	NO	8.5	0.4	N	~2.75
33	Haxby Road (nr White Cross Rd)	Roadside	460598	453227	NO_2	NO	14.5	1.7	N	~2.75

35	Carr Lane	Roadside	457603	451492	NO_2	NO	6.2	2.9	N	~2.75
37	Jarvis Abbey Park	Roadside	459522	451187	NO_2	YES	21.6	2.7	N	~2.75
44	Lamp post 8 Monkgate Cloisters	Roadside	460679	452326	NO_2	YES	2	1.6	N	~2.75
45	Clarence St	Roadside	460319	452754	NO_2	YES	3.6	2	N	~2.75
47	Strensall Road	Roadside	462009	456996	NO_2	NO	19.2	0.8	N	~2.75
50	BLANK	N/A	N/A	N/A	NO_2	N/A	N	N/A	N	N/A
60	First Lamp post on Navigation Road	Roadside	461017	451781	NO_2	YES	13	0.2	N	~2.75
78	Gillygate Monitoring Station - triplicate	Roadside	460149	452342	NO_2	YES	3.4	2.3	Y	~2.75
79	Gillygate Monitoring Station - triplicate	Roadside	460149	452342	NO_2	YES	3.4	2.3	Y	~2.75
80	Gillygate Monitoring Station - triplicate	Roadside	460149	452342	NO_2	YES	3.4	2.3	Y	~2.75
83	Drainpipe 6 Stockton Lane - nr Heworth Rd roundabout	Urban Background	461597	452830	NO_2	NO	0.1	8.8	N	~2.75
88	Lamp post1 Yew Tree Mews Osbaldwick Village	Urban Background	463354	451972	NO_2	NO	4.9	0.6	N	~2.75
90	Lamp post opposite Montague Street on Completion Road	Roadside	459997	450109	NO_2	NO	19.8	1	N	~2.75
96	Heslington Lane	Roadside	460978	449452	NO_2	NO	1.5	2.5	N	~2.75
100	House Near A59 Ring road Roundabout	Roadside	456228	453312	NO_2	NO	0.2	15	N	~2.75
101	Wiggington Road near the ring road roundabout	Roadside	459746	455897	NO_2	NO	15	0.5	N	~2.75
102	Signpost between houses 252 & 254 on Salisbury Terrace - triplicate	Roadside	458703	452429	NO_2	YES	0.2	1	N	~2.75

103	Signpost between houses 252 & 254 on Salisbury Terrace - triplicate	Roadside	458703	452429	NO_2	YES	0.1	1.4	N	~2.75
104	Signpost between houses 252 & 254 on Salisbury Terrace - triplicate	Roadside	458703	452429	NO_2	YES	0.1	1.4	N	~2.75
107	In between corner shop & betting office	Roadside	458779	452387	NO_2	YES	3	3.8	N	~2.75
108	On signpost opposite side of road from 200 Salisbury Terrace	Roadside	458814	452373	NO_2	YES	0.2	1.5	N	~2.75
109	Signpost outside 16 Rougier Street	Roadside	459924	451833	NO_2	YES	0.2	2.5	N	~2.75
110	Signpost in between Club Salvation & 31 George Hudson Street	Roadside	459985	451727	NO_2	YES	0.2	2.3	N	~2.75
111	Lamp post at side of Cedar Court opposite entrance to Multi-storey Car Park on Tanner Row	Roadside	459917	451728	NO_2	NO	26	2.6	N	~2.75
112	Lamp post outside St Gregory's Mews, opposite Council HQ Toft Green	Roadside	459873	451684	NO_2	NO	1	2.3	N	~2.75
114	Bus Stop outside Society bar/cafe Rougier Street	Roadside	459981	451778	NO_2	YES	3.5	2.7	N	~2.75
115	Inside Bus Stop - opposite tube 114	Roadside	459962	451771	NO_2	YES	47	1.5	N	~2.75
116	111 Poppleton Road, drainpipe	Roadside	458212	452037	NO_2	NO	0.1	5.3	N	~2.75
125	Osbaldwick Derwenthorpe	Roadside	463194	451967	NO_2	NO	20	1.6	N	~2.75
126	New Tube (Osbaldwick	Roadside	463482	451896	NO_2	NO	17.5	0.9	N	~2.75

	Parish Council) nr Bridge									
127	Lamp post to left of 102 Layerthorpe (flats)	Roadside	461108	452313	NO_2	NO	3.3	1.8	N	~2.75
128	Drainpipe between 7-9 Livingstone Street	Roadside	458686	452369	NO_2	YES	0.1	1.6	N	~2.75
129	Drainpipe to front of 88 Station Road	Roadside	455968	453397	NO_2	NO	0.1	14.5	N	~2.75
2a	Fishergate Monitoring station - triplicate	Roadside	460746	451034	NO_2	YES	16.3	3.5	Y	~2.75
2b	Fishergate Monitoring station - triplicate	Roadside	460746	451034	NO_2	YES	16.3	3.5	Y	~2.75
2c	Fishergate Monitoring station - triplicate	Roadside	460746	451034	NO_2	YES	16.3	3.5	Y	~2.75
3a	Bootham Monitoring Station - triplicate	Urban Background	460024	452767	NO_2	NO	39	49.6	Y	~2.75
3b	Bootham Monitoring Station - triplicate	Urban Background	460024	452767	NO_2	NO	39	49.6	Y	~2.75
3c	Bootham Monitoring Station - triplicate	Urban Background	460024	452767	NO_2	NO	39	49.6	Y	~2.75
95a	Fulford Monitoring Station - triplicate	Roadside	460938	449465	NO_2	NO	19	6.5	Y	~2.75
95b	Fulford Monitoring Station - triplicate	Roadside	460938	449465	NO_2	NO	19	6.5	Y	~2.75
95c	Fulford Monitoring Station - triplicate	Roadside	460938	449465	NO_2	NO	19	6.5	Y	~2.75
9a	Portland Street - triplicate	Urban Background	460163	452468	NO_2	NO	3.7	1.8	N	~2.75
A1	Bootham traffic light outside dance shop	Roadside	460088	452263	NO_2	YES	0.2	2.3	N	~2.75
A11	Traffic lights end of Water Lane	Roadside	459341	453042	NO_2	YES	13.6	0.4	N	~2.75
A12	Lamp post7 Clifton Green	Roadside	459251	453008	NO_2	YES	12.9	2.2	N	~2.75
A13	Lamp post1 Clifton Dale - triplicate	Urban Background	459335	452931	NO_2	NO	2.7	1.6	N	~2.75

A14	Lamp post1 Clifton Dale - triplicate	Urban Background	459335	452931	NO_2	NO	2.7	1.6	N	~2.75
A14a	Lamp post1 Clifton Dale - triplicate	Urban Background	459335	452931	NO_2	NO	2.7	1.6	N	~2.75
A17	Sailsbury Road	Roadside	458578	452472	NO_2	YES	8.7	1.5	N	~2.75
A19	17 Sailsbury Terrace - triplicate	Roadside	458713	452414	NO_2	YES	0.2	1.3	N	~2.75
A19a	17 Sailsbury Terrace - triplicate	Roadside	458713	452414	NO_2	YES	0.2	1.3	N	~2.75
A19b	17 Sailsbury Terrace - triplicate	Roadside	458713	452414	NO_2	YES	0.2	1.3	N	~2.75
A2	Drainpipe on front of registry office	Roadside	459917	452405	NO_2	YES	0.2	3.4	N	~2.75
A20	224 Sailsbury Terrace - triplicate	Roadside	458760	452404	NO_2	YES	0.2	1.1	N	~2.75
A20a	224 Sailsbury Terrace - triplicate	Roadside	458760	452404	NO_2	YES	0.2	1.1	N	~2.75
A20b	224 Sailsbury Terrace - triplicate	Roadside	458760	452404	NO_2	YES	0.2	1.1	N	~2.75
A21	Kingsland Terrace	Urban Background	458806	452326	NO_2	NO	0.2	1.4	N	~2.75
A22	Kingsland Terrace	Urban Background	458792	452242	NO_2	NO	0.2	23.8	N	~2.75
A25	Garfield Terrace	Roadside	458706	452225	NO_2	NO	0.2	1.5	N	~2.75
A29	Low Poppleton Lane	Urban Background	456939	453013	NO_2	NO	23.6	1.1	N	~2.75
A3	WRVS building - Bootham	Roadside	459822	452492	NO_2	YES	0.2	2.6	N	~2.75
A30	Boroughbridge Road	Urban Background	457060	452888	NO_2	NO	8.3	6.2	N	~2.75
A36	Boroughbridge Road	Urban Background	457625	452446	NO_2	NO	0.2	9.4	N	~2.75
A38	Boroughbridge Road	Urban Background	457857	452334	NO_2	NO	0.2	10.3	N	~2.75
A4	St Olave's Road	Urban Background	459699	452638	NO_2	YES	5.8	0.7	N	~2.75

A40	Poppleton Road School	Urban Background	458109	452196	NO_2	NO	0.2	7.9	N	~2.75
A41	140 Poppleton Road	Roadside	458172	452108	NO_2	NO	0.2	5.3	N	~2.75
A45	Grantham Drive	Urban Background	458384	451817	NO_2	NO	0.2	10.5	N	~2.75
A48	9 Poppleton Road	Roadside	458666	451468	NO_2	NO	0.2	4.9	N	~2.75
A50	Outside Fox pub - Holgate Rd	Roadside	458732	451393	NO_2	YES	16.1	0.3	N	~2.75
A51	Thrall entrance	Urban Background	458827	451348	NO_2	YES	18	2.2	N	~2.75
A52	Holgate Road (corner of Hamilton Dr East)	Roadside	458945	451254	NO_2	YES	10.9	2	N	~2.75
A53	Holgate Road	Roadside	459066	451239	NO_2	YES	7.9	2.7	N	~2.75
A55	Holgate Road	Roadside	459351	451221	NO_2	YES	5.5	0.2	N	~2.75
A56	Holgate Road	Urban Background	459470	451268	NO_2	YES	0.2	10.2	N	~2.75
A57	Hairdressers Holgate Road	Roadside	459533	451280	NO_2	YES	0.2	2.8	N	~2.75
A6	Clifton Bingo Hall	Roadside	459536	452811	NO_2	YES	6.2	3	N	~2.75
A60	Shipton Road	Urban Background	458906	453276	NO_2	NO	0.2	21.5	N	~2.75
A62	42 Shipton Road	Urban Background	458806	453483	NO_2	NO	0.2	15.7	N	~2.75
A64	Lamppost outside Charlie Browns	Roadside	460030	452327	NO_2	YES	2.4	0.6	N	~2.75
A66	70 Shipton Road	Urban Background	458672	453685	NO_2	NO	0.2	18.4	N	~2.75
A69	6 South Cottages	Urban Background	458375	453958	NO_2	NO	0.2	10	N	~2.75
A7	51 Clifton	Roadside	459441	452892	NO_2	YES	3.3	2.1	N	~2.75
A70	120 Shipton Road	Urban Background	458299	454070	NO_2	NO	0.2	13	N	~2.75
A71	154 Shipton road	Urban Background	458121	454254	NO_2	NO	0.2	9.6	N	~2.75

A74	176 Shipton Road	Urban Background	458041	454371	NO_2	NO	0.2	7.1	N	~2.75
A77	Lamp post outside 206 Shipton Road	Urban Background	457929	454537	NO_2	NO	6.1	1.7	N	~2.75
A81	Lamp post outside 276 Shipton Rd	Urban Background	457733	454805	NO_2	NO	0.2	8.4	N	~2.75
A85	Drainpipe front of Greenside guest house	Urban Background	459364	453009	NO_2	NO	0.2	11.5	N	~2.75
A88	111 Boroughbridge Road, Drainpipe nearest Garage at side of the door	Urban Background	457470	452550	NO_2	NO	0.2	12.9	N	~2.75
A9	Lime Tree House	Roadside	459295	453067	NO_2	YES	12.6	1.7	N	~2.75
A90	Lamp post25 Shipton Rd	Roadside	459238	453157	NO_2	YES	8.2	1.9	N	~2.75
A94	5 Salisbury Road	Roadside	458651	452426	NO_2	NO	0.2	13.7	N	~2.75
A96	Ousecliffe Gardens signpost, outside 31 Water End	Roadside	459038	452850	NO_2	YES	10	0.6	N	~2.75
A97	Lamp post next to Air Quality Monitoring Station on Plantation Drive	Roadside	457431	452616	NO_2	NO	18.7	2.2	N	~2.75
B1	Lamppost 1 Lowther Street opposite Riverside House Flats	Roadside	460848	452582	NO_2	YES	0.2	1.3	N	~2.75
B15	Lamp post99 Huntington Road	Roadside	461294	455305	NO_2	NO	28	1.6	N	~2.75
B19	Lamp post5 outside Huntington Primary School	Roadside	461891	455876	NO_2	NO	17.2	1.6	N	~2.75
B2	Lamp post7 Huntington Road opposite Park Grove	Roadside	460924	452697	NO_2	YES	2.5	1.3	N	~2.75
B29	Eastern Terrace	Roadside	461453	452750	NO_2	NO	0.3	1	N	~2.75

B3	Lamp post11 Huntington Road outside no 70	Roadside	460952	452826	NO_2	NO	2.9	1.4	N	~2.75
B36	Lamp post 60 Malton Road - triplicate	Urban Background	462565	454194	NO_2	NO	16.9	0.6	N	~2.75
B37	Lamp post60 Malton Road - triplicate	Urban Background	462565	454194	NO_2	NO	16.9	0.6	N	~2.75
B37a	Lamp post60 Malton Road - triplicate	Urban Background	462565	454194	NO_2	NO	16.9	0.6	N	~2.75
B38	482 Malton Road	Urban Background	463757	455155	NO_2	NO	0.2	11.7	N	~2.75
B41	76 Lawrence Street	Urban Background	461326	451330	NO_2	YES	0.2	6.5	N	~2.75
B42	83 Lawrence Street	Urban Background	461430	451348	NO_2	YES	0.2	7.2	N	~2.75
B43	117 Lawrence Street	Urban Background	461557	451343	NO_2	YES	0.2	7.9	N	~2.75
B44	Outside nursing home, Lawrence Street	Roadside	461643	451343	NO_2	YES	8.6	1.9	N	~2.75
B45	Pedestrian crossing Traffic Light Melrosegate Crossroads	Roadside	461849	451284	NO_2	YES	17.3	0.5	N	~2.75
B47	47 Hull Road	Urban Background	462019	451289	NO_2	NO	0.2	12.2	N	~2.75
B48	61 Hull Road	Urban Background	462122	451289	NO_2	NO	0.2	12.8	N	~2.75
B50	134 Hull Road	Roadside	462291	451269	NO_2	NO	0.2	3.7	N	~2.75
B51	117 Hull Road	Urban Background	462384	451298	NO_2	NO	0.2	13.2	N	~2.75
B56	Lamp post40 Hull Road	Roadside	462888	451289	NO_2	NO	14.4	2.3	N	~2.75
B58	231 Hull Road	Urban Background	462970	451300	NO_2	NO	0.2	14	N	~2.75
B60	Lamp post1 Nursery Gardens	Urban Background	463234	451339	NO_2	NO	10.7	1.3	N	~2.75
B63	Lamp post54 Tang Hall Lane	Roadside	462704	451300	NO_2	NO	13.2	0.9	N	~2.75

B72	Front of York Cycleworks	Roadside	461122	451374	NO_2	YES	10	2.9	N	~2.75
B74	Heworth Court Hotel sign outside Sutherland House on side of house on drainpipe.	Urban Background	461371	452708	NO_2	NO	5.2	17.8	N	~2.75
B80	On drainpipe on front of Heworth Surgery.	Urban Background	461185	452663	NO_2	NO	24.5	13.4	N	~2.75
B82	Lamp post Disguise Grove	Urban Background	460974	452563	NO_2	NO	3.1	1.1	N	~2.75
B83	Lamp post24 Outside No.55 Heworth Green	Roadside	461285	452695	NO_2	NO	11.3	1	N	~2.75
B84	Drainpipe to the left of the front door on 167 Hull Road	Urban Background	462654	451293	NO_2	NO	0.2	13.4	N	~2.75
B85	Lamp post7 Outside St Lawrence's Working Menes Club	Roadside	461227	451368	NO_2	YES	18.8	5.6	N	~2.75
B86	Lamp post16 Heworth Green, next to Air Quality Station	Roadside	461116	452602	NO_2	NO	5	0.7	N	~2.75
B88	Telegraph Pole 381 Hull Road	Roadside	462799	451291	NO_2	NO	10	6.8	N	~2.75
B89	Outside old DC Cook site on signpost	Roadside	461170	451357	NO_2	YES	2	2.8	N	~2.75
B90	11 Lawrence Street	Roadside	461133	451394	NO_2	YES	0.1	4.4	N	~2.75
C12	Lamp post1 Antsy Grove	Urban Background	458825	449928	NO_2	NO	10.8	0.3	N	~2.75
C17	248 Tad caster Rd	Urban Background	459085	450544	NO_2	NO	0.2	20.6	N	~2.75
C18	196 Mount Vale	Urban Background	459204	450772	NO_2	YES	0.2	9.2	N	~2.75
C19	Trentholme Dr	Urban Background	459271	450819	NO_2	YES	7.7	0.4	N	~2.75
C2	Lamp post66 Tesco roundabout	Roadside	458333	448974	NO_2	NO	16.9	1.1	N	~2.75

C20	Elmbank hotel	Urban Background	459280	450923	NO_2	YES	21.4	0.5	N	~2.75
C21	Dalton Terrace	Roadside	459410	451040	NO_2	YES	3.8	3.5	N	~2.75
C22	Park Street	Urban Background	459570	451195	NO_2	YES	14.4	1.1	N	~2.75
C23	The Mount	Roadside	459553	451252	NO_2	YES	0.2	3	N	~2.75
C26	Outside Odeon	Roadside	459639	451334	NO_2	YES	12.9	0.8	N	~2.75
C27	Windmill Pub	Roadside	459717	451433	NO_2	YES	0.2	3.2	N	~2.75
C28	House top of Selby Rd	Urban Background	461201	448386	NO_2	NO	0.2	15.3	N	~2.75
C29	Lamp post34 Selby Road	Roadside	461196	448426	NO_2	NO	21.7	0.5	N	~2.75
C30	Lamp post2 Selby Rd	Roadside	461185	448462	NO_2	NO	13.1	1.2	N	~2.75
C31	2 Selby Rd	Urban Background	461193	448473	NO_2	NO	0.2	14.1	N	~2.75
C32	Fordlands Rd	Urban Background	461128	448823	NO_2	NO	5.4	6.8	N	~2.75
C33	124 Main St	Urban Background	461085	448933	NO_2	NO	1	11.2	N	~2.75
C34	103 Main St	Roadside	461085	449067	NO_2	NO	0.2	3.5	N	~2.75
C36	50 Main St	Roadside	461052	449146	NO_2	NO	0.2	3.7	N	~2.75
C37	59 Main St	Urban Background	461045	449223	NO_2	NO	0.2	6.7	N	~2.75
C38	Lamp post8 Main St	Roadside	461038	449225	NO_2	NO	6	0.4	N	~2.75
C39	18 Main St	Roadside	460974	449336	NO_2	NO	0.2	2.4	N	~2.75
C4	147 Tadcaster Rd	Urban Background	458470	449126	NO_2	NO	0.2	14.3	N	~2.75
C40	Adams House B&B	Urban Background	460910	449628	NO_2	NO	0.2	8.7	N	~2.75
C42	300 Fulford Rd	Urban Background	460857	449748	NO_2	NO	0.2	10	N	~2.75
C43	Lamp post39 Fulford Rd	Roadside	460869	449730	NO_2	NO	8.7	0.3	N	~2.75

	- triplicate									
C43a	Lamp post39 Fulford Rd - triplicate	Roadside	460869	449730	NO_2	NO	8.7	0.3	N	~2.75
C44	Lamp post39 Fulford Rd - triplicate	Roadside	460869	449730	NO_2	NO	8.7	0.3	N	~2.75
C49	Alma terrace	Urban Background	460860	450530	NO_2	YES	6	0.9	N	~2.75
C51	Conservative Club	Roadside	460871	450727	NO_2	YES	9.8	1	N	~2.75
C52	Howard St	Roadside	460853	450781	NO_2	YES	9.9	1.4	N	~2.75
C53	Winterscale St	Roadside	460766	450924	NO_2	YES	14.7	2.1	N	~2.75
C54	Escrick St	Roadside	460762	451069	NO_2	YES	1.7	3.2	N	~2.75
C56	Pedestrian crossing on junction of Scarcroft Road/The Mount	Roadside	459484	451141	NO_2	YES	25.1	1.3	N	~2.75
C57	Lamp post1 Nelson's Lane	Urban Background	458912	450111	NO_2	NO	5.9	1.3	N	~2.75
C58	Drainpipe of 4 Main Street Fulford	Roadside	460926	449429	NO_2	NO	0.2	3.6	N	~2.75
C59	Drainpipe of 34 Tadcaster Road	Roadside	458735	449713	NO_2	NO	0.2	3.6	N	~2.75
C62	East Mount Road	Roadside	459579	451251	NO_2	YES	0.1	1	N	~2.75
C63	1 St Edwards Close	Roadside	458790	449740	NO_2	NO	0.1	15.6	N	~2.75
C7	Slingsby Grove	Roadside	458611	449477	NO_2	NO	1.4	2.6	N	~2.75
D10	Daisy Taylors Card Shop, Kings Square	Urban Background	460443	451927	NO_2	NO	0.2	0.9	N	~2.75
D12	On signpost outside 26 Fossgate	Roadside	460567	451740	NO_2	YES	0.2	1.6	N	~2.75
D13	Lamp post4 Skeldergate, opposite City Mills	Roadside	460271	451358	NO_2	YES	1.6	1.6	N	~2.75
D14	Lamp post3 Barbican Road outside No.7	Roadside	461077	451354	NO_2	YES	1.9	0.2	N	~2.75

D16	Lamp post1 , Paragon St	Roadside	460708	451231	NO_2	YES	0.2	3	N	~2.75
D17	Piccadilly/ Merchantgate junction	Roadside	460575	451616	NO_2	YES	19.3	0.3	N	~2.75
D18	Lamp post 6 Clifford St opposite Peckitt Street	Roadside	460395	451502	NO_2	YES	0.4	1.8	N	~2.75
D19	Bridge St/ Micklegate Junction	Roadside	460038	451626	NO_2	YES	1.7	0.2	N	~2.75
D20	Low Ousegate / Clifford St junction, outside Waterstones	Roadside	460323	451685	NO_2	YES	13	0.5	N	~2.75
D22	Outside Museum Gardens	Roadside	460035	452010	NO_2	YES	7.9	2.1	N	~2.75
D24	Priory St sign Micklegate	Roadside	459805	451543	NO_2	NO	3.4	0.5	N	~2.75
D25	Bus Stop E outside Royal York Hotel	Roadside	459693	451750	NO_2	YES	169.3	0.4	N	~2.75
D26	Lamp post14 Piccadilly (near Travelodge)	Roadside	460671	451400	NO_2	YES	15.5	2.1	N	~2.75
D27	Lamp post2 St Deny's Road - outside hotel	Roadside	460734	451563	NO_2	NO	11.7	1.5	N	~2.75
D28	Lamp post4 outside The Garden of India restaurant on Fawcett Street	Roadside	460764	451185	NO_2	YES	23.6	2.4	N	~2.75
D30	Lamp post outside Barbican Centre	Roadside	460834	451252	NO_2	YES	35.5	0.1	N	~2.75
D31	Lamp post9 Barbican road outside No.24	Roadside	461002	451229	NO_2	YES	2	0.3	N	~2.75
D32	Lamp post3 Bishopgate Street -next to bench	Roadside	460258	451208	NO_2	YES	22.2	1.9	N	~2.75
D33	Lamp post17 Nunnery Lane outside 81	Roadside	460075	451174	NO_2	YES	3.9	0.2	N	~2.75
D35	Drainpipe of house 22, Prices Lane	Roadside	460134	451170	NO_2	YES	0.2	1.6	N	~2.75
D36	Lamp post7 Bishopthorpe Road,	Roadside	460135	450884	NO_2	YES	6.1	0.2	N	~2.75

	opposite entrance to Charlton St									
D37	Lamp post3, Bishopthorpe Road, outside house 26	Roadside	460157	450988	NO_2	YES	2	2	N	~2.75
D38	Lamp post2 Scarcroft Rd	Roadside	460088	450929	NO_2	YES	2.7	1.6	N	~2.75
D39	Lamp post1 Bishopthorpe Road	Roadside	460185	451055	NO_2	YES	1.5	0.5	N	~2.75
D4	Lamp post11 Lord Mayor's Walk - opposite bike shop	Roadside	460560	452300	NO_2	YES	25.1	2.3	N	~2.75
D40	Lamp post16 Nunnery Lane	Roadside	460069	451196	NO_2	YES	3.3	1.6	N	~2.75
D41	Drainpipe of 55 Lord Mayor's Walk	Roadside	460286	452487	NO_2	YES	0.2	3.8	N	~2.75
D43	Rougier Street Signpost 1, has "Except for Access" sign on it.	Roadside	459920	451834	NO_2	YES	3	0.3	N	~2.75
D45	Lamp post 6 The Stonebow Opposite Windsors World of Shoes	Roadside	460673	451869	NO_2	YES	15.6	1	N	~2.75
D47	Lamp post 8 Jewbury	Roadside	460682	452187	NO_2	YES	0.6	2.4	N	~2.75
D48	Outside De Grey House right hand side of side entrance gate post	Roadside	460103	452180	NO_2	YES	33.6	2.3	N	~2.75
D49	Lamp post1 Fishergate	Roadside	460656	451269	NO_2	YES	0.2	2.8	N	~2.75
D50	Drainpipe side of Cardshop Coppergate	Roadside	460371	451682	NO_2	NO	0.2	1.9	N	~2.75
D51	Inside Taxi Rank @ York Railway Station	Roadside	459640	451722	NO_2	NO	N	40	N	~2.75
D52	Lamp post3 Kent Street at side of car park	Roadside	460887	451140	NO_2	NO	2	90	N	~2.75
D53	58 Nunnery Lane	Roadside	460115	451146	NO_2	YES	0.1	3.6	N	~2.75

D54	76 Nunnery Lane	Roadside	460146	451116	NO_2	YES	0.1	5.5	N	~2.75
D55	Museum Street - Opposite Thomas's Pub	Roadside	460087	452065	NO_2	YES	1.8	2.2	N	~2.75
D6	Margaret Phillipson Court, Aldwark	Urban Background	460570	452177	NO_2	NO	0.2	2.6	N	~2.75
D8	Lamp post2, The Stonebow - Jorvick café	Roadside	460553	451843	NO_2	NO	27.3	0.5	N	~2.75
D9	Lamp post8, Lord Mayor's Walk outside no 34	Roadside	460483	452357	NO_2	YES	1.8	0.1	N	~2.75
D56	Three Tuns Pub, 12 Coppergate	Roadside	460400	451685	NO_2	NO	0.1	1.6	N	~2.75
D57	Lamp post4, Pedestrian Crossing, Coppergate	Roadside	460416	451708	NO_2	NO	11.9	2.4	N	~2.75
D58	Traffic lights, opposite Duttons, Coppergate	Roadside	460435	451732	NO_2	NO	8	0.1	N	~2.75
D59	Bus Stop outside 8/9 SLP	Roadside	460087	452156	NO_2	YES	1.8	2.7	N	~2.75
D60	No entry sign outside 'Schuh' Shoe Shop	Roadside	460294	451883	NO_2	NO	N	1.7	N	~2.75
130	Outside 81 Low Mill Close	Roadside	463663	451054	NO_2	NO	13.6	1.1	N	~2.75

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2012	2013	2014	2015	2016
Bootham	Urban Background	Automatic	83	83	23.4	19.0	18.8	15.8	17.8 (ratified Jan - Sept only)
Fishergate	Roadside	Automatic	96	96	31.4	27.2	26.5	27.4	29.0 (ratified Jan - Sept only)
Holgate	Roadside	Automatic	98	98	33.1	38.0	32.5	30.7	29.4
Nunnery Lane	Roadside	Automatic	98	98	33.2	32.5	34.1	28.4	31.4
Gillygate	Roadside	Automatic	97	97	30.2	32.8	34.7	27.8	27.3
Lawrence Street	Roadside	Automatic	97	97	34.2	**40.4**	34.7	34.1	33.0
Heworth Green	Roadside	Automatic	99	99	34.9	27.8	33.6	28.0	28.3
Fulford Road	Roadside	Automatic	96	96	27.6	24.7	27.7	25.0	25.2
5	Roadside	Diffusion Tube	92	92	23.8	17.0	19.3	16.2	16.7
6	Roadside	Diffusion Tube	100	100	**49.1**	**40.6**	39.0	37.4	**40.6**
7	Roadside	Diffusion Tube	100	100	**53.5**	**48.4**	**55.2**	**44.9**	**46.6** *(distance corrected 36.5)*
8	Urban Background	Diffusion Tube	100	100	25.3	20.9	20.1	16.3	17.6
9	Urban Background	Diffusion Tube	100	100	28.2	21.6	19.2	15.3	18.1
11	Urban Background	Diffusion Tube	83	83	22.9	21.8	18.6	15.8	19.3
13	Roadside	Diffusion Tube	100	100	**61.7**	**46.5**	**48.3**	**45.5**	**44.9**

14	Roadside	Diffusion Tube	92	92	**53.4**	**50.7**	**52.2**	**47.1**	**47.5**
15	Roadside	Diffusion Tube	92	92	**41.6**	35.8	37.7	37.4	38.1
16	Roadside	Diffusion Tube	100	100	**44.2**	35.9	37.4	37.5	36.2
17	Roadside	Diffusion Tube	100	100	39.7	34.2	37.1	32.2	33.5
18	Roadside	Diffusion Tube	92	92	36.0	31.8	34.4	29.9	31.7
25	Roadside	Diffusion Tube	100	100	31.3	27.9	29.3	26.1	25.2
26	Roadside	Diffusion Tube	100	100	29.9	25.9	30.0	24.1	25.7
33	Roadside	Diffusion Tube	100	100	30.7	24.2	28.3	26.9	25.8
35	Roadside	Diffusion Tube	100	100	32.1	25.6	27.5	24.9	24.7
37	Roadside	Diffusion Tube	75	75	**40.5**	34.5	37.5	33.2	31.9
44	Roadside	Diffusion Tube	100	100	30.6	26.5	30.3	25.7	24.3
45	Roadside	Diffusion Tube	92	92	38.9	32.9	35.6	31.1	32.0
47	Roadside	Diffusion Tube	100	100	30.8	28.2	28.0	27.6	28.3
50	BLANK	Diffusion Tube	58	58	Blank	Blank	Blank	Blank	Blank
60	Roadside	Diffusion Tube	92	92	27.1	19.7	27.3	21.3	21.2
78	Roadside	Diffusion Tube	100	100	33.9	30.4	32.1	29.0	29.2
79	Roadside	Diffusion Tube	100	100	31.7	31.2	35.2	29.4	29.5
80	Roadside	Diffusion Tube	100	100	33.9	31.1	33.0	28.6	30.1
83	Urban Background	Diffusion Tube	100	100	27.5	22.3	20.7	18.3	20.9
88	Urban Background	Diffusion Tube	100	100	19.1	15.7	15.7	12.8	13.2
90	Roadside	Diffusion Tube	100	100	20.8	17.3	19.4	16.0	17.6
96	Roadside	Diffusion Tube	92	92	27.2	24.2	26.8	23.3	22.8
100	Roadside	Diffusion Tube	100	100	24.1	20.4	23.1	19.5	20.5
101	Roadside	Diffusion Tube	92	92	39.6	32.6	35.8	33.8	32.7
102	Roadside	Diffusion Tube	100	100	39.0	36.0	34.5	31.9	32.1

103	Roadside	Diffusion Tube	100	100	38.5	34.1	37.6	31.1	32.7
104	Roadside	Diffusion Tube	100	100	39.9	36.1	36.9	31.0	32.9
107	Roadside	Diffusion Tube	100	100	22.8	18.8	20.7	18.9	21.0
108	Roadside	Diffusion Tube	92	92	31.4	22.9	26.3	23.5	19.2
109	Roadside	Diffusion Tube	92	92	**56.5**	-	-	**46.4**	**45.4**
110	Roadside	Diffusion Tube	100	100	**61.8**	**48.6**	**51.3**	**46.6**	**46.4**
111	Roadside	Diffusion Tube	83	83	35.4	28.1	31.9	25.1	26.3
112	Roadside	Diffusion Tube	83	83	28.1	24.5	27.2	23.3	22.3
114	Roadside	Diffusion Tube	100	100	**46.6**	**40.0**	**41.5**	39.3	**41.7** *(distance corrected 36.7)*
115	Roadside	Diffusion Tube	8	8	**49.3**	38.5	**48.4**	**42.6**	-
116	Roadside	Diffusion Tube	100	100	34.1	29.1	31.5	28.0	28.0
125	Roadside	Diffusion Tube	100	100	-	17.1	17.5	15.8	14.5
126	Roadside	Diffusion Tube	100	100	-	-	19.6	16.0	16.5
127	Roadside	Diffusion Tube	100	100	-	-	24.4	23.0	24.0
128	Roadside	Diffusion Tube	100	100	-	-	22.5	18.6	19.2
129	Roadside	Diffusion Tube	100	100	-	-	21.1	17.4	16.9
2a	Roadside	Diffusion Tube	100	100	34.8	29.7	30.6	28.6	28.6
2b	Roadside	Diffusion Tube	100	100	33.7	29.4	29.9	26.5	28.4
2c	Roadside	Diffusion Tube	100	100	32.0	31.2	32.0	26.3	27.2
3a	Urban Background	Diffusion Tube	100	100	27.9	20.3	17.4	14.4	16.1
3b	Urban Background	Diffusion Tube	100	100	24.8	18.9	19.0	15.1	17.1
3c	Urban Background	Diffusion Tube	100	100	23.1	19.5	16.2	16.0	19.7
95a	Roadside	Diffusion Tube	100	100	30.1	26.2	25.9	24.4	23.1

95b	Roadside	Diffusion Tube	100	100	29.1	24.4	27.5	24.6	24.0
95c	Roadside	Diffusion Tube	100	100	29.1	25.0	24.7	25.0	24.1
9a	Urban Background	Diffusion Tube	100	100	24.9	21.1	19.8	15.5	18.7
A1	Roadside	Diffusion Tube	83	83	**56.9**	**51.6**	**52.3**	**46.0**	**54.3**
A11	Roadside	Diffusion Tube	100	100	**43.1**	34.1	37.4	33.6	30.9
A12	Roadside	Diffusion Tube	100	100	36.4	30.7	33.8	28.7	29.0
A13	Urban Background	Diffusion Tube	100	100	27.3	20.8	19.7	16.4	18.7
A14	Urban Background	Diffusion Tube	100	100	26.3	21.8	19.9	16.4	19.1
A14a	Urban Background	Diffusion Tube	100	100	26.0	22.0	20.0	15.2	18.8
A17	Roadside	Diffusion Tube	100	100	35.3	28.9	32.3	27.6	29.6
A19	Roadside	Diffusion Tube	92	92	33.8	30.2	31.6	27.7	26.8
A19a	Roadside	Diffusion Tube	100	100	33.6	28.3	30.9	28.8	27.3
A19b	Roadside	Diffusion Tube	100	100	33.4	28.7	31.9	28.6	27.9
A2	Roadside	Diffusion Tube	100	100	**41.2**	35.4	-	31.1	30.6
A20	Roadside	Diffusion Tube	100	100	34.4	31.2	32.5	28.7	34.6
A20a	Roadside	Diffusion Tube	100	100	38.7	32.4	35.6	28.8	30.2
A20b	Roadside	Diffusion Tube	100	100	37.7	30.7	34.3	29.3	31.5
A21	Urban Background	Diffusion Tube	100	100	30.3	22.7	22.8	18.5	20.0
A22	Urban Background	Diffusion Tube	100	100	28.9	23.0	22.4	18.1	21.7
A25	Roadside	Diffusion Tube	100	100	29.2	26.0	28.4	22.6	22.9
A29	Urban Background	Diffusion Tube	100	100	29.8	22.8	21.0	18.3	20.0
A3	Roadside	Diffusion Tube	100	100	36.3	30.5	34.4	29.2	28.2
A30	Urban	Diffusion Tube	100	100	24.1	21.2	22.1	17.8	20.7

	Background								
A36	Urban Background	Diffusion Tube	42	42	22.7	-	-	15.2	22.3 (estimate)
A38	Urban Background	Diffusion Tube	100	100	25.8	20.6	19.1	15.3	18.3
A4	Urban Background	Diffusion Tube	92	92	28.3	24.6	21.0	18.2	20.5
A40	Urban Background	Diffusion Tube	100	100	30.7	25.6	22.9	17.8	22.7
A41	Roadside	Diffusion Tube	92	92	27.1	22.3	26.0	20.6	23.0
A45	Urban Background	Diffusion Tube	100	100	22.8	19.8	18.8	14.3	16.1
A48	Roadside	Diffusion Tube	75	75	28.0	25.4	26.9	23.7	21.6
A50	Roadside	Diffusion Tube	100	100	34.1	30.6	-	26.2	24.6
A51	Urban Background	Diffusion Tube	100	100	29.8	24.8	23.8	19.9	22.8
A52	Roadside	Diffusion Tube	92	92	38.5	34.6	37.1	31.0	31.9
A53	Roadside	Diffusion Tube	67	67	36.7	32.4	32.2	30.8	30.6 (estimate)
A54	Roadside	Diffusion Tube	83	83	-	-	**41.3**	36.9	33.7
A55	Roadside	Diffusion Tube	100	100	39.9	35.3	36.3	31.8	29.5
A56	Urban Background	Diffusion Tube	100	100	39.3	32.9	30.2	26.3	30.0
A57	Roadside	Diffusion Tube	92	92	**54.2**	**51.6**	**49.2**	**46.9**	**47.7**
A6	Roadside	Diffusion Tube	100	100	31.4	27.1	28.8	25.5	24.4
A60	Urban Background	Diffusion Tube	92	92	23.0	18.6	16.7	13.4	14.9
A62	Urban Background	Diffusion Tube	100	100	21.1	16.4	15.3	13.6	14.7
A64	Roadside	Diffusion Tube	92	92	38.1	35.6	35.1	29.3	32.4
A66	Urban Background	Diffusion Tube	100	100	26.3	18.9	18.1	14.5	16.5

A69	Urban Background	Diffusion Tube	100	100	20.7	17.3	14.9	12.5	15.6
A7	Roadside	Diffusion Tube	92	92	36.1	28.7	29.3	27.5	30.0
A70	Urban Background	Diffusion Tube	100	100	24.8	21.7	19.7	16.4	18.5
A71	Urban Background	Diffusion Tube	83	83	21.3	16.0	16.2	12.3	16.0
A74	Urban Background	Diffusion Tube	92	92	19.2	17.3	13.8	12.6	15.8
A77	Urban Background	Diffusion Tube	83	83	25.5	20.5	21.9	16.6 (estimate)	18.8
A81	Urban Background	Diffusion Tube	100	100	26.7	19.6	17.6	15.2	16.7
A85	Urban Background	Diffusion Tube	100	100	27.6	24.4	23.0	19.3	21.2
A88	Urban Background	Diffusion Tube	92	92	24.0	19.7	21.4	15.7	18.4
A9	Roadside	Diffusion Tube	92	92	38.4	33.8	34.4	30.1	32.3
A90	Roadside	Diffusion Tube	100	100	**45.7**	37.4	**40.0**	36.0	34.3
A94	Roadside	Diffusion Tube	92	92	33.8	26.7	26.2	22.0	24.6
A96	Roadside	Diffusion Tube	92	92	35.9	31.5	34.4	28.4	31.7
A97	Roadside	Diffusion Tube	92	92	-	-	22.0	18.8	21.0
B1	Roadside	Diffusion Tube	92	92	36.9	30.4	31.8	29.4	27.9
B15	Roadside	Diffusion Tube	75	75	24.0	20.2	22.6	19.2	28.4
B19	Roadside	Diffusion Tube	100	100	28.4	21.5	21.7	19.7	21.1
B2	Roadside	Diffusion Tube	100	100	30.9	24.9	28.7	24.4	24.9
B29	Roadside	Diffusion Tube	100	100	28.9	24.3	25.6	22.2	21.7
B3	Roadside	Diffusion Tube	92	92	27.3	24.1	25.2	21.5	22.0
B36	Urban Background	Diffusion Tube	92	92	26.0	17.0	16.0	13.0	15.9
B37	Urban	Diffusion Tube	92	92	22.6	18.4	16.0	14.6	15.9

	Background								
B37a	Urban Background	Diffusion Tube	75	75	22.1	17.7	16.5	14.6	17.2
B38	Urban Background	Diffusion Tube	92	92	27.0	22.0	20.0	16.3	20.0
B41	Urban Background	Diffusion Tube	92	92	**42.3**	34.9	31.6	28.1	31.3
B42	Urban Background	Diffusion Tube	92	92	31.3	26.7	24.4	20.8	25.8
B43	Urban Background	Diffusion Tube	100	100	27.4	23.3	21.2	18.6	22.2
B44	Roadside	Diffusion Tube	100	100	34.3	33.0	34.0	31.3	30.3
B45	Roadside	Diffusion Tube	100	100	34.3	26.9	30.9	28.1	27.8
B47	Urban Background	Diffusion Tube	100	100	23.2	19.0	16.9	15.1	16.0
B48	Urban Background	Diffusion Tube	100	100	26.0	22.7	20.0	17.5	19.7
B50	Roadside	Diffusion Tube	100	100	28.4	24.1	27.1	24.3	22.0
B51	Urban Background	Diffusion Tube	100	100	22.8	20.3	19.5	16.5	17.6
B56	Roadside	Diffusion Tube	92	92	31.8	33.7	34.5	31.8	31.7
B58	Urban Background	Diffusion Tube	100	100	27.9	20.8	20.1	16.9	19.7
B60	Urban Background	Diffusion Tube	100	100	29.7	20.7	20.0	17.8	19.3
B63	Roadside	Diffusion Tube	92	92	37.7	32.2	34.9	29.5	29.1
B72	Roadside	Diffusion Tube	92	92	**56.5**	**47.4**	**47.0**	**44.6**	**42.7**
B74	Urban Background	Diffusion Tube	100	100	29.1	22.6	22.6	18.9	20.4
B80	Urban Background	Diffusion Tube	100	100	24.2	17.9	19.0	15.2	16.7
B82	Urban Background	Diffusion Tube	92	92	30.4	22.3	22.4	19.4	22.2

B83	Roadside	Diffusion Tube	100	100	33.9	27.9	32.0	27.6	25.3
B84	Urban Background	Diffusion Tube	92	92	29.8	26.2	23.2	20.2	22.2
B85	Roadside	Diffusion Tube	92	92	37.0	33.1	32.5	29.1	31.9
B86	Roadside	Diffusion Tube	100	100	28.8	25.9	26.9	22.9	23.5
B88	Roadside	Diffusion Tube	100	100	35.5	31.8	33.2	28.8	27.8
B89	Roadside	Diffusion Tube	100	100	-	-	36.6	35.0	34.7
B90	Roadside	Diffusion Tube	100	100	-	-	38.3	35.5	34.0
C12	Urban Background	Diffusion Tube	100	100	24.7	21.5	19.8	15.9	18.3
C17	Urban Background	Diffusion Tube	100	100	26.4	21.6	20.0	15.5	18.7
C18	Urban Background	Diffusion Tube	100	100	36.9	29.3	25.2	22.3	25.1
C19	Urban Background	Diffusion Tube	92	92	28.0	21.3	18.7	17.0 (estimate)	19.2
C2	Roadside	Diffusion Tube	100	100	35.9	33.1	35.3	32.0	31.5
C20	Urban Background	Diffusion Tube	100	100	26.4	23.4	20.3	16.9	19.8
C21	Roadside	Diffusion Tube	100	100	32.5	28.2	28.3	26.9	26.7
C22	Urban Background	Diffusion Tube	100	100	34.3	28.6	22.9	19.4	24.6
C23	Roadside	Diffusion Tube	100	100	**48.5**	38.5	**42.9**	39.9	39.9
C26	Roadside	Diffusion Tube	100	100	**46.8**	**40.9**	**42.1**	**40.4**	**41.2** *(distance corrected 33.1)*
C27	Roadside	Diffusion Tube	83	83	**54.5**	**49.1**	**52.0**	**46.7**	**45.8**
C28	Urban Background	Diffusion Tube	100	100	21.7	17.9	17.5	14.2	16.6
C29	Roadside	Diffusion Tube	100	100	33.8	30.2	33.5	28.8	30.0

C30	Roadside	Diffusion Tube	100	100	35.8	34.0	35.2	29.3	30.8
C31	Urban Background	Diffusion Tube	100	100	27.4	21.0	20.5	17.9	18.8
C32	Urban Background	Diffusion Tube	100	100	33.1	26.9	25.4	22.8	24.5
C33	Urban Background	Diffusion Tube	100	100	24.1	-	19.8	14.4	17.3
C34	Roadside	Diffusion Tube	100	100	29.1	26.6	28.6	23.7	25.2
C36	Roadside	Diffusion Tube	100	100	33.4	26.9	30.8	29.7	28.5
C37	Urban Background	Diffusion Tube	100	100	29.4	26.2	23.6	20.3	23.4
C38	Roadside	Diffusion Tube	100	100	35.3	30.7	30.8	28.2	28.1
C39	Roadside	Diffusion Tube	100	100	**40.2**	31.5	35.3	35.1	32.6
C4	Urban Background	Diffusion Tube	100	100	24.3	20.8	19.4	16.4	19.0
C40	Urban Background	Diffusion Tube	100	100	30.0	21.8	20.8	18.0	19.0
C42	Urban Background	Diffusion Tube	92	92	32.0	23.8	23.6	20.7	22.8
C43	Roadside	Diffusion Tube	100	100	32.8	29.4	32.3	28.7	28.8
C43a	Roadside	Diffusion Tube	100	100	31.7	29.2	32.3	28.8	30.4
C44	Roadside	Diffusion Tube	100	100	33.0	29.6	28.7	26.8	29.0
C49	Urban Background	Diffusion Tube	100	100	30.1	23.7	22.9	18.6	21.6
C51	Roadside	Diffusion Tube	92	92	32.9	30.7	31.7	25.2	26.2
C52	Roadside	Diffusion Tube	92	92	29.8	24.9	28.3	23.1	24.1
C53	Roadside	Diffusion Tube	92	92	28.1	25.4	25.0	22.2	22.8
C54	Roadside	Diffusion Tube	92	92	32.4	29.3	-	25.5	28.4
C56	Roadside	Diffusion Tube	92	92	**40.2**	33.3	34.6	32.1	31.4
C57	Urban Background	Diffusion Tube	100	100	29.0	27.2	25.7	18.1	22.6

C58	Roadside	Diffusion Tube	100	100	**43.2**	36.3	39.5	36.8	35.5
C59	Roadside	Diffusion Tube	100	100	35.8	30.9	33.8	29.9	29.6
C62	Roadside	Diffusion Tube	100	100	39.4	28.6	30.7	28.4	26.9
C63	Roadside	Diffusion Tube	100	100	-	-	20.6	19.2	18.8
C7	Roadside	Diffusion Tube	100	100	31.9	29.2	30.8	23.8	19.8
D10	Urban Background	Diffusion Tube	100	100	27.6	20.9	21.5	16.9	18.4
D12	Roadside	Diffusion Tube	75	75	26.3	22.1	25.7	22.0	20.4
D13	Roadside	Diffusion Tube	83	83	27.7	25.2	27.8	24.5	27.6
D14	Roadside	Diffusion Tube	100	100	**47.1**	**42.0**	**46.1**	39.0	36.2
D16	Roadside	Diffusion Tube	75	75	**45.5**	**40.0**	**45.2**	37.7	37.5
D17	Roadside	Diffusion Tube	83	83	36.1	31.8	34.0	31.8	29.2
D18	Roadside	Diffusion Tube	100	100	37.7	27.8	30.8	26.3	28.7
D19	Roadside	Diffusion Tube	100	100	**53.4**	**50.8**	**54.7**	**48.0**	**49.9** *(distance corrected 38.9)*
D20	Roadside	Diffusion Tube	75	75	**47.9**	**40.6**	**43.9**	**40.3**	39.7 *(distance corrected 26.9)*
D22	Roadside	Diffusion Tube	100	100	**41.7**	33.4	39.9	33.0	34.4
D24	Roadside	Diffusion Tube	92	92	39.1	31.9	-	30.3	30.6
D25	Roadside	Diffusion Tube	100	100	**47.5**	-	**41.0**	35.1	37.6
D26	Roadside	Diffusion Tube	92	92	32.8	26.7	29.2	25.3	26.6
D27	Roadside	Diffusion Tube	100	100	30.2	23.9	26.2	25.9	25.8
D28	Roadside	Diffusion Tube	100	100	**40.4**	34.0	37.3	34.1	33.3
D30	Roadside	Diffusion Tube	100	100	34.0	25.6	28.8	25.0	24.6
D31	Roadside	Diffusion Tube	100	100	36.9	33.0	39.9	31.8	32.6

D32	Roadside	Diffusion Tube	100	100	**44.6**	35.4	37.1	34.1	35.1
D33	Roadside	Diffusion Tube	100	100	37.5	29.2	31.3	25.4 (estimate)	30.0
D35	Roadside	Diffusion Tube	100	100	**44.3**	38.8	**42.0**	37.3	36.9
D36	Roadside	Diffusion Tube	83	83	**43.2**	34.5	37.5	34.9	35.3
D37	Roadside	Diffusion Tube	83	83	**41.4**	30.9	33.2	26.7	30.9
D38	Roadside	Diffusion Tube	100	100	27.8	25.0	26.5	22.5	22.0
D39	Roadside	Diffusion Tube	92	92	**40.6**	35.7	34.0	29.0	31.4
D4	Roadside	Diffusion Tube	92	92	35.1	28.3	31.7	27.2	25.7
D40	Roadside	Diffusion Tube	92	92	32.4	30.0	31.5	28.1	29.2
D41	Roadside	Diffusion Tube	100	100	**44.5**	38.7	**41.1**	37.6	32.9
D43	Roadside	Diffusion Tube	92	92	**48.0**	**45.0**	**47.9**	**40.4**	**42.4** *(distance corrected 32.8)*
D45	Roadside	Diffusion Tube	75	75	38.0	28.9	32.2	26.1	28.3
D47	Roadside	Diffusion Tube	100	100	38.5	32.5	33.4	27.2	27.7
D48	Roadside	Diffusion Tube	100	100	**42.4**	37.3	**41.2**	33.3	36.1
D49	Roadside	Diffusion Tube	100	100	**43.4**	38.5	**43.3**	39.1	36.8
D50	Roadside	Diffusion Tube	100	100	-	**42.8**	**44.3**	**41.9**	**40.3**
D51	Roadside	Diffusion Tube	100	100	-	-	**65.3**	**57.1**	**56.5**
D52	Roadside	Diffusion Tube	92	92	-	-	27.6	24.1	25.8
D53	Roadside	Diffusion Tube	92	92	-	-	32.1	27.2 (estimate)	28.7
D54	Roadside	Diffusion Tube	100	100	-	-	30.6	25.1	27.3
D55	Roadside	Diffusion Tube	92	92	-	-	39.8	**42.6**	**48.8 *(distance corrected 44.4)***

D6	Urban Background	Diffusion Tube	100	100	27.7	24.0	22.6	18.0	20.5
D8	Roadside	Diffusion Tube	100	100	**42.9**	**40.1**	**41.4**	36.3	36.9
D9	Roadside	Diffusion Tube	100	100	**42.6**	38.4	36.6	31.7	34.1
D56	Roadside	Diffusion Tube	92	92	-	-	-	**51.7 (estimate)**	**47.4**
D57	Roadside	Diffusion Tube	58	58	-	-	-	37.1 (estimate)	35.7 (estimate)
D58	Roadside	Diffusion Tube	92	92	-	-	-	**44.0 (estimate)**	38.9
D59	Roadside	Diffusion Tube	83	83	-	-	-	**50.7 (estimate)**	**44.7 *(distance corrected 41.2)***
D60	Roadside	Diffusion Tube	75	75	-	-	-	22.2 (estimate)	21.7
130	Roadside	Diffusion Tube	92	92	-	-	-	14.3 (estimate)	14.7

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

If applicable, 2016 data has been distance corrected for relevant exposure

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.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

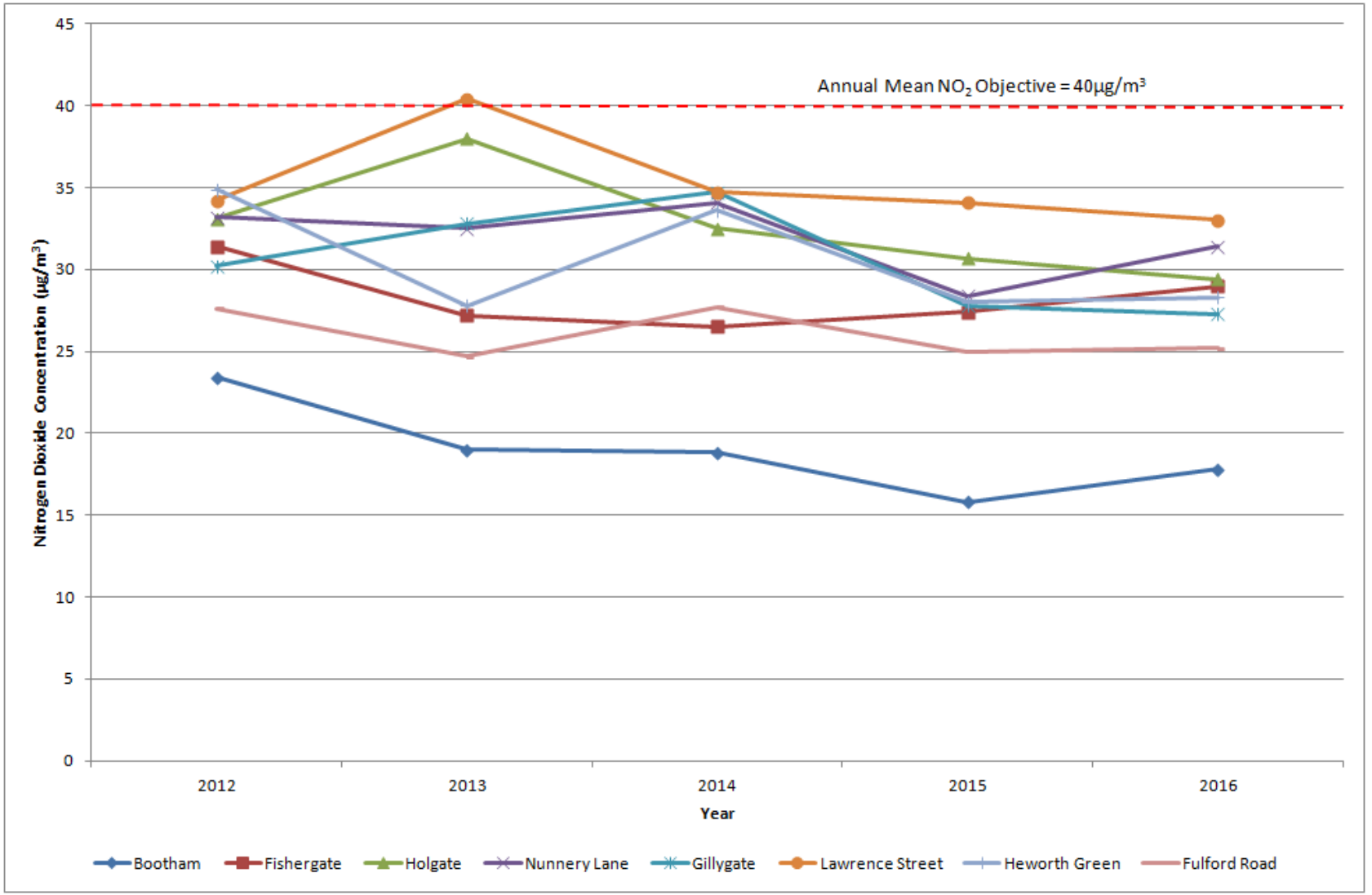


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2012	2013	2014	2015	2016
Bootham	Urban Background	Automatic	83.4	83.4	0	0	0	0	0
Fishergate	Roadside	Automatic	95.6	95.6	0	0	0	0	0
Holgate	Roadside	Automatic	97.6	97.6	0	0	0	0	0
Nunnery Lane	Roadside	Automatic	98.5	98.5	0	0	0	0	0
Gillygate	Roadside	Automatic	96.6	96.6	0	0	0	0	0
Lawrence Street	Roadside	Automatic	96.7	96.7	0	0	0	2	0
Heworth Green	Roadside	Automatic	98.7	98.7	0	0	0 (59.5)	0	0
Fulford Road	Roadside	Automatic	96.4	96.4	0	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.

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2012	2013	2014	2015	2016
Bootham (TEOM-FDMS)	Background	95.8	95.8	12.1	11.7	15.0	15.3	14.9 (ratified Jan to Sept only)
Fishergate (TEOM-FDMS)	Roadside	92.7	92.7	18.3	18.8	18.4	17.8	16.3 (ratified Jan to Sept only)
Holgate Road (TEOM-FDMS)	Roadside	95.2	95.2	21.0	23.8	18.3	20.9 *(low data capture)*	12.0
Plantation Drive (TEOM)	Roadside	97.5	97.5	18.8	18.1	17.2	-	15.5

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ 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.2 – Trends in Annual Mean PM_{10} Concentrations

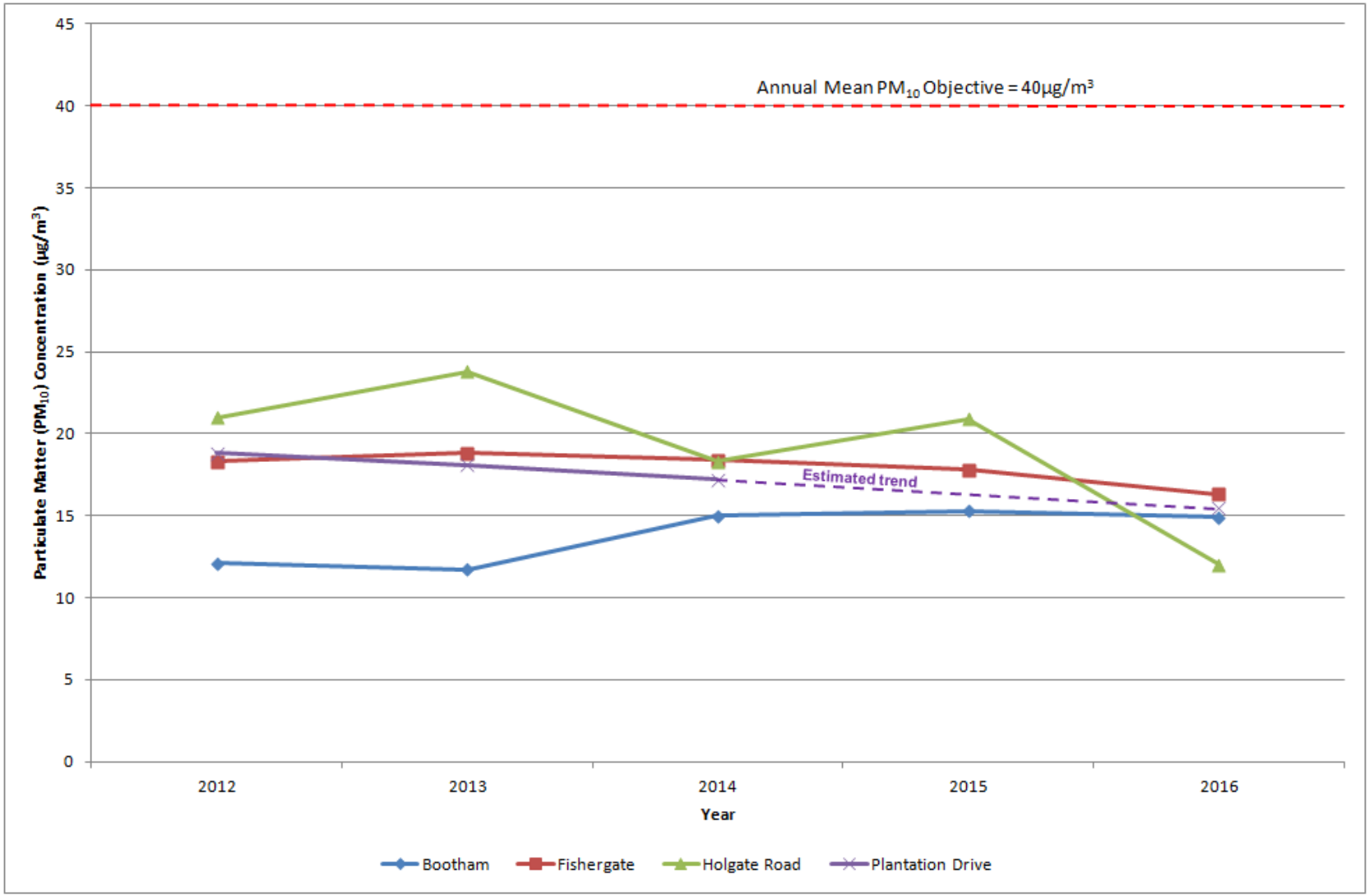


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2012	2013	2014	2015	2016
Bootham (TEOM-FDMS)	Background	95.8	95.8	3	3	4	6	2
Fishergate (TEOM-FDMS)	Roadside	92.7	92.7	8	4 (33.8)	7	8	2
Holgate Road (TEOM-FDMS)	Roadside	95.2	95.2	14	10 (39.1)	8 (32.1)	7 (41.1)	2
Plantation Drive (TEOM)	Roadside	97.5	97.5	4	4	7	N/A	2

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 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.3 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3

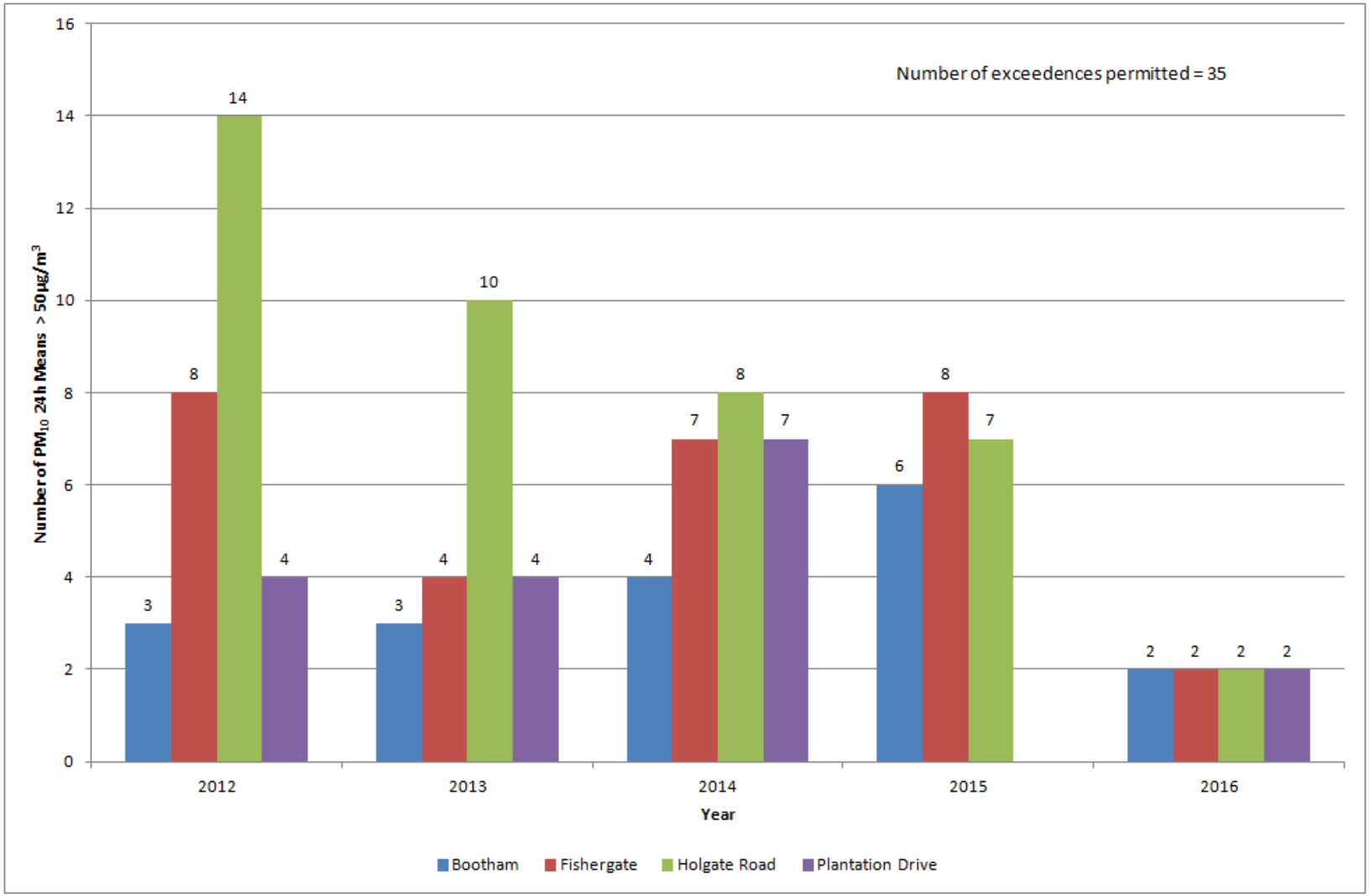


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2016 (%) [2]	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) [3]				
				2012	2013	2014	2015	2016
Bootham (TEOM-FDMS)	Urban Background	84.8	84.8	10.2	11.5	12.4	10.2	9.8
Fishergate (TEOM-FDMS)	Roadside	93.2	93.2	13.4	13.3	13.6	12.0	12.0
Gillygate (TEOM)	Roadside	99.1	99.1	-	-	9.7	9.1	9.0

Annualisation has been conducted where data capture is <75%

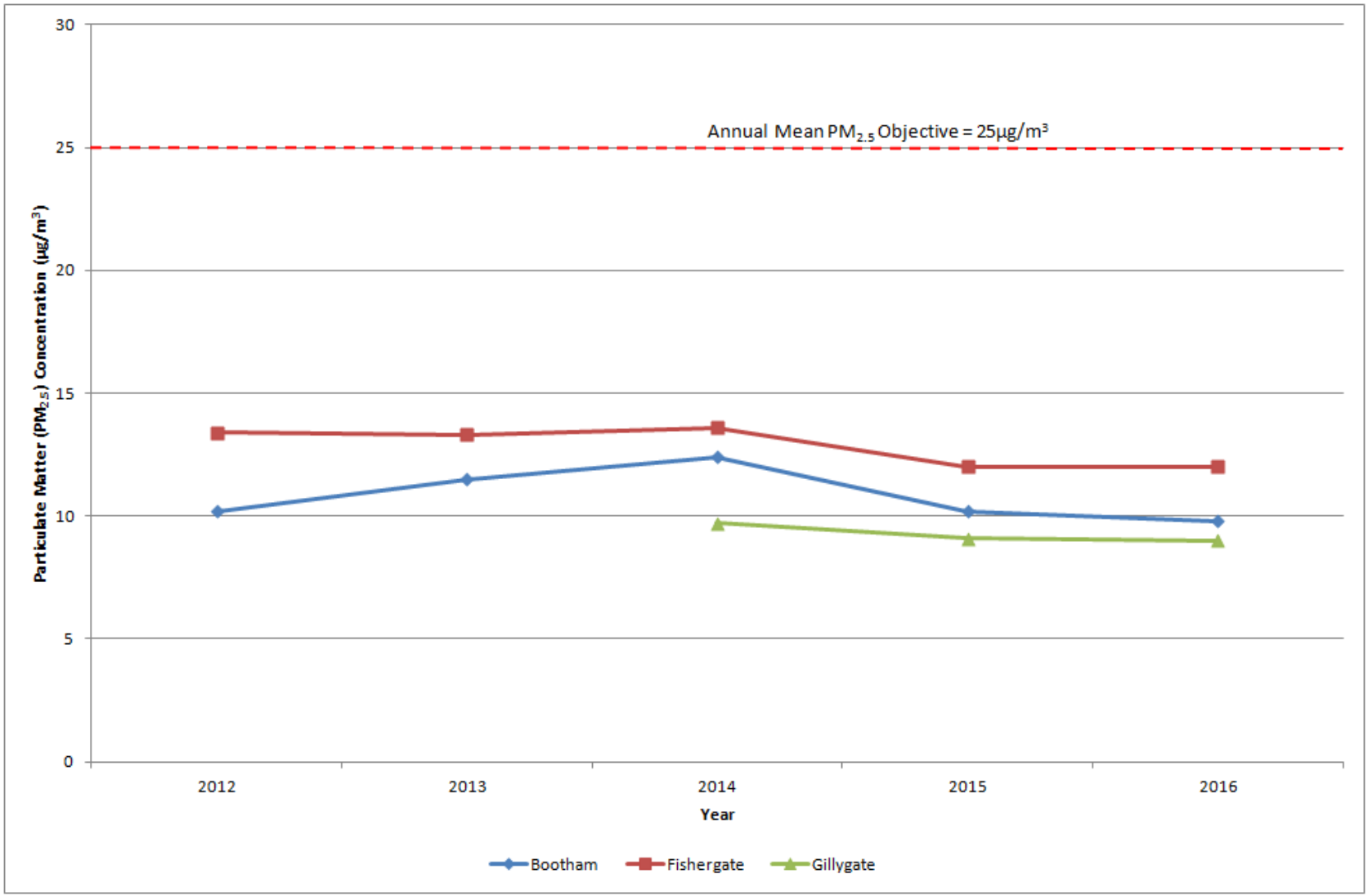
Notes:

(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.4 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2016

Site ID	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 (R=0.721, B=0.737) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
5	27.0	27.9	26.1	18.5		13.9	15.1	16.5	21.8	19.2	33.1	36.5	23.2	16.7	16.7
6	74.5	61.5	61.6	54.8	49.0	52.9	46.0	42.2	46.4	61.5	69.5	56.1	56.3	**40.6**	**40.6**
7	69.4	71.4	67.4	61.3	68.3	63.4	51.0	48.3	54.0	71.9	73.7	75.9	64.7	**46.6**	36.5
8	32.5	29.4	27.1	20.5	13.7	13.8	16.1	15.7	22.0	23.6	34.8	37.7	23.9	17.6	17.6
9	34.9	24.0	29.4	21.4	19.6	16.2	16.9	16.2	23.6	23.0	32.9	37.1	24.6	18.1	18.1
11	30.6	26.7	26.6	22.0	18.7	16.9			23.1	27.2	32.4	37.9	26.2	19.3	19.3
13	68.2	66.8	62.7	52.1	64.0	59.1	61.8	47.7	61.3	62.3	75.9	66.4	62.4	**44.9**	**44.9**
14		67.8	69.0	65.8	60.6	59.6	58.1	47.1	67.9	70.4	70.7	88.7	66.0	**47.5**	**47.5**
15		56.0	54.5	56.5	50.1	48.7	43.7	41.4	55.7	47.3	58.7	69.2	52.9	38.1	38.1
16	55.0	49.9	54.2	47.9	44.9	48.6	45.5	39.3	40.9	49.1	68.6	58.2	50.2	36.2	36.2
17	52.7	53.9	42.8	42.8	42.8	39.5	42.1	37.1	46.2	45.8	54.2	57.8	46.5	33.5	33.5
18	49.5	45.0	49.7	33.5	40.4		37.0	33.8	41.6	39.8	51.3	62.6	44.0	31.7	31.7
25	51.7	43.9	41.6	37.3	15.4	25.0	27.5	26.2	33.3	17.6	48.1	52.2	35.0	25.2	25.2
26	46.3	39.1	36.8	31.1	35.3	28.1	27.0	23.4	34.0	33.0	42.1	52.5	35.7	25.7	25.7
33	46.9	45.8	37.4	31.7	34.0	23.8	25.8	25.1	34.8	33.0	45.7	44.9	35.7	25.8	25.8

35	39.3	34.5	37.3	32.0	25.6	22.9	29.6	28.8	33.4	30.9	45.8	51.7	34.3	24.7	24.7
37	47.8	49.1	52.3		48.6	42.8	37.2	33.7	41.4	44.9			44.2	31.9	31.9
44	41.8	36.4	38.3	25.5	27.6	22.3	27.7	26.2	33.1	30.0	45.3	50.7	33.7	24.3	24.3
45	53.8	52.1	53.1	48.4		12.1	38.6	35.7	42.8	48.9	56.5	47.1	44.5	32.0	32
47	47.9	43.6	40.0	36.8	45.7	30.1	34.5	32.6	42.7	22.9	48.5	45.7	39.3	28.3	28.3
50		1.6	3.2	0.8	2.2			2.3	1.6		0.6		Blank	Blank	Blank
60		36.4	32.1	27.0	27.4	23.1	20.4	21.6	27.5	30.9	37.8	39.4	29.4	21.2	21.2
78	42.0	44.4	47.7	36.3	39.8	34.7	32.9	31.2	40.6	40.5	49.4	46.1	40.5	29.2	29.2
79	41.7	44.7	45.5	43.1	44.6	35.7	34.0	30.7	41.5	43.8	49.7	36.3	40.9	29.5	29.5
80	47.9	47.2	48.2	43.0	44.3	37.9	31.8	32.7	40.2	43.7	47.0	38.0	41.8	30.1	30.1
83	40.4	27.1	26.6	23.0	22.3	16.0	32.8	22.1	24.2	36.5	32.4	37.4	28.4	20.9	20.9
88	28.1	20.2	15.6	13.2	13.5	8.1	13.1	12.6	17.7	14.3	26.3	31.6	17.9	13.2	13.2
90	30.4	30.4	24.8	23.3	21.8	17.0	14.5	17.9	21.0	26.3	32.1	33.2	24.4	17.6	17.6
96	44.0	36.7	29.0	26.1		21.1	24.7	20.8	29.9	26.7	41.6	47.6	31.7	22.8	22.8
100	30.8	23.6	27.2	22.9	24.0	16.9	53.4	23.3	24.8	25.2	30.4	38.8	28.4	20.5	20.5
101	50.9	46.3	45.6	44.2	41.8		45.5	33.1	43.5	37.0	56.6	55.2	45.4	32.7	32.7
102	51.7	48.9	51.8	38.1	42.8	41.1	29.1	34.7	41.3	43.1	61.9	50.1	44.6	32.1	32.1
103	53.4	51.3	52.8	48.2	40.9	42.4	31.8	32.9	46.2	40.1	54.8	49.8	45.4	32.7	32.7
104	48.2	51.8	47.7	43.8	44.6	43.0	30.5	36.1	41.9	49.5	56.1	54.4	45.6	32.9	32.9
107	77.6	27.5	23.7	23.0	21.0	16.7	18.1	17.1	25.2	26.9	34.6	38.1	29.1	21.0	21
108		32.8	28.0	27.4	11.9	19.7	25.0	11.2	30.1	24.1	39.8	42.8	26.6	19.2	19.2
109	66.8	68.5		63.5	68.8	53.4	54.0	56.8	59.2	57.7	67.2	76.4	62.9	**45.4**	**45.4**
110	71.1	72.1	58.8	69.5	65.8	61.4	59.2	57.8	57.3	59.7	73.3	67.2	64.4	**46.4**	**46.4**
111	37.9	43.0	42.3	35.9	32.3	35.5	28.7	24.9		38.9		45.8	36.5	26.3	26.3
112	37.4	34.3		28.9	27.4	22.5	27.2	22.1	29.8		38.2	41.2	30.9	22.3	22.3
114	63.9	67.0	63.0	55.1	64.3	48.1	49.7	49.4	51.1	57.3	67.3	57.7	57.8	**41.7**	36.7
115	62.4												Too few	N/A	N/A

													months		
116	51.0	45.6	37.3	35.4	35.2	29.1	35.9	30.9	34.9	34.0	47.9	49.7	38.9	28.0	28
125	31.3	26.7	18.8	15.7	14.9	9.4	14.4	14.0	19.9	14.7	27.1	34.5	20.1	14.5	14.5
126	32.9	24.8	25.4	19.8	19.7	13.2	15.8	16.4	19.2	19.8	29.9	37.5	22.9	16.5	16.5
127	40.6	33.1	34.9	32.3	28.8	19.6	30.6	22.4	30.2	28.3	45.1	54.1	33.3	24.0	24
128	26.3	32.7	28.9	23.1	18.0	19.3	19.7	20.1	29.9	23.9	35.4	41.6	26.6	19.2	19.2
129	29.8	23.4	23.2	19.9	20.7	13.3	22.1	20.0	24.6	18.8	28.6	37.8	23.5	16.9	16.9
130	23.3	24.8	19.7	16.2	17.7	10.6	13.2		18.7	18.2	26.4	35.0	20.3	14.7	14.7
2a	49.2	43.1	47.8	36.0	37.2	35.9	27.7	24.1	36.7	41.1	49.4	48.5	39.7	28.6	28.6
2b	41.2	45.7	46.2	35.5	43.9	34.3	28.4	26.7	36.7	41.6	50.2	42.7	39.4	28.4	28.4
2c	41.3	32.2	45.1	32.3	43.5	35.0	29.2	23.6	34.9	43.4	47.2	44.9	37.7	27.2	27.2
3a	25.8	28.0	26.6	15.2	17.3	12.9	14.6	14.3	20.1	20.6	32.7	34.6	21.9	16.1	16.1
3b	36.4	20.3	26.3	20.5	17.2	12.8	14.4	14.8	22.9	20.8	31.8	40.5	23.2	17.1	17.1
3c	40.9	49.7	27.2	17.3	20.0	12.7	23.5	15.0	22.8	20.9	32.9	37.5	26.7	19.7	19.7
95a	39.5	34.2	34.1	24.1	31.7	24.2	27.3	21.1	31.9	32.3	44.0	39.8	32.0	23.1	23.1
95b	39.3	39.5	35.5	30.0	26.3	26.6	26.6	22.2	32.9	32.8	43.1	44.8	33.3	24.0	24
95c	37.7	36.4	37.5	31.5	31.4	26.0	28.6	22.7	33.6	26.4	42.9	46.0	33.4	24.1	24.1
9a	35.3	30.2	24.8	24.3	19.5	14.6	17.3	17.0	21.7	26.4	33.3	40.1	25.4	18.7	18.7
A1	161.8	72.2	72.8		64.7	64.0	56.4		57.7	58.5	72.4	73.4	75.4	**54.3**	**54.3**
A11	51.0	48.5	45.1	39.5	39.0	37.7	37.0	31.0	44.7	36.8	50.4	54.6	42.9	30.9	30.9
A12	50.4	46.5	47.0	40.4	32.2	36.5	27.7	29.2	35.2	37.6	50.5	50.5	40.3	29.0	29
A13	34.4	28.8	28.3	19.7	20.6	17.8	13.8	15.2	23.7	25.4	36.5	39.7	25.3	18.7	18.7
A14	36.8	28.5	28.5	21.2	19.2	18.0	13.5	15.2	22.4	27.5	37.8	41.8	25.9	19.1	19.1
A14a	26.0	26.8	28.6	24.2	22.6	25.1	14.7	15.0	25.3	27.2	32.2	38.7	25.5	18.8	18.8
A17	48.4	45.1	45.7	36.2	38.2	33.7	34.0	30.1	42.0	40.9	53.5	45.7	41.1	29.6	29.6
A19	43.6	47.2	33.6	34.2	33.1	25.4	32.2		31.8	28.2	46.5	52.9	37.2	26.8	26.8
A19a	50.4	44.4	35.8	37.1	36.3	26.5	36.1	30.0	38.2	25.9	46.6	48.1	38.0	27.3	27.3

A19b	48.9	44.9	37.1	38.2	33.3	28.4	35.1	31.7	37.8	31.2	49.1	48.2	38.7	27.9	27.9
A2	56.5	49.9	39.8	36.7	38.4	31.2	41.1	36.5	43.5	24.2	54.2	58.0	42.5	30.6	30.6
A20	45.4	50.2	51.2	47.4	41.6	38.2	29.8	39.0	41.0	87.2	50.9	55.0	48.1	34.6	34.6
A20a	49.2	45.2	48.9	42.3	40.0	38.3	33.1	31.3	41.5	36.7	46.9	49.9	41.9	30.2	30.2
A20b	48.1	41.8	43.9	47.4	38.5	40.4	30.7	33.3	42.3	48.5	55.0	53.9	43.7	31.5	31.5
A21	37.3	31.3	27.0	21.7	23.8	15.3	22.3	20.7	28.0	21.6	35.2	41.3	27.1	20.0	20
A22	37.9	34.5	31.2	26.5	25.7	17.6	22.7	21.6	27.6	25.9	37.0	45.8	29.5	21.7	21.7
A25	36.4	37.6	22.0	31.1	27.9	27.0	23.2	21.7	31.5	36.6	41.9	43.6	31.7	22.9	22.9
A29	38.3	32.8	29.7	24.5	24.2	16.3	23.7	19.0	22.4	21.0	34.1	40.0	27.2	20.0	20
A3	50.3	30.8	43.6	32.9	37.3	34.4	33.1	32.2	40.4	36.4	49.0	49.9	39.2	28.2	28.2
A30	39.0	27.3	26.5	25.5	23.9	21.6	21.7	24.5	24.2	28.6	34.7	38.9	28.0	20.7	20.7
A36		28.9	53.2				18.4	15.5	22.6				Too few months	22.3 (estimate)	22.3 (estimate)
A38	36.4	28.2	27.0	20.1	22.6	17.9	15.7	18.1	20.2	22.4	33.2	36.9	24.9	18.3	18.3
A4	35.8		28.7	24.6	23.8	18.1	22.9	20.8	28.5	24.7	36.9	40.9	27.8	20.5	20.5
A40	38.1	33.8	35.7	27.8	29.6	26.3	17.6	23.2	27.9	31.2	38.6	39.4	30.8	22.7	22.7
A41	34.5	35.7		29.6	29.3	30.6	21.1	23.4	30.8	34.7	39.9	40.9	31.9	23.0	23
A45	29.3	24.1	21.4	17.9	16.7	15.7	13.8	15.0	19.5	23.7	28.9	36.5	21.9	16.1	16.1
A48	41.6	36.7	30.7	28.8	28.7	22.1	27.3	23.0	31.4				30.0	21.6	21.6
A50	43.4	28.0	35.8	26.8	33.9	29.9	30.4	30.5	34.4	37.7	28.5	50.2	34.1	24.6	24.6
A51	41.8	34.5	28.3	25.5	26.9	18.9	27.7	27.2	31.6	29.7	37.8	41.9	31.0	22.8	22.8
A52	52.4	52.8	40.4	42.2	29.1		33.0	34.0	39.6	44.5	56.5	62.7	44.3	31.9	31.9
A53	54.9	46.0	39.9	34.6	37.6		42.7		40.2	36.7			Too few months	30.6 (estimate)	30.6 (estimate)
A54		50.5	41.0	40.0	47.7	45.4	42.0		43.8	47.8	54.3	54.9	46.7	33.7	33.7
A55	45.7	45.4	43.9	36.4	42.3	27.9	37.6	36.4	41.5	37.0	43.6	52.8	40.9	29.5	29.5
A56	37.9	42.6	40.5	40.0	44.3	39.2	31.2	33.9	38.5	39.7	52.4	48.0	40.7	30.0	30
A57	74.0	66.7	76.9	63.1	66.0	70.5	56.4	54.1	60.0		82.1	58.6	66.2	**47.7**	**47.7**

A6	47.9	38.9	29.6	29.6	29.9	22.2	28.4	27.5	35.0	28.9	40.3	48.3	33.9	24.4	24.4
A60	27.0	21.8	21.6	14.8		15.5	13.0	13.8	18.4	20.7	26.3	29.0	20.2	14.9	14.9
A62	27.9	25.5	20.3	15.6	15.6	10.6	14.5	14.8	20.5	17.5	25.9	30.6	19.9	14.7	14.7
A64	47.3	46.9	45.5	47.2		44.4	32.8	34.4	39.1	50.0	56.5	50.8	45.0	32.4	32.4
A66	31.4	22.0	24.8	18.4	18.0	12.1	17.9	15.0	23.5	19.9	30.1	36.4	22.5	16.5	16.5
A69	29.5	23.5	23.5	17.6	15.6	13.3	11.9	16.0	20.9	20.8	26.9	34.1	21.1	15.6	15.6
A7	50.0	49.2	38.6	52.0		22.8	28.1	26.6	34.2	31.3	49.3	75.4	41.6	30.0	30
A70	35.0	26.4	26.4	20.8	21.1	16.8	21.0	16.9	26.8	23.3	31.2	36.1	25.2	18.5	18.5
A71	32.5	23.8	22.0	15.2		10.0		12.1	19.7	17.3	27.7	36.9	21.7	16.0	16
A74	28.4	33.7	18.7	16.7	14.6	11.4		14.3	19.1	18.8	26.8	32.8	21.4	15.8	15.8
A77			30.6	21.5	22.4	14.4	18.7	17.2	26.2	20.9	34.3	48.5	25.5	18.8	18.8
A81	30.2	23.8	25.7	21.1	18.3	13.8	17.9	17.5	21.1	18.2	31.6	32.0	22.6	16.7	16.7
A85	34.9	29.6	28.8	26.4	29.3	22.8	24.1	20.2	31.4	25.8	35.7	35.9	28.7	21.2	21.2
A88	36.7	27.1	26.6	20.4	20.9		17.1	17.2	23.3	21.0	33.1	30.9	24.9	18.4	18.4
A9	55.0	56.1	47.9	35.1	42.0	36.4	33.7		40.9	38.7	48.8	57.9	44.8	32.3	32.3
A90	55.2	58.4	46.8	46.1	46.3	34.8	42.4	35.8	48.5	40.8	58.5	57.2	47.6	34.3	34.3
A94	51.2	43.0	41.1	35.5	25.7	16.4	16.4	15.6	22.8		47.9	60.2	34.2	24.6	24.6
A96	53.9	45.4	46.8	43.2		36.4	33.1	32.1	41.0	40.2	53.1	58.6	44.0	31.7	31.7
A97	45.0	35.2	28.1	24.8	22.4		20.9	17.0	28.6	24.4	28.2	46.5	29.2	21.0	21
A98												44.8	Too few months	N/A	N/A
B1		44.1	39.7	34.5	31.9	27.0	30.2	35.4	39.0	37.2	50.7	56.7	38.8	27.9	27.9
B15	34.2	26.4	29.7	20.3				125.2	14.9	24.3	38.4	41.1	39.4	28.4	28.4
B19	41.2	34.6	34.2	21.9	24.0	20.7	22.7	19.9	25.8	21.4	37.5	47.3	29.3	21.1	21.1
B2	49.8	44.3	33.1	29.0	28.2	23.7	25.0	23.3	31.9	29.4	47.7	49.3	34.6	24.9	24.9
B29	39.8	37.9	31.5	26.0	28.9	19.0	17.1	23.3	27.1	26.6	42.0	41.5	30.1	21.7	21.7
B3	35.3	33.6	36.1	29.2	24.6	10.4	19.7		28.4	29.5	41.4	47.5	30.5	22.0	22

B36	31.0	28.1	24.7	18.9	17.6		13.0	12.0	18.9	18.6	30.2	24.8	21.6	15.9	15.9
B37	29.3	27.2	27.8	18.0	17.8	14.3	13.6	14.5	17.6	23.8		33.1	21.5	15.9	15.9
B37a	27.6	29.5	23.2		18.5		14.4	14.7		22.2	31.5	28.4	23.3	17.2	17.2
B38	35.3	33.3	32.4	24.7	21.8	17.4	16.2		21.1	25.3	34.7	37.1	27.2	20.0	20
B41	50.8	51.4	43.5	33.5	35.6		37.1	36.6	34.8	40.0	52.7	51.5	42.5	31.3	31.3
B42	34.9	33.3	48.5	32.3	37.8	33.6	23.8	24.3		32.5	45.0	39.4	35.0	25.8	25.8
B43	32.2	34.3	33.9	28.3	29.6	27.1	20.0	22.5	26.5	33.1	36.0	38.7	30.2	22.2	22.2
B44	41.9	52.6	38.2	42.6	38.4	30.0	33.4	38.4	39.2	37.6	56.5	56.2	42.1	30.3	30.3
B45	40.4	46.9	40.5	40.1	29.5	37.5	29.2	24.2	34.9	40.0	53.6	45.4	38.5	27.8	27.8
B47	30.4	26.4	24.3	16.7	18.4	14.2	15.7	15.2	19.7	16.6	30.2	33.6	21.8	16.0	16
B48	37.3	33.4	29.2	22.9	24.0	18.0	16.4	21.5	23.6	25.8	33.5	34.5	26.7	19.7	19.7
B50	38.4	35.2	33.2	27.5	27.6	21.5	23.9	22.1	29.4	24.0	37.8	45.1	30.5	22.0	22
B51	34.6	29.3	26.3	18.7	16.2	13.5	17.9	18.2	24.0	18.8	31.6	37.4	23.9	17.6	17.6
B56	54.2		48.1	41.3	33.1	35.4	36.4	38.0	37.1	45.3	59.4	55.8	44.0	31.7	31.7
B58	34.9	31.0	25.4	23.1	22.9	18.8	20.3	18.1	24.8	25.9	36.4	39.2	26.7	19.7	19.7
B60	38.3	29.6	26.6	21.4	22.2	14.2	20.2	20.2	22.7	18.7	36.1	44.6	26.2	19.3	19.3
B63	52.9	45.4	39.6	35.5	35.4	30.4	36.2	36.2	44.8	37.1	51.4		40.4	29.1	29.1
B72	76.6	63.7	54.7	57.8	56.7	50.4		55.4	58.2	50.5	65.6	61.9	59.2	**42.7**	**42.7**
B74	39.1	36.4	30.9	18.5	21.5	18.5	18.4	19.6	24.0	28.8	36.5	40.4	27.7	20.4	20.4
B80	31.2	26.6	24.6	17.2	18.0	13.6	13.8	14.9	22.4	21.0	29.1	39.6	22.7	16.7	16.7
B82	46.0	33.1	29.3	23.4	23.9	15.9	28.7	27.1		21.8	39.0	42.6	30.1	22.2	22.2
B83	44.1	43.0	34.8	32.7	30.1	22.9	26.7	24.3	33.9	29.9	46.3	51.9	35.1	25.3	25.3
B84	35.4	36.6	30.1	26.1	29.7	22.3	24.9	25.0		25.7	33.9	41.5	30.1	22.2	22.2
B85	46.5	41.7	45.4	41.6	52.0	41.1	36.8	39.6		50.2	51.0	40.9	44.3	31.9	31.9
B86	41.8	35.4	33.3	29.1	27.2	24.7	24.8	24.2	28.7	29.4	46.4	45.9	32.6	23.5	23.5
B88	54.2	49.9	36.4	34.8	32.4	26.8	31.8	31.0	38.4	29.1	47.4	51.2	38.6	27.8	27.8
B89	51.9	58.5	49.2	46.8	45.6	40.6	43.8	42.6	43.8	43.1	51.6	59.6	48.1	34.7	34.7

B90	2.9	49.0	64.9	50.1	52.5	47.6	35.1	39.0	41.4	53.0	66.0	64.9	47.2	34.0	34
C12	31.8	25.5	27.8	22.3	23.7	19.0	15.5	15.9	24.3	23.6	33.3	35.6	24.9	18.3	18.3
C17	28.3	30.2	29.5	19.9	23.9	18.6	15.8	17.9	23.0	28.8	34.7	34.7	25.4	18.7	18.7
C18	43.7	42.0	35.0	24.9	30.9	25.1	29.2	27.0	31.3	32.2	43.3	44.6	34.1	25.1	25.1
C19	28.3	23.1	29.1	23.6	24.7		18.9	21.1	21.0	26.2	34.9	35.2	26.0	19.2	19.2
C2	46.0	51.0	39.5	42.2	41.6	36.0	38.0	35.1	35.0	41.1	55.8	62.7	43.7	31.5	31.5
C20	30.6	37.6	29.9	22.3	23.9	22.1	16.7	18.1	20.8	30.8	33.8	36.2	26.9	19.8	19.8
C21	42.7	44.2	42.1	34.3	32.5	29.5	31.4	30.7	35.8	34.0	45.2	41.9	37.0	26.7	26.7
C22	34.2	38.7	36.3	30.0	52.9	26.5	25.2	23.3	27.7	33.2	42.0	31.2	33.4	24.6	24.6
C23	56.3	61.9	64.7	60.0	60.3	52.5	46.2	45.1	50.9	55.3	60.9	50.7	55.4	39.9	39.9
C26	61.0	65.8	59.7	53.5	59.4	56.7	51.0	43.7	53.4	42.0	67.8	72.4	57.2	**41.2**	33.1
C27			71.6	66.0	60.6	59.6	59.6	60.5	59.7	55.0	68.2	75.2	63.6	**45.8**	**45.8**
C28	29.0	22.5	24.2	20.2	21.0	15.2	15.3	15.6	22.1	23.5	29.2	32.8	22.6	16.6	16.6
C29	52.5	41.8	44.5	37.8	40.5	32.9	30.1	31.5	39.2	40.5	51.0	56.8	41.6	30.0	30
C30	54.8	37.9	45.1	39.3	38.7	36.3	34.4	31.7	43.9	43.3	53.9	53.7	42.8	30.8	30.8
C31	31.7	22.2	23.8	25.7	20.4	17.8	23.4	20.7	26.8	24.1	34.3	35.3	25.5	18.8	18.8
C32	39.6	43.3	36.0	33.5	28.3	26.1	28.1	22.7	33.2	25.0	41.4	42.1	33.3	24.5	24.5
C33	29.4	28.6	25.0	21.0	19.9	16.0	17.5	15.0	22.1	21.4	27.7	38.8	23.5	17.3	17.3
C34	39.6	26.8	41.6	35.7	35.7	32.2	25.0	24.2	32.1	40.1	42.0	44.8	35.0	25.2	25.2
C36	49.0	46.2	37.9	39.0	38.5	31.6	34.8	31.9	36.3	32.3	45.1	51.2	39.5	28.5	28.5
C37	40.7	37.1	30.0	31.4	27.8	28.3	21.8	20.7	27.4	32.1	39.4	44.3	31.8	23.4	23.4
C38	46.5	43.3	47.7	40.7	29.0	34.8	25.9	26.3	38.5	30.6	46.1	58.4	39.0	28.1	28.1
C39	57.5	13.9	53.0	47.8	44.8	33.7	39.7	36.6	48.0	42.6	61.8	63.2	45.2	32.6	32.6
C4	31.5	31.5	29.1	23.6	25.0	17.7	16.7	16.7	21.5	25.4	35.4	36.1	25.9	19.0	19
C40	18.7	31.7	23.2	25.1	22.6	18.7	23.5	20.1	27.5	26.3	36.1	36.3	25.8	19.0	19
C42	33.6	35.6	28.2	27.6	29.0	21.9	37.1	29.8	29.8	28.5		39.4	31.0	22.8	22.8
C43	48.9	44.7	41.5	42.8	35.7	32.0	35.2	24.3	39.3	38.0	54.8	42.9	40.0	28.8	28.8

C43a	48.3	47.3	43.2	37.8	55.6	31.5	30.1	30.5	34.2	38.8	55.2	53.9	42.2	30.4	30.4
C44	39.3	45.5	42.7	34.6	39.5	30.5	31.3	29.7	36.3	39.5	56.2	57.0	40.2	29.0	29
C48											38.4		Too few months		0
C49	35.0	35.8	30.9	27.5	22.4	22.1	25.3	16.5	22.2	30.3	41.1	43.3	29.4	21.6	21.6
C51	42.2		42.6	38.7	33.6	30.4	26.1	23.8	36.6	21.2	51.9	53.2	36.4	26.2	26.2
C52		38.0	36.4	32.1	30.2	22.4	22.0	21.9	31.5	29.6	46.1	57.6	33.4	24.1	24.1
C53	40.7	40.3	39.5	29.8	26.2	25.6	20.6	17.1	26.1		44.7	37.2	31.6	22.8	22.8
C54		47.1	41.1	32.4	33.6	36.4	29.3	27.9	38.6	41.9	52.2	53.2	39.4	28.4	28.4
C56	49.0	52.2	47.9	45.1		40.4	35.6	31.0	33.4	42.3	54.4	47.5	43.5	31.4	31.4
C57	39.0	33.6	33.3	23.3	28.5	25.1	20.9	25.7	31.2	23.6	40.2	43.6	30.7	22.6	22.6
C58	55.5	53.3	49.9	48.1	45.6	40.0	47.5	38.3	49.3	43.7	58.4	61.3	49.2	35.5	35.5
C59	43.1	44.4	41.8	38.4	43.2	29.4	39.6	33.8	39.9	37.2	51.3	51.2	41.1	29.6	29.6
C62	44.8	40.4	37.6	34.0	34.8	28.4	32.3	29.4	31.0	37.5	48.0	50.1	37.4	26.9	26.9
C63	29.5	34.0	29.8	25.8	19.7	21.4	21.5	18.1	20.6	27.4	32.2	33.8	26.2	18.8	18.8
C7	32.6	24.9	31.0	24.6	28.5	18.5	17.5	19.4	24.4	29.8	36.1	42.2	27.5	19.8	19.8
D10	32.7	30.6	26.2	17.1	20.4	13.7	18.1	18.0	22.5	25.9	39.5	34.7	25.0	18.4	18.4
D12		35.4	32.5	29.3	28.1	22.2	24.4	23.6	28.4	31.3			28.4	20.4	20.4
D13	45.1	45.2	42.3		30.5	27.1		27.6	34.4	38.1	47.7	44.5	38.3	27.6	27.6
D14	58.8	48.4	54.9	51.8	53.8	47.6	40.7	42.0	45.4	50.1	55.2	54.8	50.3	36.2	36.2
D16				57.0	50.1	52.5	43.1	48.1	49.8	48.6	55.3	63.3	52.0	37.5	37.5
D17	56.3			38.3	38.7	29.9	35.9	33.6	37.6	35.7	50.7	48.0	40.5	29.2	29.2
D18	48.5	30.8	46.8	39.8	38.2	33.8	27.3	29.8	36.1	38.5	56.1	52.3	39.8	28.7	28.7
D19	68.6	66.5	73.3	72.5	72.9	68.9	60.0	60.0	68.7	70.0	74.1	75.6	69.3	**49.9**	38.9
D20	64.5	58.1	50.5		54.5	44.0	50.4	49.2	52.8			71.8	55.1	39.7	26.9
D22	51.3	48.4	52.6	46.4	49.4	42.8	42.1	40.4	43.4	48.7	54.5	52.8	47.7	34.4	34.4
D24	50.2	49.6	43.9	41.2	38.3	31.2	35.3	31.3		42.7	51.5	52.6	42.5	30.6	30.6

D25	52.1	53.0	57.3	55.1	49.2	49.4	45.8	42.8	47.8	48.4	65.9	59.4	52.2	37.6	37.6
D26	42.7	42.7	32.3		36.9	25.7	30.7	28.9	36.0	37.4	48.9	44.5	37.0	26.6	26.6
D27	38.9	42.0	37.5	34.6	35.8	32.4	27.5	25.9	29.3	35.4	46.5	43.7	35.8	25.8	25.8
D28	53.3	49.3	42.2	40.7	48.5	36.8	46.5	39.6	46.0	42.9	56.8	51.6	46.2	33.3	33.3
D30	36.8	33.4	36.5	34.0	33.5	29.3	27.9	29.2	33.4	32.3	45.3	38.6	34.2	24.6	24.6
D31	42.7	55.1	47.1	41.0	45.0	36.8	32.4	34.8	41.6	52.3	55.3	59.0	45.3	32.6	32.6
D32	54.5	46.8	50.4	46.0	47.7	45.6	42.7	39.6	48.8	52.4	62.7	46.9	48.7	35.1	35.1
D33	47.7	49.3	42.6	40.2	35.6	36.9	31.9	31.4	36.4	44.1	54.0	50.0	41.7	30.0	30
D35	60.4	52.8	50.3	54.9	47.8	52.0	45.4	35.3	42.9	52.3	66.2	54.0	51.2	36.9	36.9
D36	55.8		51.9		46.9	37.9	40.9	37.3	44.0	49.8	64.3	60.4	48.9	35.3	35.3
D37	50.9	46.7		36.2	43.6	38.2	24.5		40.5	44.5	52.5	51.8	42.9	30.9	30.9
D38	35.9	39.1	31.5	29.3	5.0	26.1	22.6	21.0	27.0	36.2	46.0	45.9	30.5	22.0	22
D39	52.0	50.0	48.5	43.6	45.1	39.1	36.0	26.6	36.0	47.6		54.9	43.6	31.4	31.4
D4	52.7	41.9	39.9	34.5	30.9	25.0	25.9	26.3	36.3	30.6		47.8	35.6	25.7	25.7
D40	50.1	46.5	44.2	37.7	38.0		25.7	31.6	32.0	42.3	46.6	50.6	40.5	29.2	29.2
D41	53.7	41.7	52.8	46.4	49.1	39.3	13.8	40.1	51.2	46.1	57.7	55.4	45.6	32.9	32.9
D43		61.7	62.3	52.0	61.7	51.0	54.3	51.2	58.8	59.0	65.9	68.8	58.8	**42.4**	32.8
D45	48.2	47.7	40.6	37.2		33.2		31.9	32.4		45.3	37.2	39.3	28.3	28.3
D47	46.5	37.3	40.2	32.8	33.8	29.5	29.9	30.4	38.3	43.6	47.8	51.0	38.4	27.7	27.7
D48	58.7	51.1	57.8	51.2	49.9	47.8	28.3	38.9	46.0	53.9	57.6	59.7	50.1	36.1	36.1
D49	59.2	49.3	53.9	50.0	51.0	44.0	44.5	38.0	47.3	50.6	68.0	57.6	51.1	36.8	36.8
D50	42.5	64.1	60.4	57.0	57.4	60.9	48.2	51.1	48.3	62.8	64.0	54.0	55.9	**40.3**	**40.3**
D51	83.9	82.9	72.2	79.6	83.5	74.3	85.0	71.8	78.0	68.7	87.6	73.4	78.4	**56.5**	**56.5**
D52	47.2	43.8	34.8	34.6	33.6	31.4	23.6	25.7	35.2	38.1	45.9		35.8	25.8	25.8
D53		44.4	43.5	42.3	42.1	39.6	26.3	28.9	34.6	45.8	48.7	41.4	39.8	28.7	28.7
D54	37.3	37.7	46.3	39.6	39.9	40.2	27.5	28.0	32.4	42.9	45.1	37.8	37.9	27.3	27.3
D55		69.3	66.1	67.8	74.1	74.7	53.8	64.1	64.5	74.8	73.2	62.8	67.7	**48.8**	**44.4**

D56	59.6	70.0	61.5	68.5	67.6	60.7	61.8	62.2		67.4	76.1	68.0	65.8	**47.4**	**47.4**
D57		52.1	52.2	51.2			44.6	43.8	45.9			51.7	Too few months	35.7 (estimate)	35.7 (estimate)
D58		58.2	51.9	51.4	46.3	43.8	59.1	55.3	56.6	46.8	64.4	59.4	53.9	38.9	38.9
D59	73.0	66.1	55.6	62.9	59.1	60.3	65.0	55.2	56.6		66.2		62.0	**44.7**	**41.2**
D6	33.2	33.8	29.8	24.0	25.2	18.1	18.3	19.8	25.9	27.8	38.7	40.0	27.9	20.5	20.5
D60		39.3		27.6	25.4	17.7	25.6		25.5	28.8	40.1	40.5	30.1	21.7	21.7
D8	53.2	54.3	55.5	49.7	56.3	47.1	40.2	43.6	46.4	54.8	56.8	55.8	51.1	36.9	36.9
D9	47.2	53.2	47.2	50.9	46.5	44.4	39.8	37.5	47.2	49.5	53.4	50.6	47.3	34.1	34.1

Local bias adjustment factor used

Annualisation has been conducted where data capture is <75%

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

C1: QA/QC on monitoring data

To ensure that the air quality data obtained by City of York Council fully complies with the requirements of the Review and Assessment process, a comprehensive set of QA/QC procedures are in place. The aims of the QA/QC programme were fully detailed in 'Technical Annex 2: Air Pollution Monitoring in York' which was submitted with the Second and Third Stage Review and Assessment of Air Quality in York.

All continuous sites are calibrated fortnightly by City of York Council's Public Protection Team. Sites are serviced by the equipment suppliers every 6 months and independently audited every 12 months. The annual audit also provides an independent check of site cylinder concentrations against reference standards.

City of York Council continuous monitoring sites are currently serviced and maintained by 'Matt's Monitors'. Data management is currently undertaken by Ricardo-AEA with all results being published to the Air Quality England website at: http://www.airqualityengland.co.uk/. The latest round of station audits were carried out in January 2017 by Ricardo-AEA.

For the purpose of this report, all TEOM particulate (PM_{10}) data collected during 2016 has been corrected using the Volatile Correction Model (VCM) as made available by DEFRA at www.volatile-correction-model.info/Default.aspx (note that $PM_{2.5}$ is presented as uncorrected TEOM data as the VCM is not considered appropriate for correction of $PM_{2.5}$ data). No correction factors have been applied to the TEOM-FDMS data presented in this report.

C2: Bias adjustment and precision analysis of diffusion tubes

Introduction

Diffusion tubes used by City of York Council in 2016 were supplied and analysed by Environmental Scientifics Group (ESG), Unit 12 Moorbrook, Southmead Industrial Park, Didcot, Oxfordshire, OX11 7HP. The preparation method used for the diffusion tubes was 50% TEA in Acetone.

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme. AIR offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air. For the 2016 period, the percentage of results submitted by ESG that were deemed to be satisfactory were 100% (round 12), 75% (round 13), 75% (round 15), 100% (round 16) and 100% (round 18). Further information is available here: https://laqm.defra.gov.uk/assets/airptrounds7to18apr2015feb2017.pdf

As part of the Second and Third Stage Review and Assessment of Air Quality in York, a detailed discussion of the accuracy and precision of diffusion tubes was included in Technical Annex 2: Air Quality Monitoring in York. This included a detailed description of how to calculate accuracy and precision factors for diffusion tubes.

For the purpose of this Annual Status Report, new accuracy and precision factors have been calculated for the nitrogen dioxide diffusion tubes for 2016. These factors are based on readings obtained in the 2016 calendar year. The method used to calculate these factors is the same as that outlined in Technical Annex 2 of the Second and Third Stage Review and Assessment of Air Quality in York and the reader should refer to that document for further information.

Calculation of Accuracy Factors

The accuracy factors are calculated from the results obtained from diffusion tubes co-located with real time chemiluminescence analysers. To calculate the bias of the diffusion tubes scatter plots of chemiluminescence data versus diffusion tube data for roadside and background monitoring sites were plotted. For each scatter plot a $y=mx$ line of best fit was applied. In each case the gradient of the line, m, was taken as the bias factor.

Background diffusion tube monitoring

The bias factor for the tubes located at the urban background monitoring site was found to be 0.737, demonstrating that in general the diffusion tubes overestimated the nitrogen dioxide concentrations at the urban background sites. For the purpose of this report bias corrected averages for background sites have been calculated by multiplying the raw tube result by 0.737.

Roadside diffusion tube monitoring

The bias factor for the tubes located the roadside monitoring locations was found to be 0.721, demonstrating that in general the diffusion tubes overestimated the nitrogen dioxide concentration at the roadside. For the purpose of this report bias corrected averages for roadside and kerbside sites have been calculated by multiplying the raw tube result by 0.721.

Comparison of locally derived bias correction factors and factors from national diffusion tube bias adjustment factor spreadsheet

The overall 2016 bias correction factor from the national diffusion tube bias adjustment factor spreadsheet for ESG (Didcot) *[preparation method 50% TEA in acetone]* from 30 studies, was 0.77. This is the suggested figure to use for all site types in the absence of any local collocation data. It was considered that the locally derived bias correction factors of 0.737 and 0.721 for background and roadside sites respectively were broadly comparable to this national figure. Historically, locally derived bias correction factors have always used for the correction of City of York Council's diffusion tube data and the local figures have therefore been used for correction of tube data presented in this report.

Calculation of Precision Factors

The precision factors are calculated from the results obtained from diffusion tubes co-located side by side. A measurement of the precision of the diffusion tubes has been made by calculating the Relative Standard Deviation (RSD) of the Variance of the results obtained from each of the duplicate sites[9] in York using Equations 1 and 2.

Equation 1: $\text{Variance} = \text{Sum}\{(X_a - X_{a+1}/X_m)^2\}$

Where: X_a = result 1 for month X

X_{a+1} = result 2 for month X

X_m = mean of X_a and X_{a+1}

Equation 2: $\text{RSD of Variance \%} = (\text{Variance}/n)^{1/2} \times 100$

Where: n = total number of duplicate tube results

2016 data

The Relative Standard Deviation of Variance for a single month at a single site was found to be 7.82%. This is equivalent to +/- 15.63% at 95% confidence limit.

The annual mean nitrogen dioxide concentrations in most cases have been calculated by taking the mean of 12 monthly readings. It was therefore necessary to calculate the prevision of the annual mean at a 95% confidence level for each site using Equation 3.

Equation 3: $\textit{Precision of annual mean} = \dfrac{15.63}{(n-1)^{1/2}}$

Where n = number of readings used to calculate the annual mean at a particular site.

- In most cases n = 12, hence the precision of the majority of the annual averages is +/- 4.71%.
- For sites where only 11 tubes were retrieved the precision of the annual averages is +/- 4.94%.
- For sites where only 10 tubes were retrieved the precision of the annual averages is +/- 5.21%.
- For sites where only 9 tubes were retrieved the precision of the annual averages is +/- 5.53%.

[9] Where diffusion tubes were exposed in triplicate (i.e. A, B, and C), the tubes have been expressed as 3 duplicate sets for the purposes of the precision calculations (i.e. AB, AC, and BC).

C3: Annualising diffusion tube data (period to annual correction)

LAQM.TG16 states that for those nitrogen dioxide diffusion tube sites with fewer than 9 months work of data, it is necessary to perform annualisation. Annualisation effectively scales the available monitoring data to provide an estimate of the annual mean nitrogen dioxide concentration. This can then be compared with health based Air Quality Objectives. Annualisation was not considered appropriate for tubes with only 1 month worth of data.

City of York Council undertook background diffusion tube monitoring of nitrogen dioxide at a number of background locations during 2016. Of these sites, 50 diffusion tubes had 12 months data available and have been used to derive the period to annual ratios required for the annualisation. The following steps were used:

- **Step 1** - Calculate the period mean for the diffusion tube sample requiring annualisation
- **Step 2** - Calculate the corresponding period means and annual means for each of the 50 background diffusion tube locations. Use these two figures to calculate the period mean to annual mean ratio for each of the 50 diffusion tube sites.
- **Step 3** – Calculate the average ratio across the 50 background monitoring sites (i.e. n = 50)
- **Step 4** – Use the ratio in Step 3 to adjust the period mean (Step 1) to provide an estimate of the annual diffusion tube mean (non-bias adjusted)
- **Step 5** – Bias correct the value calculated in step 4 using the appropriate bias correction factor.

A summary of the annualisation is provided in Table C.1 below.

Table C.1: Annualisation Summary

Site	Location	Valid Months	Period Mean (tube) in µg/m^3	Average Ratio	Annual Tube Mean Estimate in µg/m^3	Bias Correction Factor	Bias Corrected Annual Mean in µg/m^3
A36	B	5	27.72	1.094	30.32	0.737	22.34
A53	R	8	41.58	1.022	42.49	0.721	30.62
D57	R	7	48.79	1.017	49.60	0.721	35.74

C4: Distance Correction

Distance correction has been carried out in line with paragraphs 7.77 – 7.79 of LAQM.TG (16). Local annual mean background NO_2 concentrations have been taken from the Bootham background continuous monitoring station. In 2016, the NO_2 concentration monitored at this site was 17.8µg/m^3. This value has been used an input to the fall-off with distance calculator.

Following discussions with the LAQM Helpdesk[10] it was agreed that due to the number of diffusion tubes operated by City of York Council, only those in excess of the annual mean objective of 40µg/m^3 should be distance corrected. Table C.2 below provides commentary on each of these tubes and shows the information used to distance correct the diffusion tube data. Where a distance correction has not been undertaken, commentary has been provided in the table to explain the reason for this decision. In some instances, diffusion tubes are not strictly in relevant locations but are located at the same distance from the road as nearby properties that would be considered relevant locations. In such instances, tubes are reported as being in relevant locations.

[10] Email correspondence with Max Nancarrow of LAQM Helpdesk 28/4/2017

Table C.2: Distance Correction of Annual Means that were over the Annual Mean Objective of 40µg/m^3

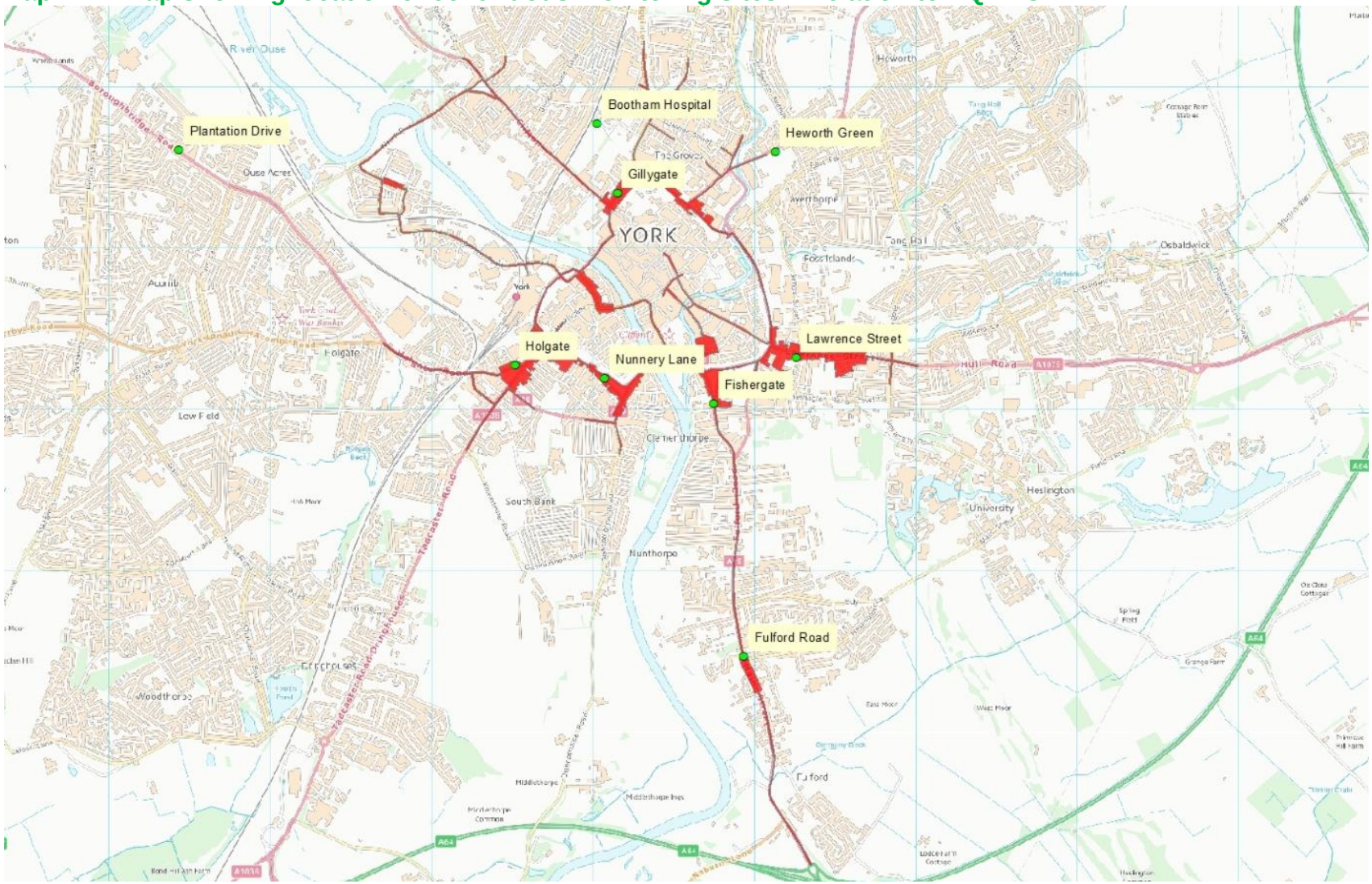
Site ID	Description	Comments	Distance to nearest point of relevant exposure (m)	Distance from monitor to kerb of nearest road (m)	Distance between kerb and receptor (m)	Raw annual mean NO_2 (µg/m^3)	Bias corrected measured NO_2 annual mean (µg/m^3)	Distance corrected annual mean (µg/m^3)
6	Lamp post top of Nunnery Lane Car Park	Located at the same distance from the road as the neighbouring flats. The bias-corrected annual mean is therefore considered relevant without distance correction.	-	-	-	56.3	40.6	**40.6**
7	Gillygate, opposite Portland Street	Requires distance correction	2.3	0.3	2.6	64.7	46.6	36.5
13	Gillygate, Papillion Hotel	Location considered relevant without correction as mounted on a drainpipe attached to facade of building	-	-	-	62.4	44.9	**44.9**
14	Gillygate (former surgery)	Location considered relevant without correction as mounted on a drainpipe attached to facade of building	-	-	-	66	47.5	**47.5**
109	Signpost outside 16 Rougier Street	Location considered relevant without correction as mounted on a drainpipe attached to facade of building	-	-	-	62.9	45.4	**45.4**
110	Signpost in-between Club Salvation & 31 George Hudson Street	Location considered relevant without correction as mounted on a drainpipe attached to facade of building. Relevant exposure at first floor level.	-	-	-	64.4	46.4	**46.4**
114	Bus Stop outside Society bar/cafe Rougier Street	Requires distance correction	3.5	2.7	6.2	57.8	41.7	36.7

A1	Bootham traffic lights	Location considered relevant without correction as mounted on a drainpipe attached to facade of building	-	-	-	75.4	54.3	**54.3**
A57	Holgate Road	Location considered relevant without correction as mounted on a drainpipe attached to facade of building. Relevant exposure at first floor level.	-	-	-	66.2	47.7	**47.7**
B72	Front of York Cycleworks, Lawrence Street	Located at the same distance from the road as the neighbouring flats. The bias-corrected annual mean is therefore considered relevant without distance correction.	-	-	-	59.2	42.7	**42.7**
C23	The Mount	Location considered relevant without correction as mounted on a drainpipe attached to facade of building	-	-	-	55.4	39.9	**39.9**
C26	Blossom Street, outside Odeon cinema	Requires distance correction *(monitor located in centre of road on island used for pedestrian crossing)*	12.9	0.8	4.8	57.2	41.2	33.1
C27	Windmill Pub	Location considered relevant without correction as mounted on a drainpipe attached to facade of building	-	-	-	63.6	45.8	**45.8**
D19	Bridge St/ Micklegate Junction	Requires distance correction	1.7	0.2	1.9	69.3	49.9	38.9
D20	Low Ousegate / Clifford St junction, outside Waterstones	Requires distance correction	13	0.5	13.5	55.1	39.7	26.9
D43	Rougier Street Signpost 1, has “Except for Access” sign on it.	Requires distance correction	3	0.3	3.3	58.8	42.4	32.8

D50	Drainpipe side of Cardshop Coppergate	Located at the same distance from the road as other relevant locations on the street. The bias-corrected annual mean is therefore considered relevant without distance correction.	-	-	-	55.9	40.3	**40.3**
D51	Inside Taxi Rank at York Railway Station	Not at relevant location *(tube installed for non-LAQM project)*	-	-	-	78.4	56.5	**56.5**
D55	Museum Street - Opposite Thomas's Pub	Requires distance correction	1.8	2.2	4	67.7	48.8	**44.4**
D56	Three Tuns Pub, 12 Coppergate	Location considered relevant without correction as mounted on a drainpipe attached to facade of building. Relevant exposure at first floor level.	-	-	-	65.8	47.4	**47.4**
D59	Bus Stop outside 8/9 SLP	Requires distance correction	1.8	2.7	4.5	62	44.7	**41.2**

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

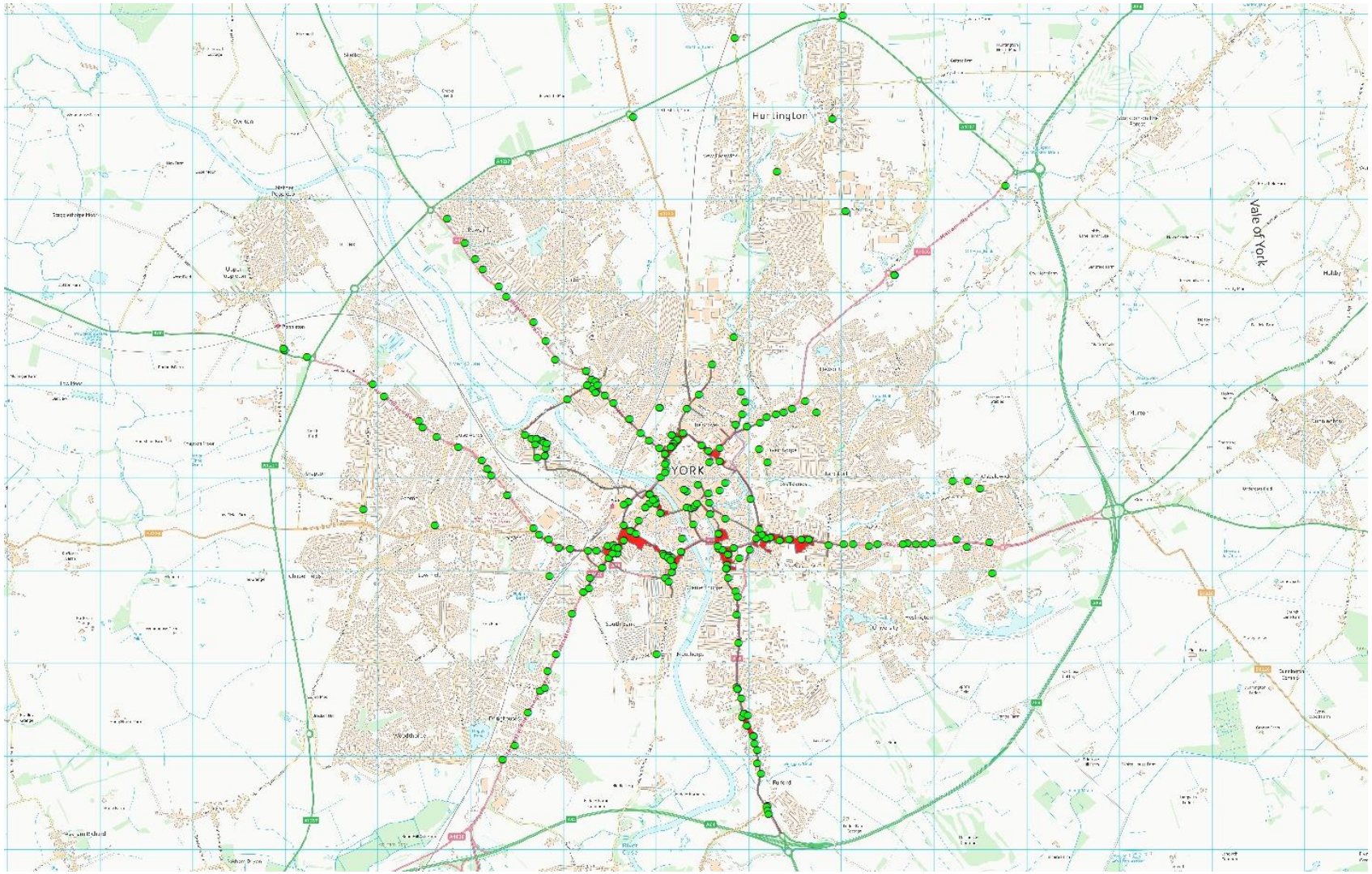
Map D.1 - Map showing location of continuous monitoring sites in relation to AQMAs



Air Quality Management Areas (AQMAs) shown in red

Map D.2 - Map showing location of diffusion tubes in relation to AQMAs

Further detailed maps of locations are available on request by emailing the author of the report



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[11]	
	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

[11] 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
$\mu g/m^3$	Microgrammes of pollutant per cubic metre

References

- All City of York Council's previous Review and Assessment reports can be found online at http://www.jorair.co.uk/index.php?page=reports
- DEFRA Technical Guidance LAQM.TG(16) is available online at: https://consult.defra.gov.uk/communications/laqm_changes/supporting_documents/LAQM%20Technical%20Guidance%202016.pdf
- DEFRA Policy Guidance LAQM.PG(16) is available online at: https://consult.defra.gov.uk/communications/laqm_changes/supporting_documents/LAQM%20Policy%20Guidance%202016.pdf