



***North East Lincolnshire Council
Annual Status Report 2018***

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June, 2018

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2018 Air Quality Annual Status Report (ASR)

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

June, 2018

North East Lincolnshire Council

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Executive Summary: Air Quality in Our Area

Air Quality in North East Lincolnshire

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 billion³.

The main source of air pollution within North East Lincolnshire (the Council) is from road traffic on the road network across the borough. In addition industrial emissions arise from the industrial areas in and around the ports of Grimsby and Immingham.

Real-time automatic monitoring was completed by the Council at three locations during 2017; two in Grimsby and one in Immingham. An additional monitoring station was installed in November 2017 in Immingham, on Woodlands Avenue. This is an AURN station and is not operated by the Council. The NO₂ concentration data for this station can be viewed in real-time at <https://uk-air.defra.gov.uk/data/> and will help provide background concentration values within Immingham.

NO₂ diffusion tube monitoring is completed at thirty two locations throughout the borough; this is the same number of tubes as in 2016. As suggested in the Detailed Assessment, completed in 2016, the diffusion tubes DIF 17 and DIF 18 were re-located in January 2017 to the junctions of Cleethorpe Road / Victor Street, and Cleethorpe Road / Park Street.

The Council has one area where air quality is in breach of national air quality standards. This is located at Cleethorpe Road / Riby Square, within Grimsby. The Council formally declared an Air Quality Management Area (AQMA) in this location in 2010. An Air Quality Action Plan (AQAP) was produced in 2012 setting out measures

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

aimed at reducing levels of NO₂ within the AQMA area. The 2012 AQAP is currently being reviewed and a revised AQAP will be issued in due course.

In 2017 there was only one location where the annual mean objective for NO₂ was exceeded; the triplicate diffusion tube location DIF 11/12/13 that is co-located with the Cleethorpe Road automatic monitoring station within the designated AQMA recorded a concentration of 47.3µg/m³. The automatic monitor recorded an annual mean value of 35.9µg/m³ for the same period, but data capture for 2017 was only 77.1% with no results for either January or December. NO₂ concentrations are historically higher during the winter months and therefore the annual mean may be lower than if monitoring had been completed during January and December.

The bias factor calculated from the co-location was 0.59 which is very low and therefore has not been used, this can be seen in the local bias correction for the Cleethorpe Road monitoring site presented in Figure C.2. The co-located diffusion tubes have been moved closer to the NO_x analyser inlet to hopefully gain a more representative bias factor in the future.

The monitoring location does not represent a location of relevant exposure for the annual mean objective, therefore the DIF 11/12/13 concentration has been distance corrected. Following distance correction the annual mean concentration was calculated as 40.1µg/m³. Outside of the designated AQMA there were no exceedances of the annual mean NO₂ objective.

The 2016 Detailed Assessment concluded the need for two new diffusion tube monitoring sites, which were installed in 2016; DIF 31 and DIF 32. The annual mean concentrations at both of these locations in 2017 were well below the annual mean objective (29.8µg/m³ at DIF 31 and 29.2µg/m³ at DIF 32). In addition, the diffusion tubes DIF 17 and DIF 18 were relocated in January 2017 to the junctions of Cleethorpe Road / Victor Street and Cleethorpe Road / Park Road. The concentrations at these two locations in 2017 were also below the annual mean objective (32.8µg/m³ at DIF 17 and 36.4µg/m³ at DIF 18).

The annual mean NO₂ concentration was not greater than 60µg/m³ at any non-automatic monitoring site. Therefore exceedances of the 1-hour mean objective are unlikely at all monitoring locations. Furthermore, there were no exceedances of the 1-hour mean NO₂ objective reported at either of the continuous monitoring stations.

Actions to Improve Air Quality

The Air Quality Steering Committee that was set up in 2016 has continued to meet on a quarterly basis through 2017. The meetings include representatives from the Planning, Public Health, Transport, Highways, Communications and Carbon Reduction Teams. Feedback continues to be positive from these meetings as they provide an opportunity for all parties to share ideas and develop a collective approach towards some of the current air quality issues within the borough.

Within the completed 2017 ASR, details were given regarding an air quality planning guidance document that was being developed, and a review of the Air Quality Strategy that was to be completed. Work has begun on the guidance document since the North East Lincolnshire Local Plan was adopted, and finalisation of the revised Air Quality Strategy is to be completed once a review and update of the 2012 Cleethorpe Road Air Quality Action Plan has been completed.

The Council vehicle fleet continues to be enhanced, with twenty three electric vehicles now included within the fleet. This enhancement is set to continue for personal use and also for commercial use. By 2019/2020 the Council will be looking to purchase 100% electric refuse vehicles.

An emissions impact review has been completed for licensed vehicles within the borough, the review is to help inform Council bids towards gaining part of the Ultra-Low Emission Vehicle Taxi Scheme. The scheme aims to promote the roll out of ultra-low emission plug in taxis throughout the UK. A study has been completed to evaluate the benefits of the scheme on CO₂ emissions, but it has also been recommended that NO_x emissions be evaluated. The study concluded that the licensed vehicle fleet was in a relatively good position, and that further improvements may be hard to achieve. An initial test of applying an age policy suggests its impact would be minimal.

Conclusions and Priorities

The following points provide a summary of the conclusions on the 2017 ASR and the priorities for 2018:

North East Lincolnshire Council

- The Council will continue to monitor NO₂ within the existing diffusion tube monitoring network, continually reviewing the positioning of diffusion tubes to monitor any possible hotspots in pollutant concentrations
- The current 2012 Cleethorpe Road Air Quality Action Plan is currently being revised and work to take this forward is to be completed during 2018;
- The Air Quality Strategy will be finalised upon completion of the revised Cleethorpe Road Air Quality Action Plan;
- Continue to work on the existing on-going action plan measures;
- The Council will continue assess any new development in terms of its impact upon local air quality to ensure that developments do not result in a negative impact. An air quality guidance document in the form of a Supplementary Planning Document is currently being developed; and
- The current service contract for the three council run automatic monitors expired in December 2017. Currently the Council are in the process of procuring new automatic monitoring equipment and a maintenance and service contract. It is envisaged that the Council will recommence real-time monitoring in January 2019.

Local Engagement and How to get Involved

Everyone contributes to the release of air pollution, and localised behavioural changes can help to reduce local concentrations or air pollutants on a wider scale. Many of the possible measures will save money and improve general fitness through increased exercise.

Everyday initiatives to help improve air quality:

- Where possible use public transport, walk or cycle. A modal shift in transportation decreases the number of cars on the road, reducing congestion, overall traffic movements and the amount of pollutant emissions;
- Car share to reduce the number of cars on the road, again this reduces congestion, traffic movement and therefore the amount of emissions;
- Driving economically by turning your engine off when stationary saving fuel and reducing emissions; and

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- Keeping your vehicle good working order, having well-inflated tyres means your car will be more efficient and use less fuel.

The Council ran a social media campaign in June 2017 to promote Clean Air Day, which was on the 15th of June 2017. A similar event was planned for the 2018 Clean Air Day, which is on the 21st of June. A free event was held in Freshney Place Shopping Centre for Clean Air Day on the 21st of June that included:

- Pledge making for National Clean Air Day;
- Information and advice on energy saving tips for your home, Home Energy schemes that are available and how to get cheaper energy bills; and
- Sustainable travel and transport information.

Clean Air Day is a chance to find out more about air pollution, share information with others and help make the environment and air quality cleaner for everyone. Further details on the Clean Air Day can be found at <https://www.cleanairday.org.uk/>.

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1 Local Air Quality Management

This report provides an overview of air quality in North East Lincolnshire during 2017. 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 North East Lincolnshire 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 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 the AQMA declared by North East Lincolnshire 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=175. Alternatively, see Appendix D: Maps of Monitoring Locations and AQMA, which provides maps of air quality monitoring locations in relation to the AQMA.

During 2017 the highest NO₂ annual mean concentration within the AQMA was recorded as 47.3µg/m³, this was recorded at the triplicate diffusion tube site that is co-located with the Cleethorpe Road automatic monitoring station (DIF 11/12/13). The automatic monitoring recorded an annual mean NO₂ concentration of 35.9µg/m³ during 2017. The bias adjustment figure calculated from the co-located diffusion tubes was very low at 0.59, therefore the co-located tubes were moved closer to the NO_x analyser inlet in January 2018 and the results will be assessed at the end of 2018.

The Cleethorpe Road monitoring station was installed in 2011 and initially had an annual mean of 48.4µg/m³. Over the past five years, without distance correction applied, the annual mean has declined every year, from 48.9µg/m³ in 2013 to 35.9µg/m³ in 2017.

The measures within the 2012 AQAP were completed in 2015. The AQAP is currently being reviewed and will be updated in due course.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA Cleethorpe Road	Sep-10	NO ₂ Annual Mean	Grimsby	Cleethorpe Road between Freeman Street and Nacton Street	NO	48.4 (2011) ⁽¹⁾	µg/m ³	40.1	µg/m ³	Action Plan 2012 Cleethorpe Road Grimsby	Oct-12	(2)

North East Lincolnshire Council confirm the information on UK-Air regarding their AQMA(s) is up to date

Notes:

(1) 2011 data used rather than 2010 (the year of declaration) as 2011 data was collated from a continuous monitoring station rather than diffusion tubes in 2010.

(2) <https://www.nelincs.gov.uk/environment-and-community-safety/environmental-health/air-quality/air-quality-management-areas/>

2.2 Progress and Impact of Measures to address Air Quality in North East Lincolnshire

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

"The report is well structured and provides most of the information specified in the Guidance. The Local Authority have used the latest ASR reporting template. The local authority is advised to note the following comments to help inform future reporting.

- 1. Continuous monitoring in Cleethorpe Road suggests continued improvements in local air quality, close to objective levels, whilst diffusion tube monitoring suggests there may be some locations nearby where levels have not improved.*
- 2. There are no active measures within the current action plan that are designed to address emissions reductions within the AQMA.*
- 3. We agree that it is time to review the current AQMA with the aim of identifying effective measures that can contribute to delivering the air quality objectives.*
- 4. The latest LAQM Technical Guidance LAQM TG(16) provides detailed guidance on the recommended approach to developing new action plan measures, involving the management of a key stakeholder group, assessment of contributory emission sources from a source apportionment, and carrying out a staged approach for considering new action plan measures.*
- 5. We recommend the guidance should be considered in detail before reviewing the action plan. It is notable that there are no effective measures in the current AQAP to address traffic generated emissions within Cleethorpe Road AQMA. The future plan will need to consider this in detail to develop effective measures.*
- 6. Table B1 in the new ASR template provides a column for entering distance corrected results, where monitoring sites are not representative of relevant exposure. There have been no corrections carried out for distance, yet many monitoring sites are clearly listed as not being representative of relevant exposure. It is recommended that the local authority conduct distance correction calculations at all monitoring sites which are exceeding the objective to determine what the nitrogen dioxide concentrations are likely to be at the façade of the nearest properties.*

7. *The Action Plan measures listed in Table 2.2 have numbering changes from the previous report. The aim within ASR reports is to provide continuity in relation to the progress with individual AQAP measures, from one year to the next. On this basis, it will be helpful in future, if the numbering of measures can be maintained year to year.*”

The comments made within the appraisal report, as shown above, have been taken into account for the completion of the 2018 ASR.

North East Lincolnshire has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key actions on measures within 2017:

- **Measure NEL1: Air Quality Strategy.** The Air Quality Strategy is in the final stages of its review. This document will be finalised once a revised AQAP for the Cleethorpe Road AQMA has been completed.
- **Measure NEL2: Internal Steering Committee.** Quarterly Air Quality Steering Committee meetings are now being held. The meetings include members from the Planning, Public Health, Transport, Highways, Communications and Carbon Reduction Teams.
- **Measure NEL3: Planning Guidance.** A Supplementary Planning Guidance document relating to air quality is currently being developed following the adoption of the North East Lincolnshire Local Plan.
- **Measure NEL9: Vehicle Procurement.** The Council have expanded their electric vehicle fleet to now include 23 vehicles. By 2019/2020 the Council will be looking to purchase 100% electric refuse vehicles.

An emissions impact review was completed in 2017 for licensed vehicles within the borough, the review is to help inform Council bids towards gaining part of the Ultra-Low Emission Vehicle Taxi Scheme. The scheme aims to promote the roll out of ultra-low emission plug in taxis throughout the UK. A study has been completed to evaluate the benefits of the scheme on CO₂ emissions, but it has also been recommended that NO_x emissions be evaluated. The study concluded that the licensed vehicle fleet was in a relatively good position, and that further improvements

may be hard to achieve. An initial test of applying an age policy suggests its impact would be minimal.

The principle challenges and barriers to the implementation of measures for the Council continue to be operating within a challenging context of reduced resources and balancing this with the need to continue to provide statutory functions such as the annual reporting to complete for LAQM. The borough is relatively small and there is only one full time officer assigned to this function. The Council has historically prioritised its resources to focus on the statutory reporting requirements, but is moving towards a more strategic and pro-active approach to the tackling the complex issue of air pollution.

The Councils priorities for the coming year are to continue monitoring within the AQMA, and across the borough, to continue developing the current action plan measures, and to revise the current AQAP.

In addition to the current monitoring network, the installation of the AURN monitoring station located in Immingham will provide additional data at a background location within the borough. The monitoring network will constantly be reviewed to ensure that monitoring locations are at relevant locations both inside and outside of the designated AQMA.

The Cleethorpe Road AQAP is currently being revised and will be updated in accordance with the revised AQAP template. This work will continue during 2018 and a further update will be provided in the 2019 ASR.

It is anticipated that the updated Cleethorpe Road AQAP will review the current action plan measures and provide updates where required in addition to developing new measures that are designed to achieve compliance. The update will engage with a number of stakeholders within the borough and will pass through a level of consultations before all measures and actions described within the AQAP are accepted.

Details of the Councils approved Energy Vision were provided in the 2017 ASR and the air quality officers continue to be involved in this project as it progresses to ensure air quality is considered within the overall vision. A copy of the North East Lincolnshire Council Energy Vision can be found at <https://www.nelincs.gov.uk/environment-and-community-safety/climate-change/>.

The considerations to air quality that are stated within the Councils Transport Plan continue to be taken into account for all transport related schemes. A copy of the North East Lincolnshire Council Local Transport Plan can be found at <https://www.nelincs.gov.uk/roads-parking-transport/local-transport-plan/>.

The Councils Air Quality Strategy provides the aims and objectives for working towards compliance of the local air quality objectives. The current plan is being updated and is currently in its final stages, this will be finalised once the update on the Cleethorpe Road AQAP has been completed. A copy of the current Air Quality Strategy can be found at <https://www.nelincs.gov.uk/environment-and-community-safety/environmental-health/air-quality/>.

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
NEL 1	Air Quality Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	LA Funded	2018 Jul-Oct	2018 Dec	Improve monitored levels of NO2 & PM10	Not quantifiable	Review 2015 strategy	2019 Jan	Postponed till after equipment review
NEL 2	Internal Steering Committee	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	LA Funded	2017 Feb-Apr	Done/Ongoing	-	Not quantifiable	Quarterly meetings	Ongoing	Positive interdepartmental working
NEL 3	Planning Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	LA Funded	2018 Oct	2018 Dec	-	Not quantifiable	Local Planning Guidance to be updated	2019 April	Local Plan now adopted and updated document will be included a SPD
NEL4	Installation of Residential Electric Vehicle Charging Points	Promoting Low Emission Transport	Other	LA Lead, Developer funded	Ongoing	Ongoing	Number of EV charging points conditioned through Planning	Not quantifiable	NELC	Ongoing	Installed through planning conditions
NEL 5	Public Air Quality Information	Public Information	Via the Internet	LA Funded	2018 April	Clean Air Day 21/6/18	Number of hits on upgraded website per annum	Not quantifiable	Information downloaded from Clean Air Day website	21st June 2108	Working with Communication Team to deliver
NEL 6	AQMA Cleethorpe Road Grimsby Potential LEZ for Buses	Promoting Low Emission Transport	Low Emission Zone (LEZ)	LA Funded	No further action	No further action	-	Not quantifiable	None	-	Measure not viable

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NEL 7	Bus Fleet Efficiency	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	LA & Stagecoach funded	Ongoing	Ongoing	-	Not quantifiable	Quarterly meeting with Bus Quality Partnership Group	Ongoing	-
NEL 8	Potential Bus Anti-Idling Campaign	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	LA & Stagecoach funded	No further action	No further action	-	Not quantifiable	Quarterly meeting with Bus Quality Partnership Group	Complete	Through fleet upgrade buses have anti idling technology installed
NEL 9	NELC Vehicle Procurement	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Annual Capital Replacement Programme	Ongoing	Ongoing	-	Not quantifiable	NELC currently have 23 EV in there fleet	Aiming for 100% by 2019/2020	-
NEL 10	Promoting Travel Alternatives	Promoting Travel Alternatives	Promotion of cycling	LA & ENGIE funded	Ongoing	Ongoing	-	Not quantifiable	Events held on an annual basis	Ongoing	Ongoing
NEL 11	Potential Workplace Travel Plans	Promoting Travel Alternatives	Promotion of cycling	LA & ENGIE funded	Ongoing	Ongoing	-	Not quantifiable	Implementation on-going	Ongoing	-
NEL 12	Car Share Promotion	Alternatives to private vehicle use	Car & lift sharing schemes	LA & ENGIE funded	Ongoing	Ongoing	-	Not quantifiable	Information on liftshare provided on NEL webpages	Ongoing	-
NEL 13	Taxis	Promoting Low Emission Transport	Taxi emission incentives	LA Funded	2018 Jan	2018 March	-	Negligible	Licensed Vehicles Emissions Impact Review undertaken	Complete	-
NEL 14	Potential Regional Air Quality Steering Group	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and	LA Funded	Ongoing	Ongoing	-	Not quantifiable	Attended LELPG meeting. Very useful for shared working practice	Ongoing	Ongoing

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			improve air quality								
NEL 15	HGV's Routing Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	LA & ENGIE led	Ongoing	Ongoing	-	Not quantifiable	Planning Aps assessed and advised on application	Ongoing	-
NEL 16	Environmental Permits	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	Lead + Funded: LA Environmental Health	Ongoing	Ongoing	-	Not quantifiable	Ongoing	Ongoing	-

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.

Currently there is no monitoring of PM_{2.5} completed within North East Lincolnshire, however PM₁₀ concentrations are monitored at both the Fryston House, Grimsby and the Kings Road, Immingham automatic monitoring stations. Therefore an estimation of the annual mean PM_{2.5} concentration can be made in line with Box 7.7 of LAQM.TG(16). Following this procedure annual mean concentrations of 9.5µg/m³ and 15.0µg/m³ have been estimated. This estimated annual mean concentration is below the 2020 annual mean objective for PM_{2.5} (25µg/m³). Further details are provided in Section 3.2.3 and in Table A.7 and Table A.8.

The current Defra 2017 background maps⁴ for North East Lincolnshire Council (2015 based) show that all background concentrations of PM_{2.5} are well below the 2020 annual mean objective for PM_{2.5}. The highest concentration is predicted to be 9.8µg/m³ within the 1 x 1km grid square with the centroid grid reference of 528500, 409500 that is set within Grimsby.

The Public Health Outcomes Framework data tool⁵ compiled by Public Health England quantifies the mortality burden of PM_{2.5} within England on a county and local authority scale. Data for 2016 for England, the South West Region and for North Devon Council are presented in Table 2.3.

It can be seen from Table 2.3 that in 2017 the percentage of adult mortality attributable to PM_{2.5} pollution within North East Lincolnshire was 0.4% higher than the average fraction for the Yorkshire and Humber region, and 0.1% lower than the average fraction for England. In 2016 the fraction for North East Lincolnshire was 5.7%, there has been a decreased of 0.5% between 2015 and 2016.

⁴ Defra Background Mapping data for local authorities (2015-based), available online at <https://uk-air.defra.gov.uk/data/lagm-background-maps?year=2015>

⁵ Public Health Outcomes Framework, Public Health England data tool (2016 data), available online at <http://www.phoutcomes.info/public-health-outcomes-framework>

Table 2.3 – 2017 Adult Mortality Attributable to PM_{2.5} Pollution

Area	North East Lincolnshire	Yorkshire and the Humber	England		
			Average	Highest	Lowest
% of Adult Mortality	5.2%	4.8%	5.3%	6.9%	2.6%

North East Lincolnshire is taking the following measures to address PM_{2.5}:

- Ongoing discussions between North East Lincolnshire Air Quality Officers and Public Health Officers on working together to reduce PM_{2.5} emissions across the district;
- Regular meetings of the Regional Air Quality Steering Group to share strategies and ideas across a number of different councils; and
- The North East Lincolnshire Joint Strategy Needs Assessment (JSNA) is now aligned to the Councils outcome framework and outcomes are updated annually in the autumn. The state of the borough report and all the outcome reports can be downloaded from <http://www.nelincsdata.net/JSNA>.

Although not initially developed to reduce concentrations of PM_{2.5}, a number of measures outlined in Table 2.2 that are related to private transport will help reduce concentrations. A major source of PM_{2.5} is from road traffic, from exhaust emissions, brake and tyre wear, and the re-suspension of existing particles on the road. From the reduction of vehicle use, and the introduction of more efficient/less polluting vehicles concentrations of PM_{2.5} will be reduced.

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

North East Lincolnshire undertook automatic (continuous) monitoring at three sites during 2017, and in addition a monitoring station was installed on Woodlands Avenue in Immingham in November 2017 as part of the AURN and as such is run by the Environmental Agency. Table A.1 in Appendix A shows the details of the sites. National monitoring results for the Immingham AURN monitoring station are available at <https://uk-air.defra.gov.uk/networks/>.

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

North East Lincolnshire undertook non-automatic (passive) monitoring of NO₂ at thirty two sites during 2017, this is the same number as in 2016. Table A.2 in Appendix A shows the details of the sites.

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

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 (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

In 2017 there was only one location where the annual mean objective for NO₂ was exceeded; the triplicate diffusion tube location DIF 11/12/13 that is co-located with the Cleethorpe Road automatic monitoring station within the designated AQMA (47.3µg/m³). The automatic monitor recorded an annual mean value of 35.9µg/m³ for the same period. The bias adjustment figure calculated from the co-located diffusion tubes was very low at 0.59, therefore the co-located tubes were moved closer to the NO_x analyser inlet in January 2018 and the results will be assessed at the end of 2018.

The monitoring location does not represent a location of relevant exposure for the annual mean objective, therefore the concentration has been distance corrected. Following distance correction the annual mean concentration was calculated as 40.1µg/m³.

Outside of the designated AQMA there were no exceedances of the annual mean NO₂ objective and there were five diffusion tube sites that were within 10% of annual mean objective (DIF 2, 11/12/13, 15, 18 and 20). Three of the monitoring sites (DIF 2, 11/12/14 and 15) do not represent a location of relevant exposure for the annual mean objective, therefore the concentrations have been distance corrected. Following distance correction there are only two monitoring sites outside of the existing AQMA that are within 10% of annual mean objective; DIF 18 located on Victor Street, and DIF 20 located on Victoria Street .

The 2016 Detailed Assessment concluded the need for two new diffusion tube monitoring sites to be installed. DIF 31 and DIF 32 were installed in 2016. The annual mean concentrations at both of these locations in 2017 were well below the annual mean objective (29.8µg/m³ at DIF 31 and 29.2µg/m³ at DIF 32). In addition, the

diffusion tubes DIF 17 and DIF 18 were relocated in January 2017 to the junctions of Cleethorpe Road / Victor Street and Cleethorpe Road / Park Road. The concentrations at these two locations in 2017 were below the annual mean objective ($32.8\mu\text{g}/\text{m}^3$ at DIF 17 and $36.4\mu\text{g}/\text{m}^3$ at DIF 18).

The annual mean NO_2 concentration was not greater than $60\mu\text{g}/\text{m}^3$ at any non-automatic monitoring site. Therefore exceedances of the 1-hour mean objective are unlikely at all monitoring locations. Furthermore, there were no exceedances of the 1-hour mean NO_2 objective reported at either of the continuous monitoring stations.

Figure A.1, Figure A.2, Figure A.3 and Figure A.4 present trends in the measured annual mean NO_2 concentrations over the past five years for the NO_2 monitoring completed across North East Lincolnshire.

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 $40\mu\text{g}/\text{m}^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of $50\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

PM_{10} is monitored by Beta Attenuation Particulate Monitors (BAMs) at two different sites within the borough; Fryston House in Grimsby (CM1) and Kings Road in Immingham (CM2). There were no exceedances of the annual mean objective at either of the monitoring sites, nor was the PM_{10} 24-hour mean objective ($50\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year) exceeded.

Figure A.5 presents trends in annual mean PM_{10} concentrations measured at the automatic monitoring sites. It can be seen that between 2013 and 2017 the annual mean PM_{10} concentration has steadily decreased at CM1 but has steadily increased at CM2. Between 2016 and 2017 there has been a sharp decrease at CM1 however CM2 has remained relatively constant. The highest concentration over the past five years was $25.9\mu\text{g}/\text{m}^3$ recorded at the CM2 site in 2016.

Figure A.6 in Appendix A shows the number of exceedances of the PM_{10} daily mean air quality objective of $50\mu\text{g}/\text{m}^3$ at the automatic monitoring sites. It can be seen that the number of exceedances have been well below the limit of 35 exceedances a year for the past five years.

The data capture at both monitoring sites during 2017 was below 75%. Annualisation has not been completed due to the hourly raw data from the monitoring sites not being available. Further details are provided in Appendix C.

3.2.3 Particulate Matter (PM_{2.5})

North East Lincolnshire currently monitor PM₁₀ at two automatic monitoring stations but do not monitor PM_{2.5}. Therefore concentrations of PM_{2.5} have been estimated from PM₁₀ measurements in line with LAQM.TG(16) guidance. Data (both PM₁₀ and PM_{2.5}) from the AURN monitoring station Leeds Headingley Roadside has been used to calculate estimated PM_{2.5} concentrations at the Fryston House, Grimsby and the Kings Road, Immingham monitoring stations.

The Leeds Headingley Roadside site was chosen due to being the closest AURN site (approximately 95km) where both the PM₁₀ and PM_{2.5} data capture for 2017 was above 85%. The AURN site York Fishergate was geographically closer (approximately 75km) but the 2017 data capture for both species was below 85%.

The methodology within Box 7.7 of LAQM.TG(16) has been followed to calculate a locally derived PM_{2.5}/PM₁₀ ratio of 0.58. This was applied to the 2017 PM₁₀ annual means calculated at Fryston House (16.3µg/m³) and Kings Road (25.8µg/m³) to give estimated PM_{2.5} annual means of 9.5µg/m³ and 15.0µg/m³. These estimated annual mean concentrations are below the 2020 annual mean objective for PM_{2.5} 25µg/m³ presented in Appendix E.

3.2.4 Sulphur Dioxide (SO₂)

North East Lincolnshire does not carry out any routine monitoring of SO₂ within its area.

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	Fryston House, Grimsby	Roadside	526582	408050	NO ₂ ; PM ₁₀	NO	Chemiluminescent and BAM	50	4	2
CM2	Kings Road, Immingham	Roadside	519193	415279	NO ₂ ; PM ₁₀	NO	Chemiluminescent and BAM	20	2	2
CM3	Cleethorpe Road, Grimsby	Roadside	527758	410426	NO ₂	YES	Chemiluminescent	2	2	1.5
AURN ⁽³⁾	Woodlands Avenue, Immingham	Urban Background	518277	415116	NO ₂	NO	Chemiluminescent	10	4	3

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.

(3) The AURN monitoring station on Woodlands Avenue began monitoring in November 2018.

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)
DIF 1	The Friary PH Victoria West	Kerbside	526838	409261	NO ₂	NO	5	2	NO	2
DIF 2	8 Town Hall Street Grimsby	Roadside	527095	409367	NO ₂	NO	5	2	NO	2
DIF 3	1 Town Hall Street Grimsby	Roadside	527100	409400	NO ₂	NO	10	2	NO	2
DIF 4/5/6	Fryston House Grimsby	Roadside	526583	408047	NO ₂	NO	50	3	YES	2
DIF 7	Peaks Parkway & Welholme Road Grimsby	Kerbside	527574	408108	NO ₂	NO	10	2	NO	2
DIF 8	Peaks Parkway & Weelsby Road Grimsby	Kerbside	527403	408666	NO ₂	NO	8	1	NO	2
DIF 9	76 Freeman Street Grimsby	Kerbside	527665	410164	NO ₂	NO	N/A	2	NO	2
DIF 10	42 Freeman Street Grimsby	Roadside	527680	410281	NO ₂	NO	0	2	NO	2
DIF 11/12/13 ⁽³⁾	112 Cleethorpe Road Grimsby	Roadside	527762	410427	NO ₂	YES	5	<1	YES	2
DIF 14	113 Cleethorpe Road Grimsby	Kerbside	527754	410445	NO ₂	YES	5	<1	NO	2
DIF 15	123 Cleethorpe Road Grimsby	Kerbside	527789	410438	NO ₂	YES	5	<1	NO	2
DIF 16	6 Freeman Street Grimsby	Kerbside	527693	410413	NO ₂	YES	0	1.5	NO	2
DIF 17	Park Street	Roadside	528725	410102	NO ₂	NO	0	3	NO	2
DIF 18	Victor Street	Kerbside	528171	410338	NO ₂	NO	7	1	NO	2

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DIF 19	Victoria Mills A Victoria Street Grimsby	Kerbside	527165	409995	NO ₂	NO	0	2	NO	2
DIF 20	Victoria Mills B Victoria Street Grimsby	Kerbside	527182	410092	NO ₂	NO	0	2	NO	2
DIF 21	9 Pyewipe Road Grimsby	Roadside	526077	410124	NO ₂	NO	0	2	NO	2
DIF 22	Great Coates/ Yarborough Road Grimsby	Roadside	524666	408814	NO ₂	NO	5	2	NO	2
DIF 23/24/25	King Road Immingham	Roadside	519193	415279	NO ₂	NO	20	1	YES	2
DIF 26	Love Lane Corner	Roadside	528891	408078	NO ₂	NO	14	2	NO	2
DIF 27	Hewitts Circus Cleethorpe	Roadside	529532	406835	NO ₂	NO	6	2	NO	2
DIF 28	Toll Bar Roundabout New Waltham	Kerbside	527685	404531	NO ₂	NO	20	2	NO	2
DIF 29	Louth Road & Waltham Grimsby	Roadside	526465	406334	NO ₂	NO	3	2	NO	2
DIF 30	Scarho/Cragston Ave Grimsby	Roadside	526520	407026	NO ₂	NO	3	2	NO	2
DIF 31	Magistrates Court Grimsby	Kerbside	527183	409647	NO ₂	NO	3	2	NO	2
DIF 32	Pink Butterfly Grimsby	Kerbside	527189	409621	NO ₂	NO	0	2	NO	2

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.
- (3) The co-location diffusion tubes at the Cleethorpe Road monitor were moved closer to the NO_x sample inlet in January 2018 to give a more representative figure in the bias adjustment calculation.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
CM1	Roadside	Automatic	81.6	77.4	31.1	32.2	27.5	29.9	26.8
CM2	Roadside	Automatic	91.3	85.7	30.8	33.4	27.2	28.2	24.0
CM3	Roadside	Automatic	80.8	77.1	48.9	47.2	46.5	41.6	35.9
AURN	Urban Background	Automatic	98.1	16.4 ⁽⁴⁾	-	-	-	-	16.9
DIF 1	Kerbside	Diffusion Tube	100.0	100.0	31.8	30.6	28.5	29.7	31.9
DIF 2	Roadside	Diffusion Tube	100.0	100.0	-	46.8	39.0	39.8	36.9
DIF 3	Roadside	Diffusion Tube	100.0	100.0	-	41.5	34.6	38.4	33.6
DIF 4/5/6	Roadside	Diffusion Tube	94.4	94.4	29.6	28.3	26.0	27.7	27.1
DIF 7	Kerbside	Diffusion Tube	91.7	91.7	33.6	31.6	31.6	31.6	33.5
DIF 8	Kerbside	Diffusion Tube	100.0	100.0	36.0	34.2	31.0	31.9	30.8
DIF 9	Kerbside	Diffusion Tube	100.0	100.0	24.0	23.8	20.2	21.8	21.3
DIF 10	Roadside	Diffusion Tube	83.3	83.3	26.1	26.6	24.5	25.2	24.9
DIF 11/12/13	Roadside	Diffusion Tube	94.4	94.4	48.6	48.7	42.7	45.2	47.3
DIF 14	Kerbside	Diffusion Tube	91.7	91.7	39.0	36.8	34.7	37.3	34.7
DIF 15	Kerbside	Diffusion Tube	91.7	91.7	39.9	38.2	30.8	35.7	37.3
DIF 16	Kerbside	Diffusion	100.0	100.0	32.2	32.2	28.8	33.1	35.2

		Tube							
DIF 17	Roadside	Diffusion Tube	100.0	100.0	28.4	27.3	27.5	30.1	32.8
DIF 18	Kerbside	Diffusion Tube	83.3	83.3	27.5	26.1	24.6	29.5	36.4
DIF 19	Kerbside	Diffusion Tube	83.3	83.3	39.5	38.4	31.7	34.2	34.7
DIF 20	Kerbside	Diffusion Tube	100.0	100.0	-	34.8	34.7	37.3	37.4
DIF 21	Roadside	Diffusion Tube	100.0	100.0	31.8	33.2	31.2	33.2	30.6
DIF 22	Roadside	Diffusion Tube	100.0	100.0	31.1	30.7	26.0	28.6	27.0
DIF 23/24/25	Roadside	Diffusion Tube	100.0	100.0	33.2	31.3	30.0	33.3	28.5
DIF 26	Roadside	Diffusion Tube	100.0	100.0	26.6	26.3	21.0	24.4	22.9
DIF 27	Roadside	Diffusion Tube	75.0	75.0	24.4	23.2	24.2	22.1	23.0
DIF 28	Kerbside	Diffusion Tube	100.0	100.0	32.2	30.2	27.2	27.7	30.2
DIF 29	Roadside	Diffusion Tube	100.0	100.0	27.1	26.9	23.9	25.0	23.7
DIF 30	Roadside	Diffusion Tube	100.0	100.0	28.3	27.3	22.1	24.4	22.1
DIF 31	Kerbside	Diffusion Tube	91.7	91.7	-	-	-	28.3	29.8
DIF 32	Kerbside	Diffusion Tube	100.0	100.0	-	-	-	29.5	29.2

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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. There is no data capture for the Councils automatic monitors during December 2017 due to the service contract for the monitors ending, and in addition CM3 had no data capture for January due to a power failure.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
- (3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.
- (4) Annualisation has not been completed at the AURN monitoring station in Immingham due to the monitoring station only being installed in November 2017. As data capture was only 16.4% for the year a large level of annualisation would be required, thus increasing the level of inaccuracy.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations: Cleethorpe Road AQMA

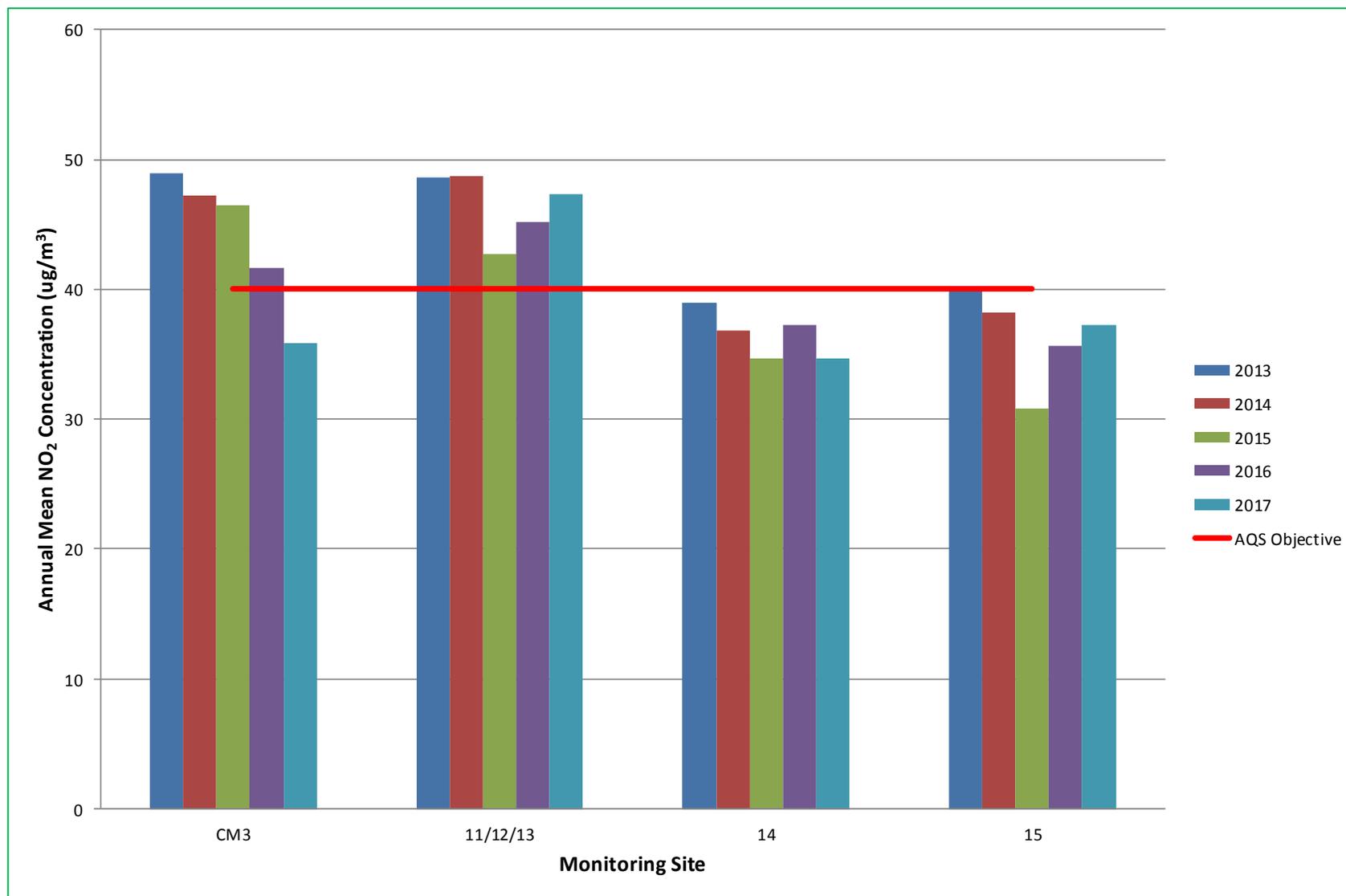


Figure A.2 – Trends in Annual Mean NO₂ Concentrations: Grimsby North

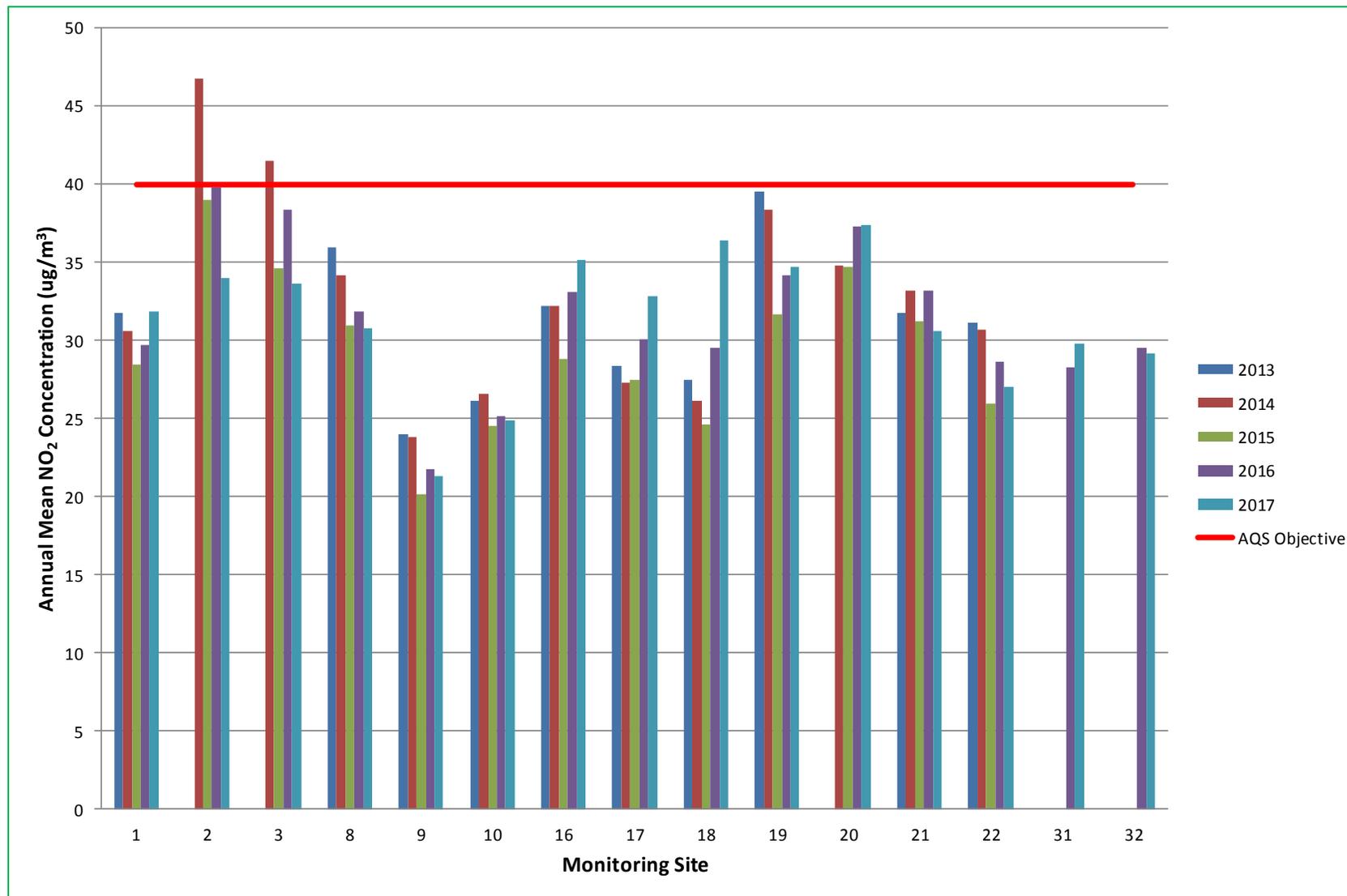


Figure A.3 – Trends in Annual Mean NO₂ Concentrations: Grimsby South

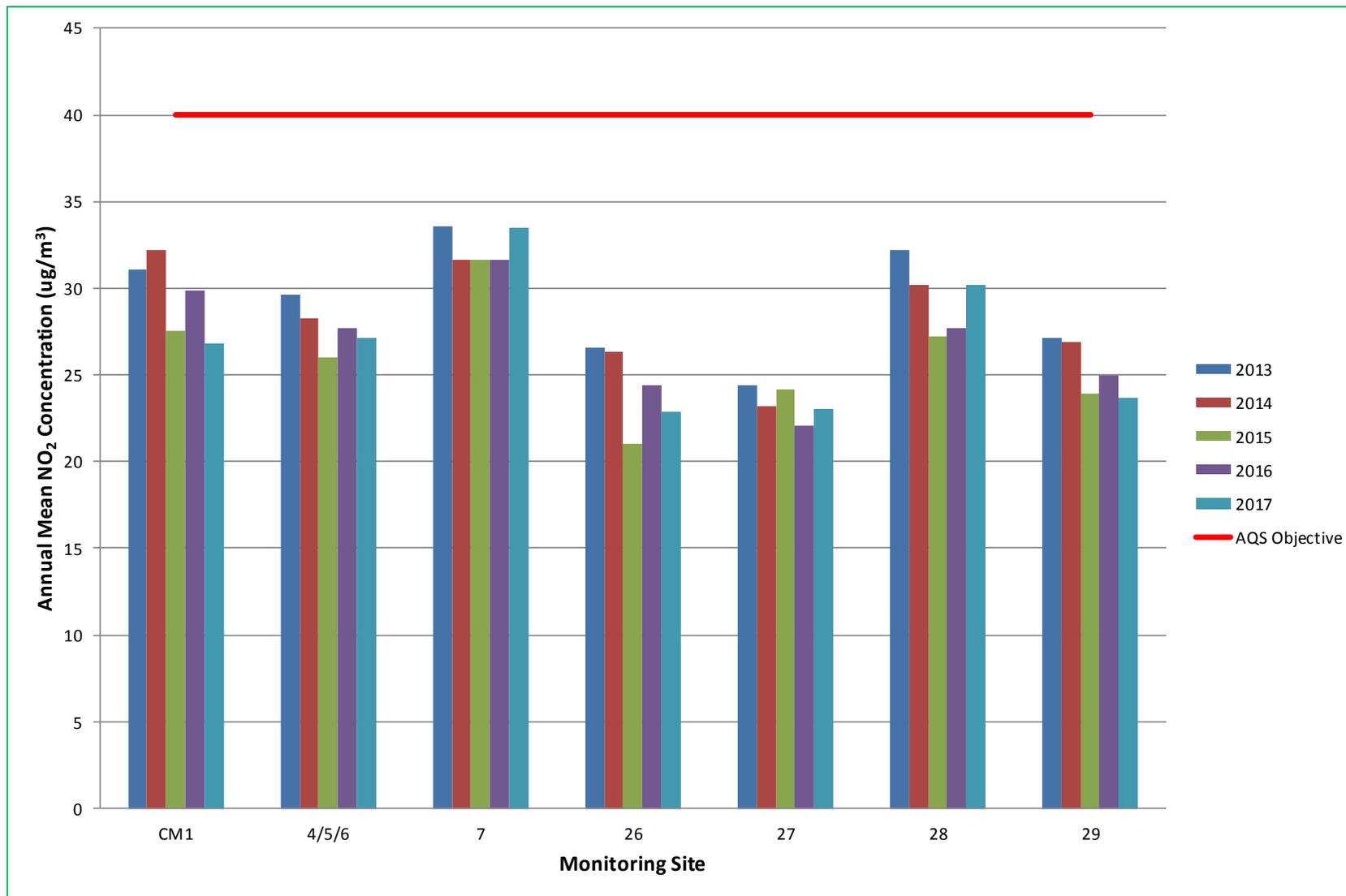


Figure A.4 – Trends in Annual Mean NO₂ Concentrations: Immingham

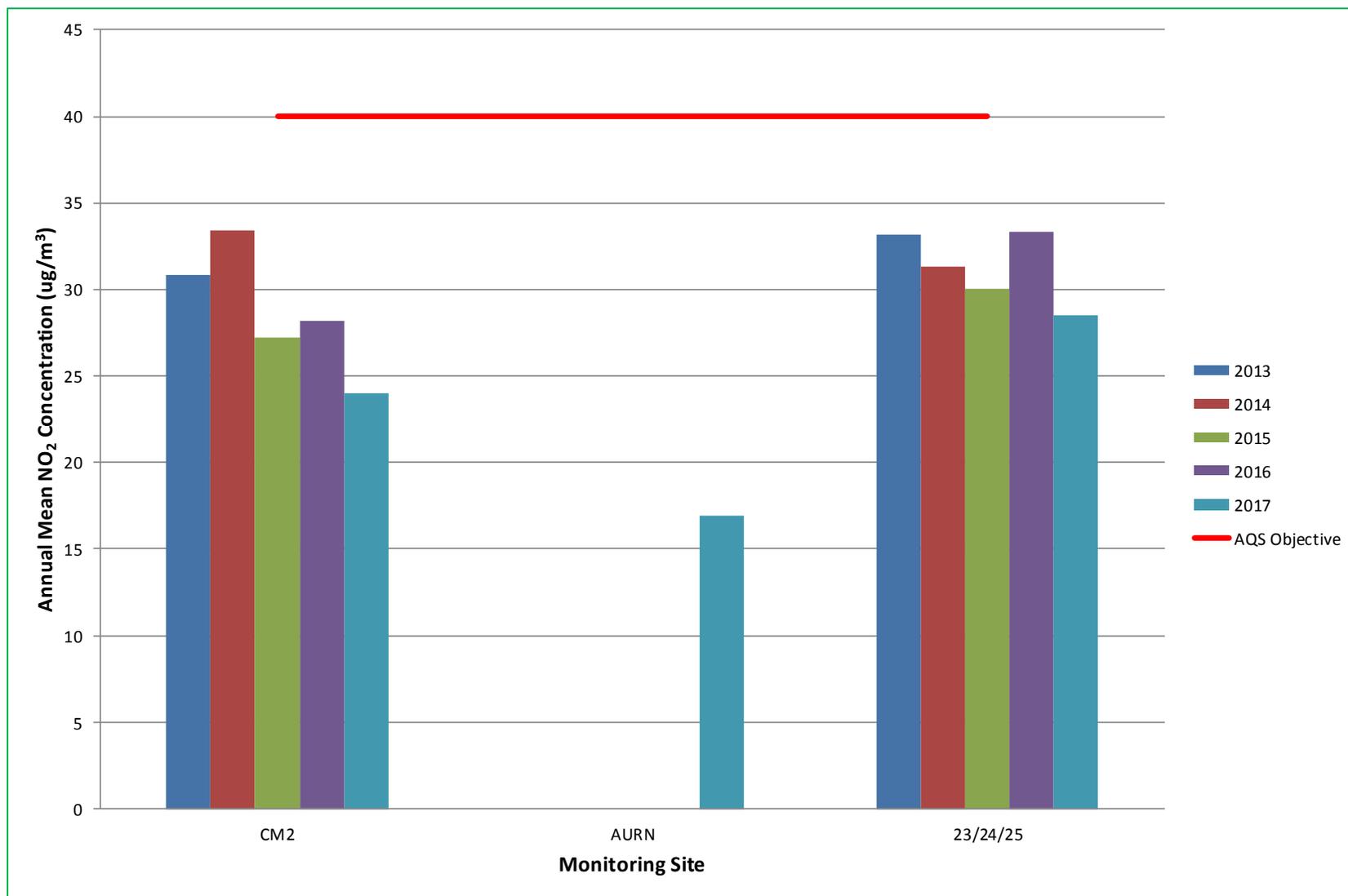


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2013	2014	2015	2016	2017
CM1	Roadside	Automatic	81.6	77.4	0	1	1	3	0 (66.7)
CM2	Roadside	Automatic	91.3	85.7	0	0	0	0	0
CM3	Roadside	Automatic	80.8	77.1	0	0	0	0	0 (54.6)
AURN	Urban Background	Automatic	98.1	16.4	-	-	-	-	0 (56.8)

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ 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. There is no data capture for the Councils automatic monitors during December 2017 due to the service contract for the monitors ending and in addition CM3 had no data capture for January due to a power failure.

(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 PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
CM1	Roadside	73.9	69.2 ⁽⁴⁾	24.9	25.1	20.5	21.4	16.3
CM2	Roadside	75.3	70.7 ⁽⁴⁾	19.8	22.4	24.1	25.9	25.8

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year. There is no data capture for the Councils automatic monitors during December 2017 due to the service contract for the monitors ending.

(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.

(4) Due to the hourly raw data not being available the raw data has not been annualised.

Figure A.5 – Trends in Annual Mean PM₁₀ Concentrations

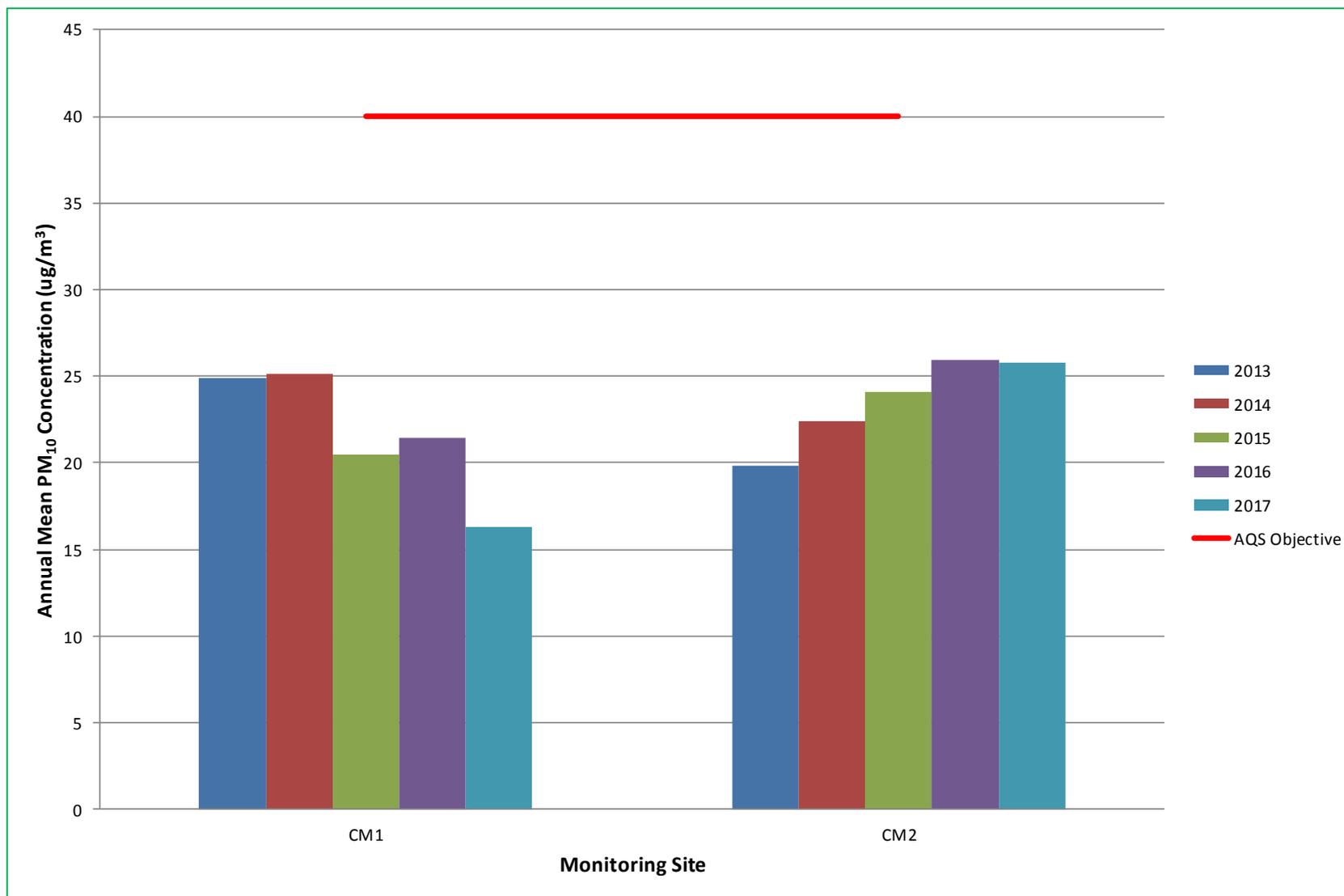


Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2013	2014	2015	2016	2017
CM1	Roadside	73.9	69.2 ⁽⁴⁾	11	16	8	3	1 (32.8)
CM2	Roadside	75.3	70.7 ⁽⁴⁾	4	15	9	14	9 (46.5)

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year. There is no data capture for the Councils automatic monitors during December 2017 due to the service contract for the monitors ending.

(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.6 – Trends in Number of 24-Hour Mean PM₁₀ Results >50µg/m³

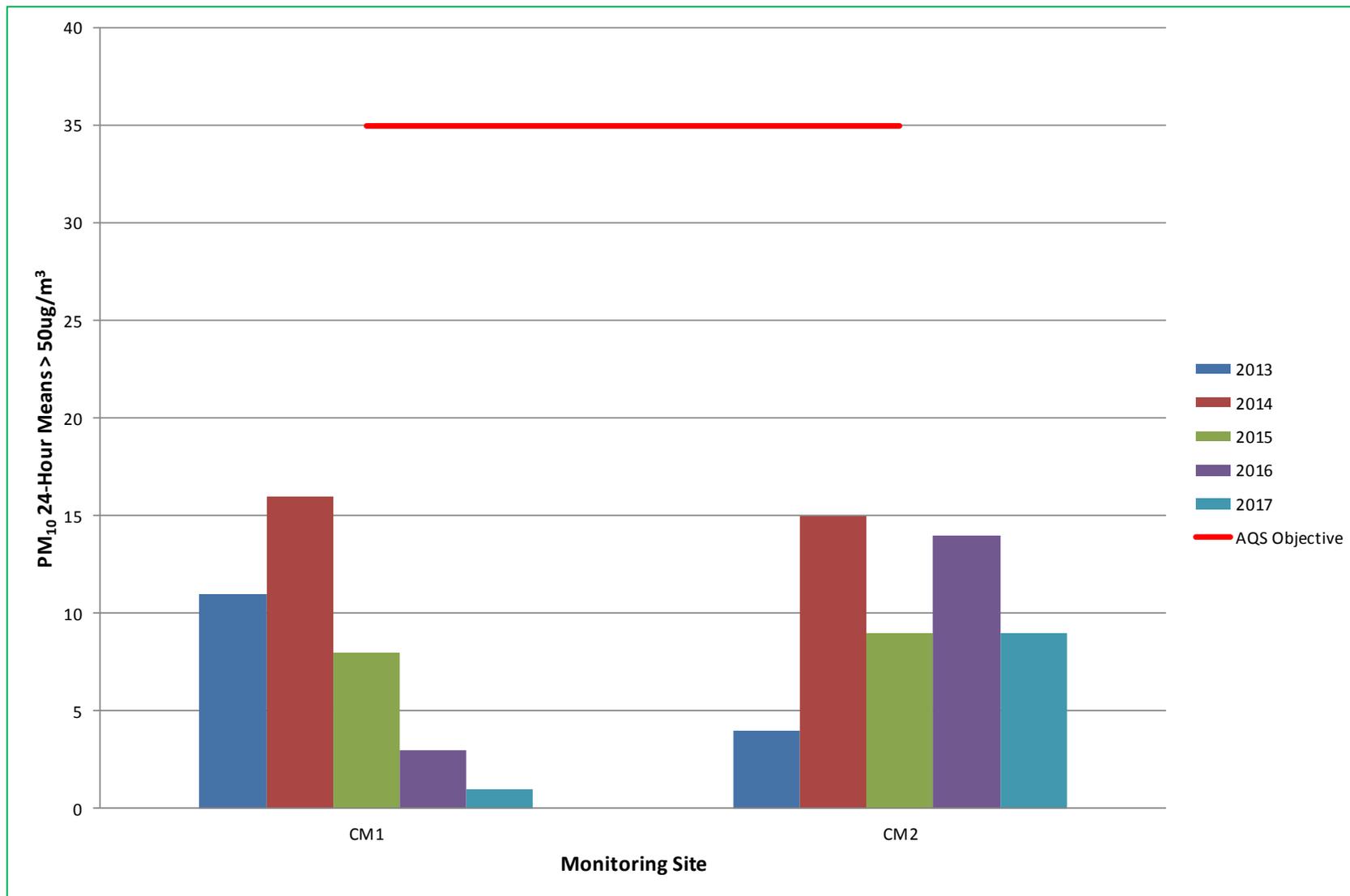


Table A.7 – Estimated Annual Mean PM_{2.5} Monitoring Results: Fryston House, Grimsby

Site ID	Site Types	2017 PM ₁₀ Valid Data Capture at LHR (%)	2017 PM _{2.5} Valid Data Capture at LHR (%)	2017 Annual Mean Concentration (µg/m ³)				Conversion Ratio Used
				LHR PM ₁₀	LHR PM _{2.5}	CM1 PM ₁₀	CM1 PM _{2.5} (estimated)	
LHR: Leeds Headingly CM1: Fryston House	Roadside	95.1	95.5	17.1	10.0	16.3	9.5	0.58

Notes:

Methodology of Box 7.7 within LAQM.TG(16) has been followed for the conversion of PM₁₀ to PM_{2.5}.

Table A.8 – Estimated Annual Mean PM_{2.5} Monitoring Results: Kings Road, Immingham

Site ID	Site Types	2017 PM ₁₀ Valid Data Capture at LHR (%)	2017 PM _{2.5} Valid Data Capture at LHR (%)	2017 Annual Mean Concentration (µg/m ³)				Conversion Ratio Used
				LHR PM ₁₀	LHR PM _{2.5}	CM2 PM ₁₀	CM2 PM _{2.5} (estimated)	
LHR: Leeds Headingly CM2: Kings Road	Roadside	95.1	95.5	17.1	10.0	25.8	15.0	0.58

Notes:

Methodology of Box 7.7 within LAQM.TG(16) has been followed for the conversion of PM₁₀ to PM_{2.5}.

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)													Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾	
DIF 1	51.9	48.2	39.2	43.6	37.1	35.1	30.6	33.9	39.1	40.3	54.9	43.7	41.5	31.9	-	
DIF 2	57.4	51.1	53.2	44.7	39.8	47.1	39.5	40.4	46.9	48.6	57.7	48.4	47.9	36.9	34.0	
DIF 3	57.4	58.1	53.2	53.8	42.8	34.7	35.0	32.0	41.4	35.3	38.8	41.3	43.7	33.6	-	
DIF 4	47.7	37.0	37.2	37.7	31.3	27.3	27.7	23.5	33.5	33.7	46.8	36.5	35.0	26.9	-	
DIF 5	47.0	35.3	39.5	34.7	29.8	29.1	27.0	24.8	33.8	Missing	49.2	39.7	35.4	27.3	-	
DIF 6	48.0	37.0	39.7	39.8	32.5	Missing	25.3	25.5	30.6	31.7	40.5	34.4	35.0	27.0	-	
DIF 7	59.2	45.0	51.9	44.7	Missing	38.3	30.2	31.0	36.7	38.6	52.8	50.2	43.5	33.5	-	
DIF 8	60.7	39.8	43.8	40.5	35.1	35.3	32.4	30.7	37.8	33.8	50.3	40.0	40.0	30.8	-	
DIF 9	35.0	31.9	30.5	28.7	22.8	22.5	19.5	22.2	22.4	27.0	36.4	32.3	27.6	21.3	-	
DIF 10	43.0	31.7	37.0	Missing	Missing	27.9	24.9	28.0	30.0	30.6	40.3	29.4	32.3	24.9	-	
DIF 11	78.2	58.7	65.5	62.3	Missing	57.5	45.3	50.9	52.9	52.3	61.8	46.3	57.4	44.2	38.1	
DIF 12	80.1	56.9	61.3	60.4	Missing	63.9	52.4	51.3	63.6	58.1	73.8	70.8	63.0	48.5	40.9	
DIF 13	87.6	68.3	78.1	64.1	57.1	60.9	55.9	48.5	52.9	63.3	66.6	65.3	64.1	49.3	41.4	
DIF 14	56.4	49.5	57.4	50.5	37.0	37.8	32.6	37.4	Missing	39.3	46.5	52.0	45.1	34.7	-	
DIF 15	63.0	56.1	55.5	51.9	40.8	40.0	38.7	34.8	Missing	39.9	55.5	56.5	48.4	37.3	33.7	
DIF 16	60.4	45.9	48.2	54.1	39.3	41.2	34.9	37.9	40.6	41.8	55.1	49.0	45.7	35.2	-	

North East Lincolnshire Council

DIF 17	62.3	45.5	54.3	42.9	38.7	39.4	34.8	32.9	36.2	38.9	43.0	42.2	42.6	32.8	-
DIF 18	Missing	Missing	44.8	57.1	39.8	42.5	36.9	44.3	41.3	44.7	61.6	60.0	47.3	36.4	-
DIF 19	63.6	Missing	49.1	48.8	37.0	Missing	27.4	39.2	37.5	40.4	52.8	54.8	45.1	34.7	-
DIF 20	74.2	40.4	52.5	53.0	45.6	38.7	33.9	38.0	44.4	45.4	62.7	54.0	48.6	37.4	-
DIF 21	60.6	43.7	45.1	37.8	35.3	30.1	31.7	30.8	35.7	32.6	45.6	48.4	39.8	30.6	-
DIF 22	56.1	36.0	32.9	38.2	27.6	28.1	24.9	26.6	36.9	33.7	37.7	42.3	35.1	27.0	-
DIF 23	58.1	44.2	41.9	37.1	35.9	29.8	23.7	29.7	36.3	33.6	48.1	41.1	38.3	29.5	-
DIF 24	56.2	41.5	34.2	37.6	32.3	20.8	28.0	26.3	29.8	33.8	46.2	39.1	35.5	27.3	-
DIF 25	58.6	40.5	40.5	37.0	36.1	30.6	25.6	29.3	35.3	36.5	30.2	44.9	37.1	28.6	-
DIF 26	42.2	30.6	29.3	31.5	26.1	26.6	23.8	24.6	28.1	27.9	36.3	29.9	29.7	22.9	-
DIF 27	45.2	31.3	30.4	29.1	25.2	24.9	24.5	Missing	27.7	Missing	Missing	30.8	29.9	23.0	-
DIF 28	62.8	34.3	41.1	40.0	31.7	34.3	31.8	32.0	36.8	38.5	49.4	38.2	39.2	30.2	-
DIF 29	41.4	35.6	32.7	31.2	29.1	25.5	23.6	22.8	29.3	32.1	33.8	32.7	30.8	23.7	-
DIF 30	46.0	36.1	36.5	25.2	28.4	17.7	21.6	19.6	26.4	24.6	33.8	28.3	28.7	22.1	-
DIF 31	66.8	49.7	39.8	33.6	33.1	31.4	30.6	32.1	37.0	35.0	Missing	37.1	38.7	29.8	-
DIF 32	54.0	46.1	44.0	33.1	39.4	32.8	29.1	28.0	32.5	34.7	42.0	39.7	38.0	29.2	-

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Where applicable, data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

(2) As per LAQM.TG(16) guidance, distance correction has been applied to all concentrations to those within 10% of the objective.

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

Diffusion Tube Local Bias Adjustment Factors

During 2017 there were three co-location studies where triplicate sets of NO₂ diffusion tubes were located with NO_x automatic monitors; Fryston House and Cleethorpe Road within Grimsby, and Kings Road Immingham. Local bias adjustment factors have been calculated for all three locations using the Precision and Bias adjustment spreadsheet (v04), the outputs are presented below in the Figures below.

Figure C.1 – Local Bias Correction Output: Fryston House (Tubes 4/5/6)

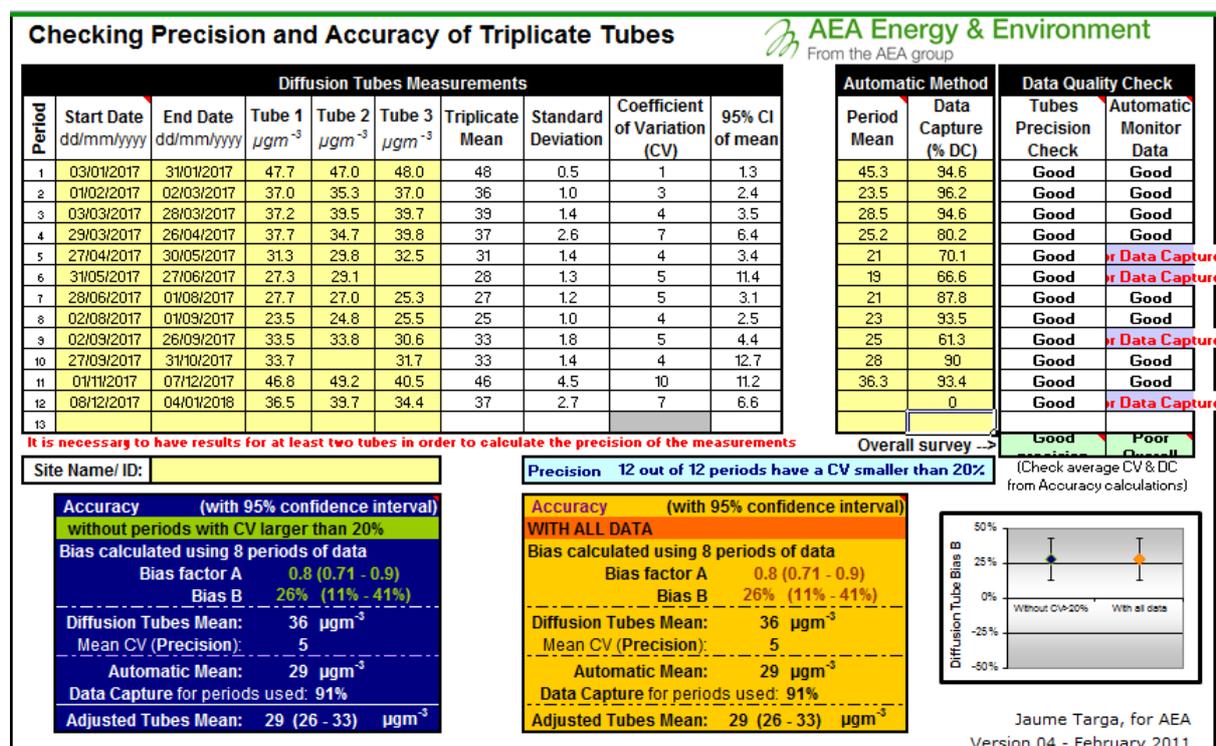


Figure C.2 – Local Bias Correction Output: Cleethorpe Road (Tubes 12/13/14)

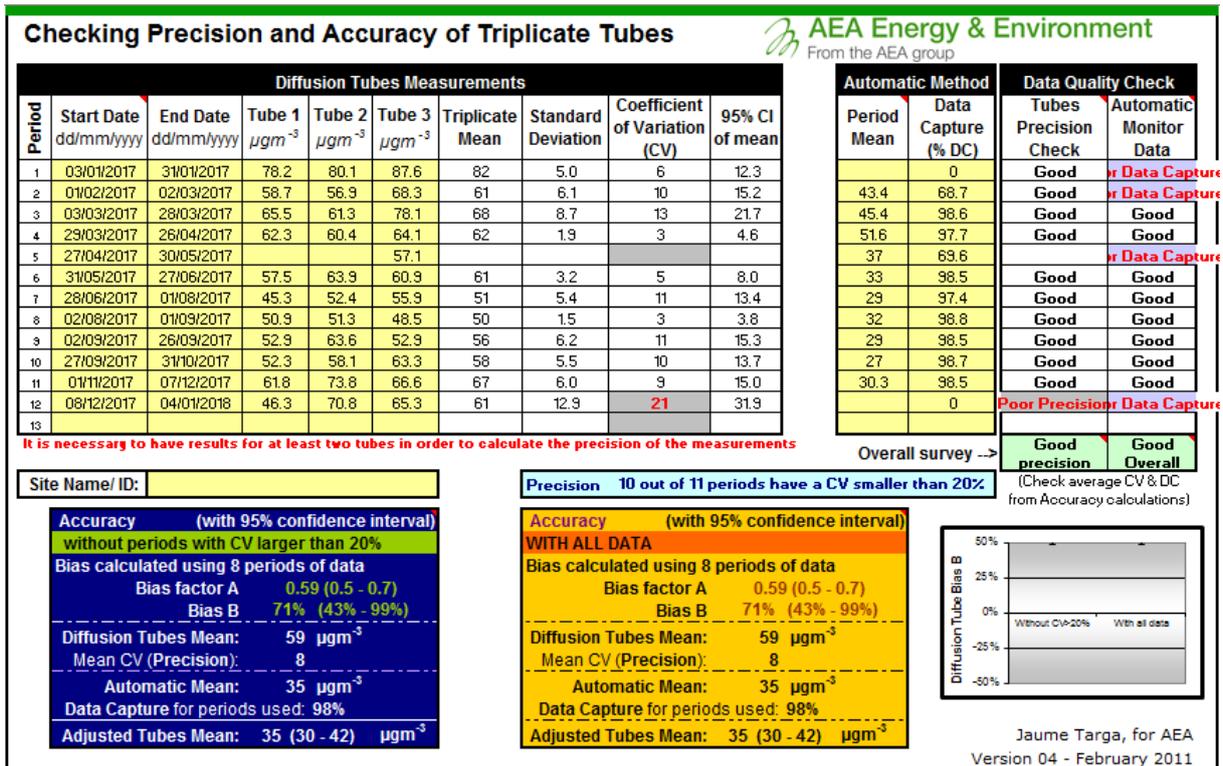
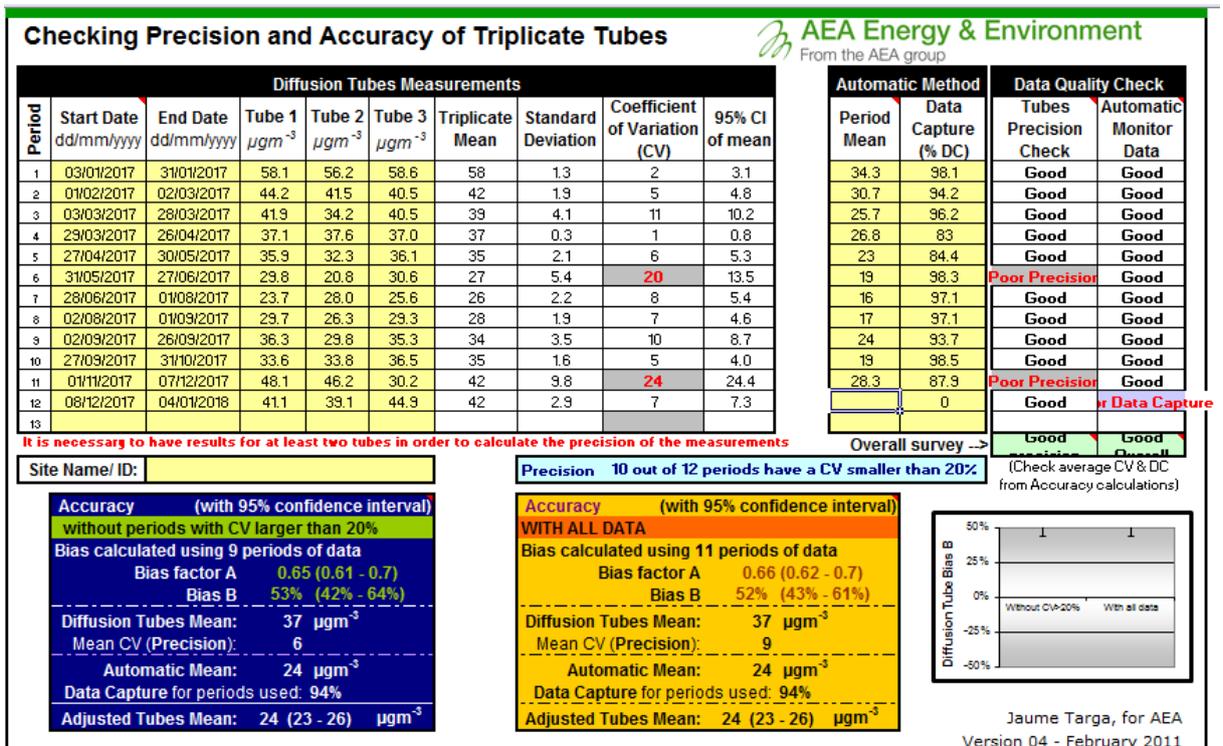


Figure C.3 – Local Bias Correction Output: Kings Road (Tubes 23/24/25)



Diffusion Tube National Bias Adjustment Factor

The diffusion tubes used by North East Lincolnshire Council are supplied and analysed by Socotec (previously Environmental Scientific Group, ESG), the tubes were prepared using the 50% TEA in acetone preparation method. The 2017 national bias adjustment factor for Socotec 50% TEA in water is 0.77, based on twenty seven studies, as derived from the national bias adjustment factor spreadsheet⁶ as presented in Figure C.4.

Figure C.4 – Socotec (ESG) 2017 National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet				Spreadsheet Version Number: 03/18						
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of June 2018			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet			
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.							LAQM Helpdesk Website			
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.				Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.						
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ² shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data.	If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953							
Analysed By ¹	Method <small>To make your selection, please click from the year list</small>	Year ¹ <small>To make your selection, please click (Alt)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ³	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	50% TEA in acetone	2017	R	Suffolk Coastal DC	12	45	37	21.7%	G	0.82
ESG Didcot	50% TEA in acetone	2017	R	Dumfries and Galloway Council	12	36	29	23.3%	G	0.81
ESG Didcot	50% TEA in acetone	2017	KS	Marlyebone Road Intercomparison	12	106	79	34.3%	G	0.74
ESG Didcot	50% TEA in acetone	2017	R	Vale of White Horse District Council	11	31	25	26.0%	G	0.79
ESG Didcot	50% TEA in acetone	2017	UB	Cardiff City Council	10	29	21	35.1%	G	0.74
ESG Didcot	50% TEA in acetone	2017	R	Cambridge City Council	12	45	33	37.7%	G	0.73
ESG Didcot	50% TEA in acetone	2017	R	Wrexham County Borough Council	12	20	17	14.5%	G	0.87
ESG Didcot	50% TEA in acetone	2017	UI	North Lincolnshire Council	12	22	16	40.7%	G	0.71
ESG Didcot	50% TEA in acetone	2017	KS	Caerphilly CBC	12	37	32	15.8%	G	0.86
ESG Didcot	50% TEA in acetone	2017	R	Caerphilly CBC	11	44	29	51.2%	G	0.66
ESG Didcot	50% TEA in acetone	2017	UB	City of York Council	12	23	15	53.4%	G	0.65
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	10	37	28	30.8%	G	0.76
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	11	32	23	41.0%	G	0.71
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	12	40	25	58.6%	G	0.63
ESG Didcot	50% TEA in acetone	2017	R	Hambleton District Council	10	21	20	4.0%	G	0.96
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	11	35	29	18.1%	G	0.85
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	12	31	26	21.3%	G	0.82
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	11	33	23	41.1%	G	0.71
ESG Didcot	50% TEA in acetone	2017	UC	Leeds City Council 1	12	41	32	28.5%	G	0.78
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 10	11	48	38	25.1%	S	0.80
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 2	12	47	35	34.4%	S	0.74
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 4	11	56	43	29.1%	S	0.77
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 7	11	38	27	39.8%	S	0.72
ESG Didcot	50% TEA in acetone	2017	R	Slough Borough Council	12	45	35	26.4%	G	0.79
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	12	32	25	28.6%	G	0.78
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	11	39	33	19.2%	G	0.84
ESG Didcot	50% TEA in acetone	2017	R	Tunbridge Wells	12	56	40	36.2%	G	0.72
ESG Didcot	50% TEA in acetone	2017		Overall Factor² (27 studies)				Use		0.77

Discussion of Choice of Bias Adjustment Factor to Use

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The Defra LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring.

⁶ National Diffusion Tube Bias Adjustment Factor Spreadsheet version 03/18 available at <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, Defra LAQM.TG(16) and the LAQM Helpdesk recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites. A summary of the local and national bias adjustment factors is presented in Table C.1.

Table C.1 – Summary of Bias Adjustment Factors

Co-location Site	Tube Precision	Automatic Data Quality	Bias Factor A (excluding periods with CV>20%)	Bias Factor B (excluding periods with CV>20%)
Fryston House, Grimsby	Good Precision	Poor Data Capture	0.8	26%
Cleethorpe Road, Grimsby	Good Precision	Good Data Capture	0.59	71%
Kings Road, Immingham	Good Precision	Good Data Capture	0.65	53%
Local Average				0.71
From NPL National Study (based on 27 studies)				0.77

Out of the local co-location studies completed, the Cleethorpe Road, Grimsby and Kings Road, Immingham study produced bias factors based upon good tube precision and good automatic monitoring data capture. But the 0.59 and 0.65 bias adjustment factors are very low and would significantly lower the diffusion tube monitoring results for 2017.

Due to this NELC felt that that the local factors calculated were not a true representation over the 2017 period and therefore the national adjustment factor of 0.77 has been used to adjust the 2017 diffusion tube monitoring data. The 2017 national bias adjustment factor is the same as the 2016 national bias adjustment factor that was used to adjust the 2016 monitoring data in the 2017 ASR.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2017 were supplied and analysed by Socotec, the tubes were prepared using the 50% TEA in water preparation method. All results have been bias adjusted and annualised where required before being presented in Table A.3.

Socotec are a UKAS accredited laboratory and analyse their diffusion tubes in line with their Standard Operating Procedure ANU/SOP/1015 that meets the guidelines set out in Defra's best practice guidance⁷. In addition Socotec participate in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO₂ tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. In the latest available AIR-PT results, AIR-PT AR 0018 (January to February 2017), AIR-PT AR019 (April to May 2017), AIR-PT AR021 (July to August 2017) and AIR-PT AR022 (September to October 2017) Socotec has scored 100% on all results. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

QA/QC of Automatic Monitoring

All of the automatic monitoring sites are visited by Council Officers at least once a month, when basic checks are made and inlet filters are changed. The Fryston House (CM1) and Kings Road (CM2) monitors are calibrated remotely, and the Cleethorpe Road (CM3) monitor is calibrated at site. These automatic monitoring sites are calibrated bi-weekly against reference cylinder gases, calibration results are used to scale the raw data. Council Officers dial into the sites daily to insure data has been collected and any potential problems with data can be rectified at the earliest opportunity.

During 2017 the maintenance contract for the three monitoring sites was undertaken by Signal Ambitect, within this contract the sites have been visited at least every six months by the contractor for a full service. In addition a 48 hour callout response system has been in place for any urgent works required. The Council are currently looking at replacing a number of monitors, therefore a new maintenance contract will be procured once any new purchases have been made.

The data validation and ratification procedure for the automatic monitoring data is carried out by Council Officers. The ratification is undertaken through analysing the daily reports to ensure that any anomalies are highlighted. At the end of each month the data is then processed and validated. To maintain a high standard of data, any

⁷ Diffusion Tubes for Ambient NO₂ Monitoring : Practical Guide for Laboratories and Users, AEA Energy & Environment, 2008

collation issues are raised with the monitor service engineers or the software team at Signal Ambitech.

The PM₁₀ data is collated using two Beta Attenuation Monitors (BAMs). The BAM tapes are changed approximately every two months by a Council Officer. BAMs do not operate with an internal correction to meet the equivalence criteria, therefore as per LAQM.TG(16) guidance, the results are divided by 1.2. This correction factor is applied through the Ambidesk software.

Short-term to Long-term Data Adjustment

The two automatic monitoring stations that monitor PM₁₀ (CM1 and CM2) both had a data capture lower than 75% in 2017. This was partly due to the service contract for all monitoring stations ending at the end of November therefore no results from December have been include within the calculations. The Ambidesk software that has been used for data collation from the automatic monitoring stations does not output hourly data to the Council therefore accurate annualisation and percentile calculation has not been possible for data from 2017. The Council is currently looking to procure a new data provider and servicing contract for the automatic monitoring stations and it is envisaged that the Council will recommence real-time monitoring in January 2019.

All diffusion tube monitoring sites had a data capture greater than 75% in 2017 therefore annualisation was not required at any site.

Distance from Road Correction

In line with LAQM.TG(16) distance correction has been applied to NO₂ monitoring sites that have recorded an annual mean concentration above the annual mean objective, or within 10% of the annual mean objective. There were seven sites within the NO₂ monitoring network that were above, or within 10% of the NO₂ annual mean objective in 2017; Sites 2, 11, 12, 13, 15, 18 and 20..

The NO₂ Fall-Off with Distance Calculator (v4.2)⁸ has been used to derive the NO₂ concentration at a location of relevant exposure; the results of the calculations are presented in Table C.2.

⁸ NO₂ Fall-Off with Distance Calculator (Version 4.2), available online at <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Table C.2 – NO₂ Fall-Off With Distance Calculations

Site ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)		
	Monitoring Site to Kerb	Receptor to Kerb	Background ⁽¹⁾	Monitoring to Site	Predicted at Receptor
DIF 2	2.0	7.0	27.1	36.9	34.0
DIF 11	1.0	6.0	27.3	44.2	38.1
DIF 12	1.0	6.0	27.3	48.5	40.9
DIF 13	1.0	6.0	27.3	49.3	41.4
DIF 15	1.0	6.0	27.3	37.3	33.7

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**

Appendix D: Maps of Monitoring Locations and AQMA

Figure D.1 – Automatic Monitoring Locations: Grimsby

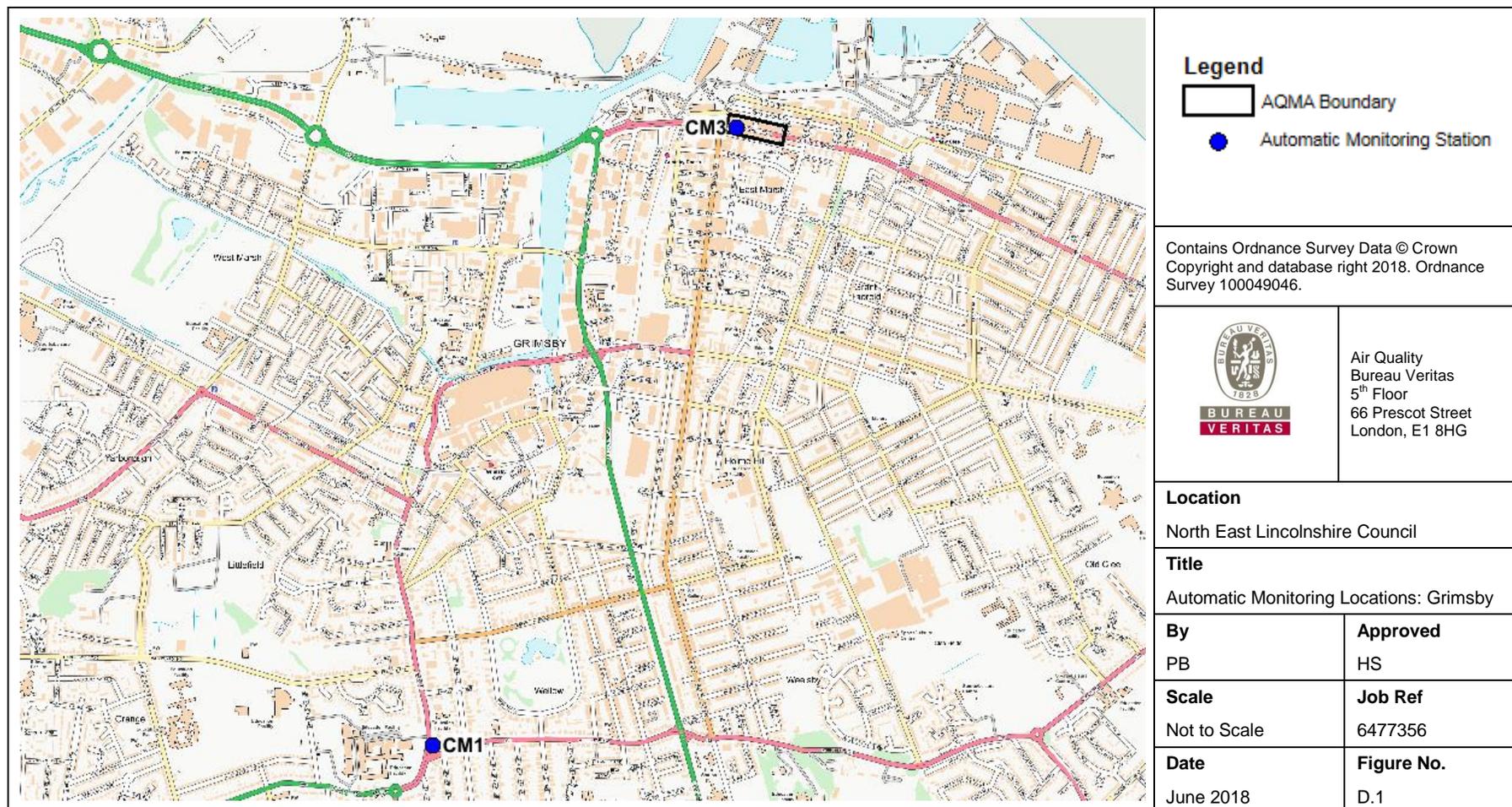


Figure D2 – Automatic Monitoring Locations: Immingham

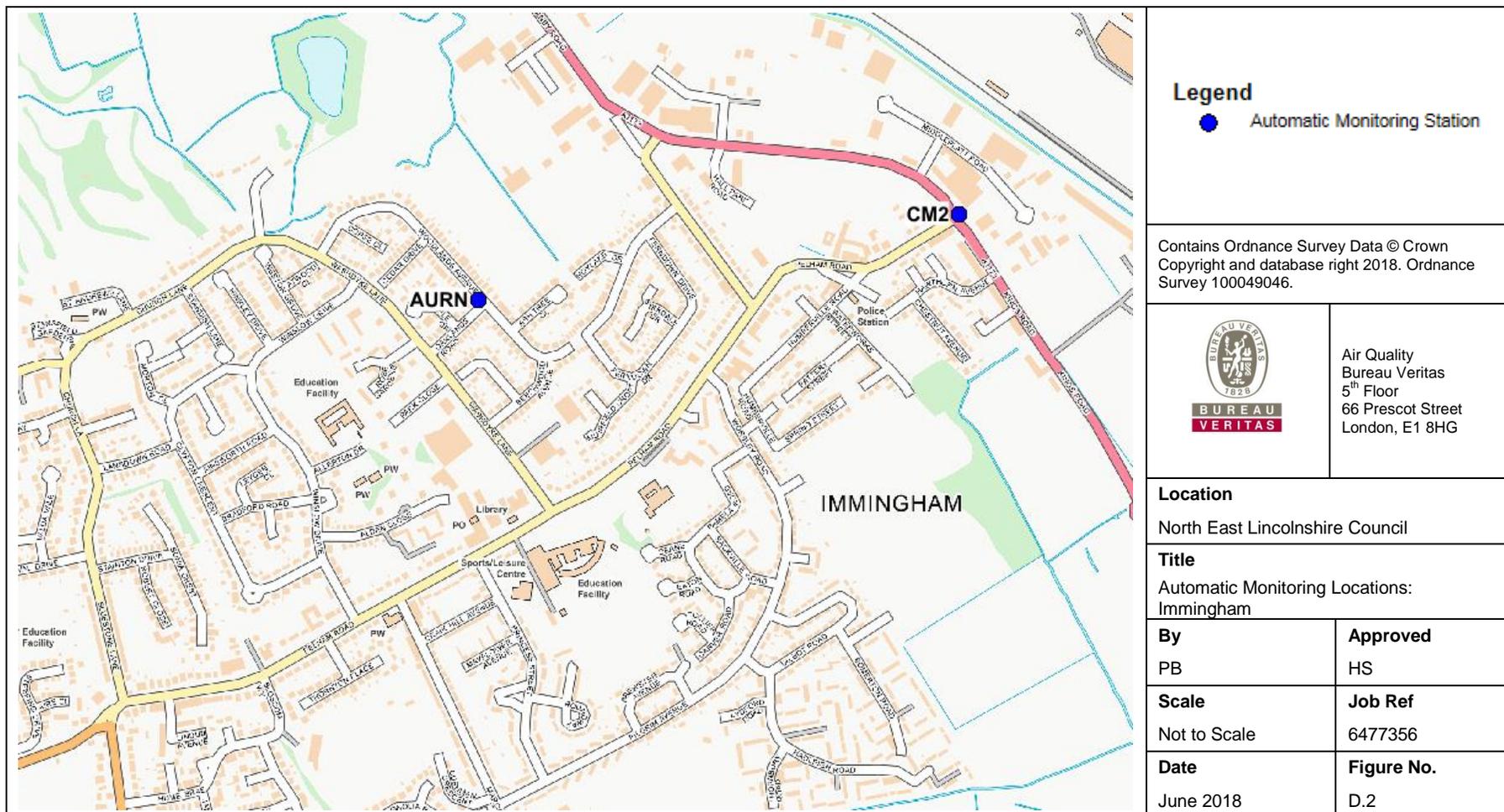


Figure D.3 – NO₂ Diffusion Tube Monitoring Locations: Grimsby, Yarborough

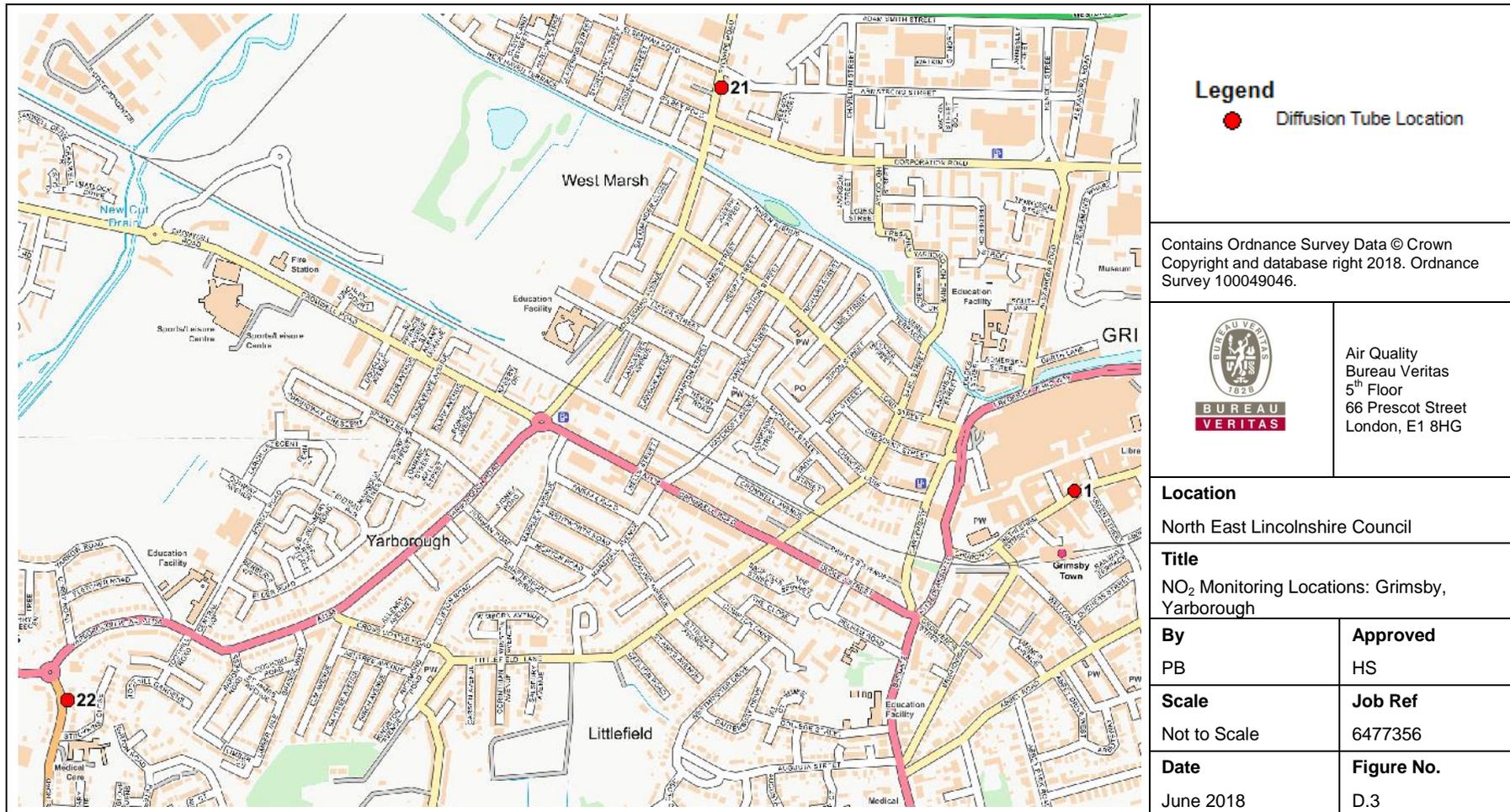


Figure D.4 – NO₂ Diffusion Tube Monitoring Locations: Grimsby North

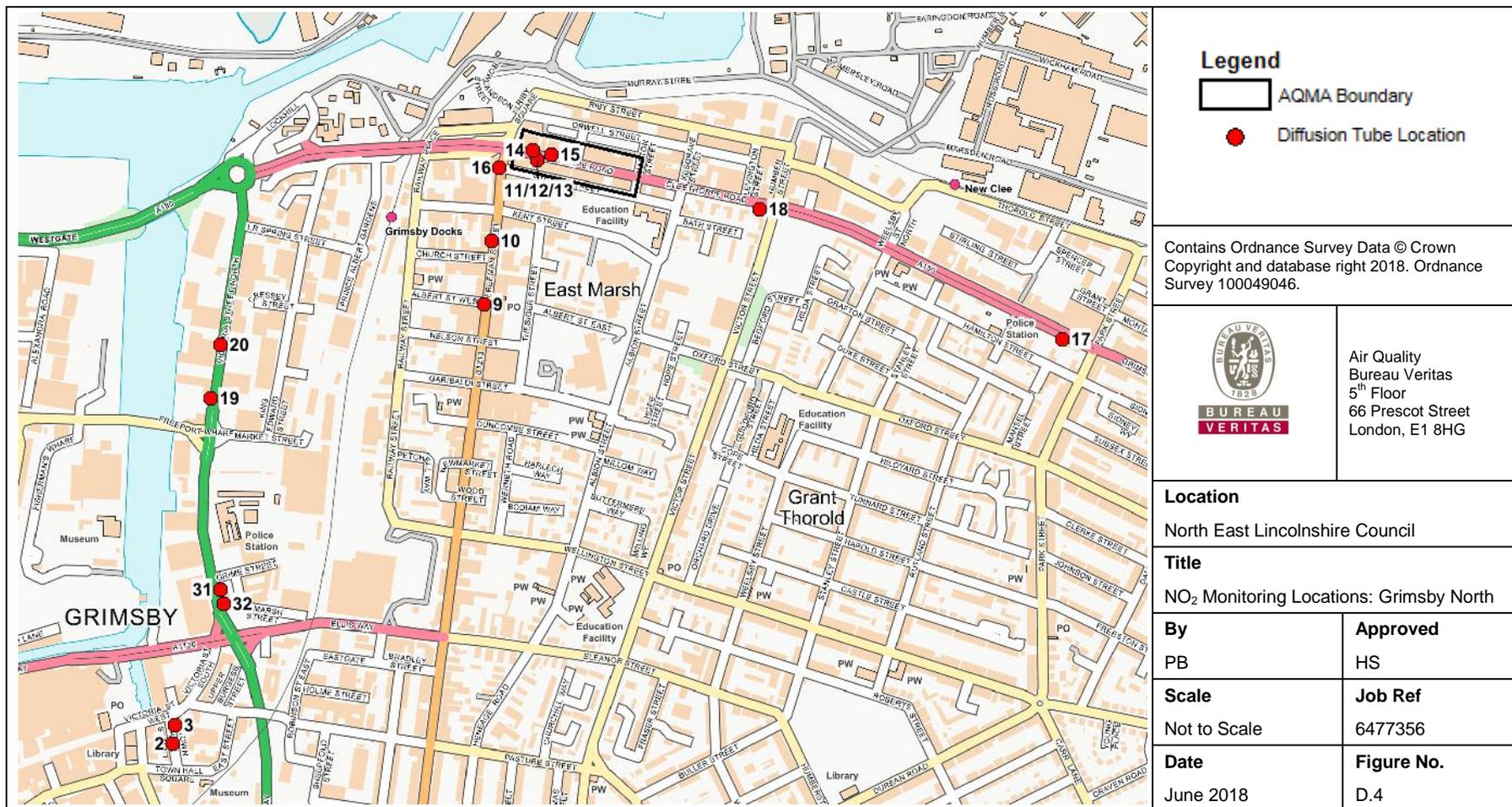


Figure D.5 – NO₂ Diffusion Tube Monitoring Locations: Grimsby, Wellow and Weelsby

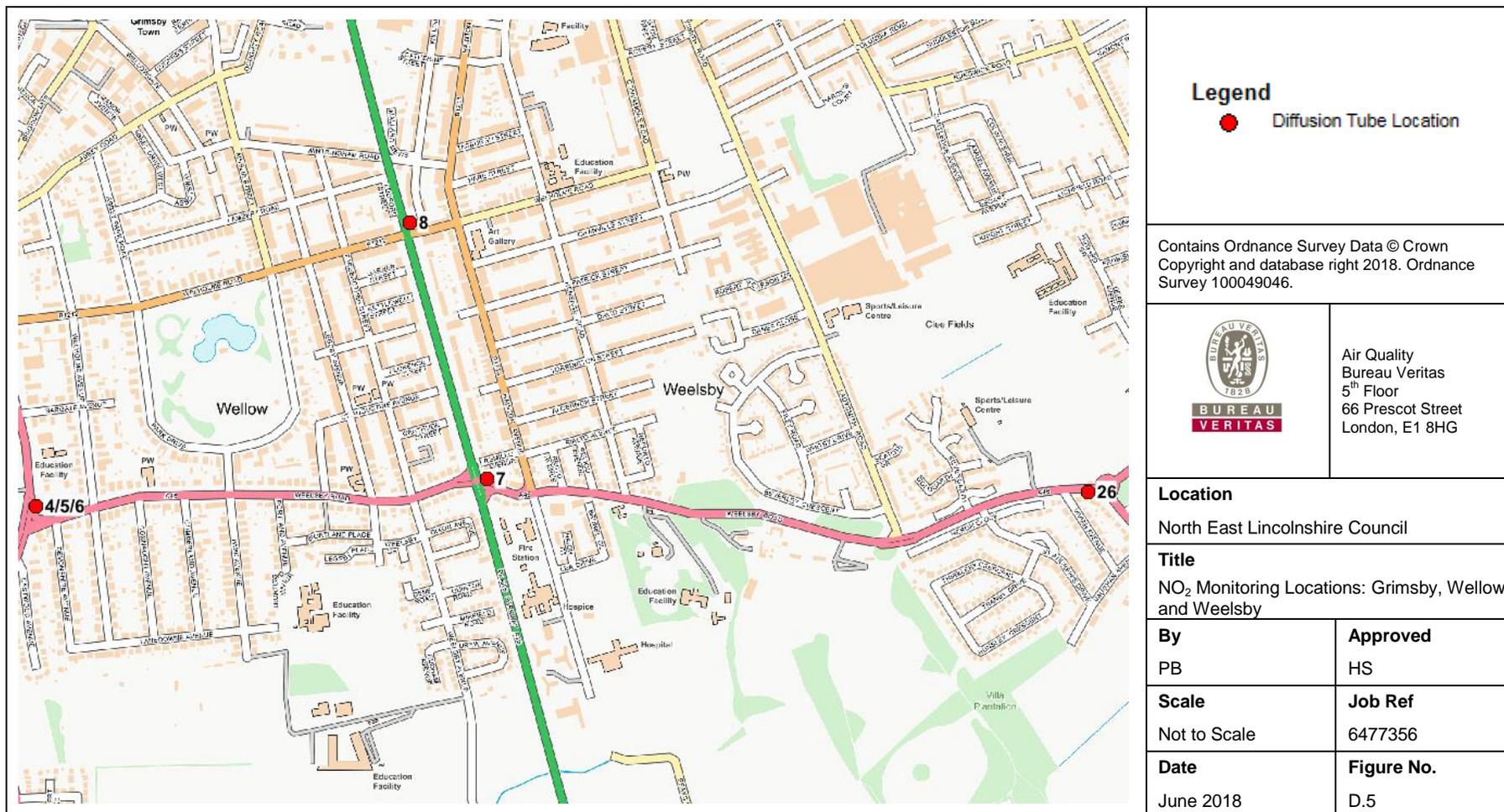


Figure D.6 – NO₂ Diffusion Tube Monitoring Locations: Grimsby South

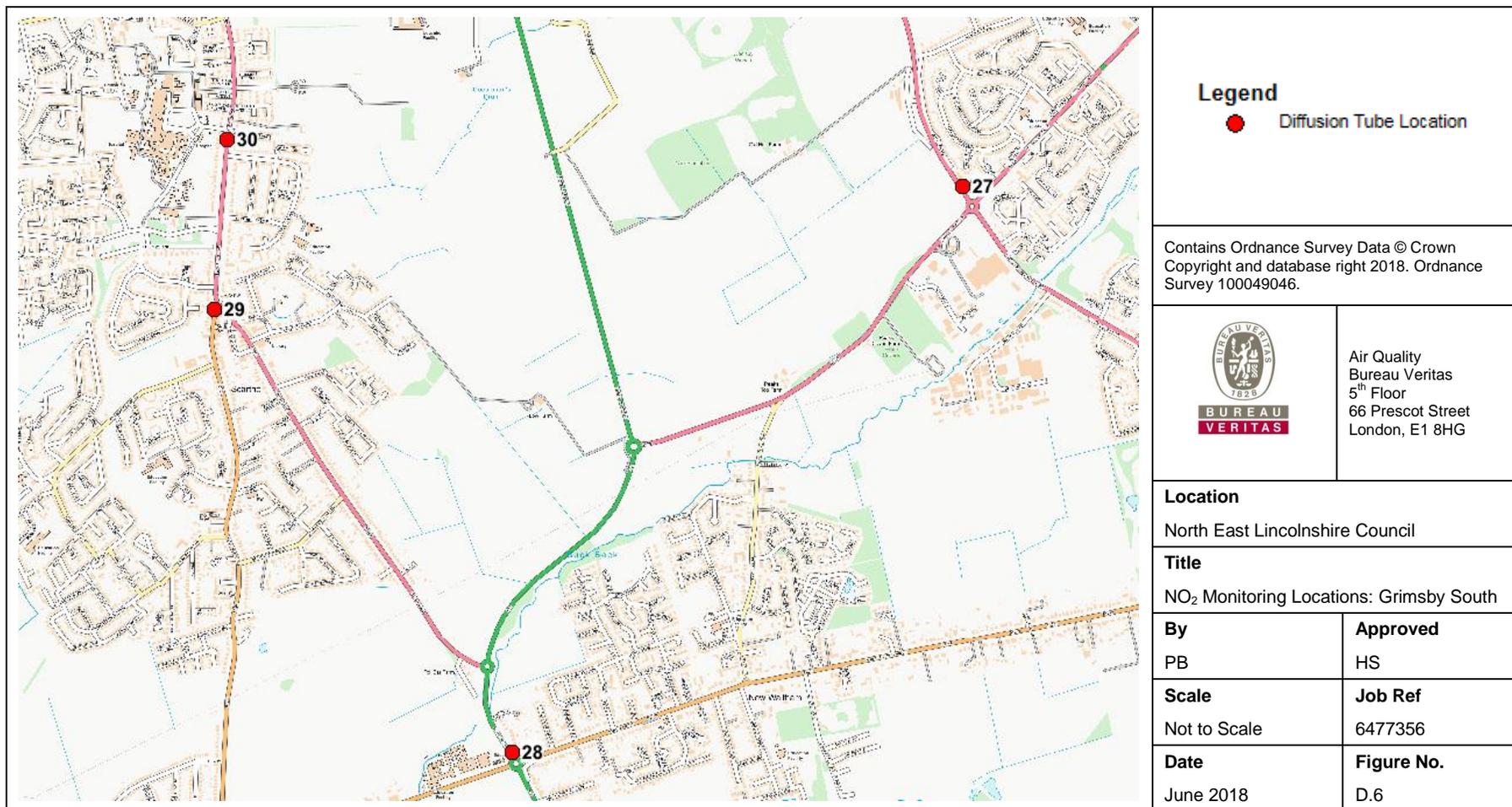
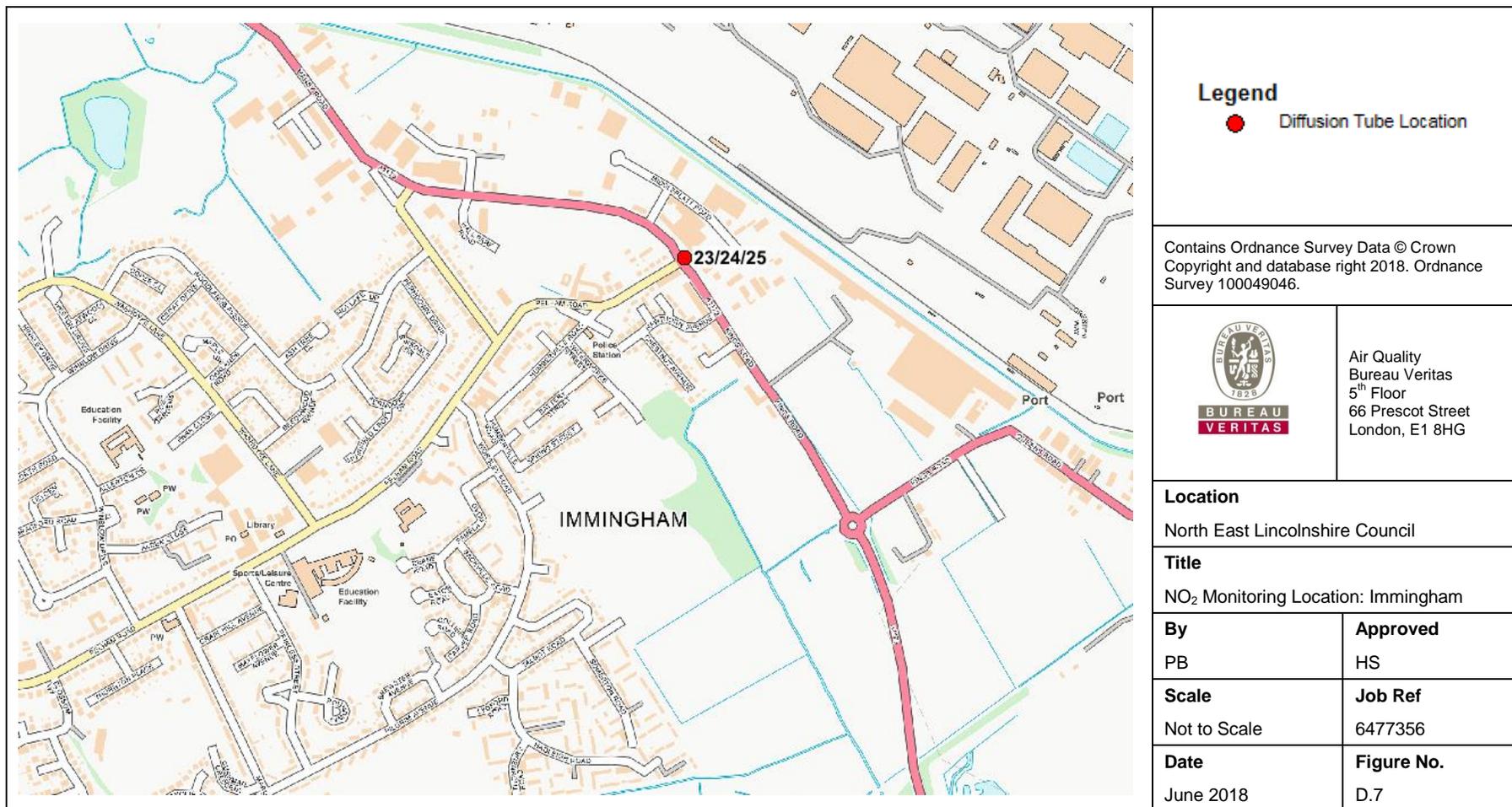


Figure D.7 – NO₂ Diffusion Tube Monitoring Location: Immingham



Appendix E: Summary of Air Quality Objectives in England

Pollutant	Air Quality Objective	
	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

Appendix F: Summary of Planning Applications Commented Upon in 2017

Planning Application Reference	Description of Development	AQA Completed?	Conclusions of AQA
DM/0333/17/ FUL	Immingham Railfreight Terminal Develop waste tyre to energy pyrolysis plant at disused Immingham Railfreight Terminal. Erect industrial building and installation of various plant and machinery across the site to include the creation of access, hardstanding/parking, boundary fencing and balancing pond. Scandinavian Way, Stallingborough, Grimsby, North East Lincolnshire, DN41 8DT.	Yes	The completed AQA concluded that the predicted air quality impacts resulting from the emissions to air from the pyrolysis plant and energy scheme were considered to be not significant at modelled human and ecological receptor locations in the local area. Development approved with conditions.
DM/0094/18/ FUL	Stallingborough Link Road Construction and modifications of a single carriageway highway link with shared cycle and footway from Moody Lane/Wood Lane junction (to the south east) to Hobson Way roundabout (to the north west) with associated works including drainage works, street lighting, fencing and landscaping. Energy Park Way, Grimsby, North East Lincolnshire	Yes	The completed AQA summarises that the results from the air quality modelling achieve the relevant air quality criteria at all ecological receptors within the vicinity of the site. Impacts were therefore classified as not significant. Decision currently pending.
DM/0766/16/ FUL	Land at Macaulay Street Erection of 224 houses with garages and/or parking spaces together with associated roads and infrastructure. Macaulay Street, Grimsby, North East Lincolnshire	Yes	The completed AQA has screened out the need for a detailed modelling assessment of impacts from increased traffic due to the development. The increase in traffic per day on any affected road is below the DMRB defined threshold (1,000). Development approved with conditions.
DM/1029/17/ SCR	Harbrough Fields Request for screening – 156 residential units and associated car parking, surface water flood mitigation and biodiversity enhancements with vehicular access from Brocklesby Avenue. Harbrough Fields, Brocklesby Avenue, Immingham, North East Lincolnshire	N/A (Screening request)	A screening response was received in relation to the proposed development, currently air quality impacts have not been discussed with the applicant. Environmental Impact Assessment (EIA) not required.
DM/0653/17/ SCR	Land Adjacent Freshney Place EIA screening for the redevelopment of redundant former bus station site to provide a 9 screen multiplex cinema and 7 Class A3 units together with	N/A (Screening request)	A screening response was received in relation to the proposed development, currently air quality impacts have not been discussed with the applicant.

North East Lincolnshire Council

Planning Application Reference	Description of Development	AQA Completed?	Conclusions of AQA
	associated alterations to adjacent shopping centre, remodelling of existing vehicular access from Frederick Ward Way, infilling to part of riverhead and hard and soft landscaping works.		Environmental Impact Assessment (EIA) not required.
DM/0850/17/SCR	Highfield House Request for EIA screening to allow use of land for residential development. Highfield House, Stallingborough Road, Immingham, North East Lincolnshire, DN40 1SW	N/A (Screening request)	A screening response was received in relation to the proposed development, currently air quality impacts have not been discussed with the applicant. Environmental Impact Assessment (EIA) not required.
DM/0971/17/FUL	Land at Hewitts Avenue Full planning permission for the development of 68 houses and 18 apartments with new access and associated landscaping and works in accordance with amended plan. Land at Hewitts Avenue, New Waltham, North East Lincolnshire	Yes	The completed AQA summarises that the results from the air quality modelling achieve the relevant air quality criteria at all receptors within the vicinity of the site. Impacts were therefore classified as not significant. Decision currently pending.

In addition to the developments listed in the table above, a variation request has been received by the Council on an existing environmental permit (EPR/JP3531PD/V004) for the Knauf Plasterboard Manufacturing facility located on Queens Road in Immingham. Currently the variation is being consulted upon and a further update on the permit will be provided within the 2019 ASR. Aside from the variation request that has been received, no new part B or A2 permits have been issued during 2017.

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
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

References

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