



2019 Air Quality Annual Status Report (ASR)

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

June 2019

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Executive Summary: Air Quality in Our Area

Air Quality in Fenland

This report forms the 2019 Annual Status Report (ASR) for Fenland District Council and sets out the findings of a review of air quality in the district in 2018.

Fenland District is located in Cambridgeshire, bordering East Cambridgeshire, Huntingdonshire and Peterborough districts. The main market towns in Fenland are Chatteris, March, Whittlesey and Wisbech. The district covers an area of 546 sq km (211 sq miles), whilst the 2011 Census records the population of Fenland at 95,300, growing by about 14% since 2001.

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 Local Air Quality Management (LAQM) regime was introduced by The Environment Act 1995, this requires local authorities to review and assess air quality in their areas from time to time. The first round of review and assessment (1997-2003) resulted in the declaration of Air Quality Management Areas (AQMAs) in Wisbech for industrial pollutants; sulphur dioxide and PM₁₀ caused by a coal-fired boiler at Wisbech canning factory. During the second round of review and assessment (2003-2005) instances of nitrogen dioxide exceedance were identified in Wisbech around town centre roads, which resulted in the declaration of an AQMA. Exceedances of the SO₂ 15-minute mean objective due to industrial emissions resulted in the declaration of the districts fourth AQMA in Whittlesey in 2006.

The review of the new monitoring data from 2018 has identified the following:

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

- The objectives for nitrogen dioxide were met at all the monitoring locations, including five new monitoring locations (25 passive monitoring sites), both inside and outside the AQMA; with generally good data capture. Whilst all sites were within the objectives there were some sites that did show a slight rise in levels from previous years whilst others showed a slight reduction. Two areas have been identified as areas to concentrate an extension of monitoring, at Broad Street March and Lynn Road Wisbech.
- The objectives for sulphur dioxide were met at the monitoring location (2 continuous monitoring sites) within the Whittlesey AQMA.
- Consideration of developments, environmental permits and changes in the district result in new pollutants has not identified any specific new sources that have not been considered previously or raise any new concerns. A detailed assessment of any new sources is not therefore required.

Fenland District Council will continue monitoring at all existing sites within the District. The five additional diffusion tubes have not identified any exceedances in the areas of concern for this monitoring period, but monitoring will continue to identify trends in these locations. The expansion of the diffusion tube networks has demonstrated that areas of public concern can be monitored.

The development of Fenland District Council's Health and Wellbeing Strategy⁴ has reinforced partnership working that will aim to improve air quality in the district. Initiatives such as active travel plans, intrinsically link both health and wellbeing and improving air quality. To detail how improved air quality can contribute to the Health and Well-being Strategy, an air quality action plan⁵ has been developed and shared with partners. The intrinsic link between poor air quality on health is also outlined in the Cambridgeshire Transport and Health JSNA.⁶

It is recognised that greater partnership working within and amongst local authorities and transport planners is vital to implement any significant improvements with regards to air quality. Partnership working particularly benefits the impacts from highways and new development.

The next air quality review and assessment report will be the 2020 ASR.

⁴ Fenland District Council Health and Wellbeing Strategy 2018-2021

⁵ Fenland District Council Air Quality Action Plan 2018

⁶ Cambridgeshire Transport and Health JSNA

Actions to Improve Air Quality

In 2018, Fenland District Council received an increased number of enquiries from the public raising concerns of the air quality in their community and the impact of poor air quality to their health and wellbeing.

Fenland District Council responded by developing an air quality action plan as an objective within the Council's Health and Wellbeing Strategy. The action plan engages with partners with the aim to achieve better quality fenland air through proactive and considered development and changes within the community.

In response to concerns regarding traffic pollution, additional diffusion tube locations were identified. Data capture at these locations was good, and has not seen exceedances.

The aim of raising public awareness has been actioned through officers attending town council meetings, working with the licensed taxi trade and participating in air quality action days.

Moving forward, actions to achieve even better fenland air quality have been laid out in Fenland's Air Quality Action Plan.

Conclusions and Priorities

This year's ASR demonstrates that Fenland continues to have air quality that meets relevant standards. Monitoring locations have widened and there is a desire to continue to monitor further. We commit to exploring options to undertake continuous monitoring in areas of community concern.

As an authority we have developed an air quality action plan to guide our future priorities and supplement the Council's Health and Wellbeing Strategy. The aim of the plan is to ensure better fenland air quality is a consideration throughout local authority decision making.

Involvement in Town Council meetings and Air Quality Action days are steps that the local authority has taken to raise awareness and expand the actions to improve air quality.

Priorities in the coming year are to revoke AQMAs that are no longer required, meet the actions identified in the Air Quality Plan and review the monitoring network for the relevance of locations and potential expansion.

Challenges that the local authority will encounter to continue to meet our priorities are;

- Ensure a proportional amount of resource is available to fulfil additional and further actions.
- Secure funding for further monitoring or modelling.
- To promote air quality as a priority for achieving health and well-being.

Local Engagement and How to Get Involved

In October 2018, Cambridgeshire County Council Full Council committed to take action to address poor air quality. The council resolved that they would support, engage and promote active participation across the County to address poor air quality. The County council are providing that link across the district to enable collaborative working, communication resources, training and learning events and guidance for public and private sector partners.

Engagement with decision makers has been progressed and formalised through the integration of the Air Quality Plan into the Health and Wellbeing Strategy.

Community transport champions have continued to progress, with 17 new champions trained throughout market towns in the district. They promote alternative transport, such as cycling and walking.

Town council updates and liaison meetings have taken place with councillors and industry to raise awareness and promote positive change.

Licensing action day included monitoring visits to all taxi ranks and to 3 schools. Part of the awareness that day was to monitor and promote anti-idling.

Information is promoted on Fenland's website and social media through the promotion of air quality action day, which includes how the public can get involved.

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1 Local Air Quality Management

This report provides an overview of air quality in the Fenland District during 2018. 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 Fenland District 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 Fenland District 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://ukair.defra.gov.uk/aqma/list?la=F&country=england&pollutant=all>

See full list at: <https://uk-air.defra.gov.uk/aqma/list>.

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

We propose to revoke AQMA Wisbech (1) and AQMA Wisbech (2), as the source of the pollution has been removed. The site is permitted by the EA, due to the change of fuel source from coal to gas; PM₁₀ and SO₂ are now no longer an issue. The permit requires limits for NO₂ to be met, monitoring of NO₂ levels in the vicinity are below the action level.

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 Whittlesey	2006	SO2 15 Minute Mean	Whittlesey	An area along roads and cycle routes to the west and northwest of Whittlesey brickworks and an area covering roads, footpaths, dwellings, schools and public open spaces to the east of Whittlesey brickworks.	NO	15-Minute Mean objective is likely to be breached based on modelling	Exceedances	15-Minute Mean within objective	Exceedances	No Formal Action Plan as monitoring consistently shows no exceedance of the objectives	N/A	N/A

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AQMA Wisbech (1)	2001	SO2 15 Minute Mean	Wisbech	An area in central Wisbech surrounding the Princes Food site.	NO	Number of 15 minute mean concentrations >266 µg/m3 = 1300	Exceedances	Source removed	Exceedances	Proposal to Revoke as source removed	N/A	N/A
AQMA Wisbech (2)	2001	PM10 24 Hour Mean	Wisbech	An area in central Wisbech surrounding the Princes Food site.	NO	Number of daily means > 50 µg/m3 (gravimetric) = 38 (modelled)	Exceedances	Source removed	Exceedances	Proposal to Revoke as source removed	N/A	N/A
AQMA Wisbech (3)	2006	NO2 Annual Mean	Wisbech	An area extending along the B198 Lynn Road between Freedom Bridge Roundabout and Mount Pleasant Road and along the A1101, from Sandylands, along Churchill Road to just past Westmead Avenue.	NO	40.9	µg/m3	31.3	µg/m3	No formal Action Plan as monitoring consistently shows no exceedance of the objectives	N/A	N/A

Fenland District 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 Fenland

Defra's appraisal of last year's ASR concluded that objectives are being met for all sources and pollutants and that work should progress on the revocation process. Although monitoring results are within the objectives, due to the location of some of the monitoring locations, future reports should correct NO₂ results for distance as outlined in the Technical Guidance (TG16). This has been carried out using the NO₂ fall off with distance calculator available on the Defra website.

Fenland District Council has taken forward a number of direct measures throughout 2018 in pursuit of improving local air quality. The main action has been to set out our Air Quality Plan to ensure measures are in place to continue to improve air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Fenland District Council expects the following measures to be completed over the course of the next reporting year:

- Review of AQMAs and revocation on compliant areas.
- A review of No₂ tube monitoring locations. It is expected that a number of sites that have seen continued compliance and improvements will no longer be monitored and new sites identified.
- A review of Fenland District Councils taxi licensing policy will consider how the trade can work towards better air quality.

Fenland District Council anticipates that the measures stated above, and in Table 2.2 will maintain compliance with the objectives throughout the district.

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
1	Improve traffic management at key junctions	Traffic Management	UTC, Congestion management, traffic reduction	CCC	2016	Ongoing	Reduced congestion and increased average speeds through the AQMA	Maintain level below standards	Access Strategy amended, following the public consultation feedback, awaiting committee sign off	2021	Lengthy Timescale / Funding
2	Consideration of Air Quality Impacts when providing comments on planning applications within an AQMA or where an AQMA could be impacted or created.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	FDC	On-going	On-going	Planning response time	Maintain levels below Standard	90% response rate	On-going	Environmental Health continues to respond to over 95% of planning applications within 21 days.
3	Fletton Liaison Meetings	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	EA / FDC	On-going	On-going	Maintain levels below Standard	Reduced vehicle emissions	Implementation on-going	On-going	Environmental health has inspected all permitted sites and no compliance actions have been required in 2018.
4	Transport & Access Group	Promoting Travel Alternatives	Promotion of walking	FDC	2016	Ongoing	Reduced vehicle use and increased use of public transport / Active Travel	Maintain levels below Standard	53 community champions have been provided with transport training to enable them to assist others to access transport and help promote walking and cycling		Additional 17 champions trained in 2018.

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5	Develop Air Quality Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	FDC	2018	2019	Publish Plan	Maintain levels below Standard	Planning Stage extended to incorporate requirements of Health and Wellbeing Strategy	2019	Completed. The report has been published with the health and well-being strategy and published.
6	March Area Transport Study	Traffic Management	UTC, Congestion management, traffic reduction	CCC	2017	Ongoing	Maintain levels below Standard	Maintain levels below Standard	Data acquisition	2020	

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} undertaken by Fenland District Council, therefore no concentration values can be reported or estimated using the method described in box 7.7 of LAQM.TG(16).

The 2017 DEFRA background maps for the Fenland District Council area (2015 based) show that all background concentrations of PM_{2.5} are far below the 2020 annual mean AQS objective for PM_{2.5}. The highest background concentration is predicted at 12.4 µg/m³, this is contained within the 1 x 1km grid square with the grid reference of 546500, 310500. This is an area of mixed residential and industrial use around Lynn Road in Wisbech.

Key indicators of the state of public health have been developed through the Public Health Outcomes Framework (PHOF)⁷ following the Health and Social Care Act 2012. The Public Health Outcomes Framework data tool, compiled by Public Health England, includes an indicator applicable to air pollution. Indicator 3.01: Fraction of mortality attributable to particulate air pollution; provides data on the mortality burden of PM_{2.5} within England and on a county and local authority scale. The fraction of mortality attributable to PM_{2.5} pollution across England is 5.3% (2016 data), the fraction within the Fenland District is 5.3%, this is equal to England as a whole and very slightly lower than average for the East of England as a whole (5.4%).

There are currently no smoke control areas within the District.

⁷ Public Health Outcomes Framework (PHOF)

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Fenland District Council did not carry out any automatic monitoring for pollutants during 2018. Monitoring data for SO₂ has been supplied by Forterra Building Products Limited (formally Hanson). As part of their Environmental Permit they monitor at two locations in the vicinity of the brickworks in Whittlesey. Forterra operates continuous ambient monitoring stations (CAMS) to the east-southeast of the former Saxon Works (Park Lane CAMS) and to the north of the Kings Dyke Works (Bradley Fen CAMS). Table A.1 in Appendix A shows the details of the sites.

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

3.1.2 Non-Automatic Monitoring Sites

Fenland District Council undertook non- automatic (passive) monitoring of NO₂ at 25 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

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

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 2018 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.

Following the bias adjustment process, all the nitrogen dioxide diffusion tubes showed compliance with the annual mean objective for nitrogen dioxide, both within and outside the NO₂ AQMA. A majority of the monitoring results for the reporting period compare favourably to the results of previous years demonstrating the improving trend recorded over recent years, data capture remains good across the district.

After bias adjustment and distance correction, an annual mean of 46.7µg/m³ has been identified for Broad Street in March. This exceedance has been considered to be linked to a noticeable increase of traffic using Broad Street during 2018, due to significant junction alterations on the bypass. This has highlighted the need for increased monitoring on Broad Street March to further assess the trend in this location.

Any annual means greater than 60µg/m³ may indicate that an exceedance of the 1-hour mean objective is also likely. No such exceedances were recorded at any monitoring site.

Fenland District Council has examined the results from monitoring in the district. Concentrations both within the AQMA and outside of it are all below the national objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment, and further highlights that consideration of revoking the AQMAs is warranted.

An expansion of the tube network and consideration of continuous monitoring for the area surrounding this location will continue into 2019.

3.2.2 Particulate Matter (PM₁₀)

Fenland District Council does not currently monitor for this pollutant.

3.2.3 Particulate Matter (PM_{2.5})

Fenland District Council does not currently monitor for this pollutant.

3.2.4 Sulphur Dioxide (SO₂)

The SO₂ monitoring results in Appendix A compares the ratified continuous monitored SO₂ concentrations for 2018 with the air quality objectives for SO₂.

These results confirm that the sulphur dioxide objectives are being achieved, for the 15-minute, hourly and daily air quality objectives at locations of relevant exposure within the current AQMA.

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)
AM1	Park Lane	Urban Background	526382	296859	SO2	YES	UV Fluorescence	0	N/A	1.5
AM2	Bradley Fen	Industrial	523924	297974	SO2	YES	UV Fluorescence	0	N/A	1.5

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	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)
S1	A605	Roadside	527059	297205	NO2	NO	3	1	NO	2.1
S2	March Station Road	Roadside	541951	297762	NO2	NO	9	2	NO	2.3
S3	Ramnoth	Kerbside	546857	308553	NO2	YES	4	1	NO	2.2
S4	Orchard R'about	Kerbside	526852	297244	NO2	NO	6	2	NO	2.2
S5	Bowthorpe	Kerbside	546414	309585	NO2	YES	3	2	NO	2.2
S6	Kings Dyke	Roadside	525287	297404	NO2	NO	7	2	NO	2.1
S7	Cemetery Road	Roadside	527287	297156	NO2	NO	5	2	NO	2.2
S8	Westmead Avenue	Kerbside	546886	308366	NO2	YES	12	1	NO	2.2
S9	Thorney Toll	Kerbside	534132	303969	NO2	NO	1	1	NO	2.9
S10	Coates	Kerbside	530613	297702	NO2	NO	0	1	NO	2.5
S11	High Street March	Roadside	541658	296190	NO2	NO	1	2	NO	2.1
S12	AWS Lynn Road	Industrial	546588	310192	NO2	YES	10	N/A	NO	2.3
S13	Lynn Road / Mt Pleasant	Roadside	546661	310396	NO2	YES	4	1	NO	2.2
S14	Clare St / A141	Kerbside	538728	285743	NO2	NO	5	1	NO	2.1
S15	Weasenham Lane JCN	Roadside	546828	308543	NO2	YES	4	2	NO	2.2
S16	Lynn Road R'about	Roadside	546260	309987	NO2	YES	0	2	NO	2.2

S17	Weasenham / Cromwell	Roadside	545509	308731	NO2	NO	2	2	NO	2.2
S18	New Road	Roadside	540391	286415	NO2	NO	9	4	NO	2.3
S19	Broad St March	Roadside	541653	296769	NO2	NO	0	3	NO	2.1
S20	Napier	Roadside	546485	309389	NO2	YES	2	2	NO	2.2
S21	Norfolk Court	Kerbside	541833	296985	NO2	NO	1	1	NO	2.1
S22	Station Road / Wild Boar	Kerbside	527357	296550	NO2	NO	1	6	NO	2.1
S23	West End	Kerbside	526351	297454	NO2	NO	1	1	NO	2.1
S24	Hockling Court	Kerbside	541777	296872	NO2	NO	1	1	NO	2.1
S25	Gildenburgh Crescent	Kerbside	528089	297173	NO2	NO	3	9	NO	2.1

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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
S1	Roadside	Diffusion Tube	100	100	25.8	22.6	24.4	23.3	21.70
S2	Roadside	Diffusion Tube	100	100	17.8	17.2	21.4	22.8	19.99
S3	Kerbside	Diffusion Tube	100	100	25.7	27.8	24.4	25.7	21.06
S4	Kerbside	Diffusion Tube	92	92	25.6	23.5	23.1	24.7	22.21
S5	Kerbside	Diffusion Tube	100	100	28.6	33.4	35.4	35.7	28.20
S6	Roadside	Diffusion Tube	100	100	21.7	20.2	19.4	20.6	16.10
S7	Roadside	Diffusion Tube	100	100	21.7	21.9	22.4	23.3	20.61
S8	Kerbside	Diffusion Tube	92	92	18.3	18.4	18.5	20.3	29.09
S9	Kerbside	Diffusion Tube	100	100	21.9	21.5	20.3	20.8	19.29
S10	Kerbside	Diffusion Tube	100	100	20	21.5	21	22.7	18.57
S11	Roadside	Diffusion Tube	100	100	22.8	22.6	21.4	19.9	20.50
S12	Industrial	Diffusion Tube	92	92	16.7	16.7	16.1	16.1	14.81
S13	Roadside	Diffusion Tube	92	92	31.8	29.8	27.1	26.3	27.24
S14	Kerbside	Diffusion Tube	100	100	21.4	21.6	19.5	18.9	17.20
S15	Roadside	Diffusion	100	100	33	34.9	34.4	33.7	29.65

		Tube							
S16	Roadside	Diffusion Tube	92	92	32.7	32.1	30.5	29.7	30.57
S17	Roadside	Diffusion Tube	92	92	20.7	19.2	20.3	20.4	17.56
S18	Roadside	Diffusion Tube	100	100	17.1	15.3	15.3	14.8	13.65
S19	Roadside	Diffusion Tube	92	92	36.2	34	33.3	35.8	30.09
S20	Roadside	Diffusion Tube	100	100	36.4	31.4	31.8	29.0	27.26
S21	Roadside	Diffusion Tube							19.06
S22	Roadside	Diffusion Tube							16.10
S23	Roadside	Diffusion Tube							22.37
S24	Roadside	Diffusion Tube							26.19
S25	Roadside	Diffusion Tube							16.65

Diffusion tube data has been bias corrected

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.

(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 NO₂ Concentrations

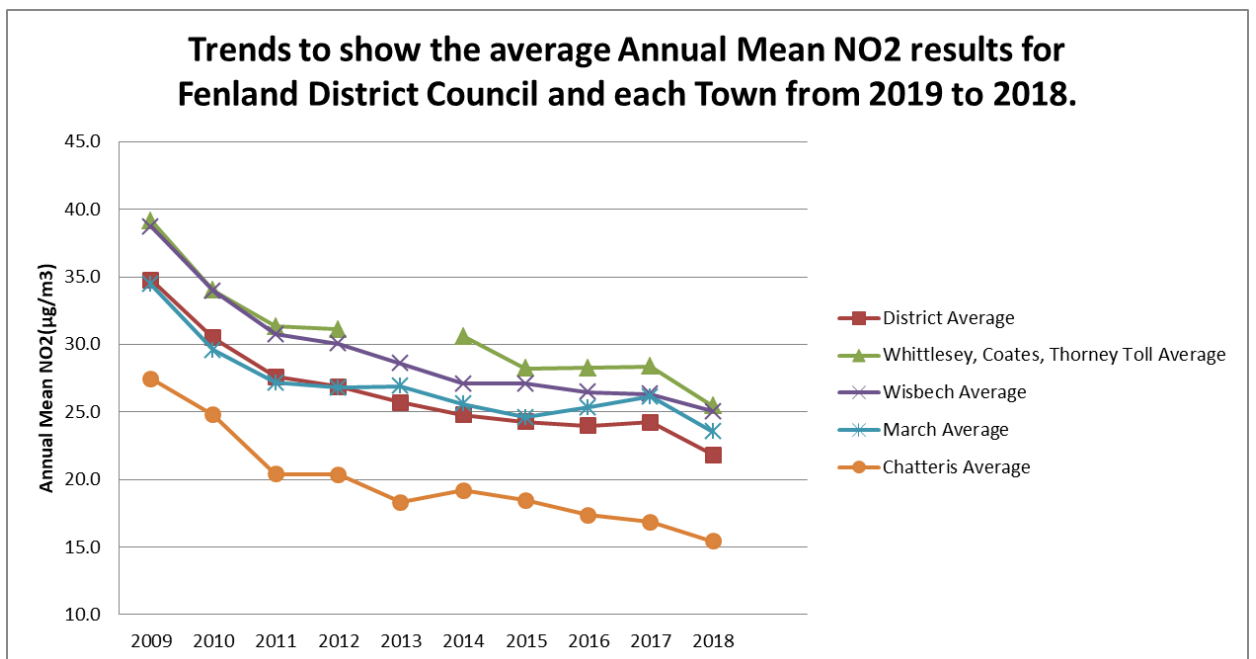
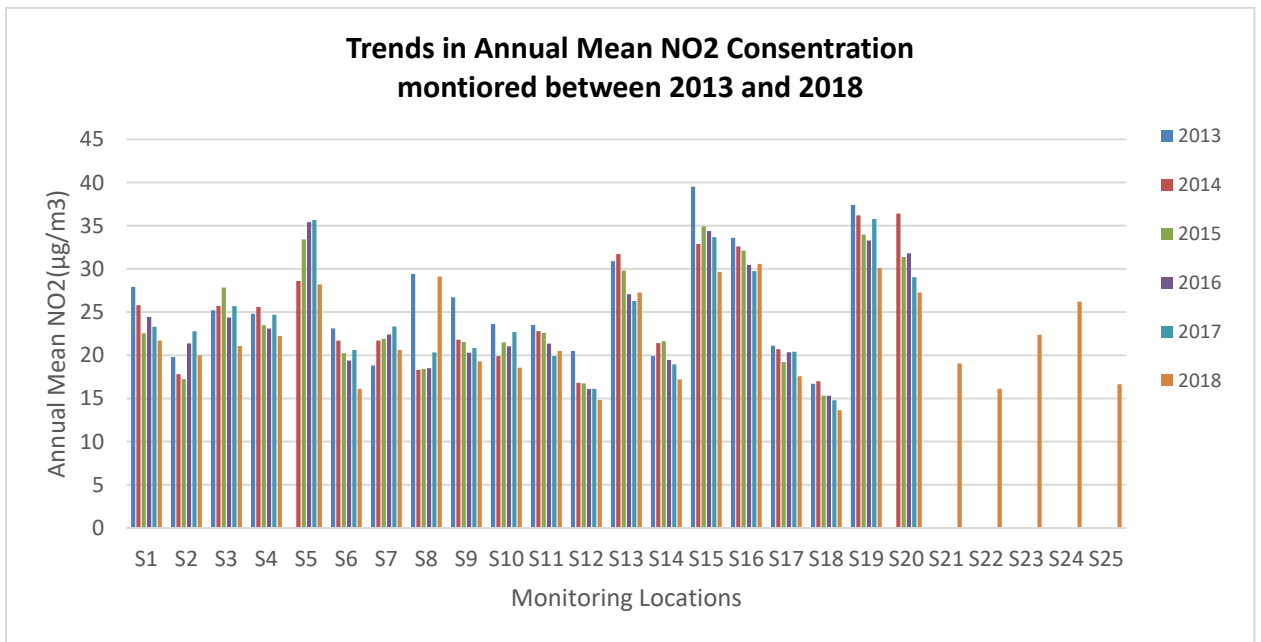


Table A.4 – SO₂ Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	Number of Exceedances 2018 (percentile in bracket) ⁽³⁾		
				15-minute Objective (266 µg/m ³)	1-hour Objective (350 µg/m ³)	24-hour Objective (125 µg/m ³)
AM1	Urban Background	98.78%	98.78%	0	0	0
AM2	Industrial	99.85%	99.85%	9	0	0

Notes:

Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

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

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

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

Figure A.2 – Trends in SO₂ Concentrations

	2012	2013	2014	2015	2016	2017	2018	National Objectives
AM1 - Park Lane CAMS								
Number of 15 minute means exceeding 266 (µg/m ³)	1	4	4	1	1	4	0	35
Number of hourly means exceeding 350 (µg/m ³)	0	0	0	0	0	0	0	24
Number of daily means exceeding 125 (µg/m ³)	0	0	0	0	0	0	0	3
% Data Capture	100	99	99	99	100	99	99	90
AM2 - Bradley Fen CAMS								
Number of 15 minute means exceeding 266 (µg/m ³)	4	1	2	0	8	2	9	35
Number of hourly means exceeding 350 (µg/m ³)	0	0	0	0	0	0	0	24
Number of daily means exceeding 125 (µg/m ³)	0	0	0	0	0	0	0	3
% Data Capture	98	99	99	99	99	98	100	90

Notes:

Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

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 (0.76) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾	
S1	36.672	34.762	35.335	27.313	22.538	16.808	25.594	24.066	23.493	28.268	36.099	31.706	28.55	21.70	19.5	
S2	35.526	27.313	27.886	22.538	20.819	14.325	22.538	24.257	29.605	29.796		34.762	26.31	19.99	17.0	
S3	30.56	34.762	27.313	26.74	16.999	18.909	27.886	27.886	33.043	29.223	29.414	29.796	27.71	21.06	19.8	
S4	36.863	33.807	32.47	25.021	22.156	16.808		25.403	26.931	29.414	38.391	34.189	29.22	22.21	19.6	
S5	49.087	45.458	37.054	39.919	31.897	21.201	35.144	35.144	41.065	35.526	42.211	31.515	37.10	28.20	27.0	
S6	25.976	24.257	25.403	21.774	13.37	10.505	22.156	21.201	22.156	19.291	22.729	25.403	21.19	16.10	15.2	
S7	31.133	31.133	29.414	24.639	15.471	12.797			27.504	30.178	36.29	32.661	27.12	20.61	18.7	
S8	47.368	46.413	36.863	36.099	35.717	21.201	41.256	37.245	42.211	38.582	42.784	33.616	38.28	29.09	22.8	
S9	32.661	21.01	26.931	25.212	18.336	14.707	28.459	25.594	24.448	24.448	33.234	29.605	25.39	19.29	19.3	
S10	25.976	29.223	27.695	20.819	19.673	17.763	22.729	18.336	23.875	26.931	29.414	30.751	24.43	18.57	21.3	
S11	28.268	35.526	27.886	26.358	25.212	23.875	26.167	21.583	20.246	28.841	34.189	25.594	26.98	20.50	22.1	
S12	26.74	18.909	22.156	17.572	13.752	10.314	16.044	17.954	22.156	21.774	23.684	22.729	19.48	14.81	-	
S13	38.582	37.245	39.919	36.672	35.908	28.459	36.099	31.706	34.571	32.661	40.874	37.436	35.84	27.24	23.8	
S14	17.763	29.032	26.931	22.538	19.673	17.19	14.134	22.347	24.257	22.156	27.695	27.886	22.63	17.20	14.6	
S15	45.649	42.402	41.829	31.897	29.605	27.695	42.784	40.683	44.121	37.627	46.413	37.436	39.01	29.65	27.5	

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S16	42.211	48.323	43.93	40.301	34.38	33.425	40.683	33.998	36.099	39.346	52.143	37.818	40.22	30.57	38.7
S17	31.897	29.223	34.571	19.1	18.145	16.426	21.201	18.909	17.572	20.437		26.74	23.11	17.56	17.6
S18	14.898	22.538	19.291	16.426	19.482	14.325	16.235	14.325	18.527	18.718	20.819	19.864	17.95	13.65	12.6
S19	45.076	42.784	33.616	33.807	37.818	34.38	44.694	37.436	40.683	41.638		43.548	39.59	30.09	46.7
S20	36.863	40.874	42.02	40.874	41.065	25.403	38.009	33.616	32.852	33.043		29.987	35.87	27.26	27.3
S21	35.908	27.504	19.291		19.291	16.235	20.437	22.347	26.167	28.077	32.47	28.077	25.07	19.06	19.1
S22	29.605	22.92	23.493	17.763	16.426	13.37	16.235	17.381	20.437	22.347	26.931	27.313	21.19	16.10	19.0
S23	41.638	31.515	32.279	25.976	22.729	14.898	21.965	29.032	32.088	34.762	27.886	38.391	29.43	22.37	22.4
S24	45.076	33.234	33.998	32.088	26.549	19.673	36.672	34.189	37.054		41.256	39.346	34.47	26.19	26.2
S25	29.796	27.886	20.819	19.482	13.752	9.741	4.393	21.583	21.01	22.347	28.459	43.548	21.90	16.65	18.9

National bias adjustment factor used

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) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Bias Adjustment Factors

Diffusion tube values have been multiplied by a bias correction factor of 0.76 obtained from the DEFRA LAQM Helpdesk national bias adjustment database (version 03/18).

Discussion of Choice of Factor to Use

No local co-location information was available so a bias adjustment factor was obtained from the national bias adjustment database which is available at: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>.

Adjustment factors are derived from data from diffusion tubes which were co-located with real-time analysers.

The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection.

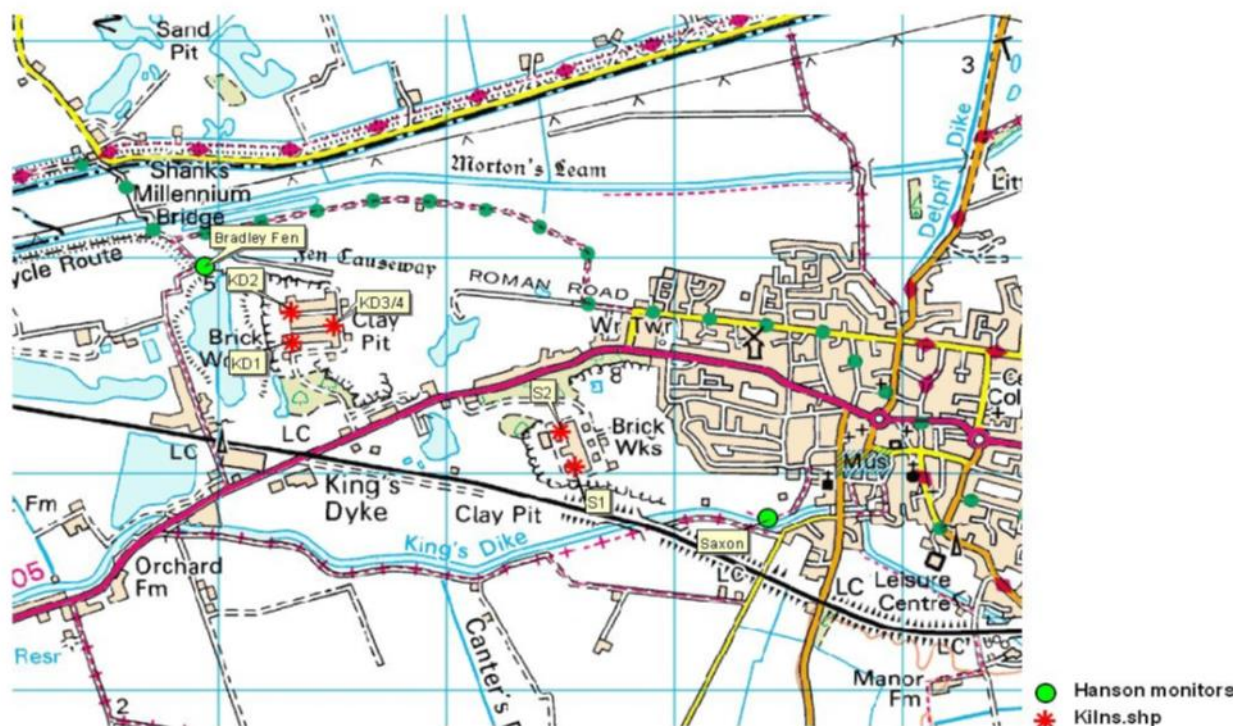
In the WASP intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, SOCOTEC (formerly ESG) currently holds the highest rank of a Satisfactory laboratory. Entering the parameters for ESG Didcot, and a 50% triethanolamine (TEA) in acetone preparation method for 2018 gave an adjustment factor of 0.76 which has been applied to the Fenland data.

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

Automatic Monitoring Sites

Fenland District Council does not currently operate any automatic monitoring sites. Monitoring of SO₂ is undertaken by Forterra Building Products (formerly Hanson) at two locations in the vicinity of the brickworks in Whittlesey. As part of their environmental permit Forterra operate a continuous ambient monitoring station (CAMS) to the east-southeast of the former Saxon Works (Park Lane CAMS (formerly Saxon) and a second CAMS to the north of the Kings Dyke Works (Bradley Fen CAMS).

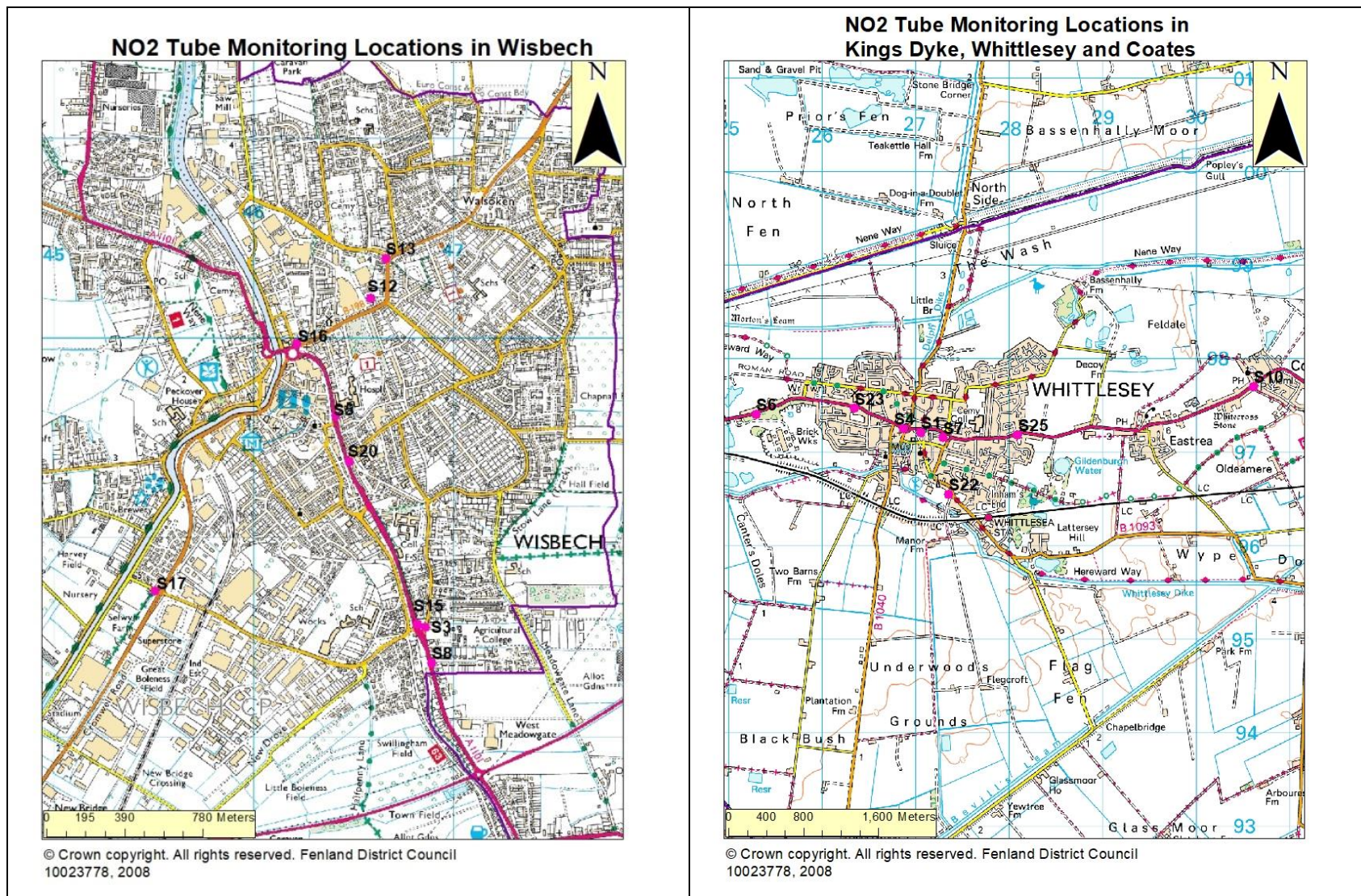
Figure D.1 Map of Automatic Monitoring Sites run by Forterra in Whittlesey



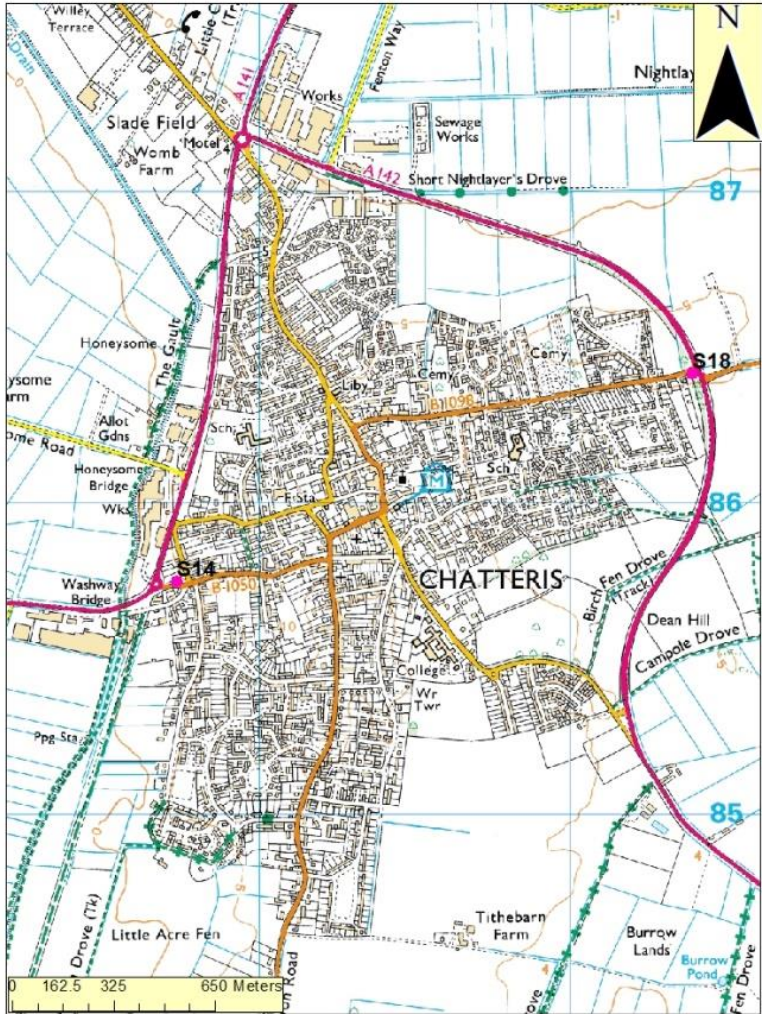
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Note: Kilns S1 and S2 no longer operate and the permit for this site has been surrendered.

Figure D.2 Map(s) of Non-Automatic Monitoring Sites

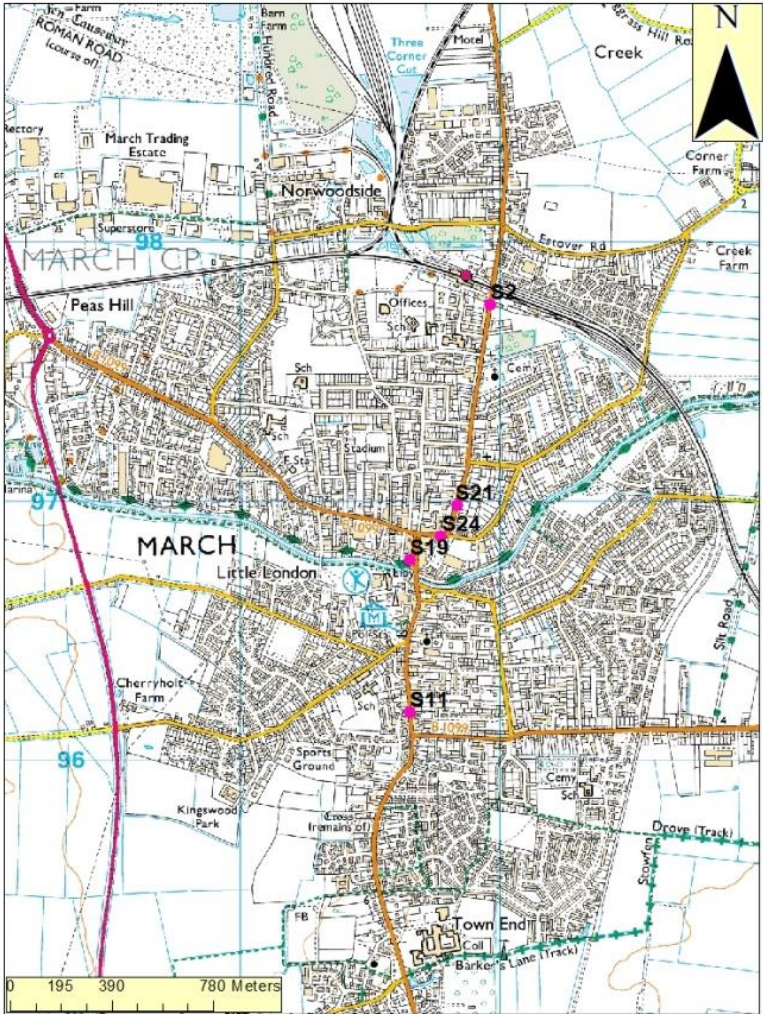


NO2 Tube Monitoring Locations in Chatteris



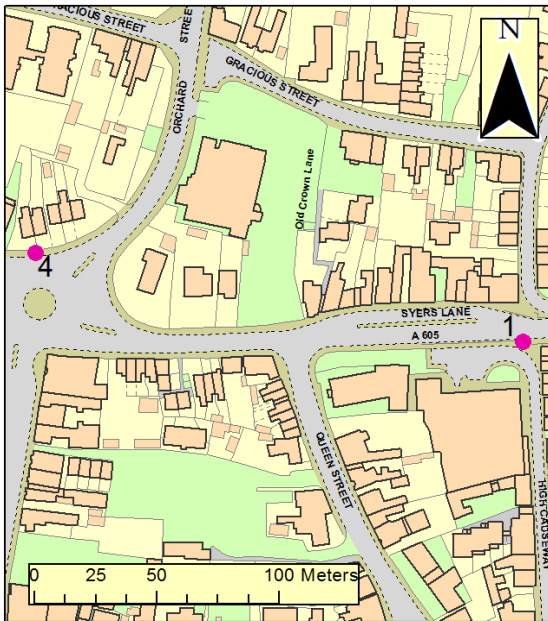
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NO2 Tube Monitoring Locations in March



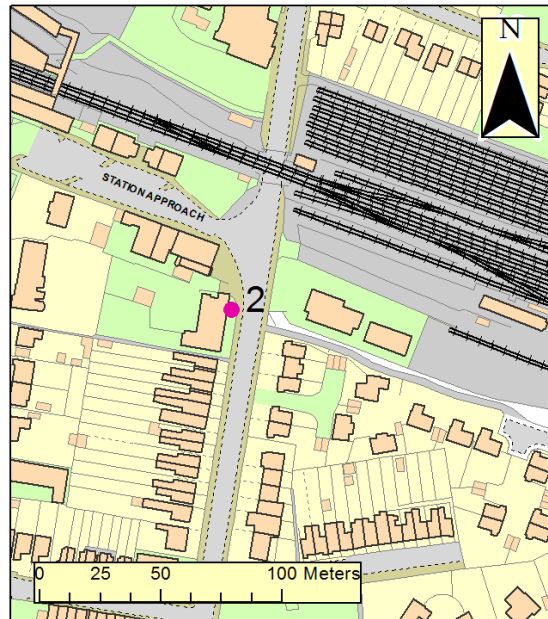
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Tubes 4 Orchard Road & 1 A605 Whittlesey



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Tube 2 - Station Road March



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Tubes 3 Ramnoth, 8 Westmead & 15 Weasenham Wisbech



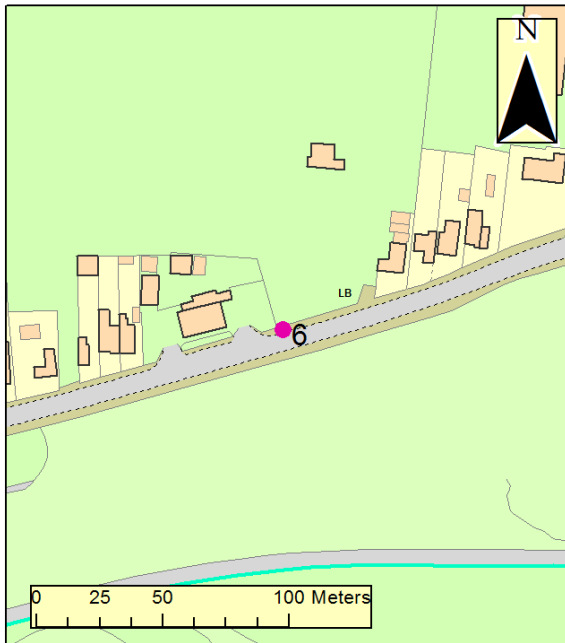
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Tubes 5 Bowthorpe & 20 Naiper Wisbech



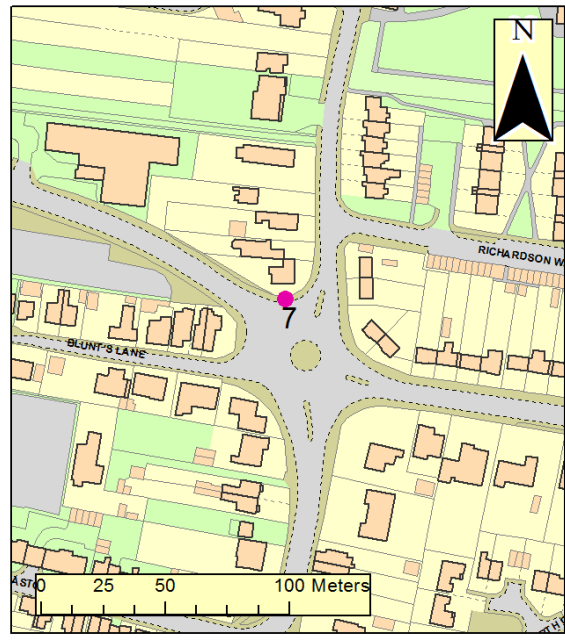
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Tube 6 Kings Dyke Whittlesey



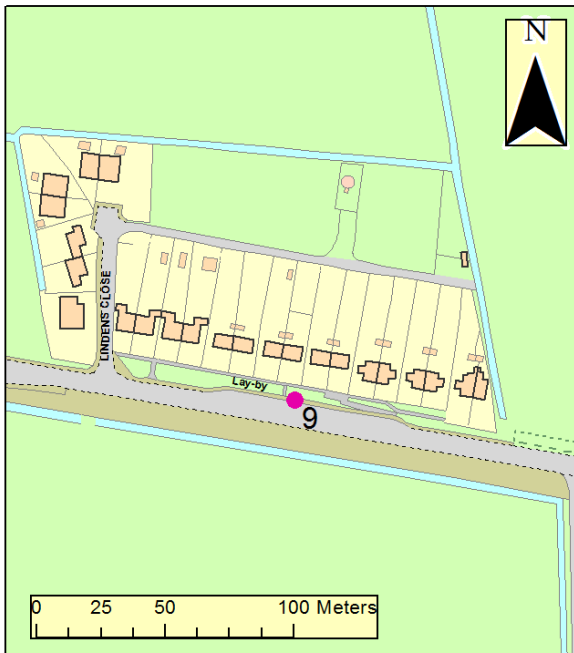
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Tube 7 Cemetary Road Whittlesey



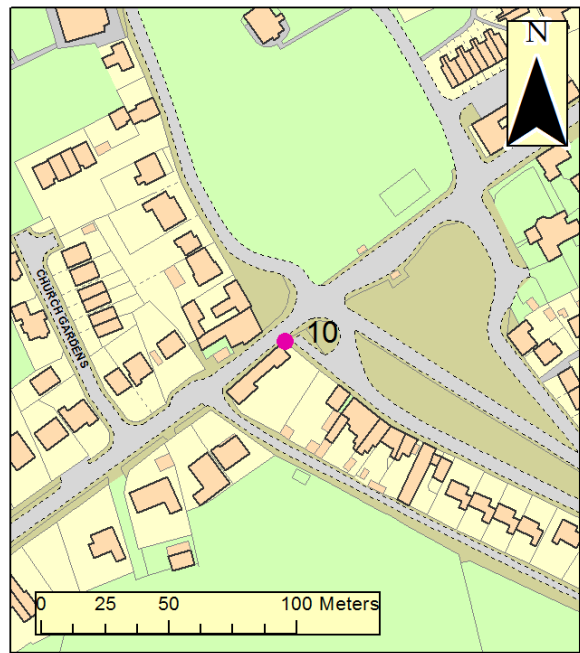
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Tube 9 A47 Thorney Toll



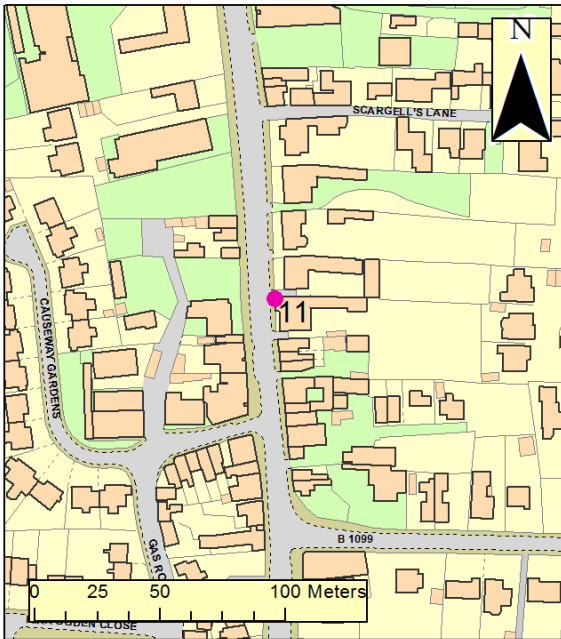
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Tube 10 - (A605) Coates



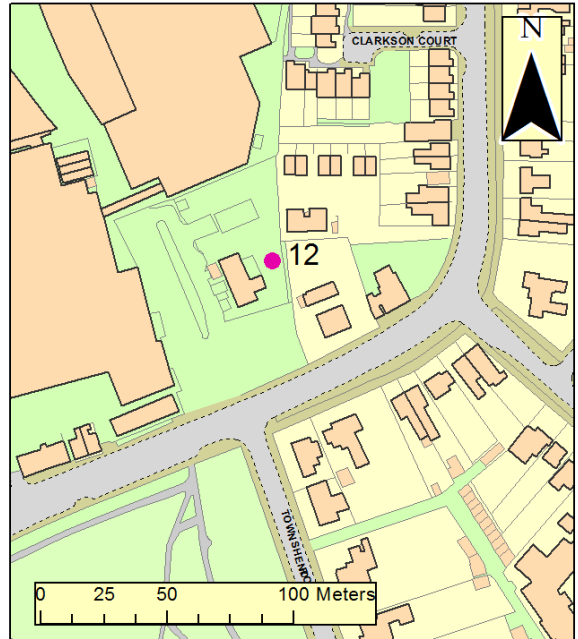
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Tube 11 - High Street March



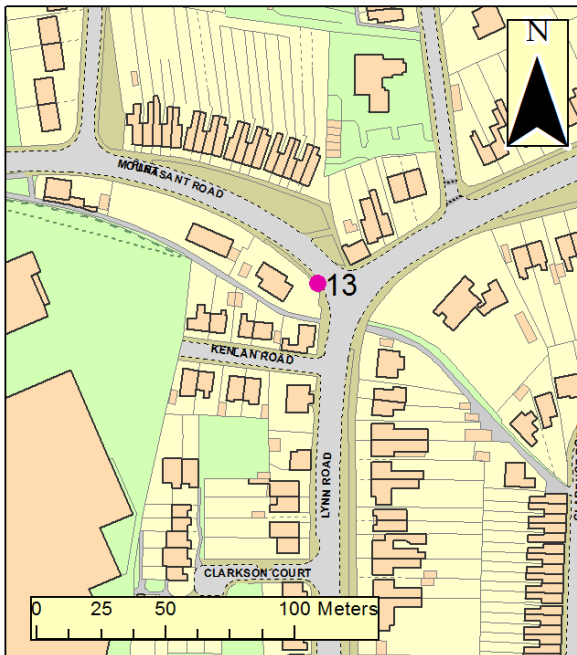
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Tube 12 AWS Lynn Road Background Site Wisbech



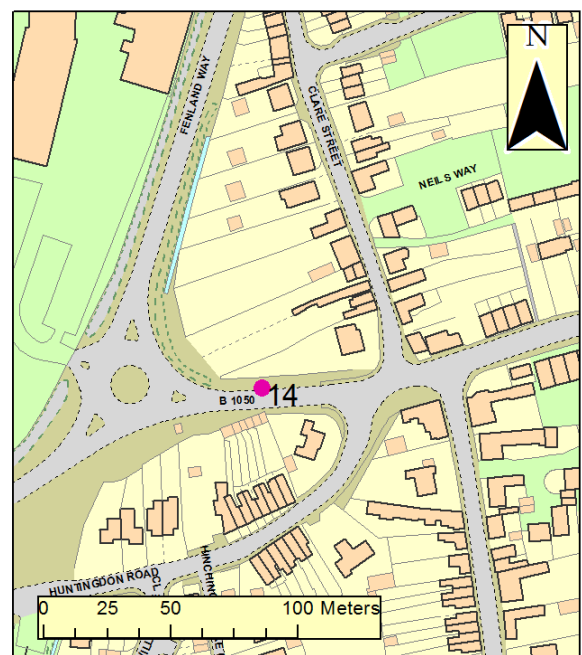
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Tube 13 Lynn Road / Mount Pleasant Wisbech



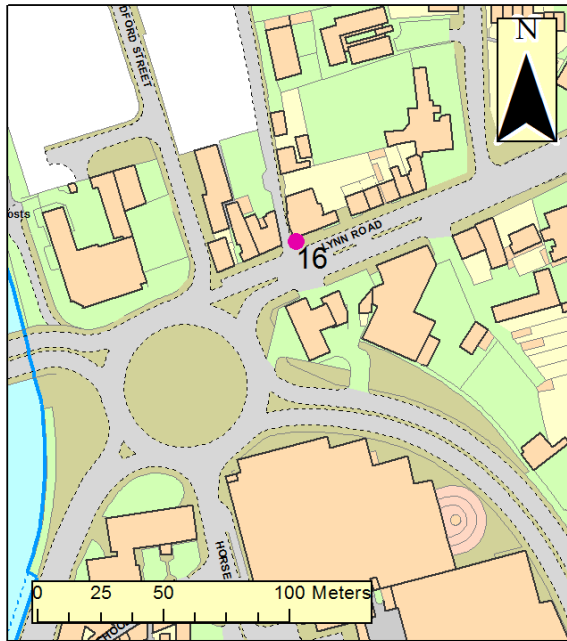
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Tube 14 - Clare Steet / A141 Chatteris



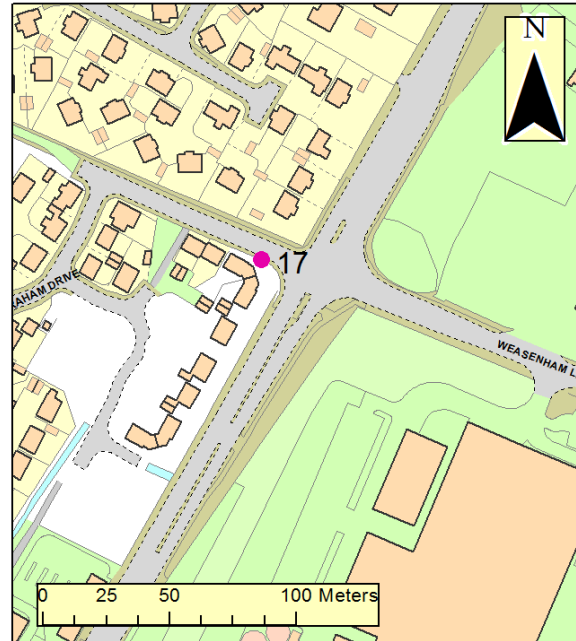
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Tube 16 Lynn Road Wisbech



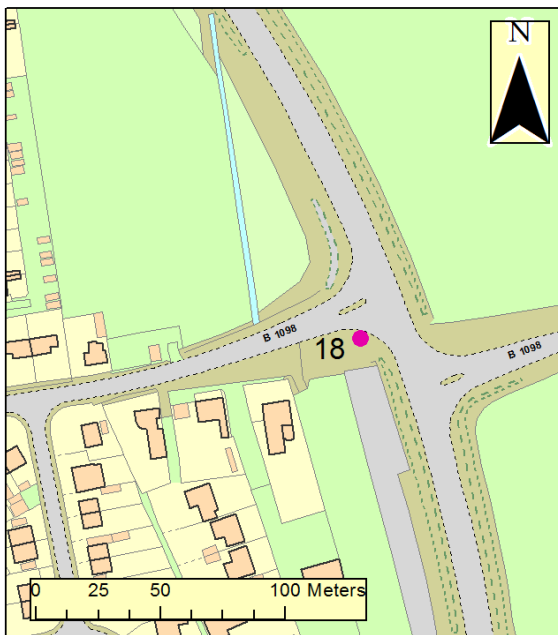
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Tube 17 Cromwell Road / Weasenham Lane Wisbech



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Tube 18 - New Road Chatteris



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Tube 19 - Broad Street March



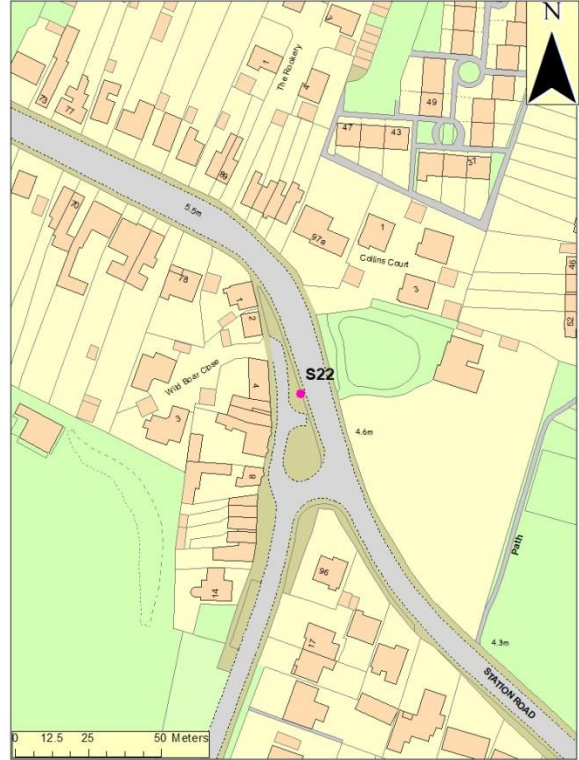
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**Tube 21 – Station Road, March
Tube 24 – Jim Hocking Court, March**



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Tube 22 – Station Road / Wild Boar Close, Whittlesey



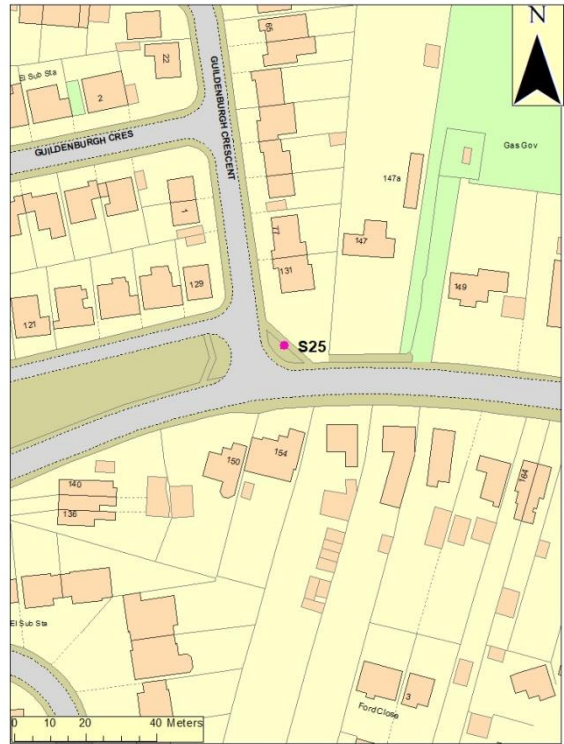
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Tube 23 – West End, Whittlesey



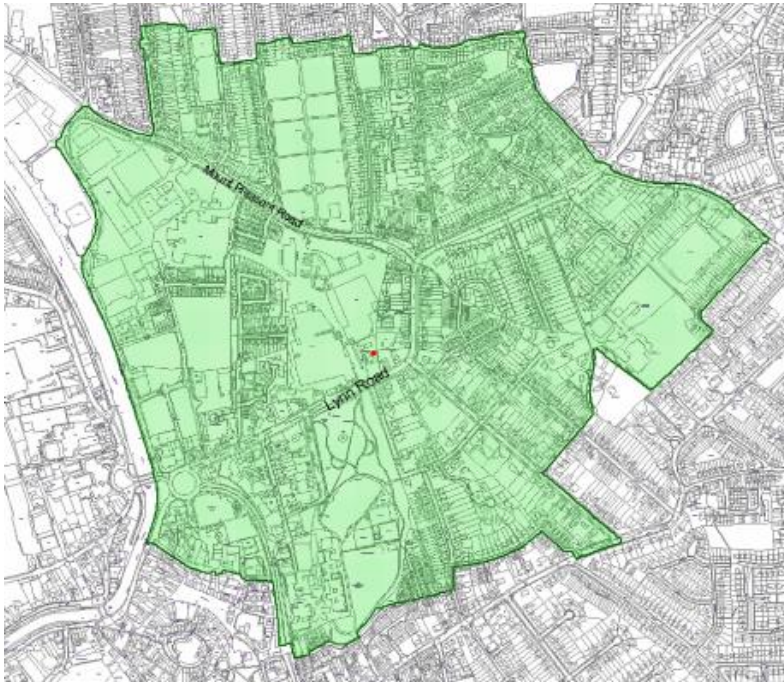
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Tube 25 – Guildenburgh Crescent / Eastrea Road, Whittlesey



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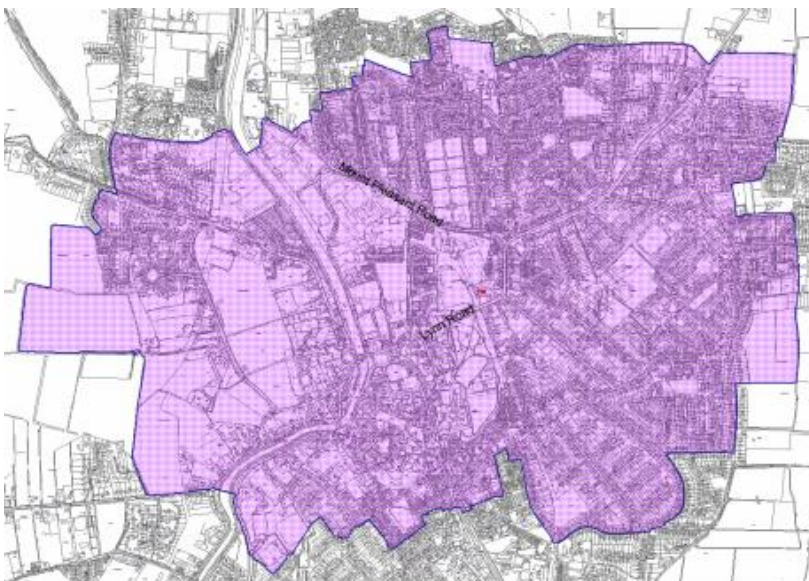
Figure D.3 PM₁₀ AQMA in Wisbech



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Green area =PM₁₀ AQMA

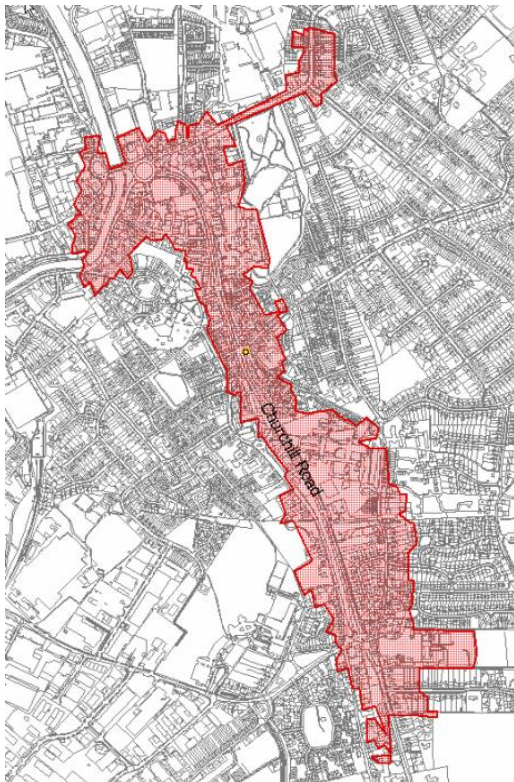
Figure D.4 SO₂ AQMA in Wisbech



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Purple area =SO₂ AQMA

Figure D.5 NO₂ AQMA in Wisbech



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Red area = NO₂ AQMA

Figure D.6 SO₂ AQMA in Whittlesey



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Blue areas = SO₂ AQMA

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁸	
	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

⁸ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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
...	...

References

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
4. Fenland District Council Health and Wellbeing Strategy 2018-2021
5. Fenland District Council Air Quality Action Plan 2018
6. Cambridgeshire Transport and Health JSNA
<http://cambridgeshireinsight.org.uk/wp-content/uploads/2017/08/Transport-and-Health-JSNA-2015-Air-Pollution.pdf>
7. Public Health Outcomes Framework (PHOF)