2018 Air Quality Annual Status Report (ASR)

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

October 2018

Local Authority Officer (s)	Martin Brown BSc, MCERTS Dr. Adobi Okam
Department	Regulatory Services and Health
Address	C/O Municipal Buildings Earle Street Crewe CW1 2BJ
Telephone	0300 123 5015
E-mail	airquality@cheshireeast.gov.uk
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Checked	**Nick Kelly** Environmental Protection Team Leader	
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Checked	**Tracey Bettaney** Principal Manager: Regulatory Services and Health	
Checked	**Fiona Reynolds** Director of Public Health	
Checked	**Sean Hannaby** Director of Planning	
Checked	**Andrew Ross** Strategic Infrastructure Manager	
Authorised for Release	**Kath O'Dwyer** Acting Chief Executive	

Executive Summary: Air Quality in Our Area

Air Quality in Cheshire East

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 inequality, because areas with poor air quality are often associated with less affluent areas[1,2].

In relation to Public Health, it is estimated that air pollution plays a part in 40,000 early deaths every year in the UK[3]. In addition, the annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be in the region of £16 billion[4].

Cheshire East Council has completed and submitted all previous rounds of Review and Assessment. This ASR responds to DEFRA's comments on the 2017 ASR, outlining the new AQMAs that were declared in 2017 (Chester Road, Middlewich; Middlewich Road, Sandbach; Hibel Road, Macclesfield; Broken Cross, Macclesfield; and Park Lane, Macclesfield). The main pollutant of interest in Cheshire East is nitrogen dioxide (NO_2). Thus this Annual Status Report (ASR) considers all NO_2 monitoring data for 2017 and assesses this against the UK Air Quality Objectives. It compares the 2017 monitoring data to previous years in order to establish a trend. Progress on measures to improve air quality are also identified, as well as Cheshire East Council's approach to reducing emissions of fine particulates ($PM_{2.5}$), which now has increased focus within the ASR as a result of emerging evidence of the health impacts.

[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] Royal College of Physicians. Every breath we take: the lifelong impact of air pollution. Report of a working party. London: RCP, 2016
[4] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Following on from findings within the 2017 ASR, the 2016 NO_2 data initially identified a requirement to carry out modelling in an additional four areas across the Borough in Middlewich, Bollington, Knutsford and Astbury with respect to breaches of the annual mean objective of NO_2. The Detailed Assessments supporting the modelling are published in Appendix F of this report. These are also discussed in Section 2 of the ASR.

As a pre-emptive response, further tubes were added to each area to provide more data to help understand the air quality situation. The tubes were put out in January, August and October 2017.

Whilst the modelling concluded that there was no need to declare any of these areas as AQMAs, monitoring results suggested that a precautionary approach should be taken with the areas around Lewin Street, Middlewich and Chelford Road, Knutsford. Therefore, the Council will be declaring these two areas as AQMAs and will be reviewing their boundaries in the future.

Within the Lower Heath (tube CE114) and West Road (tube CE104), Congleton AQMAs, the diffusion tube annual mean has previously been reported above 60 µg/m^3, with the most recent levels for 2017 measurement > 60 µg/m^3. In accordance with guidance and research[5] these circumstances indicate that the areas have the potential to exceed the short term hourly objective and therefore further investigation is being carried out.

As of the 1st June 2018, the Cranage AQMA was revoked in accordance with Defra guidelines as the receptors within the boundary had moved following the demolition of existing properties. Further monitoring has been and will continue to be conducted at the next nearest receptors to the source, i.e. the M6 motorway. These monitoring sites have shown no further exceedances of the annual objective, hence the decision to revoke the AQMA.

The monitoring data for 2017 shows (in general) lower concentrations than 2016. However, having analysed the data between 2012 and 2017, we found some statistically significant difference ($p < 0.05$) between some of the years (see Section 3.2.1.1 and Appendix G Table G.1); some of the years did not indicate any significant

[5] Laxen D and Marner B (2003). Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites – http://uk-air.defra.gov.uk/assets/documents/reports/cat06/1hr_NO2_rpt_Final_b.pdf

difference. They were found to be around the usual range of annual variations. It is normal to expect monitoring data to fluctuate year on year, primarily due to variable weather conditions, however other local factors can influence nitrogen dioxide concentrations such as roadworks close to the monitoring location, or long term construction in an area.

Whilst it is important to note that air quality in Cheshire East is generally good, there remain 17 AQMAs within the Borough all of which can be viewed on the Cheshire East Council Air Quality website[6]. As mentioned previously there are two further AQMAs to be declared this year following on from work reported within the 2017 ASR.

Actions to Improve Air Quality

All of the AQMAs declared in Cheshire East are as a result of traffic/vehicular emissions. As such most of the measures to improve air quality are focused on targeting vehicular emissions. Through the Air Quality Action Plan (AQAP), a considerable amount of work has been carried out by the Council to improve air quality. This AQAP has been recently reviewed and will address all AQMAs declared up to the end of 2017. The new draft AQAP is in development following consultation with key stakeholders and members of the public. The proposed actions in the AQAP will be applied to the areas of; traffic management, development and planning, alternative and active travel, low emission transportation and public awareness.

The Council's Air Quality Team is continually working with partner agencies to implement the measures in the AQAP and to determine if any further measure should be included in the AQAP.

Projects delivered through the past action plan include; comprehensive traffic reviews and resigning works in Nantwich; A556 Bypass in Mere; Crewe Green link road; installation of electric vehicle charging points and the relocation of the entrance to Crewe Station. In addition, there has been work to upgrade traffic lights at various

[6] http://www.cheshireeast.gov.uk/environment/environmental_health/local_air_quality/review_and_assessment/aqma_area_maps.aspx

locations across the borough such as: - Lower Heath Congleton, Rood Hill Congleton, and West Road Congleton.

Conclusions and Priorities

As mentioned previously and based on the 2017 monitoring data, there is the need to declare two further AQMAs in the towns of Middlewich and Knutsford. The boundaries of these areas will be reviewed over the course of the next year to establish which sensitive receptors should be included. However, in the interim the Council will take a precautionary approach to setting the boundary which can be refined as more data becomes available.

The AQMA in Cranage was revoked on the 1st June 2018 as a result of there no longer being any sensitive receptors within the AQMA boundary. Further monitoring continues to be conducted in the locality to ensure other receptors in the area are not exposed to NO_2 concentrations above the AQO.

The 2017 ASR discussed whether there was a need to declare an AQMA with respect to the hourly objective in West Road and Lower Heath, Congleton. This work remains ongoing throughout 2018.

The priorities for the next year, aside from work to declare the new AQMAs, are to work with partner agencies and stakeholders to implement the actions outlined within the AQAP. There will also be work undertaken on the Mere AQMA to determine the new AQMA boundary following the opening of the new A556 bypass which removed a large proportion of the source from the existing area.

Local Engagement and How to get involved

As part of compiling the 2018 AQAP, the Council held a number of workshops in the towns where there are currently AQMAs. The aim of these workshops was to provide members of the public and Town/Parish Councils an opportunity to discuss existing ideas for the AQAP and bring new ideas to the table using local knowledge on the potential causes of poor air quality.

The Council was also requested to hold two air quality information evenings for Holmes Chapel and Disley Parish Councils. The aim of these events was to provide information to members in the broader aspects of air quality as well as the monitoring

currently being undertaken by the Council and to provide the opportunity for questions to be asked. The information provided in these events can then be shared with the towns constituents. These types of events will be held throughout the remainder of 2018 for other Parish or Town Councils and any other relevant interested parties/groups as requested.

The key message for these events is to provide innformatiobn in relation to what constitutes poor air quality and the difficulties the Council faces in tackling it without the help and commitment of the community. This could include ideas like considering the use of public transport or cycling rather than the car where possible. Any suitable suggestions will be followed up to determine if they are viable and potentially be included in the AQAP.

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1 Local Air Quality Management

This report provides an overview of air quality in Cheshire East Borough Council 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 (PG 16, TG 16).

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their area 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 Air Quality objectives. This Annual Status Report (ASR) is an annual requirement to outline the strategies employed by Cheshire East Borough Council to improve air quality and the progress that has been made against the delivery of those strategies.

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

Cheshire East has 17 AQMAs all of which are as a result of breaching the NO_2 Air Quality Objective (AQO). The main NO_2 contributor in Cheshire East is traffic/vehicular emissions. Therefore most of the measures to improve air quality are predominantly aimed at targeting traffic (vehicular) emissions. Details of AQMAs and their current status are listed in Table 2.2. A revised AQAP has been produced and this will be adopted later in 2018. This new AQAP will consider all existing AQMAs and the newly declared AQMAs to date.

Actions in the AQAP are categorised as;

- **General measures**: - The measures in this section address the management of air quality across the entire borough.
- **AQMA specific measures**: - Each AQMA has its own peculiarity, which requires bespoke measures to manage their air quality in that area.

Progress on measures to improve air quality is contained in Table 2.3.

In addition to the AQAP, there are a number of policies, strategies and plans at national and local levels which contribute towards improvements of air quality. Some of the local strategies used in Cheshire East include the Air Quality Strategy (AQS), Local Transport Plan (LTP) and Low emission Strategy (LES). Details of these policies can be found in the updated AQAP.

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 Cheshire East Council can be found in Table 2.2. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at;

https://www.cheshireeast.gov.uk/environment/environmental_health/local_air_quality/aqma_area_maps.aspx

A map of all the air quality monitoring locations across Cheshire East can be found at https://opendata.cheshireeast.gov.uk/Environment/2018-NO2-Diffusion-Tube-Map/cc8y-c4tn

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

2.1.1 Modelling NO_2 exceedances

In 2017, the Council identified exceedances of the annual mean NO_2 objective measured at some of the diffusion tube monitoring sites (Table 2.1). As a result, the Council commissioned Cambridge Environmental Research Consultants Ltd (CERC) to model NO_2 concentrations within those areas in order to help make appropriate decisions as to whether those areas should be declared as AQMAs.

CERC carried out the modelling using the Atmospheric Dispersion Modelling System (ADMS) ADMS-Urban dispersion model. It is a practical air pollution modelling tool, which has been developed to provide detailed predictions of pollution concentrations for all sizes of study area.

The modelling used 2017 traffic data from the Department for Transport and 2016/2017 data provided by Cheshire East Council. This traffic data was used in conjunction with the latest emission factors published by Defra, which were adjusted to take into account evidence of real-world driving emissions. The modelling also included emissions from industrial and other sources, taken from the National Atmospheric Emissions Inventory.

A year of hourly sequential meteorological data measured at Manchester Airport in 2017 was also used for the modelling.

The NO_x chemistry calculations in ADMS-Urban take into account emissions and background concentrations of NO_x, NO_2, volatile organic compounds (VOCs) and ozone (O_3). As such, hourly average rural background concentrations of NO_x, NO_2 and ozone (O_3) from Glazebury and or Ladybower and Aston Hill were inputted into the model to account for NO_x chemistry inclusion. According to CERC, this data was downloaded from the National Air Quality Information Archive.

NO_x chemistry is based on NO_x being mainly released into the atmosphere in the form of nitric oxide (NO) which is then converted to NO_2 through chemical processes in the atmosphere. Under most atmospheric conditions, the dominant pathway for NO_2 formation is via the reaction of NO with O_3.

Table 2.1 presents the measured and modelled annual average NO_2 concentrations at the monitoring locations for 2017 where exceedances had been identified in 2017.

The outcome of the modelling suggests that there were no predicted exceedances of the 40 µg/m^3 annual NO_2 objective at Bollington, Astbury, Knutsford and Middlewich at relevant public exposure (Table 2.1 and Appendix F).

However, Knutsford and Middlewich showed predicted exceedances of the annual NO_2 objectives along the main roads but this did not extend to any of the sensitive receptors (more detailed information of the modelling can be found in Appendix F).

As such, the modelling suggests that it is not necessary to declare an AQMA within these areas.

However, the Council will take a precautionary approach and look to declare an area around Lewin Street-Middlewich and Chelford Road, Knutsford as AQMAs within the next 12 months. This is because the measured NO_2 concentrations in those areas show annual mean exceedances (Table 2.1).

The Council will continue monitoring NO_2 in these four areas in order to collect sufficient data to better understand any long term air quality trend/profile in each of the areas, to help make air quality decisions in the future. This will also help to refine existing and potentially new AQMA boundaries.

Table 2.1 Diffusion tube site measured and modelling concentrations

Town	Location	Tube ID	Measured NO_2 concentration ($\mu g/m^3$) 2016	Measured NO_2 concentration ($\mu g/m^3$) 2017	Modelled NO_2 concentration ($\mu g/m^3$) 2017
Bias adjustment factor (Month/Year)			**0.92 (September/2017)**	**0.87 (September/2018)**	
Bollington	16 Henshall Road	CE93	**40.90**	36.82	36
	19/21 Henshall Road	CE288		25.94	36
	3 The butchers, Henshall Road	CE289		23.10	24
	6/8 Henshall Road	CE290		33.39	38
Knutsford	15 Chelford Road	CE94	**52.70**	**45.06**	32
	The Willows, Chelford Road	CE286		30.20	29
	Park Cottage, 19 Chelford Road	CE291		24.08	32
Middlewich	White horse, Lewin Street	CE134	38.90	36.02	38
	Longcross court, Lewin Street	CE270		30.69	37
	DIY Shop, Lewin Street	CE282		**42.83**	35
	35 Lewin Street	CE269		**40.34**	34
Astbury	Rose Cottage, Peel Lane	CE127	**40.40**	35.39	31
	Egerton Arms, Peel Lane	CE294		35.60	38
	South View Cottage, Peel Lane	CE295		21.14	26

The bold concentrations are concentrations above NO_2 annual exceedances
Measured NO_2 concentrations are distance corrected

Following the opening of the new A556 bypass, which has removed the vast majority of traffic from the area and shown a significant reduction in the NO_2 monitoring data as compared to previous years, we propose to amend the Mere AQMA.

In order to amend the Mere AQMA, we will include extra diffusion tube monitoring around the Tabley area by Junction 19 of the M6 to aid in the amendment of the AQMA boundary.

The Cranage AQMA was revoked on the 1 June 2018 because there is no longer any relevant exposure within the AQMA as the householder has demolished and redeveloped the properties at a greater distance from the M6 Motorway.

Table 2.2 – Declared/Revoked Air Quality Management Areas

AQMA Name	Date Declared/Revoked	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 West Road	Declared 01/05/2005	NO_2 Annual Mean	Congleton	Between the Wagon and Horses gyratory and the fire station roundabout	NO	61 µg/m^3	56 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA A34/A54 Rood Hill	Declared 01/05/2005	NO_2 Annual Mean	Congleton	A short stretch at the Rood Hill A34/A54 traffic lights.	NO	60 µg/m^3	41 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA Lower Heath	Declared 01/04/2008	NO_2 Annual Mean	Congleton	A short stretch of the A34 at Lower Heath	NO	47 µg/m^3	61 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA A5022/A534	Declared 01/04/2008	NO_2 Annual Mean	Sandbach	A number of properties around the junction of A534 and A5022.	YES	47 µg/m^3	41 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2

AQMA Name	Date Declared/Revoked	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 Nantwich Road	Declared 14/11/2008 Amended 01/05/2012	NO_2 Annual Mean	Crewe	A stretch of the A534 through Crewe	NO	44 µg/m^3	38 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA Earle Street	Declared 31/01/2010 Amended 01/04/2012	NO_2 Annual Mean	Crewe	A length of Earle Street through Crewe	NO	42 µg/m^3	38 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA Hospital Street	Declared 16/12/2006	NO_2 Annual Mean	Nantwich	A short stretch of the A534 through Nantwich	NO	59 µg/m^3	48 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA A556 Chester Road	Declared 24/04/2008	NO_2 Annual Mean	Mere	An area along the length of the A556 Chester Road, Mere, between the roundabout with the A56 Lymm Road to the north and junction 19 of the M6 to the south.	NO	59 µg/m^3	39 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2

AQMA Name	Date Declared/Revoked	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 A6 Market Street	Declared 01/04/2010	NO_2 Annual Mean	Disley	A stretch of the A6 running from Market Street/Buxton Old Road crossroads in the west, to the junction with Redhouse Lane in the east.	NO	62 µg/m^3	57 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA A523 London Road	Declared 01/04/2010	NO_2 Annual Mean	Macclesfield	An area from the Mill Lane/Silk Road junction in the north, to a point 65m south of the London Road Terrace junction in the south.	NO	43 µg/m^3	42 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA A50 Manchester Road	Declared 01/04/2010	NO_2 Annual Mean	Knutsford	A small number of properties along the A50 at the Windsor Way junction	NO	43 µg/m^3	34 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2
AQMA Wistaston Road	Declared 01/11/2011	NO_2 Annual Mean	Crewe	A stretch of Wistaston Road through Crewe	NO	44 µg/m^3	33 µg/m^3	Local Air Quality Management Final Action Plan	Jul-11	Cheshire East Air Quality Action plan 2011 - https://goo.gl/s6puD2

AQMA Name	Date Declared/Revoked	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 Chester Road, Middlewich	Declared 01.10.2017	NO_2 Annual Mean	Middlewich	A stretch of Chester Road in Middlewich	NO	42 µg/m^3	44 µg/m^3	Cheshire East Borough Council Air Quality Action Plan	TBC	Cheshire East Air Quality Action plan 2018 (draft) - https://goo.gl/s6puD2
AQMA Middlewich Road, Sandbach	Declared 01.10.2017	NO_2 Annual Mean	Sandbach	A short length of Middlewich Road, Sandbach	NO	49 µg/m^3	39 µg/m^3	Cheshire East Borough Council Air Quality Action Plan	TBC	Cheshire East Air Quality Action plan 2018 (draft) https://goo.gl/s6puD2
AQMA Hibel Road, Macclesfield	Declared 01.10.2017	NO_2 Annual Mean	Macclesfield	A short length of Hibel Road, Macclesfield	NO	44 µg/m^3	46 µg/m^3	Cheshire East Borough Council Air Quality Action Plan	TBC	Cheshire East Air Quality Action plan 2018 (draft) https://goo.gl/s6puD2
AQMA Broken Cross, Macclesfield	Declared 01.10.2017	NO_2 Annual Mean	Macclesfield	An area around Broken Cross Roundabout, Macclesfield	NO	44 µg/m^3	33 µg/m^3	Cheshire East Borough Council Air Quality Action Plan	TBC	Cheshire East Air Quality Action plan 2018 (draft) https://goo.gl/s6puD2

AQMA Name	Date Declared/Revoked	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 Park Lane, Macclesfield	Declared 01.10.2017	NO_2 Annual Mean	Macclesfield	A short stretch of Park Lane, Macclesfield	NO	44 µg/m^3	38 µg/m^3	Cheshire East Borough Council Air Quality Action Plan	TBC	Cheshire East Air Quality Action plan 2018 (draft) https://goo.gl/s6puD2
AQMA M6 Motorway	Revoked 01/06/2018	NO_2 Annual Mean	Cranage	A short stretch between junctions 18 and 19 of the M6 Cranage	YES					

2.2 Progress and Impact of Measures to address Air Quality in Cheshire East Council

In order to discuss the progress the Council has made in addressing air quality issues, we will first address DEFRA's previous appraisal comments dated October 2017 (Reference: ASR17-150).

2.2.1 Defra's appraisal of 2017 ASR concluded the following:

1. *The report highlights significant changes in terms of plans to declare new AQMAs, following Detailed Assessments, a review of existing AQMAs, and reviewing the monitoring strategy, in advance of plans to produce a new action plan for 2018.*

   Response – All monitoring sites are constantly reviewed to make sure that they are still relevant. For example following the review of existing sites and AQMAs, Cranage AQMA was revoked. Following the detailed assessments based on the monitoring data across the borough, 5 new AQMAs were declared. They are;

   - Chester Road, Middlewich
   - Middlewich Road, Sandbach
   - Hibel Road, Macclesfield
   - Broken Cross, Macclesfield
   - Park Lane, Macclesfield.

   In addition a new AQAP that contains actions aiming to reduce concentrations of air pollutants has been produced and will be adopted in 2018.

2. *The results of the Detailed Assessments highlight the relative uncertainties provided by modelling when typically no more than 2 diffusion tubes have been used as a basis to verify the models. This is not considered sufficiently robust to be confident in the outcomes, and is reflected by the degree of corrections that have been applied to the model results. Thus all potential AQMA exceedance boundaries should be verified by monitoring.*

Response – The need for more tubes in order to have more robust data for model verification was identified prior to appraisal comments. As such extra tubes were already put in place before appraisal at all potential AQMA exceedance boundaries in order to obtain more robust data and verify the AQMA boundaries

3. *We agree the Council should consider declaring AQMAs as recommended, however without the confirmation of further monitoring results, the boundaries in most cases will also be uncertain.*

   Response – As agreed by DEFRA, in 2017 Cheshire East declared 5 new AQMAs mentioned above. However, additional monitoring is being carried out to verify the AQMA boundaries, and continued status as AQMAs.

4. *For sites where the objective has been met in recent years, now showing only a marginal exceedance, including:*
   - *Chester Road, Middlewich*
   - *Lewin Street, Middlewich*
   - *Chester Road Macclesfield*

   These sites should remain under review with additional monitoring sites employed to determine whether there may be evidence for declaring AQMAs in future years when there is additional supportive evidence. There is a rationale that where pollution levels are only marginally above the objective level, that carrying out additional monitoring for a further year can be a productive exercise in clarifying what steps are needed.

   Response – These sites still remain under review with additional monitoring sites deployed in order to gather evidence which will support the declaration of the AQMA and determine extent of AQMAs and potential AQMA.

5. *We agree that the Cranage AQMA can be revoked based upon the assessment provided in Appendix F of the 2017 ASR.*

Response – Cranage AQMA has been revoked. This is because there is no longer any relevant exposure within the boundary of the declared AQMA, there is no requirement to keep the AQMA.

6. *We would urge the Council to carefully consider the latest Technical Guidance (LAQM TG (16)), in relation to the development of a new Action Plan. Chapter 2 of this Guidance provides clear Guidance on the principles to follow.*

   Response – Cheshire East Council has produced a draft AQAP. The Council hopes to publish this document towards the end of 2018. This AQAP has been produced following guidance provided in the LAQM TG (16). The document features key requirements, source apportionment and required reduction emission as suggested by the LAQM TG (16).

7. *There are some key common requirements for the development of an effective*

   AQAP:

   1) Develop the AQAP in stages;

   2) Undertake appropriate local monitoring and assessment (source apportionment)

   3) Decide what level of actions are required

   4) Establish links to other key policy areas / strategies

   5) Establish a Steering Group with key stakeholder groups at an early stage

   6) Undertake measures selection and impact assessment

   7) Agree monitoring and evaluation of success and

   8) Undertake consultation.

   These elements are all discussed in detail within Chapter 2 of LAQM TG (16)

   Response – All these key requirements were used in the development of the AQAP. Action Plan, outcome, comments, response, and contributions can be found in the 2018 AQAP document.

8. *The Action Plan will need to address emissions reductions required to deliver the air quality objectives at all the hotspot locations identified with*

AQMAs. Thus the continued monitoring and assessment of air quality is required as a means to establish a baseline of pollution data, that can be considered alongside traffic and emissions data to provide a monitoring framework to review progress on the future impacts of measures to improve air quality throughout the Council area.

Response – The AQAP document, features emission reduction calculation for all the AQMAs. Monitoring will continue across the AQMAs in order to measure air quality progress.

9. *It is considered that there will need to be significant engagement with the local and neighbouring highways authorities and Highways England in order to provide a co-ordinated response with key neighbouring authorities, and to ensure that a detailed assessment of the local options for traffic management are given due consideration within the development of the action plan.*

   Response – A range of different key stakeholders such as Highways, Public Health, other Local Authorities and members of public in existing AQMAs were consulted during the production of the AQAP. Other external agencies such as Highways England have also been consulted. A draft copy of the 2018 AQAP has been provided to them. All comments can be found in the AQAP document.

10. There appear to be some discrepancies in the current AQMA records presented within the report. We believe there were amendments to some of the original AQMAs, and other amendments do not appear on our records. Please can the Council validate the current AQMA details to ensure central records are up to date

    Response – All AQMA details have been validated. Up to date information has been supplied to DEFRA and all AQMA details on the DEFRA website have been updated.

2.2.2 Action measure progress

Cheshire East Council 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 2.3.

It should be noted that the AQAP measures included in this ASR are those which are in the existing AQAP and the new measures included in the new Draft AQAP will be included in the 2019 ASR once they have been finalised and approved.

- Comprehensive traffic reviews and resigning completed in Nantwich, A556 Bypass completed in Mere, Crewe Green link road completed and Crewe Station entrance relocated.
- Upgraded traffic lights at various locations such as:
    - Lower Heath, Congleton
    - Rood Hill, Congleton; and
    - West Road, Congleton
- In order to reduce pollution on the A6 corridor, the A6 Corridor is managed as part of the South East Manchester Multi-Modal Scheme (SEMMMS) and A555 Manchester Airport Relief Road Enhanced mitigation measure includes speed limit reduction making the whole A6 30mph in order to smooth traffic flow.
- Air Quality steering group has been established since April 2016.
- Completion of public consultation engagement on the AQAP in towns where there are AQMAs.
- A Residential Travel Information Pack (Guide for Developers) has been produced. Developers use this guide to develop their Travel Information Pack which they submit as part of their planning conditions and are given to residents of the development.
- A number of Active Transport Modes schemes have been implemented across the borough see Table 2.3 and Table 2.4.

Cheshire East Council expects the following measures to be completed over the course of the next reporting year:

- Adoption of the updated Air Quality Strategy towards by the end of 2018. Once it is adopted a copy will be uploaded to the Council's website.
- The Low Emission Strategy (LES) has been completed with a plan for adoption by the Council towards the end of 2018; once adopted a copy will be available on the Council's website.
- The AQAP has been reviewed with a plan for adoption by the Council towards the end of 2018. Once adopted, a copy will be available on the Council's website and copies sent to the relevant stakeholders.

Cheshire East Council's priorities for the coming year are:

- to continue to manage and improve air quality through traffic management, development and planning, active and alternative travel and support the use of low emission transportation.
- for the Air Quality team and Cheshire East Public Health team to communicate the effects of poor air quality on health.
- for the Air Quality team and Cheshire East Public Health team to develop a Cheshire East based health impact assessment.
- for the Air Quality team to continue to work with partner agencies and stakeholders to implement the measures in the AQAP.

The principal challenges and barriers to implementation that Cheshire East Council anticipates are:

- Financial constraints as radical actions come at a significant cost; and
- Increased use of private vehicles especially diesel vehicles.

Table 2.3 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
AIR QUALITY MONITORING ACTIONS											
AQM1	Co-location of diffusion tubes with real time air quality equipment	Other	Other		2006	2006 onwards	Tubes co-located	0	Complete. Data used to inform future air quality assessments and modelling where applicable	N/A	
AQM2	Annual review of air quality monitoring sites to ensure their suitability and relevance	Other	Other	Cheshire East Council	2000 onwards	2000 onwards	Tube locations reviewed annually	0	Complete. Reviewed on an annual basis and in line with emerging situations	N/A	
AQM3	Review and assess Cheshire East's air quality in accordance with government guidance	Other	Other	Cheshire East Council	In line with Defra timescales	Ongoing	Reports submitted to DEFRA on time	0	2017 report completed on time	N/A	2017 ASR has been submitted
AQM4	Develop and implement an Air Quality Strategy	Policy Guidance and Development	Other policy	Cheshire East Council	2010/2011	2011-2016	Publication of Air Quality Strategy Implementation of Strategy commitments	0	Air Quality Strategy produced Commitments implemented in line with set targets	Completed	Strategy is being reviewed 2018
AQM5	Revision to Local Emission Inventory	Other	Other	Cheshire East Council	2012	2013	Revised Local Emission Inventory	Emissions reduction (Unquantified)	Complete 2017	Complete	Vehicular emissions updated 2011 -2016
AQM7	Regulation of industrial process in line with Environmental Permitting Programme	Environmental Permits	Other measure through permit systems and economic instruments	Cheshire East Council	Ongoing	Ongoing	Inspection programme developed each year in accordance with risk assessments	Emissions compliant with regulated limits.	As per Environmental Permitting Regime	2017: CEC has 133 Permitted processes (Part B) and 2 (Part A2). During 2017, 100% of required inspections were completed	Ongoing

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
AQM8	Production of Bi-annual newsletter to all processes	Environmental permits	Other	Cheshire East Council	Ongoing	Production and dissemination of newsletter monitored by internal performance systems	Action revised due to resource constraints	0	No progress in 2017	N/A	
AQM9 LTP policy B1,B3	Continue to work with partner agencies (i.e. HE, EA etc.)	Other	Other	Cheshire East Council	Ongoing	Identification of site specific initiatives where appropriate	Liaison is an ongoing process on proposed measures	0	No progress in 2017	Ongoing	
AQM10	To establish and run a CEC Air Quality Steering Group to consider all aspects of the Air Quality Management process	Policy Guidance and Development Control	Other policy	Cheshire East Council	2012	Bi-annual meetings	2 meetings per year of the AQ steering group	0		Ongoing	CEC Air Quality Steering Group has been set up to meet quarterly and is chaired by the Portfolio holder for Planning and Housing
PROVISION OF GUIDANCE AND INFORMATION											
AR1	To develop standalone air quality guidance	Public Information	Via the Internet	Cheshire East Council	2011	2011	Development of guidance	0	Guidance updated in 2016 to reflect latest DEFRA health advice.	Ongoing	
AR2	To expand the air quality website	Public Information	Via the Internet	Cheshire East Council	2010	Ongoing	Up to date information provided on the website	0		Ongoing	Updated and improved air quality website.
AR3	To produce an air quality education pack for delivery in schools	Public Information	Via other mechanisms	Cheshire East Council	2018	2018/2019	Provision of a resource pack on air quality	0	Preparation of education awareness pack	N/A	Discussion with schools
AR4	To undertake and promote an eco-driving campaign for the CE workforce	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Cheshire East Council	2010 LTP Implementation Plan	2010-2012 LTP Implementation Plan	Number of events delivered annually	Emissions reduction (unquantified)	No progress in 2017	Ongoing	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
AR5	Promote driver training to operators to reduce emissions and support procurement of greener fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Cheshire East Council	2010 LTP Implementation Plan	2010-2012 LTP Implementation	Number of events delivered annually	Emissions reduction (unquantified)	No events delivered in 2017	Ongoing	Review of corporate fleets to identify efficiency savings reduction. As part of planning application 15/2355W (the Council's Waste Hub) a planning condition requires the hub to provide a fleet management and replacement strategy to and subsequently implement the measures for the duration of the development
AR6	Production of a newsletter to all residents and interested parties within AQMAs	Public Information	Via other mechanisms	Cheshire East Council	Q3 2011	Annually thereafter	Production of a newsletter	0	Letter sent to all residents within the newly declared AQMAs in Sandbach, Macclesfield and Middlewich. 3 Public drop in sessions held and attended by 60 residents.	Ongoing	
AR7	Consider the introduction of a large scale proactive public information system (text)	Public Information	Other	Cheshire East Council NHS	2014	2014	Adoption of a scheme or feasibility study outlining why not to go ahead	0		At this stage no action has been taken. Action to be reviewed during the review of the AQAP.	
TRAVEL PLANNING ACTIONS											
TR1	Travel Planning - Support businesses to reduce carbon emissions from transport and minimise car use	Promoting Travel Alternatives	Workplace Travel Planning	Cheshire East Council	2015	Ongoing	Require Travel Planning / Residential Travel Information Pack conditions on planning applications.	Emissions reduction (unquantified)	A Residential Travel Information Pack (Guide for Developers) has been produced.	Ongoing	Developers submit Travel Plans as part of their planning condition.

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
TR3	Adopt a consistent approach to parking supply, management and tariffs, seeking to balance issues of sustainability, quality of life and economic vitality	Traffic Management	Other	Cheshire East Council	LTP Implementation programme	LTP Implementation programme	Implementation of a car parking strategy	Emissions reduction (unquantified)	Car Parking Strategy was produced in 2010	2019	The Car parking Strategy is currently being updated and it is anticipated that the new strategy will be approved in early 2019.
TR4 LTP policy B6	Review current concessionary travel criteria to ensure it offers value for money and supports broader objectives	Other	Other	Cheshire East Council	LTP Implementation Programme	Ongoing	Annual number of concessionary fares issued	Emission reduction (Unquantified)	Cheshire East has launched a consultation on Subsidised Bus Routes, which may impact on the availability of travel choices for this population	Ongoing	.
TR5	Improved public transport facilities, service levels and reliability	Promoting Travel Alternatives	Other	Cheshire East Council	LTP Implementation programme	LTP Implementation programme	Implementation of Passenger Transport Strategy	Emissions reduction (unquantified)	Continue to work with partners to support infrastructure across the Borough	Ongoing	
TR6	Active Transport Modes	Promoting Travel Alternatives	Promotion of walking/promotion of cycling/other	Cheshire East Council	Rights of Way Implementation Plan 2011-2015	Rights of Way Improvement Plan	Implementation of PROW Plan	Emissions reduction (unquantified)	A number of schemes implemented across the Borough	Ongoing	
TR7	To work with partners to undertake vehicle emission testing schemes	Vehicle Fleet Efficiency	Testing Vehicle Emissions	Cheshire East Council VOSA Police	2012	2012	A decision as to whether such a scheme is appropriate to CEC	0	This action has been discounted. There is a lack of resource from VOSA to continue further.	N/A	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
TR8	To educate and persuade and if necessary enforce requirement to switch off idling engines	Traffic Management	Anti-idling enforcement	Cheshire East Council	2012	2012	Decision to adopt legislation or otherwise following feasibility study Number of advisory notices issued to motorists and operators	Emissions Reduction (unquantified)	. Civil enforcement officers are targeting school drop off and pick up areas across the Borough	Ongoing	
TR9	Ensure that taxis licensed by the Council comply with vehicle emission limits	Promoting Low Emission Transport	Taxi Licensing conditions	Cheshire East Council	2010	Ongoing	Number of taxi's licensed. Number of ULEV Taxis in the fleet	Emissions reduction (unquantified)	Additional emission test required as part of taxi licence process. Draft policy to be presented for consultation and approval during 2019/20.		
TR10	To work with partners to manage the highway network and manage delay including roadwork coordination	Transport Management	Other	Cheshire East Council	LTP Implementation programme	LTP Implementation programme	Implementation of Network Management Plan	Emission Reduction (Unquantified)	On schedule	Ongoing	
TR11	To map congestion hotspots against AQMAs /areas of concern and ensure congestion reduction measures are targeted in those areas	Other	Other	Cheshire East Council	LTP Implementation programme	LTP Implementation programme	Production of a map	0	Complete		Congestion hotspot maps completed and work fed into Transport Town Frameworks and LDP working groups.

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
TRF1 (LTP Policy B5)	Work with freight operators to establish appropriate freight routes, delivery routines and driver practices to reduce emissions	Freight and Delivery Management	Delivery and Service Plans/Route Management Plans/Other	Cheshire East Council	LTP Implementation programme	LTP Implementation programme	Implementation of a Freight Strategy	Emission Reductions (Unquantified)	No progress in 2017	2018	LTP Refresh is underway and Freight Management will be incorporated into the renewed LTP.
TRF2	Develop a database of freight distribution within the Borough	Freight and Delivery Management	Other	Cheshire East Council	LTP Implementation programme	LTP Implementation programme	Production of a database	0	No progress in 2017	2018	LTP Refresh is underway and Freight Management will be incorporated into the renewed LTP.
TRF3	Examine the feasibility for introduction of an eco-star scheme for freight operators	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Cheshire East Council	2015	2016 onwards	ECOSTARS Scheme or similar introduced	Emissions reduction (unquantified)	2016 DEFRA Grant application with Cheshire West and Chester unsuccessful.	N/A	Consider re-application in 2019/20

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
LEADING BY EXAMPLE ACTIONS											
CEC1	Implement and deliver a staff travel plan and car share scheme	Promoting Travel Alternatives	Workplace Travel Planning	Cheshire East Council	2009-2010	2010 onwards	Delivery of a Staff Travel Plan	Emissions reduction (unquantified)	Cheshire East has introduced a car share passenger allowance, participates in a lift share scheme and provides a cycle to work incentive scheme. Electric vehicles are available to lease through the Councils Tusker vehicle scheme	Ongoing	
CEC2	Introduce E government policies which reduce the need for council customers to travel to access services	Promoting Travel Alternatives	Other	Cheshire East Council	2010	2010 onwards	Improvement of services	Emissions reduction (unquantified)	Progressing in line with Government policies	Ongoing	
CEC3	Reduce emissions from our own estate and vehicle fleet	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles	Cheshire East Council	2010	2012	Implementation of energy efficient systems	Emissions reduction (unquantified)	A number of projects have been implemented and monitored through the Cheshire East Carbon Management Programme.	Ongoing	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
CEC4	Investigate feasibility of introducing incentivised parking tariffs on CEC car parks for low emission vehicles	Promoting low emission transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles	Cheshire East Council	2014	2015	Number of incentivised parking places in Borough. Number of electric vehicle charging points on CEC car parks	Emissions reduction (unquantified)	6 Rapid EV points have been installed on council car parks across the Borough as part of an OLEV project in 2015. The car park strategy commits to low carbon infrastructure on car parks. A policy paper has been produced considering the introduction of Emission Based Parking Charging in the Borough	Ongoing	The concept of emissions based parking charges has been discounted by decisions makers.
ACTIONS LINKED TO DEVELOPMENT CONTROL											
DC1	Ensure the AQAP has strong links to the local plan, LTP and carbon management programme	Policy guidance and development	Other policy	Cheshire East Council	2011-2012	2012 onwards	Air Quality included in LTP and Local Plan	0	Complete	Complete	
DC2	The integration of air quality issues within the Local Plan and Core Strategy	Policy guidance and development	Other policy	Cheshire East Council	2010	2012 onwards	Alignment of AQAP with Core Strategy and Local Plan	0	Complete	Complete	Policy SE12 of the Cheshire East Local Plan which was adopted in July 2017.

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
DC3	The publication of guidance on air quality and development control	Policy guidance and development	Air Quality Planning and Policy Guidance	Cheshire East Council	2011	2011	Production of guidance leaflets	Emissions reduction (unquantified)	Complete. Guidance produced on what is required to be submitted with a planning application. Internal development control training in air quality undertaken and reviewed as necessary. Working with internal partners to update the planning application validation process.	Ongoing	Supplementary planning guidance to be produced in line with the findings of the Low Emission Strategy.
DC4	Use the existing development control processes to improve air quality	Other	Other	Cheshire East Council	2011	Ongoing	Assess all air quality impact assessments in accordance with EPUK Guidance. Monitor decision notices to ensure AQ conditions applied	Emissions reduction (unquantified)	100% applications screened for AQ impact. Mitigation required as necessary.	Ongoing	Insufficient resource to monitor whether conditions applied to decision notices, and to monitor whether conditions complied with
DC5, LTP policy B2,C2,S 9	Seek to enable appropriate new development supporting appropriate sustainable transport initiatives mitigating potential impact of development proposals	Policy Guidance and development	Low Emission Strategy	Cheshire East Council	2012	2014 onwards	Development of a Low Emission Strategy/ Supplementary Planning document	Emissions reduction (unquantified)	DEFRA funding obtained to enable the development of a Low Emission Strategy for CEC.		
DC6	Low Emission Strategy development and implementation	Policy Guidance and development	Low Emission Strategy	Cheshire East Council	2011	2013 onwards	Low emission Strategy Completed	Emissions reduction (unquantified)	LES Completed 2018	Ongoing	LES Requires formal adoption

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
CRANAGE AQMA – AREA SPECIFIC ACTIONS											
CR1	Additional Air Quality Monitoring	Other	Other	Cheshire East Council	2004 onwards	2015	Monitoring Complete	Concentrations reduced	Complete	Complete	Cranage has been revoked on the 1st of June 2018. It is no longer an AQMA
WEST ROAD CONGLETON – AREA SPECIFIC ACTIONS											
WR1/RH 1/LH1	Congleton Bypass	Traffic Management	Strategic highway improvements	Cheshire East Council	2012	LTP implementation	Congleton Bypass Constructed	Emissions reduction (unquantified)	Planning permission granted in 2015	Ongoing	Currently scheduled for completion at the end of 2020.
WR3/RH 2/NANT 14/LH4/ SAND4/ MERE7	NOx busting paint	Other	Other	Cheshire East Council	2011	2012 onwards	Re-application and further study of benefits	15% reduction in concentrations measured	Plans to start fresh application		This exercise will be resumed 2019/20 as part of the new AQAP
WR4/RH 3/LH2	Additional modelling of traffic flows	Other	Other	Cheshire East Council	2011/12	2012/2013	Completion of modelled traffic flows	0	Undertaken as part of Congleton Link Road study	Complete	
WR5/RH 5/LH5/N ANT3/DI S13	Parking Enforcement	Traffic Management	Parking enforcement on the highway	Cheshire East Council	2011	2011 onwards	Number of FPN's		Ongoing enforcement	Ongoing action	
WR6	Investigate buffer effect of small gardens	Other	Other	Cheshire East Council	2008	2012	Sufficient monitoring data to enable study to be completed thoroughly	Data reviewed, levels monitored are well below the standard. To be kept within the AQMA at this time	Completed		
WR7	Timing changes to pedestrian crossing	Other	Other	Cheshire East Council	2011	2012	Feasibility paper complete	Lights have been upgraded although the timings are fixed	Completed		
WR8/RH 7/LH8	Examine feasibility of introducing a LEZ for Congleton	Promoting Low Emission Transport	Low Emission Zone	Cheshire East Council	2015	2020	Complete feasibility study	Emissions reduction (unquantified)	Initiative will be considered post Congleton Link Road development (date to be announced)	Ongoing	To consider CAZ in new Action Plan

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
WR9	Investigate 'Green Walls' to determine effectiveness of absorbing NO_2	Other	Other	Cheshire East Council	2011	2012	Decision made to progress a scheme for CE based on measured reductions in NO_2	0	Feasibility study paper completed Area however does not lend itself to such a scheme	Complete	
ROOD HILL CONGLETON – AREA SPECIFIC ACTIONS											
RH4/LH 3	Investigate further signal changes on traffic lights	Traffic Management	UTC, congestion management	Cheshire East Council	2011	2011 onwards	Feasibility study complete	Emissions reduction (unquantified)	MOVA system installed at rood Hill Junction	Complete	
RH6	Junction Improvement	Traffic Management	Strategic highway improvements	Cheshire East Council/development company	2012	2015	Junction improvement completed	Emissions reduction (unquantified)	Secured undertaking of this scheme as part of a large planning application within the vicinity of the AQMA. No further action at this time	No progress	Unlikely to be taken forward due to Congleton Relief Road

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
LOWER HEATH CONGLETON – AREA SPECIFIC ACTIONS											
LH6	Timing changes to pedestrian crossing	Traffic Management	Other	Cheshire East Council	2011	2011	Feasibility study complete	0	Lights have been upgraded although the timings are fixed	Completed	
LH7	Investigate the feasibility of the installation of a puffin crossing	Traffic Management	Other	Cheshire East	2011	2012	Feasibility study complete	0	No progress in 2017		
HOSPITAL STREET NANTWICH – AREA SPECIFIC ACTIONA											

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
NANT1	Comprehensive traffic/ tourist re-signing and reclassification of roads in and around Nantwich	Traffic Management	Other	Cheshire East Council	2009	2011-2012	Completion of re-signing project Post classification study complete	Reduction of emissions in Hospital Street Unquantified	Comprehensive traffic resigning complete	Complete	
NANT2	Improve rail facilities	Transport Planning and Infrastructure	Other	Nantwich Town Council Network Rail	2010	2011 onwards	Improved facilities	0	Station refurbishment completed. Cycle provision included	Complete	
NANT4	Contact stores in the area to request they route delivery vehicles away from the AQMA	Freight and Delivery Management	Other	Cheshire East Council	2011	2013	Stores contacted /agreed to re-route	Emissions Reduction (Unquantified)	Survey undertaken which indicated a small interest in a coordinated approach to road freight to local businesses.	Complete	A lack of resource within the Transportation team has limited detailed analysis of data and hindered further progress
NANT5	Review the need for vehicle weight restriction 1-whole town 2-Hospital Street	Other	Other	Cheshire East Council	2012	2013	Feasibility Study complete	Emissions Reduction (Unquantified)	No progress	N/A	Highways service indicates this is not deliverable.
NANT6	Review the need for 20mph speed limit: -Whole Town -Hospital Street	Traffic management	Reduction of speeds	Cheshire East Council	2013	2014	Review completed and decision made as to benefits of implementation	Emissions Reduction (Small)	Air quality modelling screening exercise has been carried out. This was not linked to any feasibility study, any proposed scheme nor did it consider any wider transport implications. It indicated that in isolation a 20mph speed limit in Hospital Street could be of benefit to air quality.	Complete	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
NANT7	Review configuration of junctions in the Town to ensure traffic is diverted away from the AQMA	Traffic Management	Other	Cheshire East Council	2013	2014	Review completed and decision made as to benefits of implementation	Emissions Reduction (Unquantified)	Complete	Complete	Linked to NANT1
NANT8	Review of the impact of making A534 Hospital Street one way	Traffic Management	Other	Cheshire East Council	2011	2013	Review completed and decision made as to benefits of implementation	Emissions Reduction (Significant)	Air quality modelling screening exercise has been carried out. This was not linked to any feasibility study, any proposed scheme nor did it consider any wider transport implications. It indicated that in isolation a single one way route on Hospital Street could provide significant air quality benefits	Complete	Discussion with Highway Planners have concluded that such a scheme would not be practical or deliverable in the town for other reasons
NANT9	Review the need for carriageway alterations in Hospital Street / Pratchett's Row to make route less appealing	Traffic Management	Other	Cheshire East Council	2012	2013	Review completed and decision made as to benefits of implementation	Emissions Reduction (Unquantified)	Complete	Complete	Discussed with Highways. CEC policy is against any traffic scheme which would interfere with flow/cause road safety issues. Action not progressed further
NANT10	Review of the need to introduce a traffic management system using traffic lights	Traffic Management	UTC, Congestion management, traffic reduction	Cheshire East Council	2015	2020	Review completed and decision made as to benefits of implementation	Emissions Reduction (Unquantified)	No progress in 2017		

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
NANT11	Contact satellite navigation companies to ensure maps are updated to include the reclassification of roads around Nantwich	Traffic Management	Other	Cheshire East Council	2011	2011	Contact completed and confirmation of changes received	Emissions Reduction (unquantified)	Completed		
NANT12	Review options to improve traffic flow on the bypass (A500) to reduce congestion in the town centre and the AQMA	Traffic Management	Other	Cheshire East Council	2013	2014	Review completed and decision made as to benefits of implementation	Emissions Reduction (unquantified)	Complete	Complete	Linked to NANT1
NANT13	Install automatic analyser in the AQMA to improve knowledge	Other	Other	Cheshire East Council	2011	2012	Automatic analyser installed	0	Scheme not progressed due to a lack of resources and space requirements in the area	Complete	
NANT15 LTP policy S8	Complete the Crewe to Nantwich Cycleway	Transport Planning and Infrastructure	Cycle network	Cheshire East Council	2011-2016	2011-2016	Connect 2 completed	Emissions Reduction (Unquantified)	Completed 2013. Data from Public Rights of Way indicates the path has a high level of use for both commuting and leisure purposes	Complete	
NANT16	Review the introduction of well-designed speed bumps on Hospital Street	Traffic Management	Other	Cheshire East Council	2013	2013	Review completed and decision made as to benefits of implementation	0	Action discounted. Current administration does not favour these. There is a corporate policy which actively encourages the removal of such schemes	Complete	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
NANT17	Ensure Peter Destapleigh Way made more attractive to through traffic through effective traffic management	Traffic Management	Other	Cheshire East Council	2013	2013	Review completed and decision made as to benefits of implementation	Emissions Reduction (unquantified)	Complete This route formed part of the Nantwich road resigning and reclassification project. Through traffic is encouraged to take this route	Complete	
NANT18	Provide a 'build out' at Crewe Road/Hospital Street junction to prevent HGV's and speeding cars using Hospital Street	Traffic Management	Other	Cheshire East Council	2012	2012	Review completed and decision made as to benefits of implementation	0	Discussion undertaken with Highways. Major safety implications associated with this measure. This has therefore been discounted on safety grounds	Complete	
NANT19	Investigate the proportion of locally generated traffic using Hospital Street compared to the volume of traffic generated from outside	Other	Other	Cheshire East Council	2013	2013	Report completed	0	No progress		Consider whether to take forward to revised AQAP
NANT20	Review the location of the current pedestrian crossing on Pratchett's Row and examine need for one on Hospital Street	Traffic Management	Other	Cheshire East Council	2015	2015	Review completed and decision made as to benefits of implementation	0	Reviewed by Highways in 2012. Unlikely to be removed due to safety considerations	Complete	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
NANT21	Install switch off when idling signs at station crossing points	Traffic Management	Anti-idling enforcement	Cheshire East Council	2011	2012	Signage installed	Emissions reduction (unquantified)	No progress made		Current administration is not encouraging extra signage and has undertaken a process of decluttering. Action discounted
NANT22	Investigate traffic priority on Hospital Street / Pratchett's Row junction to give priority to Hospital Street traffic	Traffic Management	Other	Cheshire East Council	2013	2014	Review completed and decision made as to benefits of implementation	0	Discussion undertaken with Highways. To be factored into work programme for counts in due course	Ongoing	
NANT23	Review the need for 'keep clear' signage on Hospital Street at junction with Crewe Road roundabout	Traffic Management	Other	Cheshire East Council	2012	2012	Review completed and decision made as to benefits of implementation	0	Complete Keep clear sign painted at the junction. Traffic is able to flow more freely and has resulted in smaller queues in the AQMA	Complete	
SANDBACH JUNCTION 17 – AREA SPECIFIC ACTIONS											
SAND1	Additional air quality monitoring	Other	Other	Cheshire East Council	2010	2010 onwards	Provide a network of diffusion tubes to adequately assess the air quality having regard to relevant exposure	0	Additional diffusion tubes placed in Sandbach area from 2015		Extra tubes have been placed to monitor air quality trend and AQMA boundary

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
SAND2	Air Quality modelling	Other	Other	Cheshire East Council	2016	2016	Modelling exercise complete	0	Dispersion modelling completed as part of 2016 ASR. Confirmed need for further AQMA in Sandbach	Completed	
SAND3	Installation of Ramp Access Signal Controls at J17	Traffic Management	Access management	Highways England	2010	2010	Number of sites implemented	Emissions reduction (unquantified)	Ramp management systems in place and used at peak times	Completed	Major junction improvement at M6 J17 completed in 2016
SAND5	Investigate the feasibility of traffic signalisation on part of the network	Traffic Management	Strategic highway improvements	Highways England	2013	2015	Review completed and decision made as to benefits of implementation	Emissions reduction (unquantified)	Complete Highway improvements undertaken as part of the Government Pinch Point scheme. Monitoring data within the AQMA suggests a slight improvement as a result of the scheme	Completed	
SAND6	Review the need for a speed limit reduction	Traffic Management	Reduction of speed limits	Cheshire East Council/Highways England	2013	2015	Review completed and decision made as to benefits of implementation	Emissions reduction (unquantified)	Speeds remained the same post Pinch Point highway improvements.	Completed	
A556 MERE – AREA SPECIFIC ACTIONS											
MERE1	A556 Bypass Scheme	Traffic Management	Strategic Highway Improvements	Highways England	2010	2015-2017	Completion of Bypass	Early monitoring shows NO_2 Concentrations reduced by approximately 50% throughout the area	Completed	Completed	Bypass opened March 2017

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
MERE2	AQ assessment for network improvements	Other	Other	Highways England	Ongoing	2015 onwards	Completion of bypass	Unknown	Progressing Undertaken when necessary. The department is ensuring that AQ is not adversely affected by highway development	2019	Early monitoring results in properties close to the new A556 do not show an exceedance.
MERE3	Regular review of AQ monitoring within AQMA and surrounding area	Other	Other	Cheshire East Council	Annual review	Annual review	Review of monitoring locations	0	Progressing Monitoring continues and will aid in the interpretation of longer term concentrations of NO_2 within and around the AQMA	2019	Monitoring sites are constantly reviewed to make sure they are relevant to sensitive receptors
MERE 4	Junction Improvement	Traffic Management	Strategic Highway Improvements	Highways England	2013	2015-2017	Decision as to whether schemes are appropriate	0	Ongoing as part of action MERE1. The old A556 route is to be made less appealing to traffic and improve the route for non-motorised users	2017	
MERE5	Signal Improvements along the route	Traffic Management	Strategic Highway Improvements	Highways England	2008	2008	Feasibility study	Emission Reductions (Unquantified)	Signal improvements undertaken at various stages along the route to smooth out traffic flows	2018	
MERE6	Review monitoring data following Further Assessment to refine the AQMA boundary	Other	Other	Cheshire East Council	2011	2012	12 months of monitoring data Completion of study and DA if necessary	Early monitoring shows NO_2 Concentrations reduced by approximately 50% throughout the area	Bypass opened. Monitoring required for additional 12 months to confirm whether AQMA can be amended or revoked.	ongoing	Monitoring is ongoing and extra tubes have been placed around the Tabley area by Junction 19 of the M6 to determine boundaries for amendment
MERE8	Explore feasibility of undertaking a Traffic Census	Other	Other	Highways England Cheshire East Council	2011	2012	Completion of census	0	On hold pending by-pass and other work in higher priority areas	N/A	Unnecessary due to bypass

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
MERE9	Explore the feasibility of a low emission zone	Promoting Low Emission Transport	Low emission zone	Cheshire East Council	2012	2013	Undertake feasibility study	0	On hold pending by-pass and other work in higher priority areas	N/A	Unnecessary due to bypass
MERE10	M56 road safety improvements	Traffic Management	Strategic highway improvements	Highways England	2012	2012	Feasibility study	Emissions Reduction (Unquantified)	Complete Improvements undertaken around J7 at Bowden	2020	Unnecessary due to bypass
A6 DISLEY – AREA SPECIFIC ACTIONS											
DIS1	Ensure the A6 Corridor is managed as part of the SEMMMS scheme	Traffic Management	Other	Stockport Metropolitan Borough Council. Cheshire East Council	2012	2015 onwards	Implementation of SEMMMS scheme	Emissions reduction (unquantified)	Ongoing	2020	A555 Manchester Airport Relief Road projected to cause negative AQ impacts. Condition requires enhanced mitigation in Disley
DIS2	Improved rail facilities	Transport Planning and Infrastructure	Other	Stockport Metropolitan Borough Council Cheshire East Council	2012	2015 onwards	Implementation of SEMMMS scheme	Emissions reduction (unquantified)	SEMMMS (South East Manchester Multi-Modal Scheme) project underway. Rail facilities to be considered as part of DIS1	Ongoing	
DIS3	NOX busting paint	Other	Other	Cheshire East Council	2015	2016	A decision made as to whether such a scheme is appropriate for the area	15% reduction in concentrations measured in other areas.	Completed June 2016 Select properties and pavement within the AQMA applied with solution as part of a study in conjunction with MMU university	2020	This exercise will be revisited 2019/20
DIS4	Investigate 'Green walls' to determine effectiveness at absorbing NO_2	Other	Other	Cheshire East Council	2014	2015	Decision made to progress a scheme for Cheshire East based on measured reductions in NO_2	Emissions Reduction (Unquantified)	No Progress	2018	Will be investigated further as part of a revised AQAP

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
DIS5	Traffic Management Study for A6	Traffic Management	Other	Cheshire East Council	2014	2015 onwards	Completed traffic management review	0	Enhanced mitigation measures being reviewed	2017	Delivered as part of the A555 MARR Enhanced Mitigation Package
DIS6	Redhouse Lane development- signalled junction (s106)	Traffic Management	Congestion management	Cheshire East Council	2013	2013 onwards	Traffic signal study complete	Increase in emissions predicted.	Completed 2017	2017	Installation of lights underway. AQ Modelling indicates will not result in expansion of AQMA however will be a small increase in air pollution to properties closest to the lights. Additional monitoring installed.
DIS7	Bypass	Transport Planning and Infrastructure	Other	Cheshire East Council	2013 onwards	2015	Study completed	0	Action discounted. The topography of the land is unfeasible for such a scheme	Transport Planning and Infrastructure	There has been documented evidence of a bypass scheme since the 1980's. Any bypass would require significant funding and land take.
DIS8	Shared Space Scheme at Fountain Square	Traffic Management	Other	Cheshire East Council	2014	2016 onwards	Enhanced Mitigation Scheme Completed	Increase in emissions predicted.	Completed 2017	2017	This action is being considered as part of DIS1 scheme
DIS9	Reduce emissions from HGV's	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Cheshire East Council	2014	2017 onwards	Undertake HGV study and examine emission reduction options	Emissions reduction (unquantified)	Not yet started		See TRF3 above
DIS10	Speed limit review	Traffic Management	Reduction of speed limits, 20mph zones	Cheshire East Council	2014	2017	Speed Limit Review	Emissions reduction (unquantified)	Completed 2017	2017	As part of DIS1. The enhanced mitigation scheme includes making the whole A6 corridor 30MPH (removing some 40MPH) which will have the effect of smoothing traffic flows.

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
DIS11	Re-install automatic analyser in the AQMA to improve knowledge	Other	Other	Cheshire East Council	2013	2013	Automatic analyser installed	0	Complete	Ongoing	Real-time analyser monitoring is ongoing
DIS12	Set up of an A6 Air Quality Working Forum	Other	Other	Cheshire East Council	2014	2014 and beyond	Forum set up and working	0	No progress	Ongoing from 2016	Air Quality Steering Group includes Disley. Meetings held with Highways regarding the A6 Mitigation Scheme (DIS 1)
DIS14	Clean Air Zone	Traffic Management	Other	Cheshire East Council	2015	2020	Complete feasibility study & Implement CAZ if feasible	Emissions reduction (unquantified)	Not yet started. To be reviewed once DIS 1 complete	2019	
NANTWICH ROAD CREWE – AREA SPECIFIC ACTIONS											
CRE1	Crewe Green Link Road	Traffic Management	Strategic Highway Improvements	Cheshire East Council	2013	2015	Traffic reduction and air quality improvement along Nantwich Road	Emissions reduction (unquantified)	Road opened in 2015.	Completed	No conclusive evidence of an improvement to AQ in Nantwich road AQMA. No deterioration either.
CRE2	Traffic Signal Review	Traffic Management	UTC, Congestion management, traffic reduction	Cheshire east Council	2015	2015 onwards	UTC feasibility study	Emissions reduction (unquantified)	No progress	No Progress	Resources in Highway Strategy team. Not a priority for delivery
CRE3	Relocate Crewe Station Entrance	Transport Planning and Infrastructure	Other	Cheshire East Council Network Rail	2011	2016	Scheme approved	Reduce concentrations in Nantwich Road AQMA	Completed 2015	Complete	Monitoring is going on at least 250 m from the train entrance
CRE4	Box Junction enforcement/re-hatching	Traffic Management	Other	Cheshire Police	2011	2011 onwards	Enforcement of junction	Emissions reduction (unquantified)	Ongoing	Ongoing	

Measure No.	Measure	EU Category	EU Classification	Organisations involved in Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
CRE5	Station Parking Review	Other	Other	Cheshire East Council	2011	2014	Review complete	Reduce concentrations in Nantwich Road AQMA	Station parking considered as part of CRE3	Complete	
CRE6	Relocate Bus Stop	Other	Other	Cheshire East Council	2013	2014	Decision to move bus stop	Reduce concentrations in Nantwich Road AQMA	Decision made to discount this option. Bus Stop is in a safe place where there is sufficient space for vehicles to move around any stationary buses at the stop.	Complete	
CRE7/EAR4/KNU3	NOX busting paint	Other	Other	Cheshire East Council	2016	2016/2017	A decision made as to whether such a scheme is appropriate for the area	15% reduction in concentrations measured in other areas.	Reviewed and this exercise will be resumed and will be considered in the new AQAP	2019/20	
CRE8	Investigate 'Green walls' to determine effectiveness at absorbing NO_2	Other	Other	Cheshire East Council	2013	2014	Decision made to progress a scheme for Cheshire East based on measured reductions in NO_2	Literature review completed. Area does not lend itself to such a scheme	Completed	Completed	

MANCHESTER ROAD KNUTSFORD – AREA SPECIFIC ACTIONS											
KNU1	Review A50 roundabout/junction	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Cheshire East Council	2014	2015	Review undertaken	Emissions reduction (unquantified)	No progress- linked to KNU5	No Progress	
KNU2	Review pedestrian crossings on roundabout	Other	Other	Cheshire East Council	2014	2014	Crossings removed if not necessary	Emissions reduction (unquantified)	No progress to date	No Progress	To be reviewed during AQAP review
KNU4	Review A556 Bypass Impact	Other	Other	Cheshire East Council	2017	2018 onwards	Confirm whether A556 bypass has any negative impact in Knutsford	0	Not started	2019	Bypass opened March 2017, not open long enough to determine whether there has been any impact to date
KNU5	Knutsford Infrastructure Package	Traffic Management	UTC, Congestion management, traffic reduction	Cheshire East Council	2013	2013 onwards	Measures implemented in line with package document	Emissions reduction (unquantified)	Ongoing	Ongoing	Project being overseen by Cheshire East highways and linked to developments proposals within the town
KNU6	Reduce emissions from HGV's	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Cheshire East Council	2014	2015 onwards	Undertake HGV study and examine emission reduction options	Emissions reduction (unquantified)	Not yet started.	2017-2018	See TRF3 above
EARLE STREET CREWE – AREA SPECIFIC ACTIONS											
EAR1	Review pedestrian crossing arrangements	Other	Other	Cheshire East Council	2014	2014	Review undertaken	Emissions reduction (unquantified)	Not yet started	2017-2018	To be reviewed during AQAP revision
EAR2	Review Retail Park car park contribution to AQMA	Other	Other	Cheshire East Council	2013	2014	Review undertaken	Emissions reduction (unquantified)	No progress		

EAR3	Investigate green planting around Retail Park	Other	Other	Cheshire East Council	2014	2014	Decision made to progress the scheme based on measured reductions in NO2	Emissions reduction (unquantified)	Literature review completed.	2019/20	

Actions to improve air quality in the 5 newly declared AQMAs will be included in the revised 2018 AQAP.

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.

Although Cheshire East Council does not currently monitor $PM_{2.5}$, measures as listed in Table 2.4, set out the specific measures which Cheshire East Council is taking to address and reduce exposure to $PM_{2.5}$. In addition, measures to reduce NO_2 will also improve particulate matter concentration.

Table 2.4 - Measures to improve $PM_{2.5}$

Measures Category	Measure Classification	Measures being undertaken	Implementation Date
Traffic Management	Urban Traffic Control systems, Congestion Management, Traffic Reduction	The Council continues to address parking around schools, and has launched a Borough Wide Initiative to reinvigorate school travel plans and encourage active travel modes to schools. .	Ongoing
	Anti-Idling Enforcement	School drop off and pickup areas being targeted by Civil Enforcement Officers issuing advice to motorists. The Council will be contacting all school heads to issue advice for parents which can	2018/19

Measures Category	Measure Classification	Measures being undertaken	Implementation Date
		be passed out in school newsletters.	
Promoting Travel Alternatives	Promotion of Walking	Cheshire East Council has joined Mode shift STARS to encourage schools to increase the levels of sustainable and active travel.	Ongoing
	Encourage / Facilitate home working	Home working is encouraged which reduces the need for travel, aids in congestion management and peak time traffic reduction. The Council requires Travel Information Packs to be provided on new development in the Borough by means of planning conditions.	Ongoing Ongoing Ongoing
	Workplace Travel Planning & Personal Travel Planning	Cheshire East has published a business guide to travel planning which is a useful starting point for organisations and businesses looking to produce a travel plan http://www.travelcheshire.co.uk/ and http://www.cheshireeast.gov.uk/public_transport/travel_plans/business_travel_planning/business_travel_planning.aspx MyPTP (Personal Travel Plan) has been procured from Liftshare to produce bespoke travel plans for individuals. New businesses are required to have a travel plan through planning condition.	2016 and ongoing 2016

Measures Category	Measure Classification	Measures being undertaken	Implementation Date
			2016
	Promotion of cycling and Walking	Publication and adoption of the Cheshire East Cycling Strategy 2017-2027	March 2017
		Learn to Bike and Bikeability courses have been undertaken by Cheshire East and Everybody Sport and Recreation in Schools. In 2016/17 there were 1,693 level 1, 3711 level 2 and 208 level 3 passes	Ongoing
		Love to ride Cycle Challenge which saw 25% of participants riding for the first time, 2,539 total trips of which 44% were made for transport purposes (i.e. replaced a private car journey)	2016
		Footpaths 3 and 36 Cycle Track Order, Crewe: Conversion of public footpath to cycle track for use by pedestrians and cyclists between Hungerford Road and Sydney Road.	2016
		Continuation of the Leighton Greenway Scheme to extend towards Leighton Hospital, Crewe.	2016
		Revision and reprint of Walks for All Leaflet featuring 10 accessible routes around the Borough. A leaflet popular with all, especially families, and now updated with site access improvements made since the last publication.	2016
		Sandbach Footpath No. 6: working with landowners, Cheshire East Highways and developers to improve accessibility along the footpath to connect a primary school with an area agreed for	2016

Measures Category	Measure Classification	Measures being undertaken	Implementation Date
		parent parking.	
	Promote use of Rail and Inland Waterways	Middlewood (Poynton) Station Access Improvements to encourage greater use of public transport	2016
Transport Planning and Infrastructure	Cycle Network	Upgrade to Crewe Cycle Tracks	Mar-2017
		Cycle Parking provision in Alsager and Nantwich	Mar-2016
		Sandbach – Shared Use footway / cycleway facility	Mar-2016
		National Cycle Route 55 Macclesfield Improvements	Mar-2016
		Extension of Leighton greenway between Residential Areas and Town Centre in Crewe	Mar-2017
		Congleton Town Centre to Railway Station Cycle Route (Multi-Modal Travel)	Mar-2017
		Crewe Shared Cycle / Footway facility extension	Mar-2017
		Wilmslow to Manchester Airport Cycle Route	Mar- 2017
	Walking Network	Congleton Bridleway No. 31 improved accessibility between housing and schools (Schools set up Walking buses as a result)	Mar-2016
		Congleton footway No. 23 improvements	Mar-2016

Measures Category	Measure Classification	Measures being undertaken	Implementation Date
		Knutsford footpaths 14&15 Improved accessibility forming link between housing and town centre	Mar-2016
		Odd Rode footpath No. 22 between housing and medical centre, play area and park improved	Mar-2016
		Middlewich footpath No. 13 surfacing works to improve accessibility between housing, town centre and canal towpath.	Mar-2016
		Cranage footpath No. 4 improvements to off-road facilities between Holmes Chapel Town and Open Space Access	Mar-2016
Policy Guidance and Development Control	Low Emissions Strategy	A Low Emission Strategy is will be adopted by Cheshire East Council	2018
Promoting Low Emission Transport	Taxi Licensing conditions	Taxi licensing review will include thresholds on emissions of Euro Standards for vehicles Provision (via planning condition) of Electric Vehicle Charging Points on all new residential properties together with travel information packs. Continued operation of Electric Vehicle Charging Points for public use. Consideration of introducing Emission Based Parking Charges in the Borough	2019/20 Ongoing Ongoing 2019/20

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 the air quality objectives.

Cheshire East Borough Council undertook automatic (continuous) monitoring at two sites during 2017 for NO_2, using a chemiluminescence monitor. One of the sites, RTA 1 in Mere, was decommissioned in June 2017 as it was no longer required due to the opening of the new A556 bypass. The remaining site, RTA 3 in Disley, will continue for the foreseeable future due to the potential exceedances of the hourly objective within the town.

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 (Figure D.1 and Figure D.2). Further details on how the monitors are calibrated and how the data has been validated are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Cheshire East Borough Council undertook non- automatic (passive) monitoring of NO_2 at 134 sites during 2017. The passive monitoring comprises the use of diffusion tubes, with each tube being exposed for a calendar month at a time. The tubes were analysed by Gradko Laboratories, which is a UKAS accredited laboratory, and the results of these tubes are compared against the annual average objective. 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 validations 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 of this work are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

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

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

3.2.1.1 Nitrogen Dioxide (NO_2) Trend

Figure 3.1 show the overall trend at the different AQMA sites. In Cheshire East, there are 134 monitoring points (diffusion tubes),therefore monitoring locations within AQMAs with at least 5 years data are included in the trend graph Figure 3.1 and used for the multiple comparison calculation (significant difference) in Appendix G Table G.1.

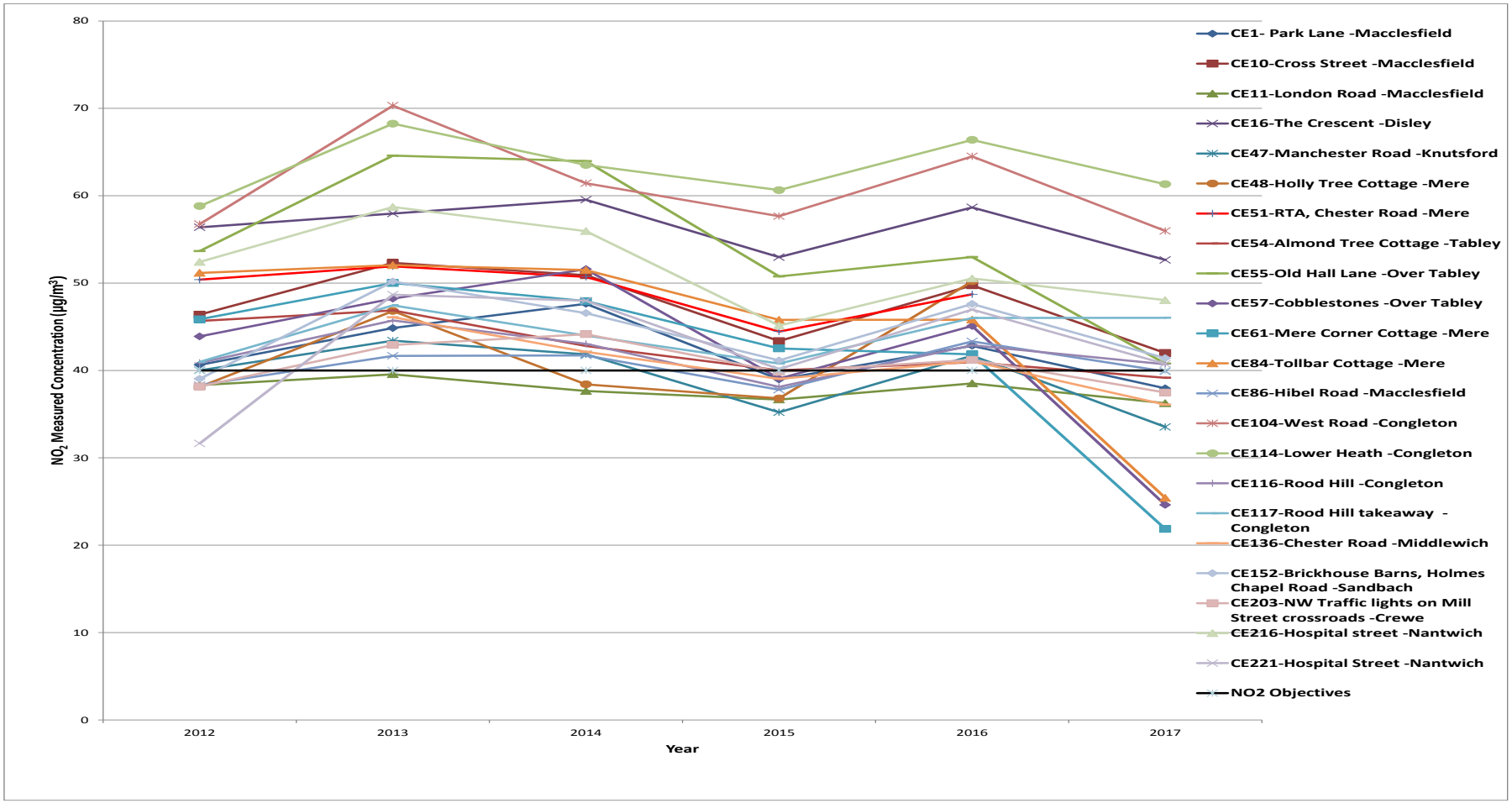

Figure 3.1 - Trends in Annual mean NO_2 Concentration measured at diffusion tube sites located in AQMAs

- Figure 3.1 shows that no specific trend was observed across the measurement years in the AQMAs.
- We observed that the NO_2 concentrations measured in the different sites across the years were different and 2013 appeared to have the highest NO_2 concentration measurements observed, except at 5 monitoring tube points (CE1, CE16, CE48, CE57 and CE 203) (Figure 3.1). Therefore, we analysed the data between 2012 and 2017 and we observed statistically significant difference ($p < 0.05$) between some of the years (see Appendix G Table G.1).
- 'Statistically significant' refers to a high probability that the outcome is not due to chance or random variation, but could be as a result of different meteorological conditions in the different years and/or regional and local factors such as long term road works, improvement of traffic light signalling, creation of bypasses that reduced the traffic and congestion in some areas and includes improving NO_2 measured in that area like in the case of A556 bypass in the Mere area in 2017 (Tube CE57, CE61 and CE84). Where the significance level $p < 0.05$ is the threshold probability. $p < 0.05$ shows how strong the probability is that the difference are not by chance in this case 0.05 refers to 99%.(see Appendix G Table G.1)
-
- In some other years (see Appendix F for years that showed statistically significant difference), differences were not considered to be statistically significant as the measurements were mostly within the usual range of annual measurements.
- As shown in Figure 3.1, tube CE114 showed concentrations ≥ 60 µg/m^3 in the years 2013 – 2017, tube CE104 showed concentrations ≥ 60 µg/m^3 in 2013 - 2014 and 2016 and tube CE16 showed concentrations ranging from 52.65 – 59.54 µg/m^3.

TG16 states that exceedances of the NO_2 hourly mean are unlikely to occur where the annual mean is below 60µg/m^3. As such, the diffusion tube annual mean measurements at those sites indicate the likelihood of exceedance of the 60 µg/m^3 NO_2 hourly mean objective. Note that this relationship is based upon

observations made mainly at roadside and kerbside monitoring sites where road traffic is the primary source of emissions, as in the case of these sites.

- Although the results at these tube sites suggest that there may be likelihood of exceedance of the hourly objectives, placing a real-time monitor in these locations is impossible due to the lack of space. However, there is a real-time monitor (RTA3) around the CE16 area. RTA3 in 2017 recorded an hourly mean of 184 µg/m^3 with 5 exceedances of the NO_2 hourly limit of 200 µg/m^3 (Table A.4 in Appendix A). In this case the hourly mean objective level of 200µg/m^3, which should not be exceeded more than 18 times in a year, was not breached.
- In 2017, concentrations ranging between 21.86 – 25.41 µg/m^3 were measured at CE57, CE61 and CE84 (Figure 3.1). These concentrations were low in comparison to previous years and may be as a result of the new A556 bypass which opened in 2017. Continued monitoring will be carried out at these sites (CE57, CE61 and CE84) in order to establish a trend. Conversely tube CE54 in close proximity to CE57, CE61 and CE84, showed relatively similar concentrations across the measurement years (Figure 3.1) and did not significantly drop in levels like CE57, CE61 and CE84 in 2017. This could be due to them being on the opposite side of the road, closer to the M6 and further away from the A556 and so may not be positively impacted by the A556 bypass.

- In 2017, out of the 20 tubes placed in the AQMAs, 11 tubes were below the AQO annual mean of 40 µg/m^3.

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)
RTA1	A556 Chester Road, Mere	Roadside	373004	382626	NO_2	YES	Chemiluminescent	5	2	1.5
RTA3	Market Street, Disley	Kerbside	397538	384710	NO_2	YES	Chemiluminescent	1	1	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)
CE1	Marios, 144 Park Lane	Roadside	391553	372999	NO_2	Y	0.5	1.3	NO	2.8
CE2	129 Park Lane, Macclesfield	Roadside	391583	373025	NO_2	Y	0.4	1.5	NO	2.7
CE4	65 Mill Lane	Roadside	391965	372951	NO_2	Y	0	10	NO	1.95
CE5	80/82 Mill Lane	Roadside	391996	372904	NO_2	Y	0	3	NO	2.2
CE10	78/80 Cross Street	Roadside	392024	372594	NO_2	Y	0	3	NO	2.8
CE11	125 London Road	Roadside	391868	372208	NO_2	Y	0.6	1.4	NO	2.8
CE12	1 Field View Drive	Urban background	392109	372219	NO_2	N	0	10	NO	2
CE16	31 The Crescent	Roadside	397697	384826	NO_2	Y	0.5	1.75	NO	2.65
CE19	58 Buxton Road	Roadside	398014	384705	NO_2	Y	2.3	1.45	NO	2.8
CE23	25 London Road South	Roadside	391921	383440	NO_2	N	3.95	1.9	NO	2.25
CE28	183 London Road South	Roadside	391613	382775	NO_2	N	6.3	2.15	NO	2.6
CE29	34 Altrincham Road	Roadside	384097	381137	NO_2	N	0	4.08	NO	2.3
CE30	7 Altrincham Road	Roadside	384047	381129	NO_2	N	3.3	1.4	NO	2.7
CE39	Old Post Office/Iron Gates Farm, Monks Heath	Roadside	384446	374144	NO_2	N	0	4.6	NO	1.95

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)
CE40	Knutsford Day Nursery	Roadside	375457	378412	NO_2	N	0.2	6.2	NO	2.75
CE42	RTA Manchester Road	Roadside	374973	378784	NO_2	N	6.8	2.55	NO	2.45
CE47	17 Manchester Road	Roadside	374940	378825	NO_2	Y	0.65	2.2	NO	2.2
CE50	Westholme	Roadside	373081	382842	NO_2	N	0	32	NO	1.72
CE54	Almond Tree Cottage	Roadside	372260	379249	NO_2	Y	10.7	3.5	NO	1.83
CE55	Old Hall Lane	Roadside	372269	379717	NO_2	Y	0	4.9	NO	2.03
CE57	Cobblestones	Roadside	372357	380062	NO_2	Y	0.1	6.5	NO	1.87
CE61	Mere Corner Cottage	Roadside	372765	381544	NO_2	Y	0	14.2	NO	1.7
CE62	Mere Home Farm	Roadside	372668	381542	NO_2	Y	0.2	65.3	NO	1.65
CE63	Old Smithy Cottage	Roadside	373205	383713	NO_2	Y	0	13.5	NO	1.6
CE64	Mereside farm, Chester Road, Rostherne	Roadside	373766	384824	NO_2	Y	0.18	8.8	NO	1.95
CE65	Intack Farm, Intack Lane, High Legh	Other	367000	383414	NO_2	N	0.05	6.9	NO	1.52
CE68	Newlyn, West Lane, High Legh	Other	370333	385246	NO_2	N	4.3	40.3	NO	2.55
CE71	3 Oxford Road	Roadside	390941	373645	NO_2	N	0.15	1.4	NO	2.05

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)
CE73	124 Chester Road	Roadside	390876	373661	NO_2	N	0.65	1.4	NO	2.4
CE74	116 Cumberland Street	Roadside	391332	373920	NO_2	N	0	7.2	NO	1.5
CE76	2 Denfield Cottages	Roadside	372938	383846	NO_2	N	N/A	N/A	NO	1.7
CE77	Kenilworth Cottage	Rural	372106	381399	NO_2	N	N/A	N/A	NO	1.8
CE78	Yarwood Heath Farm, Yardwood Heath Lane	Rural	374626	385487	NO_2	N	0.18	356	NO	1.72
CE82	78 Buxton Road	Roadside	398140	384676	NO_2	Y	0.17	8.15	NO	2.05
CE84	Tollbar Cottage	Roadside	372549	380741	NO_2	Y	0	2.7	NO	1.8
CE86	12 - 14 Hibel Road	Roadside	391763	374057	NO_2	Y	0.3	1.9	NO	2.4
CE87	186 Park Lane	Roadside	391455	372957	NO_2	Y	1.5	1.5	NO	2.2
CE92	A555 Roundabout, Clay Lane	Roadside	385574	384390	NO_2	N	40	1.65	NO	2.15
CE93	16 Henshall Road	Kerbside	392729	377350	NO_2	N	0.42	0.75	NO	2.1
CE94	15 Chelford Road	Roadside	375858	378106	NO_2	N	0	1.35	NO	1.8
CE104	13 West Road	Roadside	384866	363089	NO_2	Y	0	2.5	NO	2.55
CE105	35 West Road	Roadside	384804	363081	NO_2	Y	0	5.65	NO	1.7

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)
CE110	Lights outside 99 Lower Heath	Kerbside	386195	363959	NO_2	N	5	1.1	NO	2.7
CE114	28 Lower Heath	Roadside	386186	363933	NO_2	Y	0.15	1.75	NO	2
CE115	1 Lower Heath	Roadside	386173	363943	NO_2	N	0	13.6	NO	1.65
CE116	68 Rood Hill	Roadside	385713	363484	NO_2	Y	0.1	2.5	NO	2.25
CE117	Rood Hill takeaway 62/64	Roadside	385725	363469	NO_2	Y	0.15	1.9	NO	2.3
CE120	8 Littondale Close	Urban background	387007	364383	NO_2	N	0	9.2	NO	1.6
CE122	108 West Road	Roadside	384935	363075	NO_2	N	0	9.8	NO	1.45
CE125	7 Sandbach Road	Roadside	384593	363026	NO_2	N	0.1	11.55	NO	1.75
CE127	Rose Cottage, Peel Lane	Roadside	384583	361575	NO_2	N	0.18	1.26	NO	1.78
CE128	Brereton Heath Park/Nature Reserve	Rural	379521	365453	NO_2	N	0	5	NO	0.7
CE131	25 Fairacre Drive	Urban background	371011	364574	NO_2	N	0	11.5	NO	1.88
CE134	White Horse, Lewin Street	Roadside	370468	366037	NO_2	N	0	1.2	NO	2.45
CE136	51 Chester Road	Roadside	369855	366422	NO_2	Y	0	2.3	NO	1.75
CE139	Allotment View, Oak Tree Lane	Roadside	374250	369134	NO_2	N	0	99.2	NO	1.8

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)
CE141	NE Lamp post by lights A50/A54 crossroads	Roadside	376334	366963	NO_2	N	25	3.5	NO	2.27
CE146	221 Heath Road	Roadside	377367	360934	NO_2	N	0	32.5	NO	2.12
CE149	Saxon Cross, Holmes Chapel Road	Roadside	377018	362124	NO_2	Y	16.3	1.75	NO	1.75
CE150	The Spinney	Roadside	376188	360660	NO_2	N	0	16.5	NO	2.05
CE152	Brickhouse Barns, Holmes Chapel Road	Roadside	377045	361989	NO_2	Y	0.15	2.62	NO	1.92
CE154	4/6 London Road	Roadside	373949	361475	NO_2	N	2.85	1.75	NO	2.35
CE155	53/55 Middlewich Road	Roadside	375447	360941	NO_2	Y	0.45	2.78	NO	2.43
CE157	2 Birch Gardens	Roadside	376083	360555	NO_2	N	0	18.5	NO	2.25
CE203	NW Traffic lights on Mill Street crossroads	Kerbside	370731	354731	NO_2	Y	1.25	0.55	NO	2.75
CE204	7 South Street	Roadside	370763	354696	NO_2	Y	0.44	1.6	NO	2.75
CE206	108 Nantwich Road/Edward Street	Roadside	370568	354649	NO_2	Y	0	5.6	NO	2.15
CE212	9 Edleston Road	Roadside	370556	354717	NO_2	N	1.9	1.75	NO	2.64

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)
CE215	8 Crewe Road (opposite the vets)	Roadside	365644	352207	NO_2	N	1	2.15	NO	2.65
CE216	146 Hospital street	Roadside	365596	352167	NO_2	Y	0.3	1.33	NO	2.77
CE217	Hospital street side of 6 Rookery Court	Roadside	365569	352182	NO_2	Y	2.1	1.75	NO	2.7
CE221	103/105 Hospital Street	Roadside	365500	352196	NO_2	Y	0.22	1.45	NO	2.5
CE222	7 Pratchetts Row	Roadside	365436	352198	NO_2	N	5.3	3.3	NO	2.68
CE224	Outside Kings Arms, Earle Street/Rainbow Street	Roadside	370845	355745	NO_2	Y	0	1.87	NO	2.72
CE225	53/55 Earle Street	Roadside	370879	355746	NO_2	Y	4	2	NO	2.65
CE230	95/97 Wistaston Road	Kerbside	370118	355432	NO_2	Y	1.62	0.25	NO	2.47
CE232	83 Flag Lane	Roadside	370041	355480	NO_2	N	2	1.75	NO	2.52
CE234	Whitemoss Farm, Nursery Road	Other	377071	354979	NO_2	N	0	10.75	NO	1.85
CE235	Go Green/32 Nantwich Road	Roadside	370803	354728	NO_2	Y	0	9.5	NO	1.97
CE236	5/7 Wellington Road, Nantwich	Roadside	365247	351846	NO_2	N	5.45	1.4	NO	2.7

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)
CE237	53/55 Millstone Lane	Roadside	365692	352421	NO_2	N	6.15	1.55	NO	2.62
CE238	33/35 North Street	Roadside	370485	357285	NO_2	N	7.6	1.8	NO	2.57
CE239	128/130 Wistaston Road	Roadside	369986	355432	NO_2	Y	1.7	1.4	NO	2.6
CE245	105 Crewe Road	Roadside	379054	355400	NO_2	N	5.5	1.75	NO	2.6
CE246	148/150 Gresty Road	Roadside	370871	354315	NO_2	N	4.5	1.5	NO	2.55
CE247	339 Crewe Road	Roadside	367739	352878	NO_2	N	4	2.4	NO	2.3
CE248	Woodlands Farm, 62 Northwich Road	Roadside	373591	370681	NO_2	N	0	40.5	NO	1.8
CE249	1 Mistletoe Cottage	Other	377646	358276	NO_2	N	14.7	2.3	NO	1.65
CE250	Street sign outside 33a Mill Lane	Roadside	391969	373042	NO_2	Y	6	1.8	NO	2.1
CE251	192 Park Lane	Roadside	391438	372945	NO_2	N	0	6.2	NO	1.5
CE252	Near 17 Fallibroome Road	Roadside	389355	373657	NO_2	Y	0.3	1.7	NO	2.3
CE253	Near 63 Brock Street	Roadside	391634	374021	NO_2	Y	3	8	NO	2.1
CE254	175 Broken Cross	Roadside	389317	373577	NO_2	Y	0	2.4	NO	2

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)
CE255	31 Broken Cross	Roadside	389640	373681	NO_2	Y	0.1	3.9	NO	2.3
CE256	15 Chelford Road	Roadside	389262	373624	NO_2	Y	8.3	1.5	NO	2
CE257	64 Broken Cross	Roadside	389577	373643	NO_2	Y	6.5	1.4	NO	2.17
CE258	92 Chester Road	Roadside	390978	373675	NO_2	N	0.24	3.4	NO	2.3
CE259	103 Chester Road	Roadside	390968	373660	NO_2	N	0.35	1.25	NO	2.3
CE260	199 Park Lane	Roadside	391416	372957	NO_2	Y	0	4.4	NO	2.4
CE261	79 Park lane	Roadside	391709	373070	NO_2	N	3.15	2.6	NO	2.3
CE262	11 Beech Lane	Roadside	391683	374087	NO_2	Y	0.53	2.01	NO	1.73
CE263	37 Beech Lane	Roadside	391646	374163	NO_2	N	0.15	4.1	NO	1.97
CE264	43 Oxford Road	Roadside	390929	373512	NO_2	N	0.51	1.93	NO	2.25
CE265	108 Wilmslow Road	Roadside	385789	383616	NO_2	N	2.57	10.67	NO	1.75
CE266	Outside Crown Mews, Hibel Road	Roadside	391757	374031	NO_2	Y	1.73	1.47	NO	1.8
CE267	238 Booth Lane	Roadside	371176	364733	NO_2	N	2.67	2.39	NO	1.78
CE268	216 Booth Lane	Roadside	371606	364859	NO_2	N	2.79	1.97	NO	2.15
CE269	Nr 35 Lewin Street	Roadside	370496	366010	NO_2	N	0.3	1.4	NO	2.44

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)
CE270	Outside Longcross Court	Roadside	370433	366136	NO_2	N	1.24	1.85	NO	2.2
CE271	1 Cledford Lane	Roadside	371104	364886	NO_2	N	5.84	1.07	NO	2.34
CE272	Outside Simcox Printers (46), Middlewich Road	Roadside	375449	360449	NO_2	N	2.67	1.68	NO	2.2
CE273	The Ox-Fford Pub, Oxford Road	Roadside	390885	373455	NO_2	N	0.4	1.47	NO	2.2
CE274	Audlem Cyclesport, 16 The Square	Roadside	365988	343612	NO_2	N	0	1.1	NO	2.2
CE275	10 Nantwich Road	Roadside	369941	366342	NO_2	N	0.25	1.98	NO	2.5
CE276	15/17 Chester Road	Roadside	369936	366394	NO_2	Y	0.41	1.32	NO	2.2
CE277	9 Market Street	Roadside	397531	384704	NO_2	Y	0.59	1.25	NO	2.15
CE278	Smithy House, 108 Adlington Road	Roadside	387367	381532	NO_2	N	4.1	1.45	NO	2.2
CE279	183 Wilmslow Road	Roadside	385671	384137	NO_2	N	0	2.6	NO	2.15
CE280	23 Newton Bank	Roadside	369855	366368	NO_2	N	0.1	2.6	NO	2.05
CE281	The Lindens, 12 - 14 Chester Road	Roadside	369783	366466	NO_2	Y	11.3	2.05	NO	2.1

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)
CE282	The DIY shop, 5 Lewin Street	Roadside	370449	366119	NO_2	N	0.2	2.02	NO	2.1
CE283	29 Middlewich Road	Roadside	375544	360921	NO_2	Y	0.15	5.45	NO	2.17
CE284	127 Buxton Road	Roadside	398023	384717	NO_2	Y	1.45	2.1	NO	2.25
CE285	63/65 Lawton Street	Roadside	386278	362850	NO_2	N	0.4	1.65	NO	2.7
CE286	The Willows, Chelford Road	Roadside	375934	378010	NO_2	N	0	1.3	NO	1.8
CE287	Old Smithy Cottage	Roadside	373212	383727	NO_2	N	0.15	9.2	NO	2.1
CE288	19/21 Henshall Road	Roadside	392670	377331	NO_2	N	2.2	1.85	NO	2.15
CE289	3/the butchers, Henshall Road	Roadside	392739	377385	NO_2	N	0.15	3.1	NO	2.15
CE290	6/8 Henshall Road	Kerbside	392747	377378	NO_2	N	0.5	0.95	NO	2.12
CE291	Park Cottage, 19 Chelford Road	Roadside	375945	378019	NO_2	N	0.18	4	NO	2.25
CE292	Dairy Farm Cottage, Chester Road	Roadside	372264	379723	NO_2	N	0.15	40	NO	2.04
CE293	1 Mistletoe Cottage	Roadside	377640	358290	NO_2	N	0.2	9.2	NO	2.2
CE294	Egerton Arms, Peel Lane	Roadside	384599	361581	NO_2	N	0	2.7	NO	2.3
CE295	South View Cottage, Peel Lane	Roadside	384562	361576	NO_2	N	0.15	3.3	NO	2.25

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
RTA1	Roadside	Automatic	90.6	38	**42**	**40**	34	38	25
RTA3	Kerbside	Automatic	73.1	73.1	35	32	39	**49**	**46**
RTA5	Roadside	Automatic			24				
RTA6	Roadside	Automatic			37	35	39		
CE1	Roadside	Diffusion Tube		92	**46.94**	**49.97**	**40.70**	**44.88**	39.00
CE2	Roadside	Diffusion Tube		100	33.99	31.79	29.78	32.97	30.59
CE3	Roadside	Diffusion Tube			35.39	33.93	31.74	32.73	
CE4	Roadside	Diffusion Tube		100	38.48	32.81	32.91	33.23	31.44
CE5	Roadside	Diffusion Tube		100	**42.81**	39.85	35.01	39.24	33.43
CE6	Roadside	Diffusion Tube			**59.96**				
CE7	Roadside	Diffusion Tube			**43.46**	37.50			
CE10	Roadside	Diffusion Tube		92	**52.31**	**50.90**	**43.36**	**49.74**	**41.06**
CE11	Roadside	Diffusion Tube		92	**41.46**	39.44	38.42	**40.48**	37.43
CE12	Urban background	Diffusion Tube		100	17.18	14.97	13.93	14.56	12.96
CE15	Urban background	Diffusion Tube			**47.19**	**41.37**			
CE16	Urban background	Diffusion Tube		100	**60.47**	**62.19**	**55.26**	**61.33**	**53.93**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE19	Roadside	Diffusion Tube		92	**45.17**	**45.03**	**40.59**	**43.47**	**42.29**
CE23	Roadside	Diffusion Tube		100	31.23	31.14	28.17	30.20	26.19
CE25	Roadside	Diffusion Tube			24.13	25.57			
CE26	Roadside	Diffusion Tube			25.49	26.43			
CE27	Roadside	Diffusion Tube			25.03	25.49			
CE28	Roadside	Diffusion Tube		100	28.36	26.91	25.00	25.53	22.99
CE29	Roadside	Diffusion Tube		100	28.39	27.10	24.51	28.62	24.15
CE30	Roadside	Diffusion Tube		100	**42.23**	**42.52**	38.86	**40.99**	36.25
CE31	Roadside	Diffusion Tube			29.16	26.99	26.19	28.99	
CE39	Roadside	Diffusion Tube		100	**41.14**	38.90	34.59	39.18	32.42
CE40	Roadside	Diffusion Tube		100	33.37	31.65	28.79	30.92	27.58
CE42	Roadside	Diffusion Tube		100	**40.05**	39.76	35.53	**40.85**	32.84
CE43	Roadside	Diffusion Tube			**40.99**	37.10			
CE44	Roadside	Diffusion Tube			39.51	37.65			
CE45	Roadside	Diffusion Tube			31.12	28.93			

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CE46	Roadside	Diffusion Tube			**44.57**	**45.95**			
CE47	Roadside	Diffusion Tube		100	**45.04**	**43.43**	36.42	**43.39**	34.03
CE48	Roadside	Diffusion Tube			**46.81**	38.41	36.80	**50.20**	
CE49	Roadside	Diffusion Tube			**82.80**	**67.97**			
CE50	Roadside	Diffusion Tube		100	28.02	25.22	23.88	23.81	17.46
CE51	Roadside	Diffusion Tube			**51.92**	**50.71**	**44.45**	**48.72**	
CE52	Roadside	Diffusion Tube			**50.74**	**48.07**			
CE53	Roadside	Diffusion Tube			**54.43**	**48.91**			
CE54	Roadside	Diffusion Tube		100	**60.24**	**54.68**	**51.17**	**53.39**	**49.47**
CE55	Roadside	Diffusion Tube	100	58	**64.59**	**63.96**	**50.76**	**52.98**	39.87
CE56	Roadside	Diffusion Tube			**45.11**	**48.70**			
CE57	Roadside	Diffusion Tube		92	**48.23**	**51.59**	39.06	**45.09**	24.06
CE60	Roadside	Diffusion Tube			**66.34**	**64.65**			
CE61	Roadside	Diffusion Tube		100	**50.01**	**47.94**	**42.52**	**41.84**	21.37
CE62	Roadside	Diffusion Tube	100	42	23.13	22.48	18.51	20.59	16.89

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CE63	Roadside	Diffusion Tube	83	42	39.59	36.17	29.77	32.92	26.89
CE64	Roadside	Diffusion Tube		83	32.48	30.90	25.30	27.52	22.85
CE65	Roadside	Diffusion Tube		92	38.48	35.06	30.87	34.54	32.39
CE68	Other	Diffusion Tube		92	32.17	31.08	29.44	30.76	28.77
CE71	Other	Diffusion Tube		100	**40.40**	34.24	32.91	37.26	30.54
CE72	Other	Diffusion Tube			32.15	29.98			
CE73	Roadside	Diffusion Tube		100	**44.27**	**40.21**	36.73	38.17	36.37
CE74	Roadside	Diffusion Tube		100	25.98	22.98	21.23	24.39	21.58
CE75	Roadside	Diffusion Tube			38.93	32.14			
CE76	Roadside	Diffusion Tube		100	19.32	17.40	16.03	17.72	16.68
CE77	Roadside	Diffusion Tube		92	16.43	15.96	13.30	15.46	15.54
CE78	Roadside	Diffusion Tube		100	25.02	21.98	20.33	22.20	19.91
CE79	Roadside	Diffusion Tube			36.29	37.74			
CE81	Roadside	Diffusion Tube			**72.53**	**76.94**			
CE82	Roadside	Diffusion Tube		100	26.32	24.21	22.73	23.38	22.46

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE84	Roadside	Diffusion Tube		83	**52.05**	**51.49**	**45.79**	**45.81**	24.84
CE86	Roadside	Diffusion Tube		100	**42.51**	**42.58**	38.54	**44.29**	39.91
CE87	Roadside	Diffusion Tube		100	39.47	**43.60**	37.43	**40.10**	36.87
CE88	Kerbside	Diffusion Tube			**47.62**	**44.77**	**41.38**	**44.49**	
CE89	Kerbside	Diffusion Tube			**49.48**	**46.12**			
CE90	Kerbside	Diffusion Tube			**51.09**	**44.83**			
CE91	Roadside	Diffusion Tube				**46.77**	**44.85**	**48.04**	
CE92	Roadside	Diffusion Tube		83		28.95	26.76	34.73	29.46
CE93	Roadside	Diffusion Tube		100				**43.36**	39.23
CE94	Roadside	Diffusion Tube		83				**52.66**	**45.06**
CE95	Roadside	Diffusion Tube						32.11	
CE103a	Roadside	Diffusion Tube			**74.02**	**48.59**			
CE104	Roadside	Diffusion Tube		100	**70.31**	**61.43**	**57.66**	**64.50**	**54.72**
CE105	Roadside	Diffusion Tube		100	35.14	33.03	29.00	34.12	29.93
CE108	Roadside	Diffusion Tube			20.78	20.63			

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CE109	Roadside	Diffusion Tube			26.94	26.92			
CE110	Roadside	Diffusion Tube		100	36.74	36.27	32.86	35.53	33.54
CE112	Roadside	Diffusion Tube			27.62	25.54			
CE113	Roadside	Diffusion Tube			23.36	24.03			
CE114	Roadside	Diffusion Tube		100	**69.20**	**64.38**	**61.46**	**67.34**	**60.82**
CE115	Roadside	Diffusion Tube		100	28.82	26.31	22.85	25.84	23.46
CE116	Roadside	Diffusion Tube		100	**45.73**	**43.05**	38.12	**42.89**	39.79
CE117	Roadside	Diffusion Tube		92	**48.01**	**44.50**	**41.24**	**46.57**	**45.59**
CE118	Roadside	Diffusion Tube			26.50	31.12			
CE120	Urban background	Diffusion Tube		100	13.27	11.97	10.54	11.08	11.10
CE122	Urban background	Diffusion Tube		100	28.12	25.24	22.42	24.77	22.94
CE123	Urban background	Diffusion Tube			39.35	34.37			
CE125	Roadside	Diffusion Tube		100	29.88	28.81	24.21	28.01	25.38
CE127	Roadside	Diffusion Tube		100	**42.84**	38.40	35.24	**41.20**	36.15
CE128	Roadside	Diffusion Tube		92	14.33	11.63	10.23	11.62	9.75

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CE130	Roadside	Diffusion Tube			20.01	18.54	16.96	20.88	
CE131	Roadside	Diffusion Tube		100	17.10	14.24	12.87	14.54	12.06
CE133	Roadside	Diffusion Tube			24.86	23.96	20.99	22.01	
CE134	Roadside	Diffusion Tube		92	**41.40**	39.39	35.91	38.94	36.02
CE135	Roadside	Diffusion Tube			33.72	33.49			
CE136	Roadside	Diffusion Tube		100	**46.09**	**42.13**	39.04	**41.05**	35.28
CE137	Other	Diffusion Tube			**47.78**	**44.52**			
CE138a	Other	Diffusion Tube			**46.16**	31.33			
CE139	Other	Diffusion Tube		100	33.83	31.33		23.17	23.36
CE141	Roadside	Diffusion Tube		100	**41.68**	**41.95**	37.06	**40.60**	37.64
CE143a	Roadside	Diffusion Tube			32.47	34.17			
CE144a	Roadside	Diffusion Tube			34.33	35.49			
CE145a	Roadside	Diffusion Tube			31.55	31.32			
CE146	Roadside	Diffusion Tube		100	35.96	35.35	25.03	31.69	23.12
CE148a	Roadside	Diffusion Tube			**60.68**	**62.31**			

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE149	Roadside	Diffusion Tube		100	**40.55**	38.60	32.73	36.75	32.49
CE150	Roadside	Diffusion Tube		92	31.18	29.18	27.00	28.26	26.85
CE152	Roadside	Diffusion Tube		100	**50.57**	**46.92**	**41.44**	**48.03**	**40.81**
CE153	Roadside	Diffusion Tube			**54.59**	**51.72**			
CE154	Roadside	Diffusion Tube		100		36.54	33.14	34.07	29.92
CE155	Roadside	Diffusion Tube		100		**50.41**	**44.62**	**49.42**	39.52
CE156	Other	Diffusion Tube				21.75	17.86	19.99	
CE157	Other	Diffusion Tube		92				26.59	23.68
CE203	Other	Diffusion Tube		100	**49.74**	**51.49**	**46.19**	**48.11**	**43.03**
CE204	Roadside	Diffusion Tube		100	**40.58**	39.26	31.99	36.51	31.82
CE206	Roadside	Diffusion Tube		92	34.13	30.53	25.71	30.65	24.52
CE207	Roadside	Diffusion Tube			32.69	28.66			
CE208	Roadside	Diffusion Tube			32.96	29.24			
CE212	Roadside	Diffusion Tube		100	39.78	39.50	32.52	38.59	30.00
CE215	Roadside	Diffusion Tube		100	32.52	29.89	25.27	29.24	24.02

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CE216	Roadside	Diffusion Tube		100	**60.67**	**57.80**	**46.51**	**52.18**	**48.59**
CE217	Roadside	Diffusion Tube		92	37.92	36.32	30.56	35.68	32.37
CE218	Roadside	Diffusion Tube			**49.03**	**45.24**			
CE219	Roadside	Diffusion Tube			**61.61**	**63.61**			
CE220	Roadside	Diffusion Tube			**57.58**	**57.31**			
CE221	Roadside	Diffusion Tube		100	**49.70**	**49.02**	**40.97**	**48.01**	**40.73**
CE222	Roadside	Diffusion Tube		100	35.22	32.83	28.08	30.48	27.73
CE223	Roadside	Diffusion Tube			29.76	26.88			
CE224	Roadside	Diffusion Tube		100	**42.86**	**42.49**	35.75	36.97	37.19
CE225	Roadside	Diffusion Tube		100	**41.98**	**44.04**	39.56	**41.34**	34.21
CE226	Roadside	Diffusion Tube			32.82	32.42	26.32	31.46	
CE229	Roadside	Diffusion Tube			29.66				
CE230	Kerbside	Diffusion Tube		100	36.39	31.88	30.45	34.99	29.17
CE232	Kerbside	Diffusion Tube		100	**42.37**	**41.87**	38.23	**40.22**	35.50
CE233	Kerbside	Diffusion Tube			39.22	**42.84**			

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE234	Other	Diffusion Tube		100	37.15	35.34	26.67	31.35	21.71
CE235	Other	Diffusion Tube		92	32.81	31.62	28.04	31.52	27.51
CE236	Other	Diffusion Tube		100	37.82	32.16	28.22	30.84	26.79
CE237	Roadside	Diffusion Tube		100	38.12	36.75	31.64	36.10	31.16
CE238	Roadside	Diffusion Tube		100	35.55	33.23	29.91	34.34	28.84
CE239	Roadside	Diffusion Tube		100	**41.94**	**40.82**	35.82	**40.86**	32.86
CE245	Roadside	Diffusion Tube		100		30.35	27.23	30.25	26.60
CE246	Roadside	Diffusion Tube		92		38.70	35.99	**41.95**	37.26
CE247	Roadside	Diffusion Tube		100		24.37	23.87	23.43	19.44
CE248	Roadside	Diffusion Tube		100				36.69	31.64
CE249	Roadside	Diffusion Tube	100	58				21.59	21.58
CE250	Roadside	Diffusion Tube		100					37.26
CE251	Roadside	Diffusion Tube		100					28.28
CE252	Roadside	Diffusion Tube		100					26.19
CE253	Roadside	Diffusion Tube		92					25.83

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE254	Roadside	Diffusion Tube		100					32.46
CE255	Roadside	Diffusion Tube		100					26.87
CE256	Roadside	Diffusion Tube		100					36.32
CE257	Roadside	Diffusion Tube		83					39.37
CE258	Roadside	Diffusion Tube		100					24.68
CE259	Roadside	Diffusion Tube		100					33.63
CE260	Roadside	Diffusion Tube		100					22.73
CE261	Roadside	Diffusion Tube		92					28.79
CE262	Roadside	Diffusion Tube		75					29.69
CE263	Roadside	Diffusion Tube		100					25.96
CE264	Roadside	Diffusion Tube		100					28.86
CE265	Roadside	Diffusion Tube		92					24.90
CE266	Roadside	Diffusion Tube		100					**51.00**
CE267	Roadside	Diffusion Tube		83					24.54
CE268	Roadside	Diffusion Tube		100					31.95

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE269	Roadside	Diffusion Tube		92					**41.50**
CE270	Roadside	Diffusion Tube		67					32.93
CE271	Roadside	Diffusion Tube		100					24.54
CE272	Roadside	Diffusion Tube		92					31.29
CE273	Roadside	Diffusion Tube		92					33.26
CE274	Roadside	Diffusion Tube		100					19.44
CE275	Roadside	Diffusion Tube		100					34.05
CE276	Roadside	Diffusion Tube		92					**44.99**
CE277	Roadside	Diffusion Tube		92					**59.55**
CE278	Roadside	Diffusion Tube		92					**45.07**
CE279	Roadside	Diffusion Tube		100					27.76
CE280	Roadside	Diffusion Tube		100					**40.13**
CE281	Roadside	Diffusion Tube		92					38.86
CE282	Roadside	Diffusion Tube		100					**43.49**
CE283	Roadside	Diffusion Tube		100					35.35

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CE284	Roadside	Diffusion Tube	100	58					32.40
CE285	Roadside	Diffusion Tube	100	50					25.77
CE286	Roadside	Diffusion Tube	100	42					30.20
CE287	Roadside	Diffusion Tube	100	42					16.54
CE288	Roadside	Diffusion Tube	100	42					29.27
CE289	Roadside	Diffusion Tube	100	42					23.26
CE290	Kerbside	Diffusion Tube	100	42					35.48
CE291	Roadside	Diffusion Tube	100	42					24.20
CE292	Roadside	Diffusion Tube	60	25					30.27
CE293	Roadside	Diffusion Tube	100	42					13.33
CE294	Roadside	Diffusion Tube	100	25					35.60
CE295	Roadside	Diffusion Tube	100	25					21.28
CEC WAG	Roadside	Diffusion Tube				15.45	15.60		

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

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

Notes:

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

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

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

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

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

(4) Blank cells represent tubes which were not active during that particular year."

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
RTA1 Mere	Roadside	Automatic	90.6	38	**-**	**- (128)**	**-**	**- (117)**	**- (107)**
RTA3 Disley	Kerbside	Automatic		73	**- (96)**	**- (105)**	**- (139)**	**9 (193)**	**5 (184)**
RTA5 Crewe	Roadside	Automatic			**- (90)**				
RTA6 Knutsford	Roadside	Automatic			**-**	**-**			

Notes:

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

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

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE1	57.46		52.90	41.22	44.67	39.20	38.20	32.03	41.02	41.95	55.89	48.55	44.83	39.00	37.12
CE2	44.88	39.31	37.54	39.84	32.18	29.61	28.60	24.80	31.39	29.63	45.58	38.60	35.16	30.59	29.85
CE4	47.71	40.73	35.66	46.10	31.55	29.67	29.70	25.47	33.97	28.77	43.60	40.78	36.14	31.44	-
CE5	53.81	45.60	40.33	37.55	40.36	30.91	31.59	28.99	37.08	31.14	43.25	40.52	38.43	33.43	-
CE10	70.86		37.40	42.05	50.38	42.14	40.17	36.47	48.14	42.51	62.70	46.31	47.19	**41.06**	-
CE11	47.66	42.84		49.72	36.28	39.76	49.39	31.29	39.13	36.51	49.91	50.76	43.02	37.43	35.46
CE12	23.51	19.08	15.96	12.92	11.28	9.55	9.97	9.81	11.20	12.20	21.84	21.45	14.90	12.96	-
CE16	82.16	73.30	67.50	70.80	61.06	65.58	61.96	43.66	62.71	46.89	57.61	50.68	61.99	**53.93**	**51.48**
CE19	64.53	48.77	50.38		41.64	51.67	48.44	34.34	48.10	43.05	56.54	47.21	48.61	**42.29**	35.92
CE23	43.19	35.37	35.45	30.45	28.00	26.04	24.87	21.87	27.55	26.73	35.66	26.12	30.11	26.19	22.95
CE28	39.79	33.21	27.21	20.84	22.11	21.97	19.32	17.71	23.84	22.12	35.16	33.87	26.43	22.99	20.26
CE29	39.01	34.65	30.23	27.11	27.09	21.75	22.22	20.66	26.28	23.63	32.52	27.96	27.76	24.15	-
CE30	53.41	50.55	49.40	48.12	36.97	37.07	33.99	30.42	37.98	33.43	43.94	44.75	41.67	36.25	30.29
CE39	47.38	42.61	37.05	27.06	44.10	34.50	34.56	30.33	43.87	30.99	38.73	35.98	37.26	32.42	-
CE40	42.52	37.85	35.43	31.00	28.77	27.03	26.31	23.48	28.79	26.84	38.55	33.85	31.70	27.58	27.45

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE42	48.48	44.60	41.08	33.37	47.23	35.77	35.71	27.42	35.65	29.20	38.45	36.07	37.75	32.84	26.84
CE47	56.03	47.45	44.72	39.51	23.74	33.95	30.60	33.26	38.95	30.81	46.53	43.82	39.11	34.03	32.80
CE50	70.19	25.25	17.46	12.59	12.14	11.66	12.22	12.30	12.17	12.72	21.64	20.48	20.07	17.46	-
CE54	56.87	50.88	55.08	68.82	54.68	53.50	64.07	49.62	60.66	42.08	68.27	57.76	56.86	**49.47**	38.45
CE55	64.49	59.22	40.30	37.73	28.48	35.06	36.50						43.11	39.87	-
CE57	56.02	44.83	26.58		17.42	20.04	19.34	19.04	20.31	21.39	29.00	30.19	27.65	24.06	-
CE61	45.11	40.69	26.26	18.88	20.27	17.96	18.41	17.57	18.14	19.07	26.62	25.78	24.56	21.37	-
CE62	26.28	22.63	18.38	14.07	13.09								18.89	16.89	16.88
CE63	44.14	37.79	24.71	18.64	25.05								30.07	26.89	-
CE64	34.30	28.76	29.31	21.63	25.15	19.73	24.39	22.87	23.77			32.71	26.26	22.85	22.79
CE65	48.61	50.61	47.62	42.19	45.02	24.71	25.64	18.18	27.92		36.09	42.99	37.23	32.39	-
CE68	47.48	41.58	40.44	29.18	26.37		24.00	26.40	30.08	27.91	36.84	33.47	33.07	28.77	27.85
CE71	48.85	39.84	39.40	32.58	36.46	29.89	28.69	24.33	31.79	30.63	42.48	36.30	35.10	30.54	30.14
CE73	49.51	42.94	45.15	51.19	37.92	36.23	38.38	27.44	38.90	32.24	58.70	43.05	41.81	36.37	34.40
CE74	34.60	27.15	24.79	23.88	38.58	17.61	17.76	15.75	19.17	18.23	30.84	29.31	24.81	21.58	-
CE76	27.26	21.55	21.78	15.65	19.59	14.46	14.37	14.92	16.49	18.78	23.81	21.44	19.18	16.68	-
CE77	21.26	17.81	18.92	15.89	12.98		13.96	15.00	15.38	15.58	25.15	24.49	17.86	15.54	-
CE78	31.57	25.88	26.07	20.35	20.09	17.07	17.80	18.09	20.23	19.51	29.05	28.86	22.88	19.91	19.91
CE82	35.63	27.63	25.94	27.71	23.41	24.26	24.89	18.72	21.27	21.53	31.49	27.25	25.81	22.46	22.38

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE84	52.38	50.88	22.74	19.39	15.09			17.61	20.03	22.01	34.53	30.84	28.55	24.84	-
CE86	61.79	52.81	52.15	38.89	40.35	37.67	38.32	31.65	44.32	42.17	53.55	56.83	45.87	39.91	39.01
CE87	57.35	49.62	48.92	40.05	40.77	37.83	35.18	31.31	39.85	33.23	47.78	46.72	42.38	36.87	33.07
CE92	42.83	37.96	39.34	37.31	26.16		28.87	25.45	33.05	27.78		39.81	33.86	29.46	18.78
CE93	59.28	50.35	45.38	41.03	43.50	43.83	39.33	34.61	46.08	40.01	49.22	48.43	45.09	39.23	36.82
CE94	56.79	56.28	54.88	50.03		43.26	44.74		51.31	42.41	68.64	49.57	51.79	**45.06**	-
CE104	71.06	68.93	67.18	87.00	61.72	53.34	56.05	45.88	63.18	45.72	73.79	60.85	62.89	**54.72**	-
CE105	46.20	38.44	35.12	38.69	35.02	30.06	30.53	27.65	32.54	24.76	40.22	33.65	34.41	29.93	-
CE110	51.93	46.08	45.58	38.25	32.14	31.26	32.01	28.34	36.57	32.69	45.09	42.71	38.55	33.54	26.71
CE114	73.16	72.95	79.44	76.65	63.12	69.22	68.39	56.59	76.15	55.25	79.00	68.98	69.91	**60.82**	**59.95**
CE115	38.50	30.31	31.49	24.87	28.15	21.23	20.84	20.95	21.23	21.21	31.60	33.25	26.97	23.46	-
CE116	49.52	50.38	55.16	53.18	42.88	43.43	42.65	43.08	48.83	34.80	46.68	38.30	45.74	39.79	-
CE117	63.16	57.20	64.90	61.16		40.64	47.40	45.04	54.30	39.88	54.03	48.76	52.41	**45.59**	**45.00**
CE120	23.90	16.77	13.35	9.29	8.45	7.84	8.47	8.31	9.79	11.89	17.11	17.96	12.76	11.10	-
CE122	40.66	30.15	28.72	28.10	22.00	19.84	20.70	18.73	23.90	20.62	32.39	30.65	26.37	22.94	-
CE125	39.72	35.66	32.96	28.04	26.80	25.02	23.21	20.72	25.22	25.32	34.04	33.38	29.18	25.38	-
CE127	49.79	39.96	47.16	47.66	42.46	35.32	38.89	33.81	44.80	31.94	50.88	35.95	41.55	36.15	35.39
CE128		13.76	12.10	9.71	8.39	7.88	9.37	8.48	9.88	10.67	16.88	16.12	11.20	9.75	-
CE131	26.13	15.75	13.99	11.82	10.96	8.33	10.16	9.14	10.83	11.23	18.95	19.11	13.87	12.06	-

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE134	56.48	48.52	42.77	39.46	39.48	36.75	38.16	36.99	38.55		40.52	37.76	41.40	36.02	-
CE136	51.74	47.41	46.32	43.33	41.58	38.43	36.00	31.51	39.54	33.95	39.94	36.89	40.55	35.28	-
CE139	32.28	28.96	30.04	28.61	19.19	23.30	24.45	22.73	24.81	22.67	34.52	30.66	26.85	23.36	-
CE141	47.91	55.85	55.23	41.78	37.02	40.11	35.40	33.88	42.21	38.14	47.44	44.20	43.26	37.64	23.65
CE146	43.72	30.41	29.65	21.84	32.69	21.11	21.59	21.02	24.51	20.67	24.15	27.53	26.57	23.12	-
CE149	50.96	44.11	42.86	44.38	33.01	28.38	31.66	27.92	34.61	29.39	44.87	35.98	37.34	32.49	21.52
CE150	42.55	34.73	35.46	32.34	24.42	24.34	23.59	24.43		24.87	35.30	37.50	30.87	26.85	-
CE152	57.13	55.48	54.77	49.57	42.95	41.93	42.88	34.76	43.91	37.93	53.12	48.51	46.91	**40.81**	**40.48**
CE154	50.17	40.82	39.78	36.30	28.62	25.51	29.71	25.38	32.68	27.26	41.42	35.06	34.39	29.92	25.98
CE155	63.54	48.63	50.71	52.42	50.19	39.68	43.31	32.83	48.14	32.59	43.09	40.01	45.43	39.52	38.50
CE157		31.53	29.61	32.49	25.10	24.86	26.29	23.86	28.39	17.60	33.54	26.08	27.21	23.68	-
CE203	70.61	57.93	55.01	57.50	41.24	41.37	38.95	40.00	51.06	39.32	48.40	52.12	49.46	**43.03**	36.68
CE204	49.19	42.09	41.01	39.77	38.74	29.02	31.15	27.61	35.37	28.61	39.20	37.18	36.58	31.82	30.82
CE206	41.89	30.79	31.10		27.24	21.91	23.87	21.54	28.66	21.14	29.03	32.89	28.19	24.52	-
CE212	50.58	42.45	42.80	31.47	35.53	31.39	30.27	26.61	35.39	26.90	28.83	31.64	34.49	30.00	27.21
CE215	39.58	36.45	33.18	22.59	29.08	22.56	22.67	20.13	24.91	22.43	25.70	32.06	27.61	24.02	22.91
CE216	73.76	65.75	57.65	54.80	55.59	50.06	49.47	47.52	52.13	55.29	52.37	55.76	55.85	**48.59**	**46.99**
CE217	47.80	42.37	39.11	47.47	32.97	30.29		29.08	32.74	28.49	41.52	37.43	37.21	32.37	28.68
CE221	54.61	50.41	52.85	60.88	43.63	43.65	45.36	38.93	46.26	33.37	47.44	44.48	46.82	**40.73**	39.84

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE222	43.68	43.17	35.50	23.84	32.69	31.32	28.27	26.25	29.49	23.94	32.85	31.48	31.87	27.73	23.68
CE224	57.68	46.08	52.91	42.53	32.24	37.88	34.53	32.08	42.90	36.08	50.90	47.23	42.75	37.19	-
CE225	49.93	45.42	42.48	37.25	38.13	31.86	34.28	32.02	41.12	33.93	41.71	43.80	39.33	34.21	29.07
CE230	46.12	37.09	36.50	41.49	28.89	27.26	28.71	24.46	33.75	24.32	38.51	35.23	33.53	29.17	24.44
CE232	55.28	52.47	47.32	38.66	37.04	37.50	35.63	29.08	36.14	32.66	43.59	44.32	40.81	35.50	31.82
CE234	45.36	33.75	28.84	19.47	34.40	19.71	20.93	18.36	24.36	18.56	17.74	17.92	24.95	21.71	-
CE235	42.51	34.12	33.59	32.69	28.89	25.44	26.58	25.01		26.60	35.90	36.48	31.62	27.51	-
CE236	46.11	39.72	35.39	29.22	33.42	25.07	25.70	20.40	27.30	23.52	30.59	33.12	30.80	26.79	20.78
CE237	48.72	44.85	40.63	35.11	28.86	30.13	30.53	29.10	32.90	30.38	39.27	39.39	35.82	31.16	24.30
CE238	50.46	38.93	35.94	35.75	32.40	25.32	28.47	23.93	35.17	21.57	35.90	33.92	33.15	28.84	22.23
CE239	58.74	44.48	44.41	34.50	40.86	32.59	30.63	26.30	35.27	29.14	37.30	38.96	37.77	32.86	29.16
CE245	44.48	35.74	35.00	30.10	24.70	23.94	23.75	23.44	26.67	24.20	37.42	37.41	30.57	26.60	21.69
CE246	62.92	52.36	47.83	43.52	38.70	34.39	33.78	32.83	39.56	35.72		49.55	42.83	37.26	29.97
CE247	34.36	28.60	22.68	20.22	18.25	16.77	18.23	19.01	20.36	15.60	25.19	28.91	22.35	19.44	16.97
CE248	44.31	38.26	42.50	43.85	27.32	33.80	34.30	28.28	34.99	32.89	42.05	33.80	36.36	31.64	-
CE249	33.99	27.36	22.13	17.27	22.74	17.42	17.22						22.59	21.58	18.50
CE250	53.02	48.93	44.71	47.87	37.90	36.47	35.89	31.79	43.86	40.51	49.07	43.89	42.83	37.26	30.26
CE251	43.25	39.74	35.95	28.98	30.45	27.36	25.92	23.57	28.14	28.88	39.58	38.25	32.51	28.28	-
CE252	42.17	35.57	32.96	26.61	26.53	26.51	24.66	23.81	27.10	28.11	33.04	34.22	30.11	26.19	25.61

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE253	43.51	34.84		23.67	24.01	25.26	23.07	22.99	27.91	26.62	36.20	38.48	29.69	25.83	24.44
CE254	48.45	37.74	36.27	43.64	33.99	32.24	33.04	27.54	37.05	31.10	44.88	41.83	37.31	32.46	-
CE255	44.67	33.89	32.65	31.97	26.46	24.61	25.25	21.29	29.40	27.46	37.10	35.86	30.88	26.87	-
CE256	55.80	49.64	47.79	41.88	37.21	37.54	36.48	33.02	39.53	37.47	39.48	45.15	41.75	36.32	25.65
CE257	62.84	57.72	52.34	42.80	42.99	40.18	35.94	31.84		42.07		43.84	45.26	39.37	28.54
CE258	36.65	32.61	29.06	32.80	28.09	22.02	23.48	21.01	24.31	22.62	36.26	31.56	28.37	24.68	24.46
CE259	50.55	42.97	42.78	43.00	34.47	34.28	31.31	28.06	34.07	31.64	47.81	42.98	38.66	33.63	32.53
CE260	35.27	25.81	26.85	29.38	24.69	19.77	20.84	20.62	24.56	21.64	35.50	28.63	26.13	22.73	-
CE261	32.81	38.10	36.21		30.07	28.46	27.66	25.42	31.88	30.31	44.77	38.34	33.09	28.79	26.33
CE262	51.01	36.78		25.74	29.81		25.82	26.00	30.69		42.64	38.62	34.12	29.69	28.79
CE263	48.90	33.91	32.23	24.62	26.61	21.71	21.96	22.60	27.72	23.69	37.57	36.54	29.84	25.96	25.83
CE264	48.71	36.34	34.05	29.75	34.18	27.54	28.54	22.84	27.98	29.45	41.12	37.65	33.18	28.86	27.97
CE265	43.27	35.20		24.64	26.70	22.10	23.93	20.17	27.04	25.17	34.82	31.73	28.62	24.90	23.97
CE266	65.00	65.65	68.62	57.27	56.41	61.93	52.83	40.94	54.41	54.09	68.94	57.34	58.62	**51.00**	**44.59**
CE267		33.28	31.50	30.19	25.00	22.77	23.70		27.83	22.40	33.74	31.61	28.20	24.54	22.41
CE268	47.88	39.89	42.81	36.53	33.33	32.98	31.35	28.90	36.43	28.55	41.84	40.21	36.73	31.95	28.04
CE269	70.12	58.04	52.07	48.31		42.03	43.06	33.53	46.67	35.62	51.60	43.70	47.70	**41.50**	**40.34**
CE270		45.67		40.65	37.85		35.18	30.42		21.24	40.63	40.68	36.54	32.93	30.69
CE271	36.95	34.01	30.10	27.73	23.56	25.29	23.72	23.41	26.94	23.58	32.15	30.95	28.20	24.54	20.12

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE272		42.80	45.15	37.13	30.60	31.41	31.07	28.68	33.65	30.69	42.57	41.83	35.96	31.29	27.32
CE273	51.95	43.91	37.63	31.44	32.76	32.52	31.34	27.74		37.29	47.91	46.03	38.23	33.26	32.17
CE274	35.37	28.01	27.12	20.17	22.69	17.22	15.99	15.80	16.23	17.82	26.25	25.45	22.34	19.44	-
CE275	52.40	44.07	44.46	40.38	36.85	34.42	34.71	29.07	39.30	33.49	41.32	39.23	39.14	34.05	33.42
CE276		55.36	62.31	56.12	48.01	49.18	49.55	28.67	57.41	45.41	63.59	53.19	51.71	**44.99**	**43.03**
CE277	79.68	73.78	68.61	81.53	65.56	66.34	59.69	49.74	67.16		72.82	68.05	68.45	**59.55**	**55.59**
CE278	70.04	61.55	58.15	55.81	59.60		46.48	34.24	51.03	35.87	49.12	48.03	51.81	**45.07**	35.02
CE279	11.85	41.82	43.02	35.97	28.60	28.34	26.58	22.73	33.35	27.90	42.60	40.15	31.91	27.76	-
CE280	55.55	54.68	49.17	52.49	42.52	44.47	40.87	36.67	44.04	37.00	50.36	45.63	46.12	**40.13**	-
CE281	57.28	50.28	49.73	48.61	44.63	38.88	42.26	30.20	47.58	31.88	49.97		44.66	38.86	26.64
CE282	65.52	64.00	60.64	48.17	53.70	46.64	43.70	34.29	46.52	40.05	51.73	44.91	49.99	**43.49**	**42.83**
CE283	58.25	44.89	45.27	49.59	41.13	32.21	37.26	26.20	42.01	29.71	43.08	38.04	40.64	35.35	35.17
CE284						32.44	34.98	27.25	34.53	30.68	41.75	38.42	34.29	32.40	29.80
CE285							27.74	25.41	31.12	25.35	36.45	38.30	30.73	25.77	25.06
CE286								28.64	34.33	31.43	47.12	44.31	37.17	30.20	-
CE287								16.32	16.38	17.64	25.89	25.51	20.35	16.54	16.52
CE288								25.09	31.94	28.03	44.41	43.26	34.54	29.27	25.94
CE289								20.45	26.29	25.74	33.68	31.05	27.44	23.26	23.10
CE290								32.48	44.32	39.15	47.43	45.95	41.86	35.48	33.39

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87 - September) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
CE291								22.66	28.09	27.06	39.74	31.34	29.78	24.20	24.08
CE292								32.36	32.51			39.51	34.79	30.27	30.24
CE293								16.26	17.91	14.56	19.06	17.14	16.98	13.33	13.34
CE294										30.21	54.40	38.14	40.91	35.60	-
CE295										17.85	30.98	24.56	24.46	21.28	21.14

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

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

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

(2) Distance corrected to nearest relevant public exposure.

(3) Blank cells represent no tube data available for that month.

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

QA/QC on Monitoring Data / Diffusion tube Bias Adjustment and Distance Corrections

Factor from Local Co-location Studies

A local bias adjustment factor has not been calculated for any of the real time sites due to data capture being below the threshold required therefore the Council has opted to use the relevant national bias adjustment factor.

Diffusion Tube Bias Correction Factors

Co-location studies undertaken at various locations across the country are available at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html. Table C1 below gives an example of the bias correction factors produced by Gradko laboratory.

Table C.1 – Previous Bias Adjustments

Year	Month	Bias Correction Factor
2017	March	0.97
2017	March	0.94
2017	June	0.92
2017	September	0.92
2018	March	0.89
2018	July	0.87
2018	September	0.87

Discussion of which factor to use

In considering which bias adjustment factor is the most representative of exposure in the area, the guidance suggests that where a co-location site has good precision of diffusion tubes, and high quality chemiluminescent data to the Automatic Urban Rural

Network (AURN) standards, the local factor may be more representative, and in other cases the national factor should be used.

For the purposes of review and assessment it is prudent to adopt the precautionary approach and use the worst case result to determine whether there is a need to proceed to a more detailed assessment in any area. In all instances, the national factors (conservative values) have been deemed worst case and as such will be used for adjusting the 2017 data.

QA/QC of Automatic Monitoring

The chemiluminescent analysers undergo span and zero calibrations on a regular basis using BOC certified gas. The resultant span and offset (zero) values are used by Air Quality Data Management (AQDM) for the ratification of data. The analysers are fitted with internal permeation tubes to enable daily internal span and zero checks. A maintenance and support contract is held by ESU1 and the units are serviced every 6 months in line with AURN requirements.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes are prepared and analysed by Gradko Environmental Ltd. using the 20% TEA in water method. The laboratory's internal analysis procedures are assessed by U.K.A.S on an annual basis for compliance to ISO 17025:2005. They also follow the guidelines of the Defra Harmonisation document related to the preparation, extraction, analysis and calculation procedures for NO_2 passive diffusion tubes.

Gradko participates in the Air-PT scheme for NO_x tubes, which is operated by LGC Standards and supported by the Health and Safety laboratory, and a field inter comparison.

The Council has also implemented its own QA/QA procedures to ensure that final results are as accurate as possible. This includes the use of two new written

procedures, one covering the storage, use and monitoring using the diffusion tubes, and the other covering the data management of the results. As part of the data management there is now a secure, password protected spreadsheet containing all data relevant to the results.

Short- term to long term data validation

There were fourteen diffusion tube sites for which there was low data capture (less than 75%) in 2017 and these were annualised following guidance set out in Box 7.10 of TG (16) as detailed below.

The annual mean of background diffusion tube sites were compared to a 'period mean' for the sites with a low data capture. The 'period mean' is the mean for the period for which there is data for each background site, and a ratio is then calculated between the annual mean and the period mean. The average ratio is used to adjust the short term results to represent annual mean for each site.

Table C.2 below details the annualisation results for each of the monitoring sites where there is less than 75% data capture. The full monitoring results (showing where annualisation has been carried out) can be seen in Table A3 and B1.

Table C.2 – Annualisation of short-term measurements

Site	Background Site	Period Mean	Annualisation Factor	Annualised Result	Bias and Distance Corrected Result
CE55	CE77	43.11	1.063	45.83	39.87
CE62	CE77	18.89	1.028	19.42	16.88
CE63	CE77	30.07	1.028	30.91	26.89
CE249	CE128	22.59	1.098	24.91	18.50
CE270	CE131	36.54	1.036	37.86	30.69
CE284	CE12	34.29	1.086	37.24	29.80
CE285	CE131	30.73	0.964	29.62	25.06
CE286	CE77	37.17	0.934	34.71	30.20
CE287	CE77	20.35	1.028	19.01	16.52
CE288	CE12	34.54	0.974	33.65	25.94
CE289	CE12	27.44	0.974	26.73	23.10
CE290	CE12	41.86	0.974	40.78	33.39
CE291	CE77	29.78	0.934	27.81	24.08
CE293	CE128	16.98	0.902	15.32	13.34

Distance Correction

The Council follows the guidance in Chapter 7, Section 1 of Defra's Technical Guidance TG16 to complete this process.

Wherever possible diffusion tubes are located on the façade of the receptor, however in some cases this is not possible (either due to access restrictions or the lack of somewhere suitable to mount the diffusion tube bracket). In these cases the diffusion tube can be located nearby, perhaps on a lamp post or road sign. Where this has been done, it is necessary to "distance correct" the measured concentration to show the predicted concentration at the sensitive receptor.

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

The AQMA maps for Cheshire East are detailed at

https://www.cheshireeast.gov.uk/environment/environmental_health/local_air_quality/review_and_assessment/aqma_area_maps.aspx

The map of all the air quality monitoring locations in Cheshire East can be found at

https://opendata.cheshireeast.gov.uk/Environment/2018-NO2-Diffusion-Tube-Map/cc8y-c4tn

Automatic Monitoring Sites

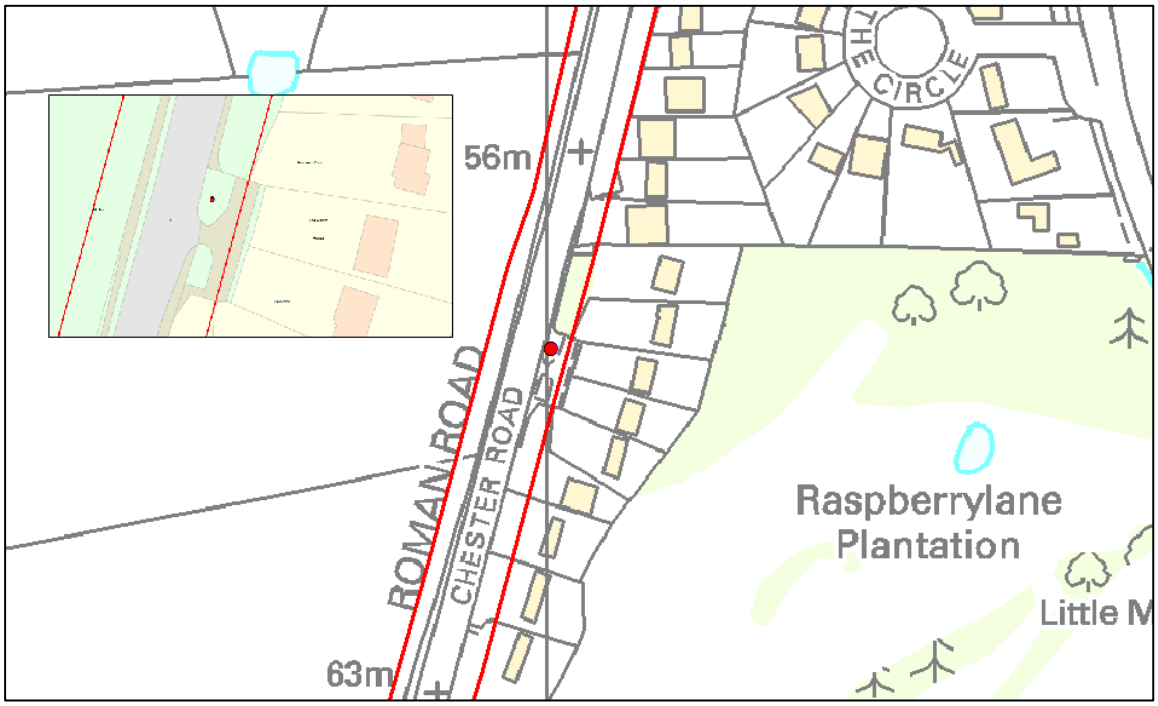

Figure D.1 - Location of RTA1- A5034 (formerly the A556) Chester Road, Mere

Note: this analyser has now been decommissioned as of the 2nd June 2017

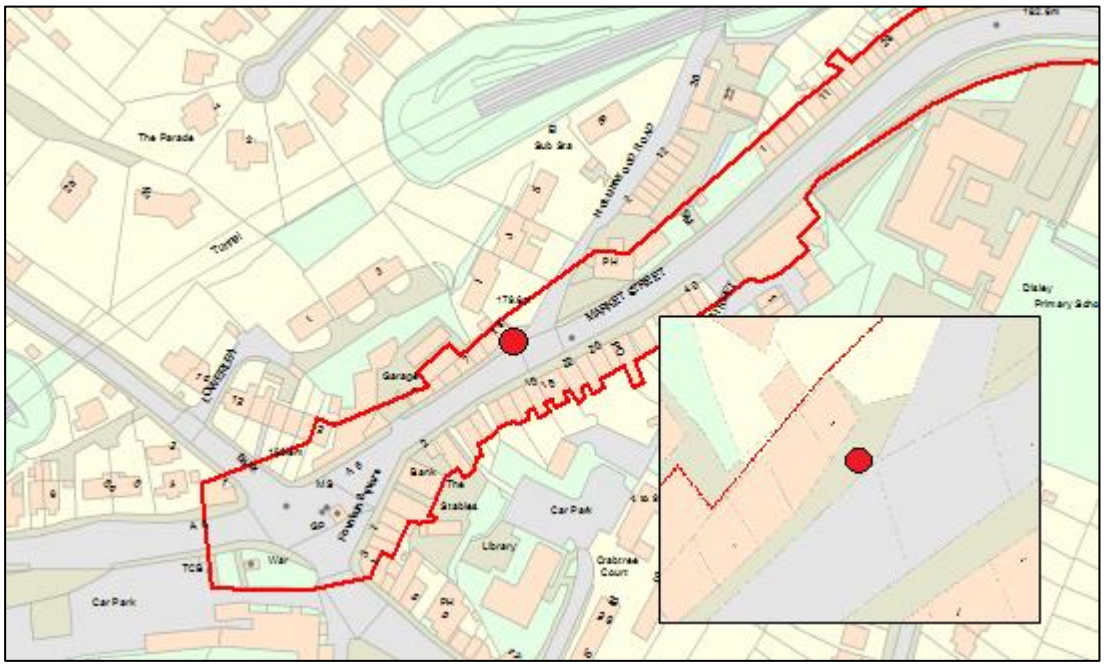

Figure D.2 - Location of RTA3, A6 Market Street, Disley

Passive Monitor -Diffusion Tubes Locations

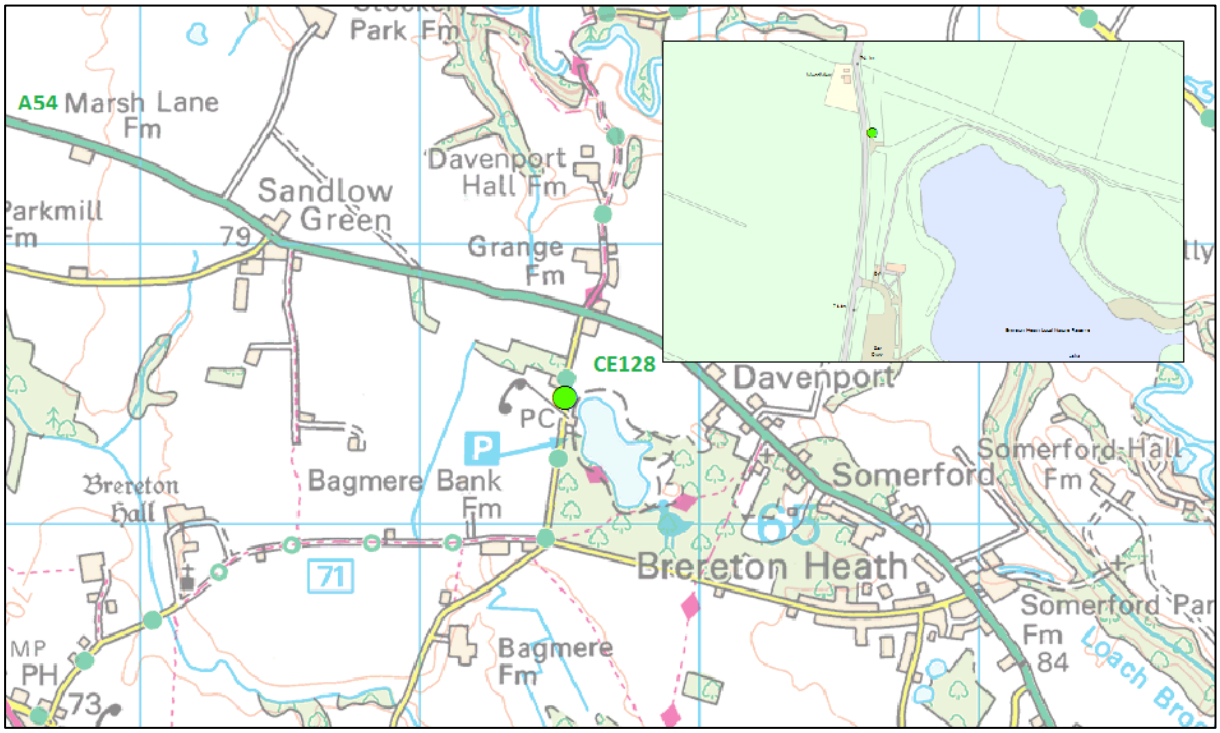

Figure D.3 - Rural Background Site - Brereton Heath Park/Nature Reserve

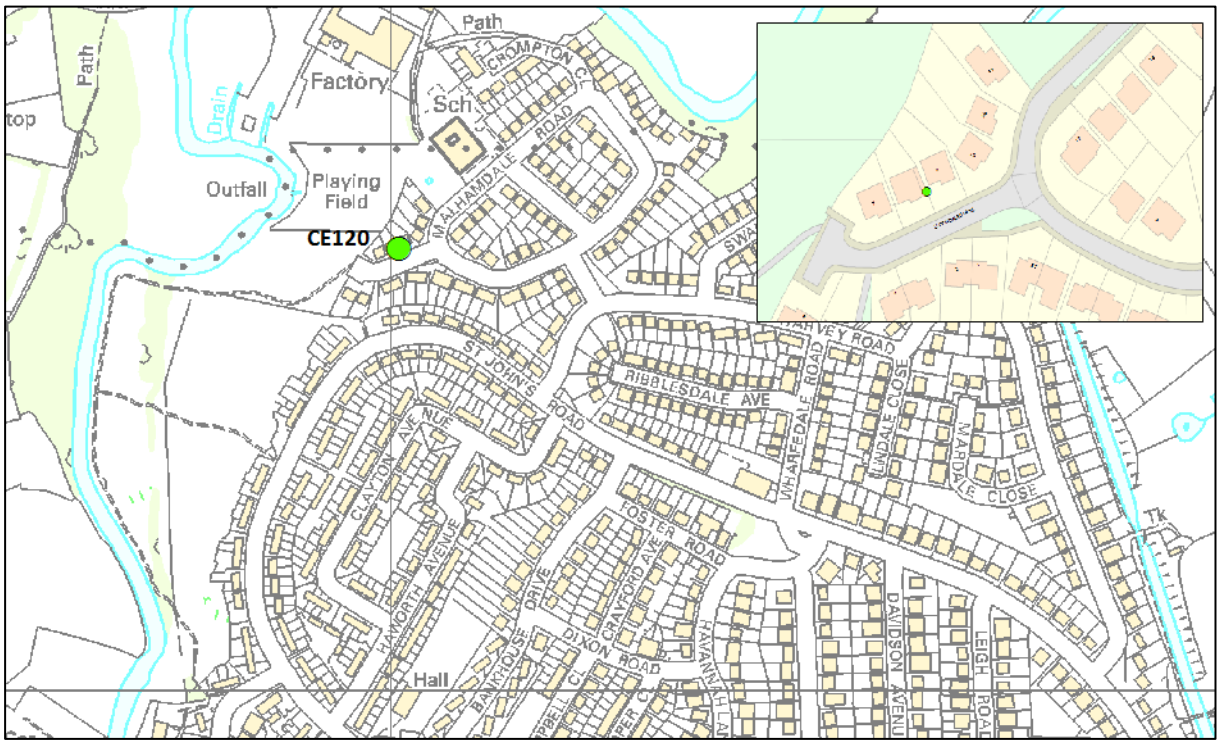

Figure D.4 - Urban Background Site – 8 Littondale Close, Congleton

Figure D.5 – Lower Heath AQMA, Congleton

Figure D.6 – Rood Hill AQMA, Congleton

Figure D.7 – West Road AQMA, Congleton

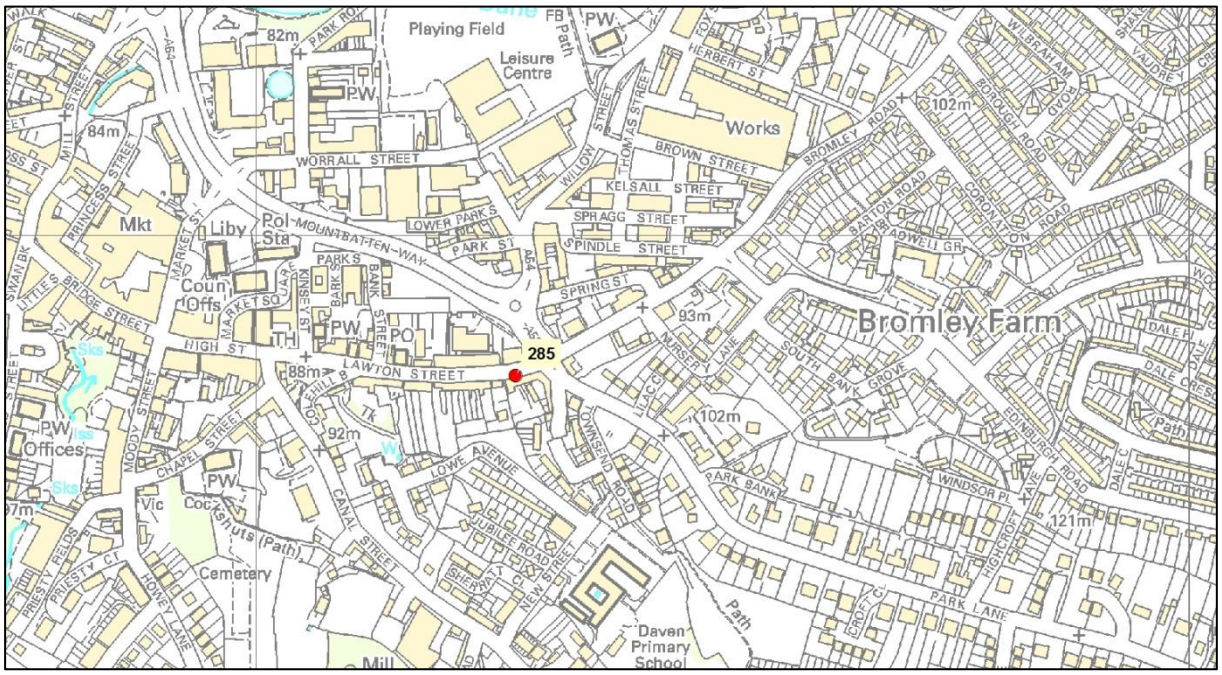

Figure D.8 – Lawton Street, Congleton

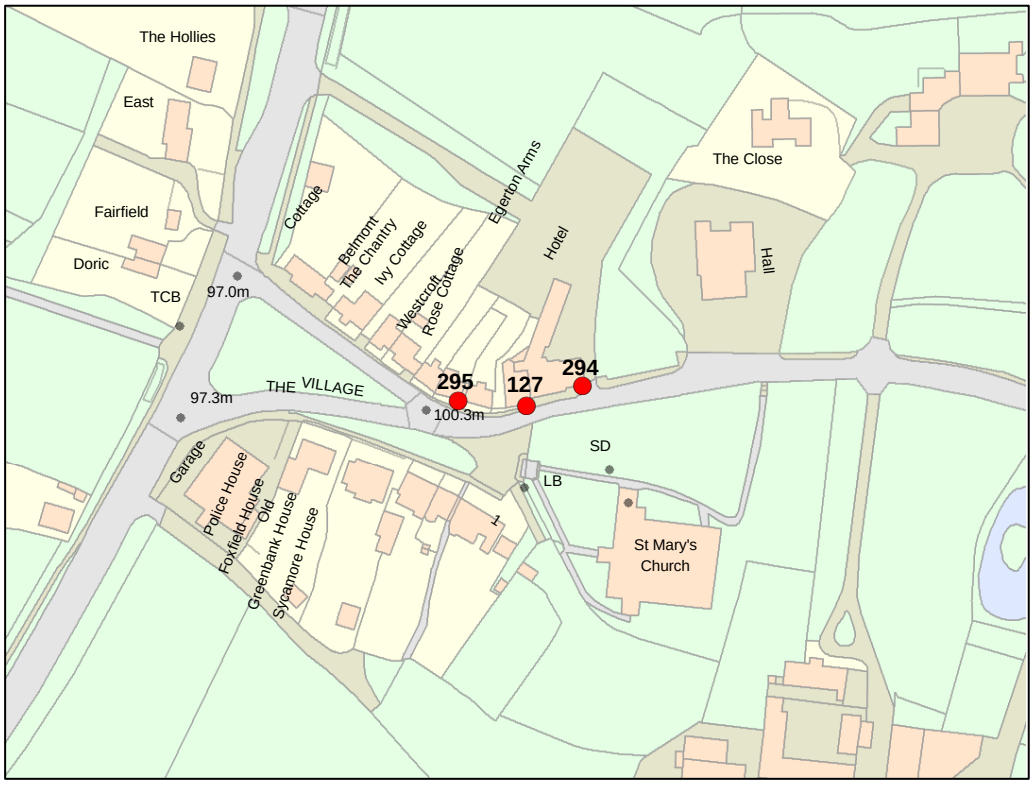

Figure D.9 – Astbury, Nr Congleton

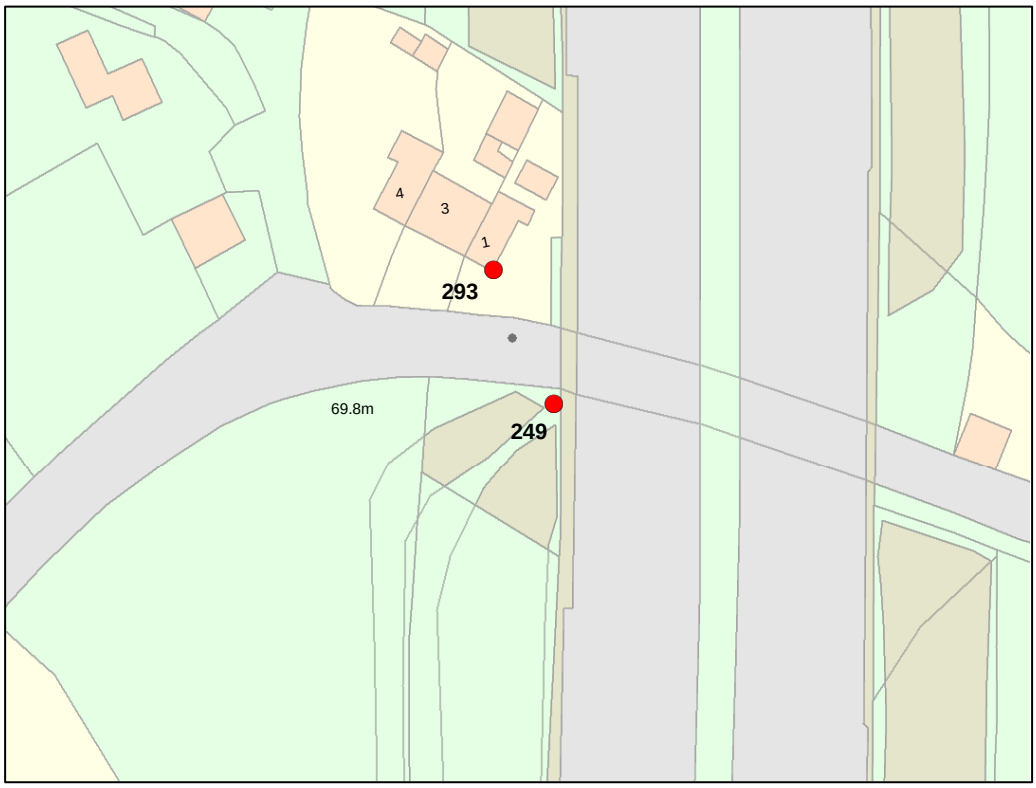

Figure D.10 – Hassall Green

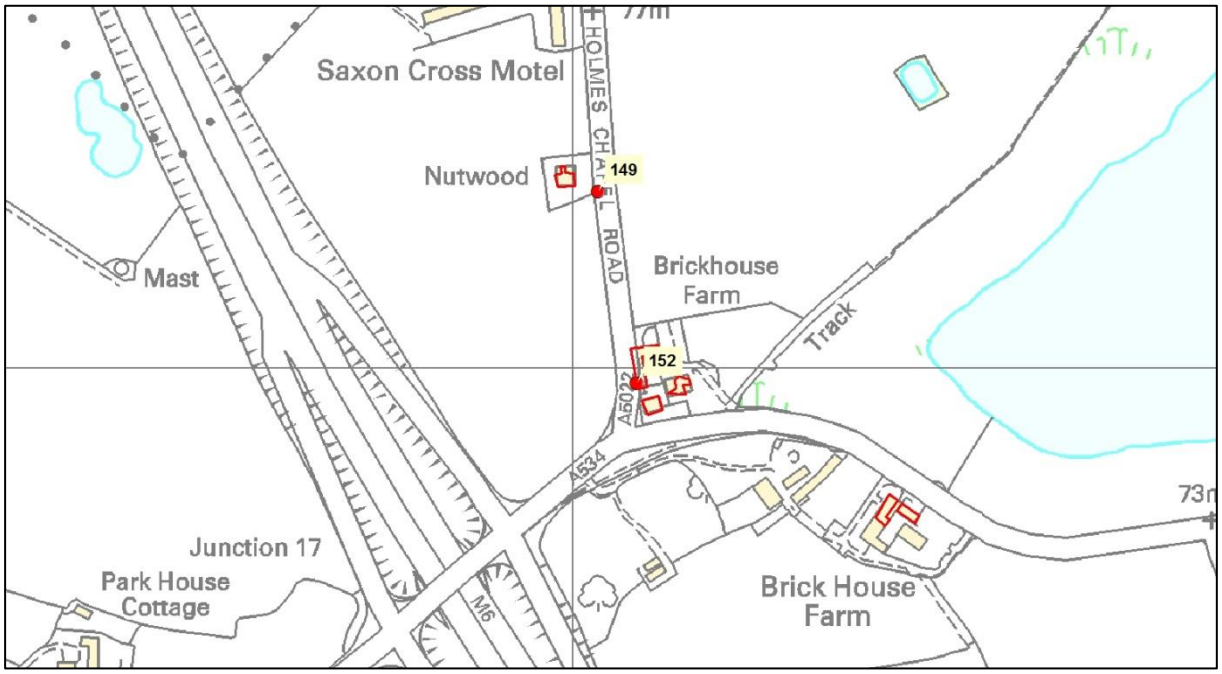

Figure D.11 – Junction 17 Sandbach AQMA

Figure D.12 – Middlewich Road, Sandbach AQMA

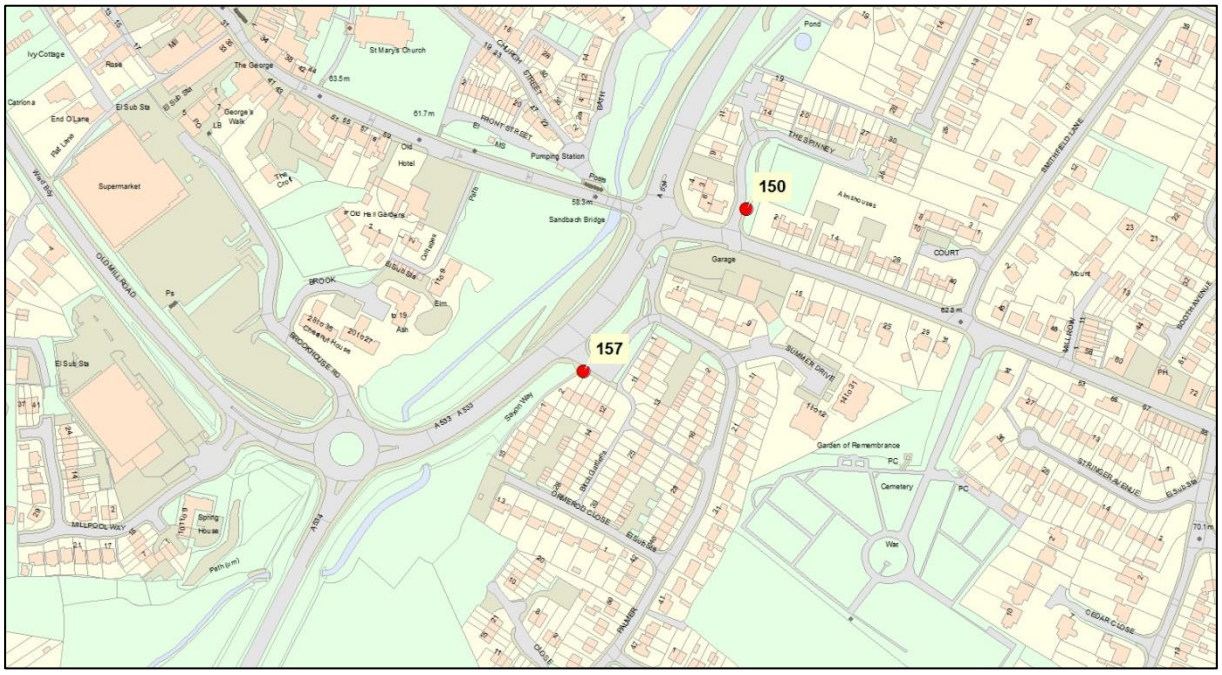

Figure D.13 – Sandbach

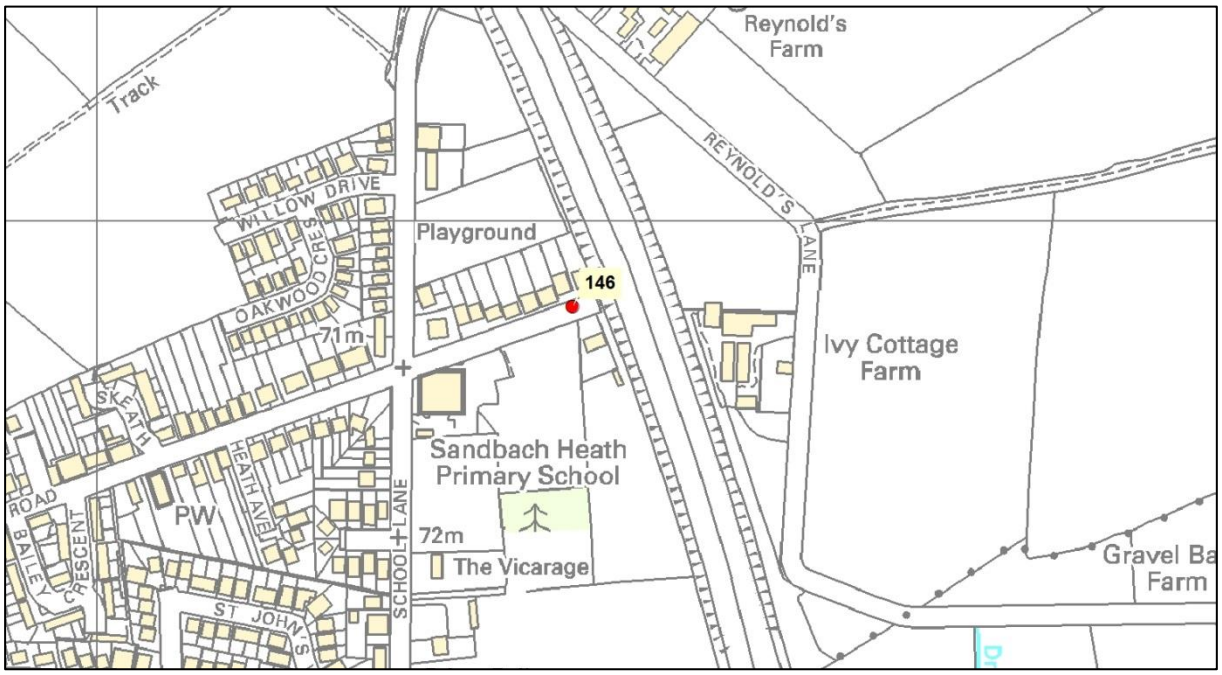

Figure D.14 – Sandbach M6

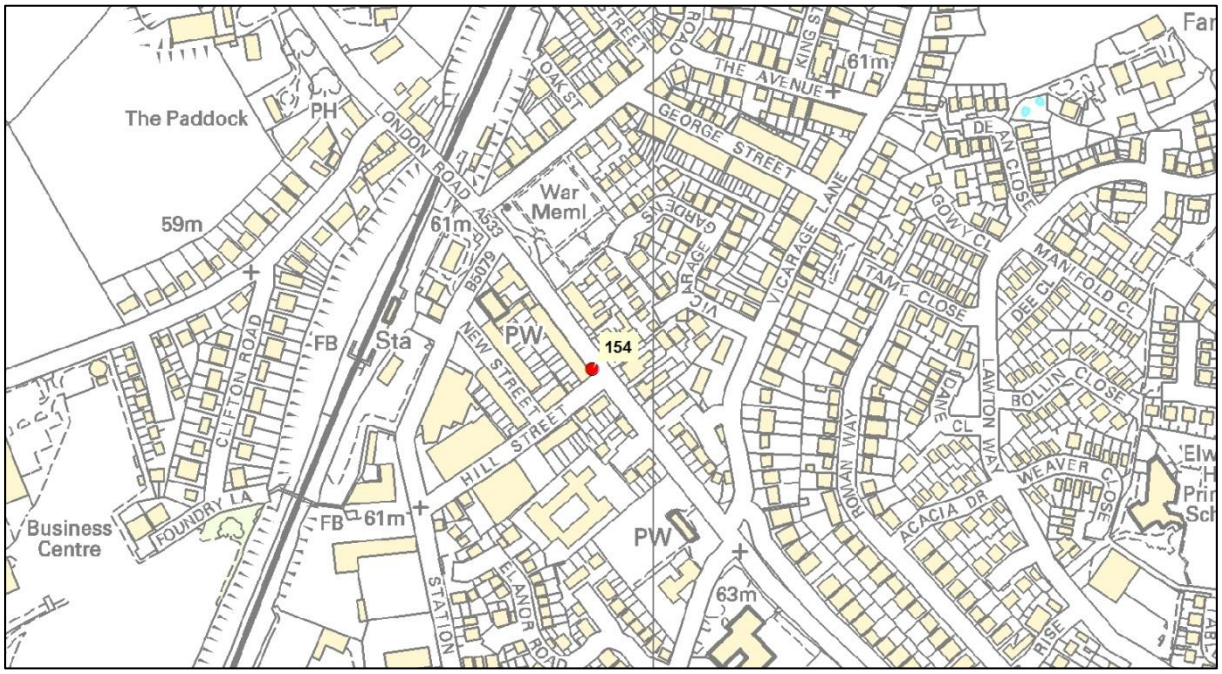

Figure D.15 - Elworth

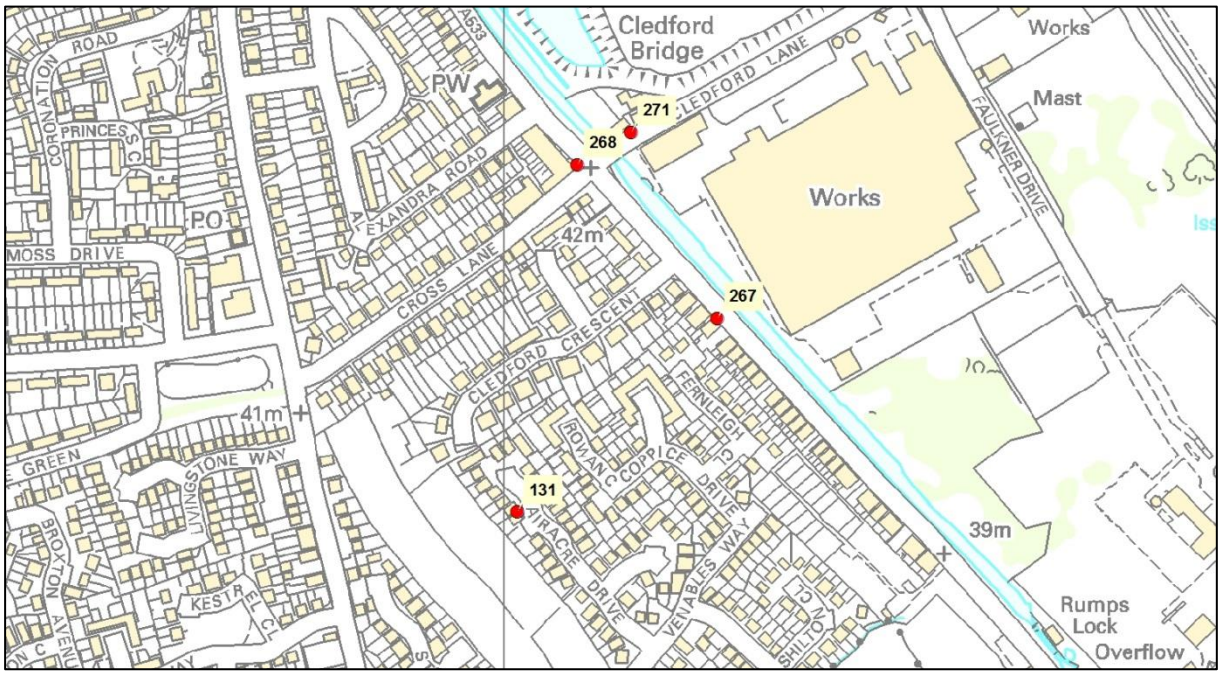

Figure D.16 – Middlewich (Cledford Area)

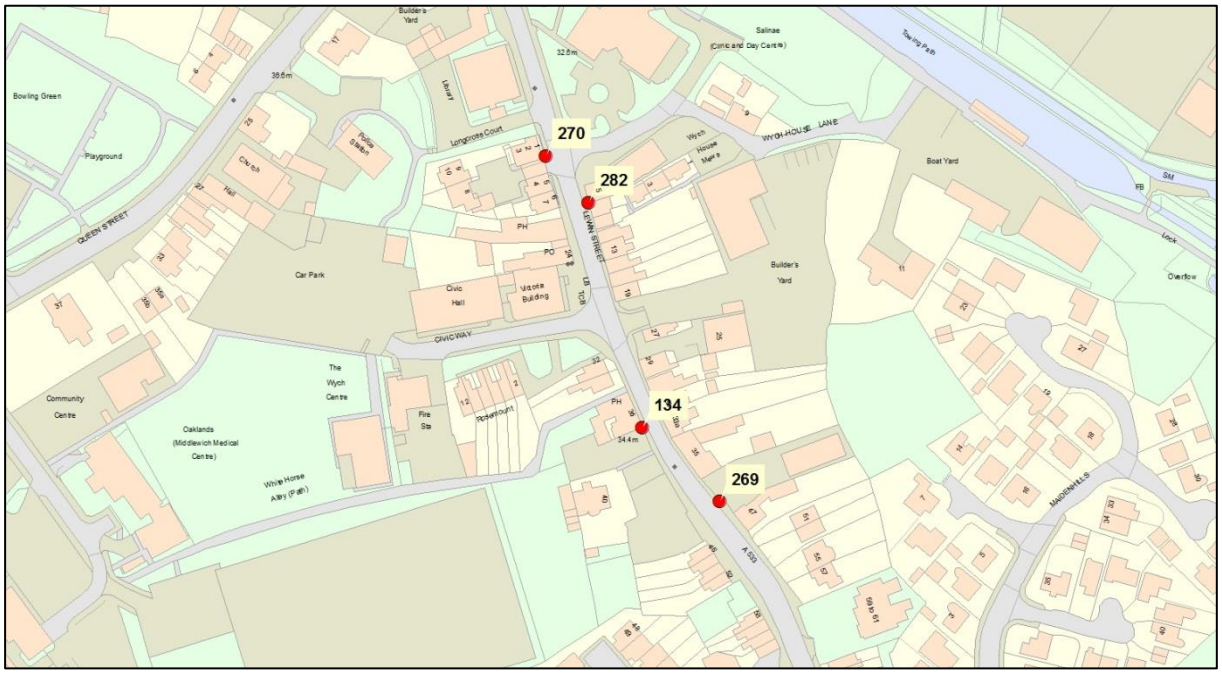

Figure D.17 – Middlewich (Lewin Street)

Figure D.18 – Chester Road Middlewich AQMA

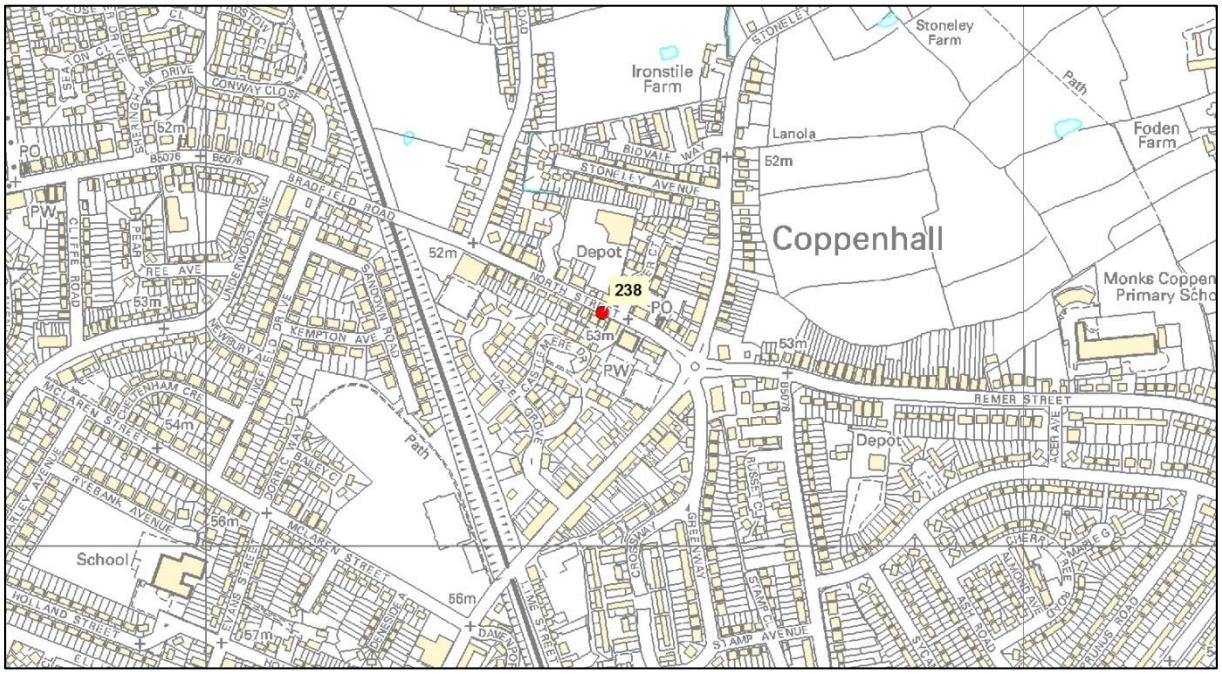

Figure D.19 – Crewe (North Street)

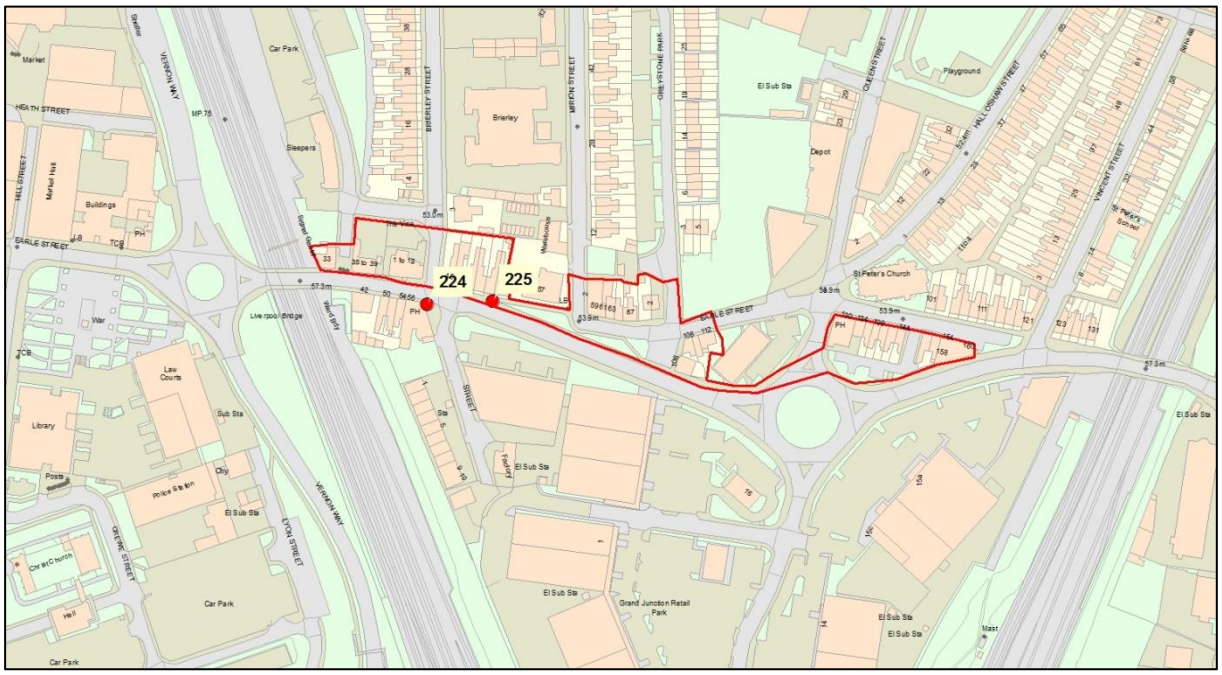

Figure D.20 – Earle Street, Crewe AQMA

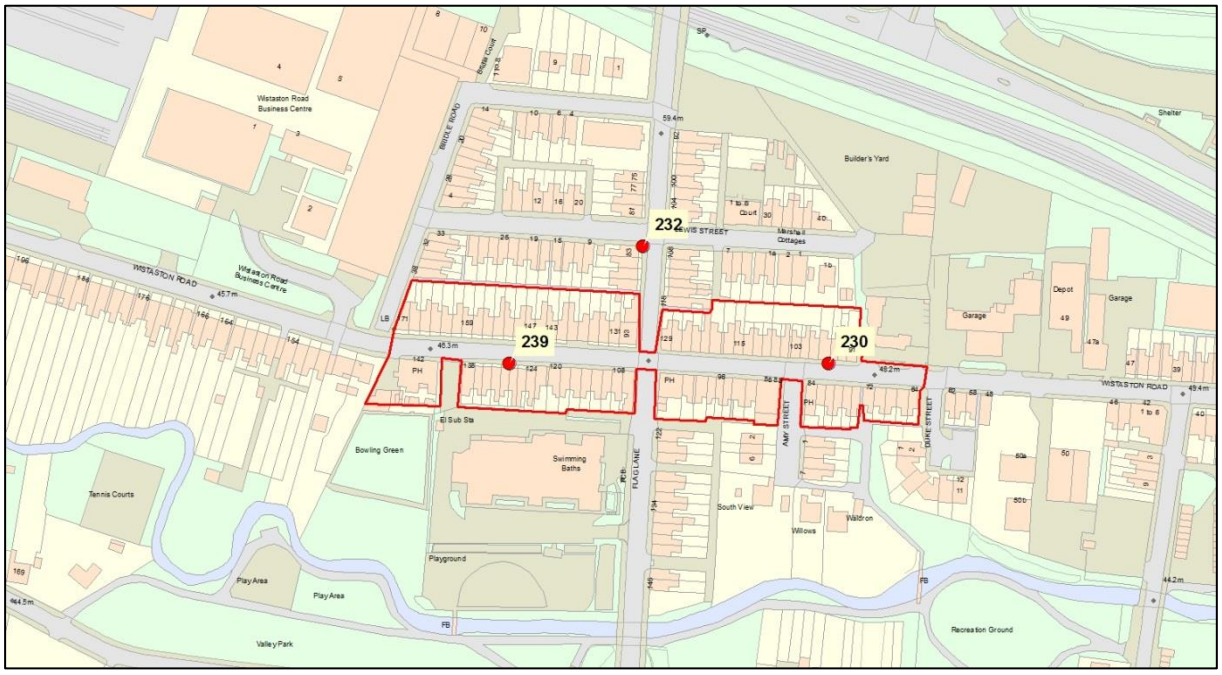

Figure D.21 – Wistaston Road, Crewe AQMA

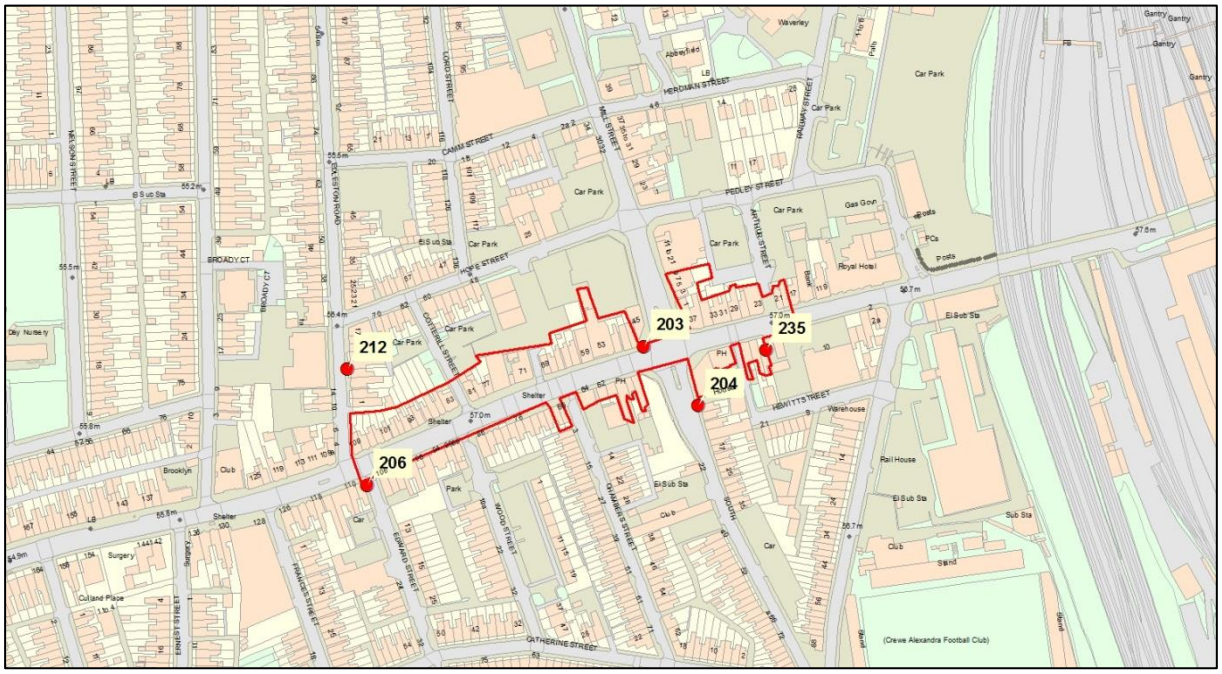

Figure D.22 – Nantwich Road, Crewe AQMA

Figure D.23 – Crewe (Gresty Road)

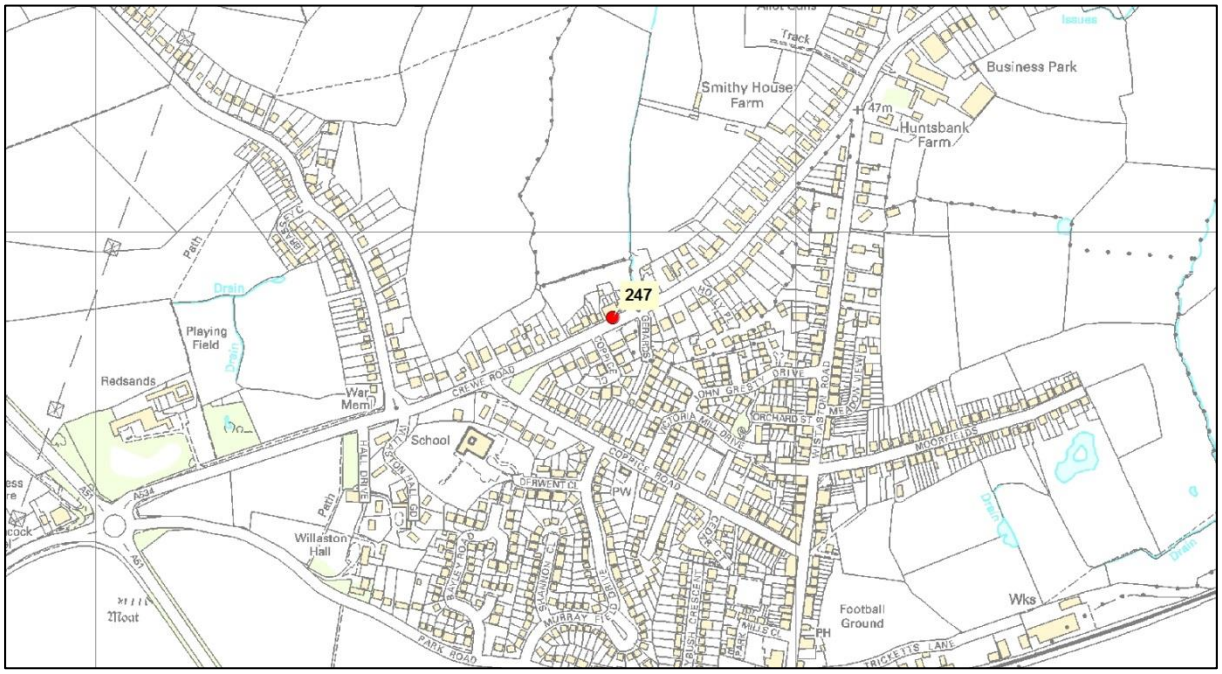

Figure D.24 – Willaston (Nr. Crewe)

Figure D.25 – Hospital Street, Nantwich AQMA

Figure D.26 – Nantwich (Wellington Road)

Figure D.27 – Audlem

Figure D.28 – Holmes Chapel

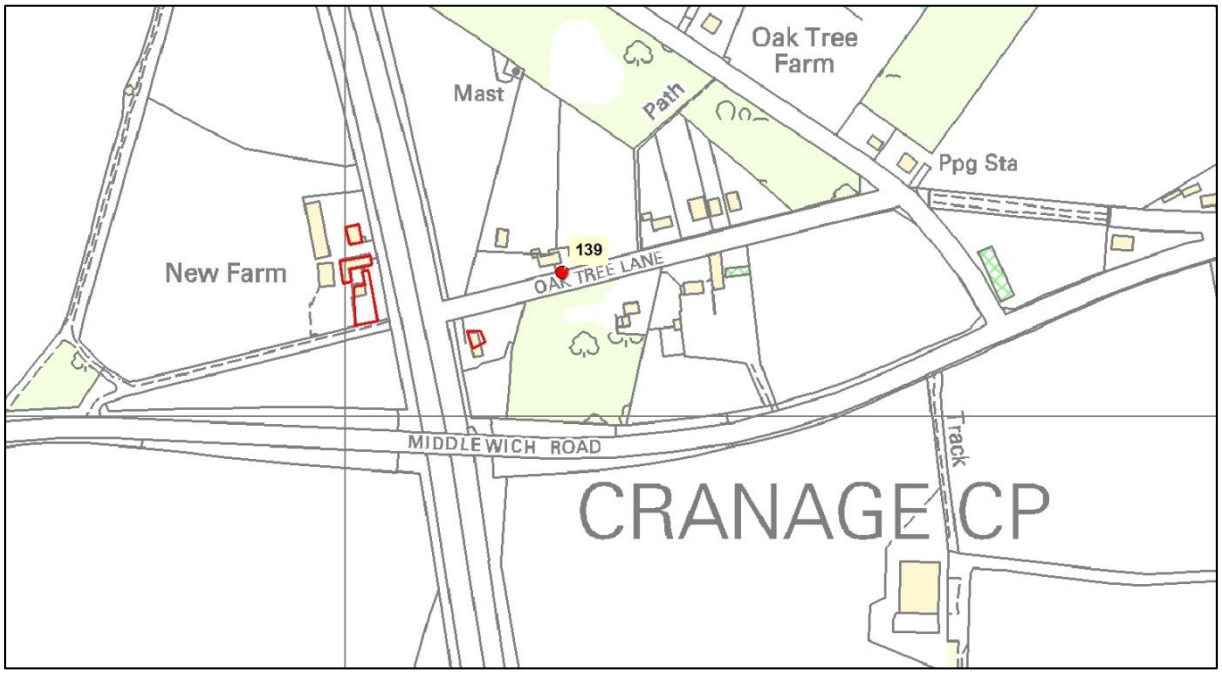

Figure D.29 – Cranage AQMA (now revoked) and nearby monitoring

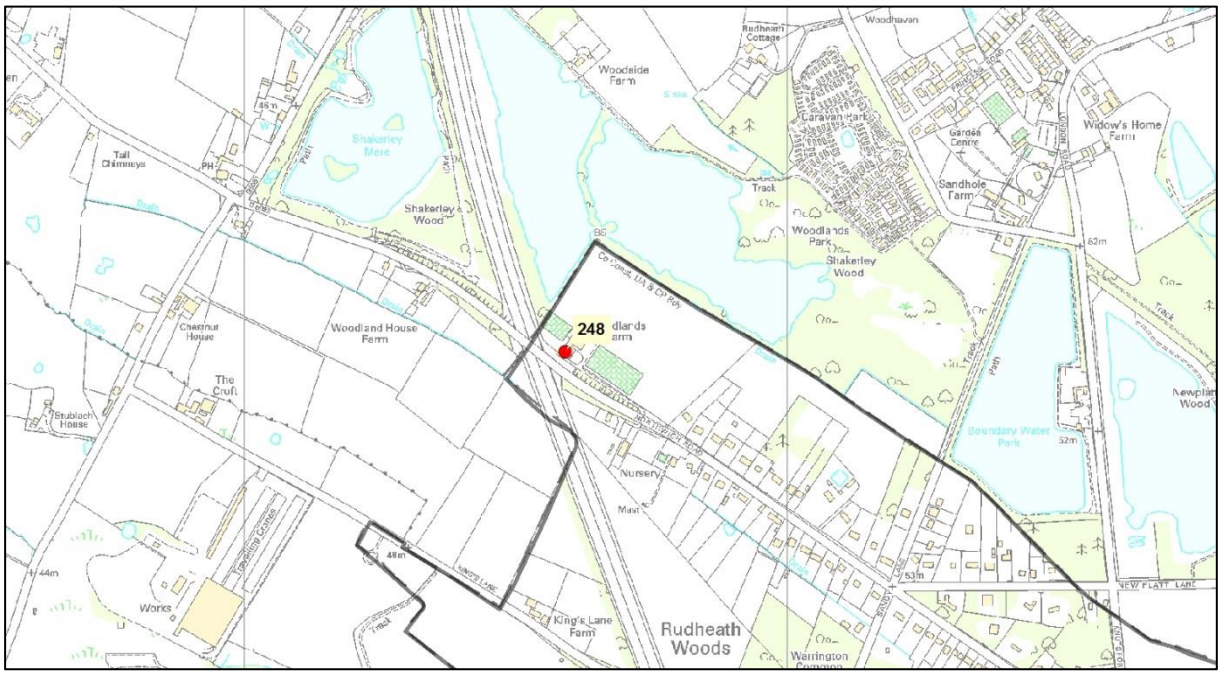

Figure D.30 – Cranage (M6)

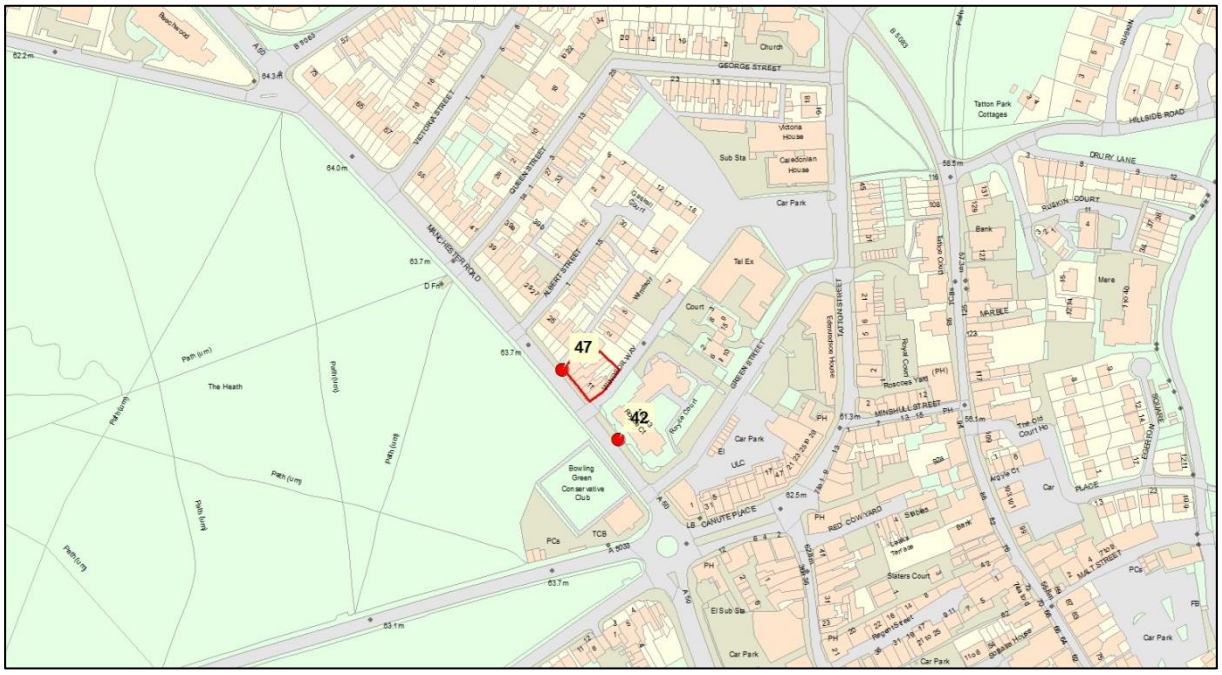

Figure D.31 – Knutsford AQMA

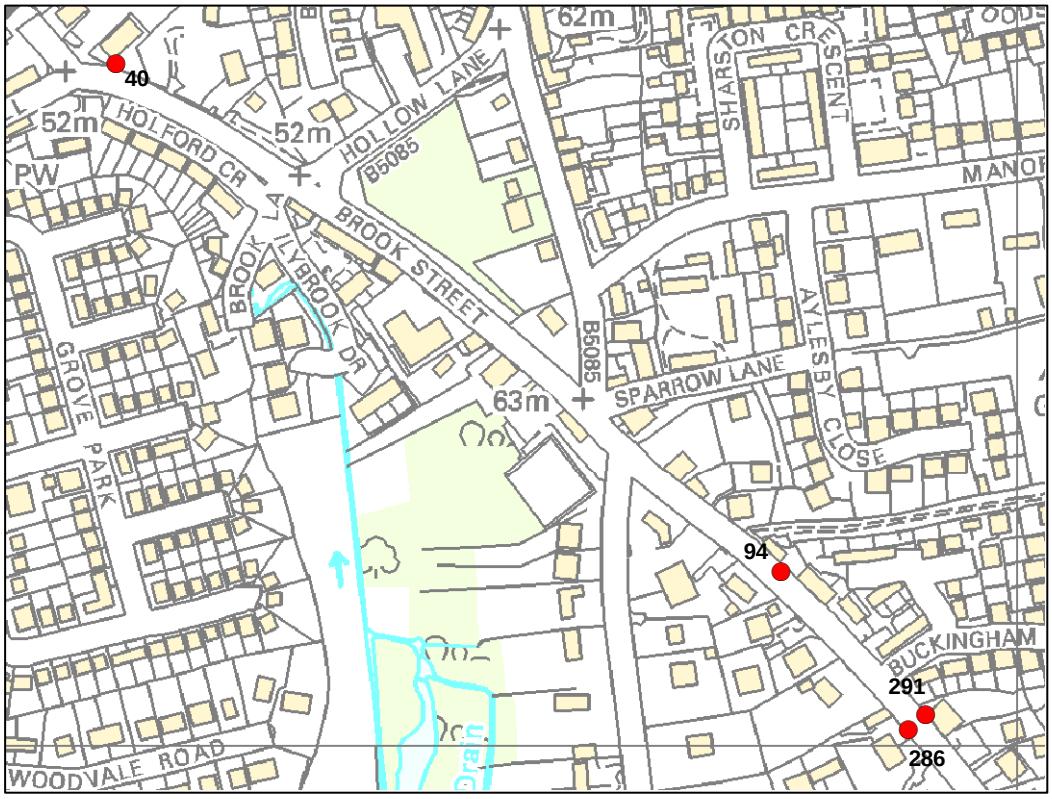

Figure D.32 – Knutsford (Chelford Road and Brook Street)

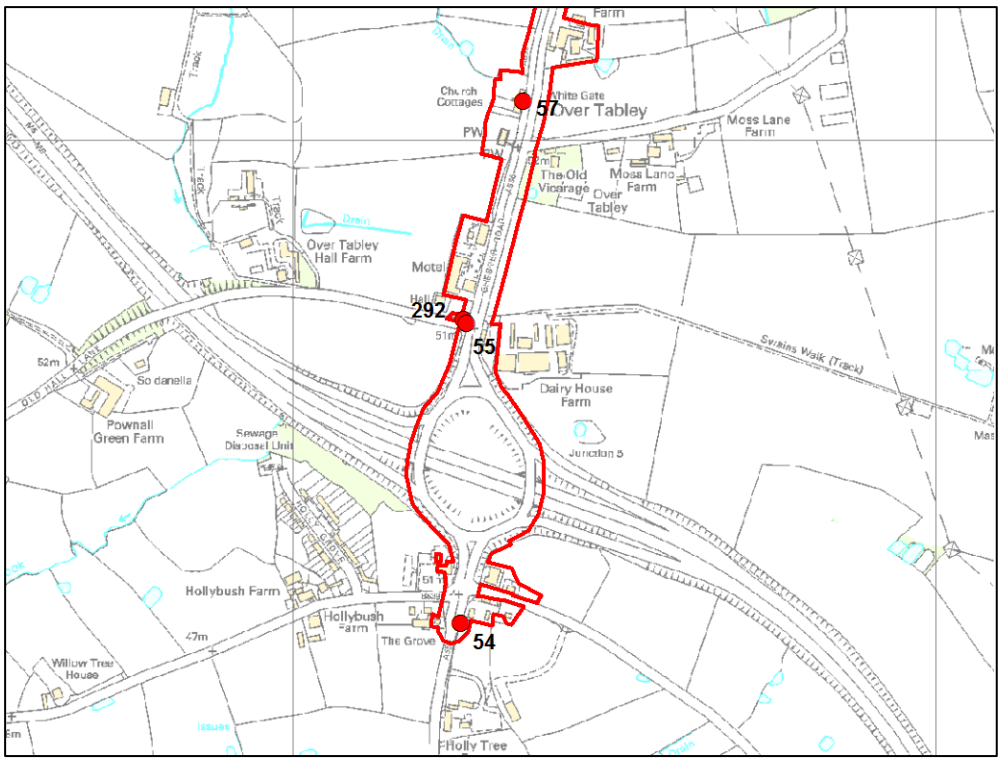

Figure D.33 – Mere AQMA (1)

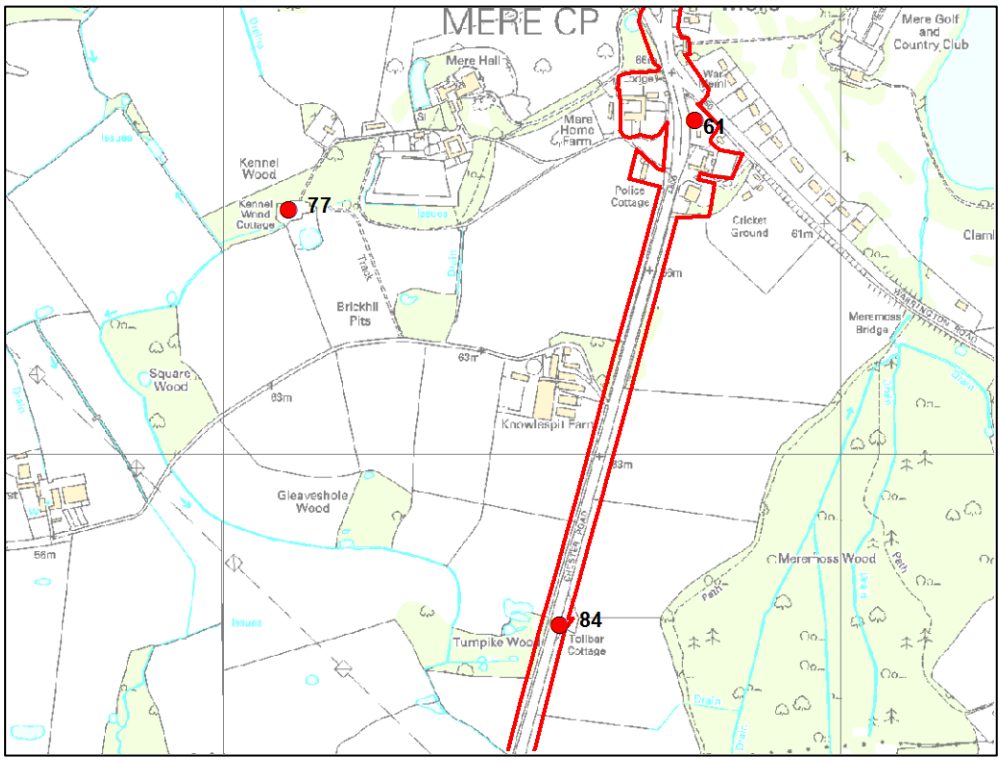

Figure D.34 – Mere AQMA (2)

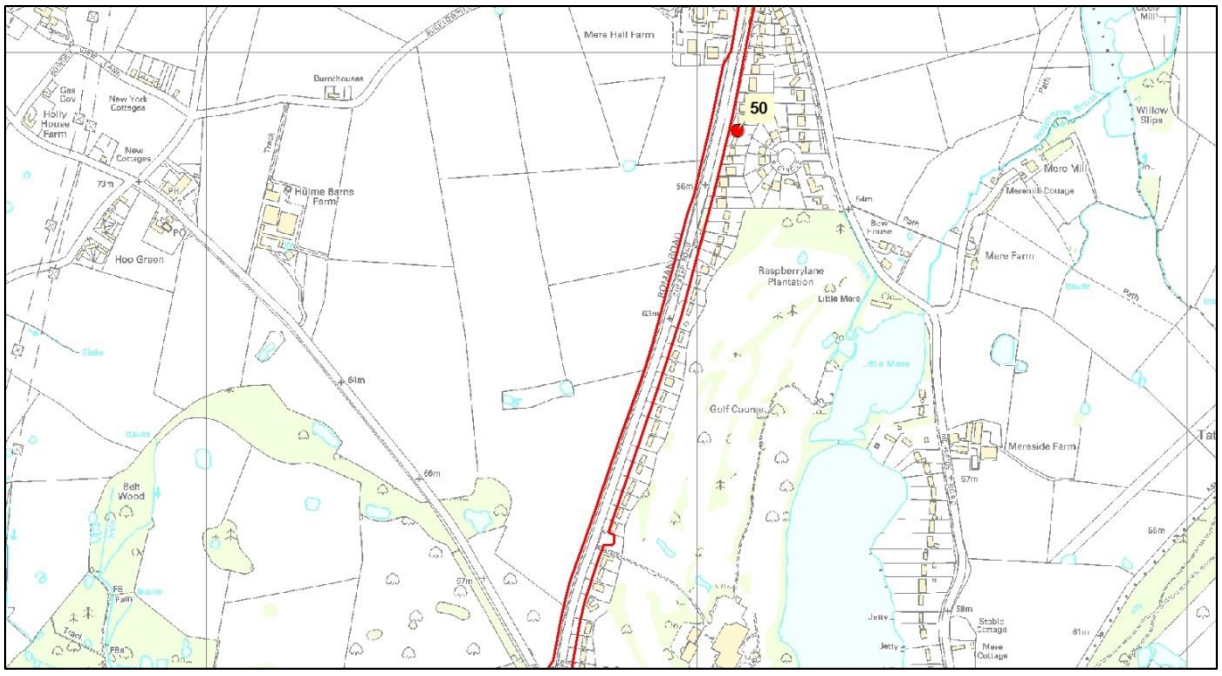

Figure D.35 – Mere AQMA (3)

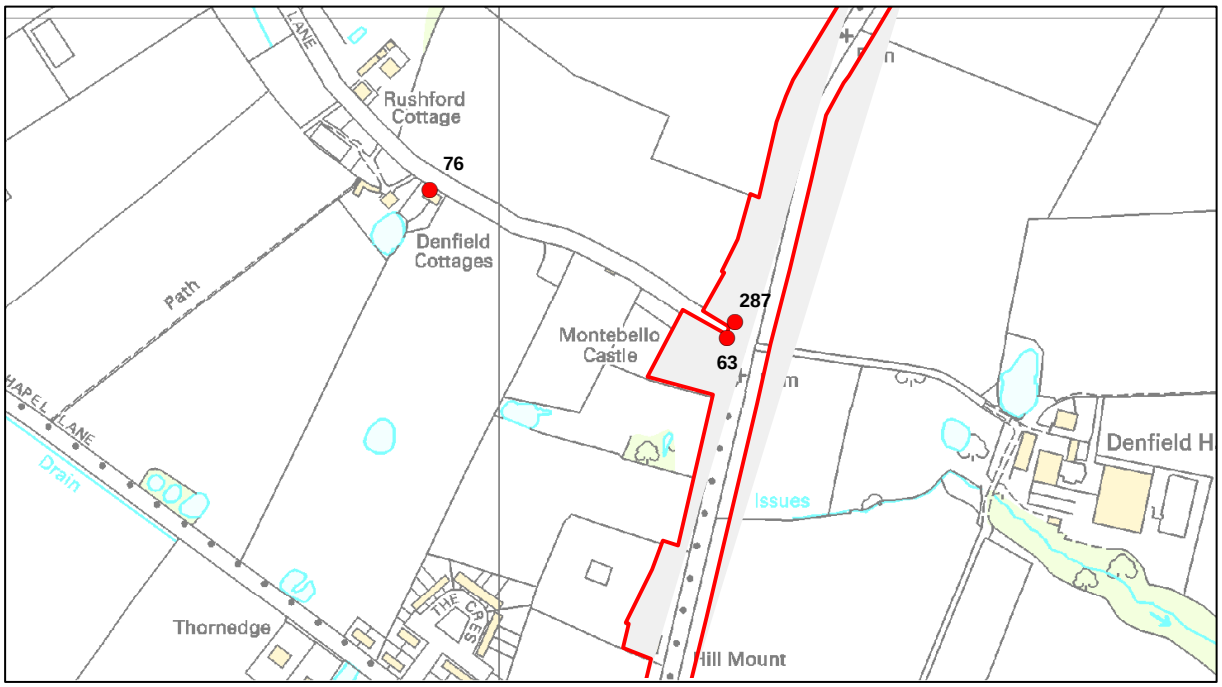

Figure D.36 – Mere AQMA (4)

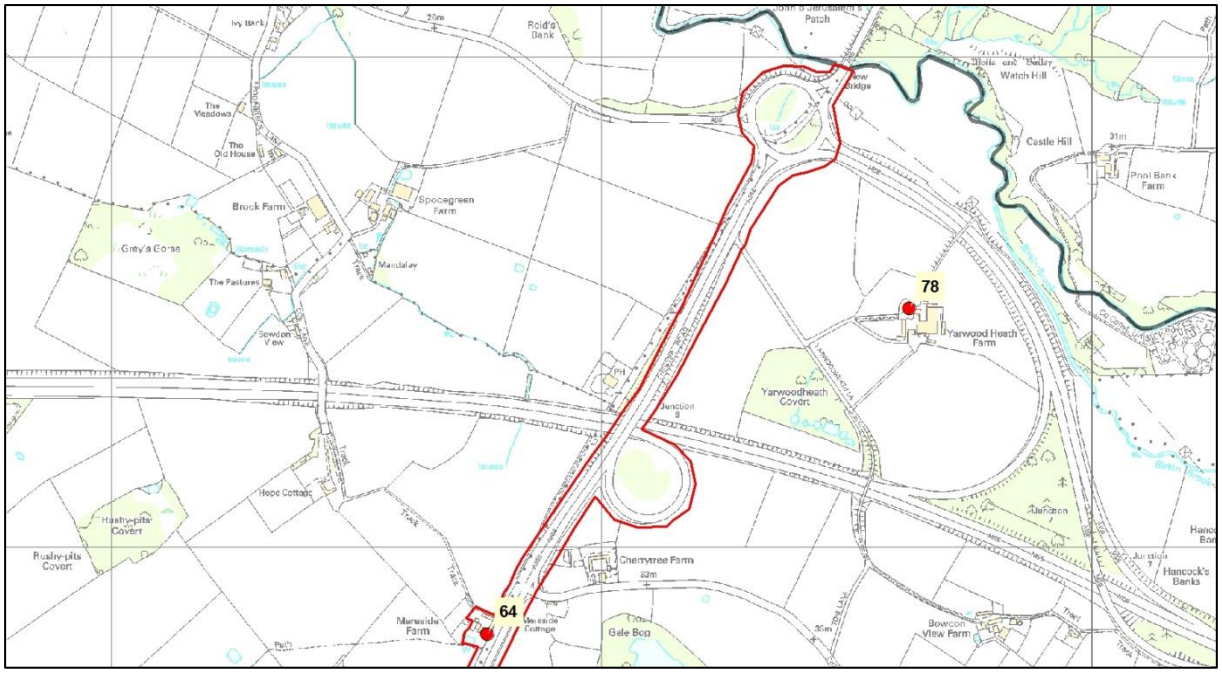

Figure D.37 – Mere AQMA (5)

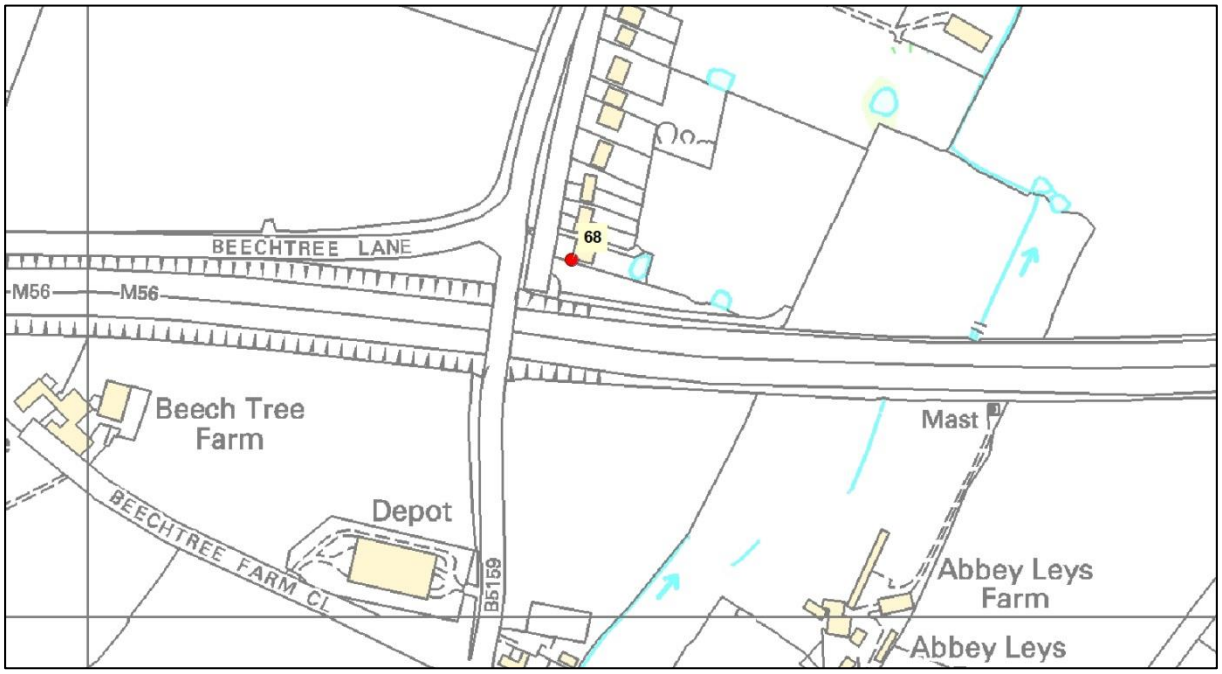

Figure D.38 – High Legh M56

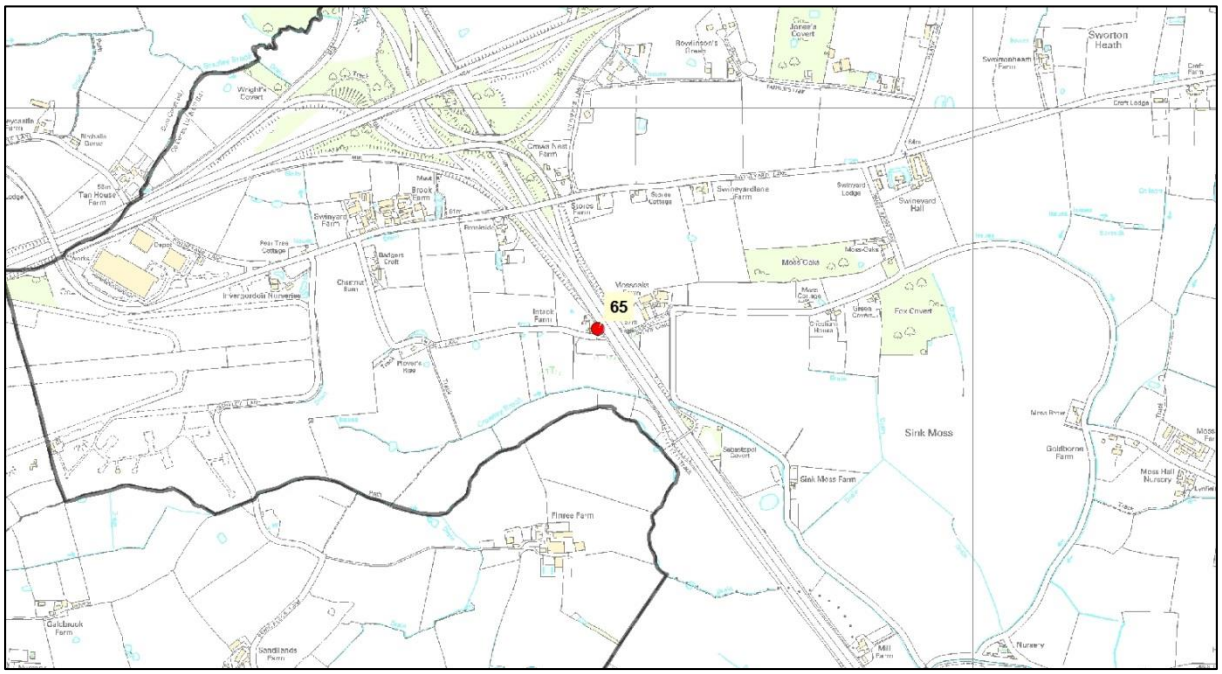

Figure D.39 – High Legh (M6)

Figure D.40 - Wilmslow

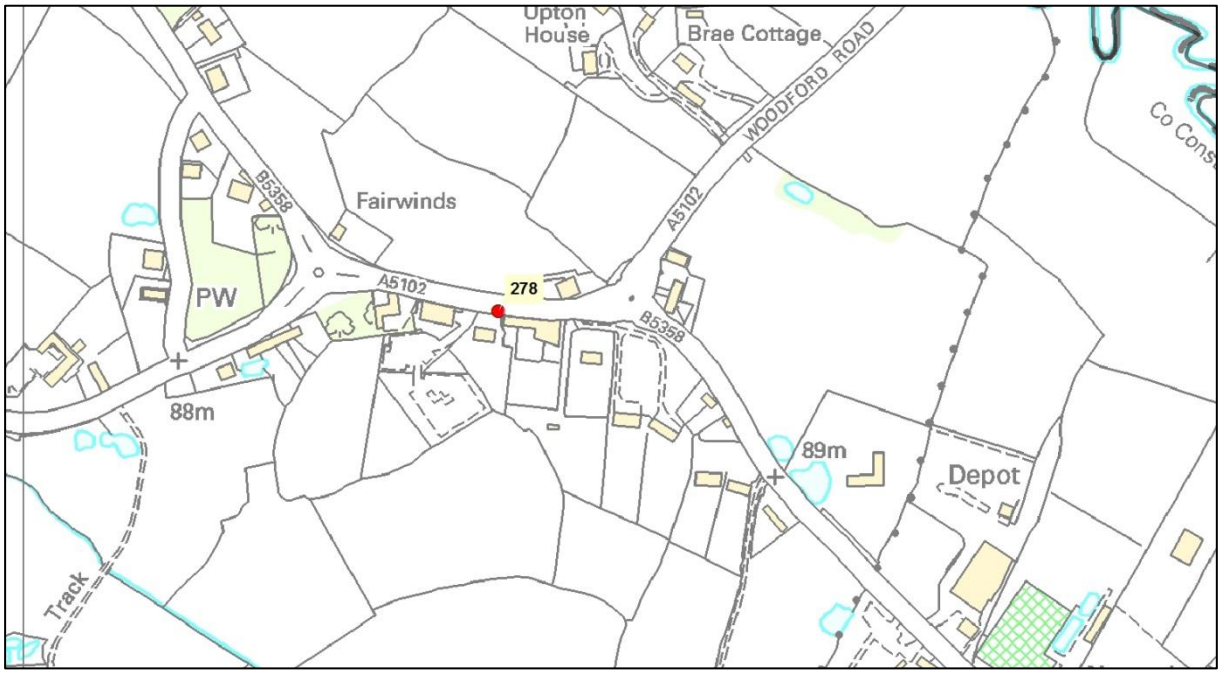

Figure D.41 – Wilmslow (Dean Row)

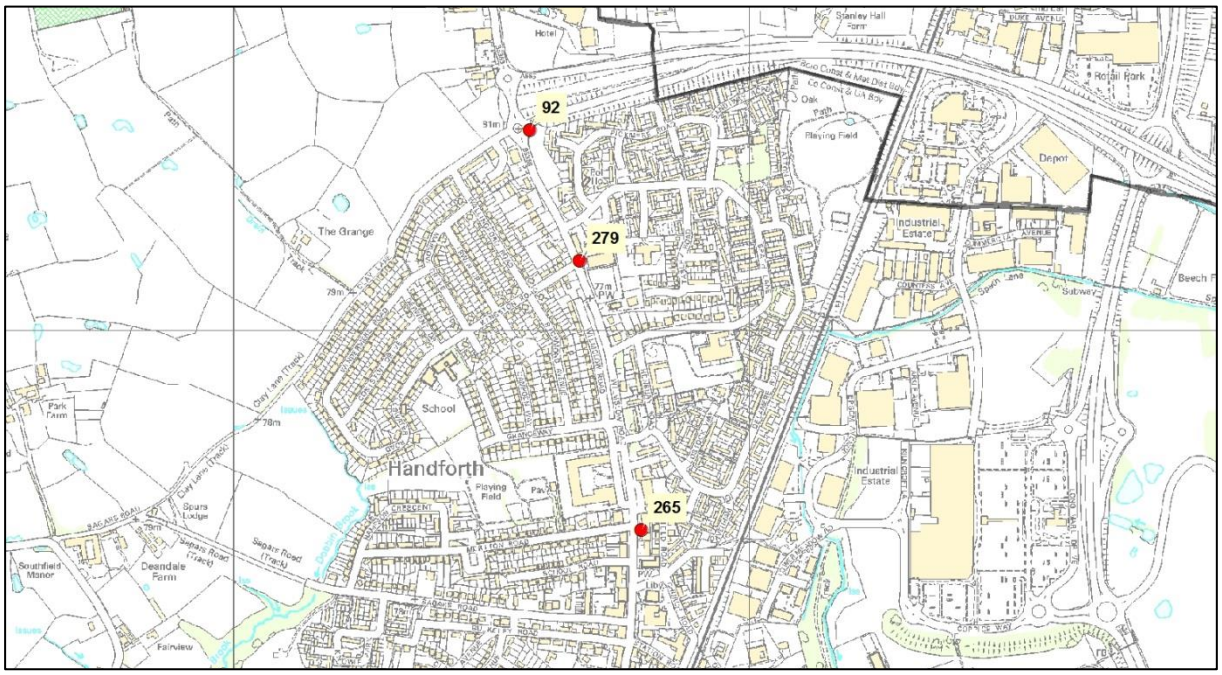

Figure D.42 – Handforth

Figure D.43 – Poynton

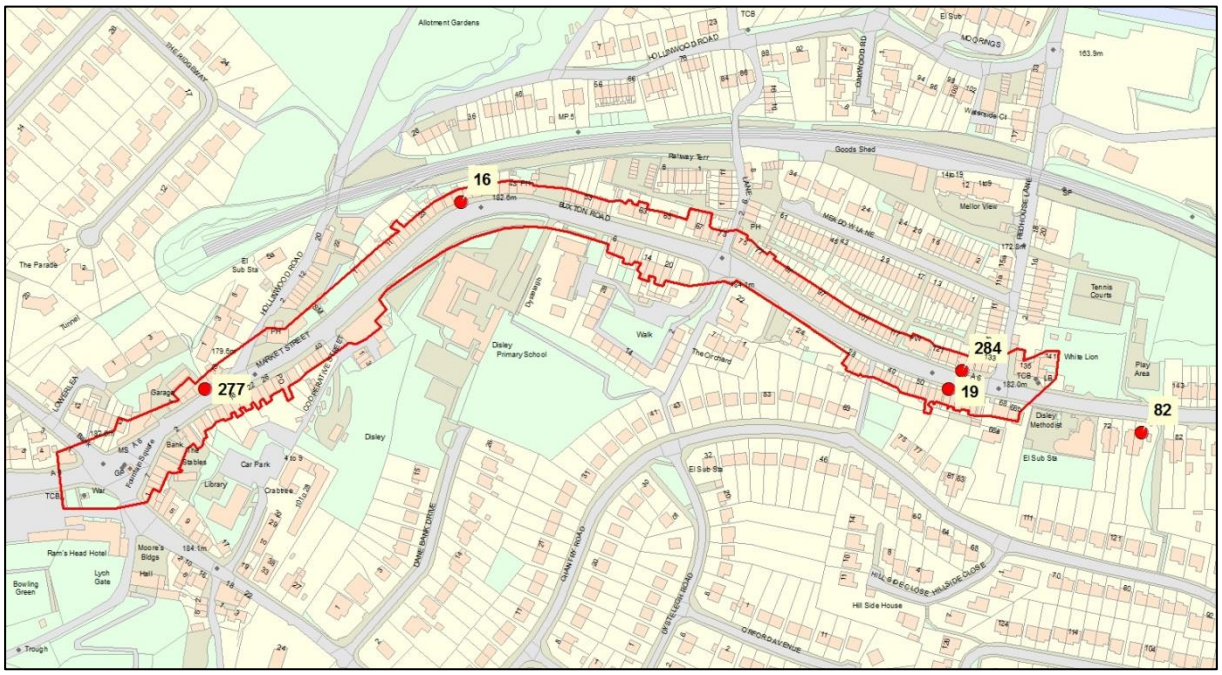

Figure D.44 – Disley AQMA

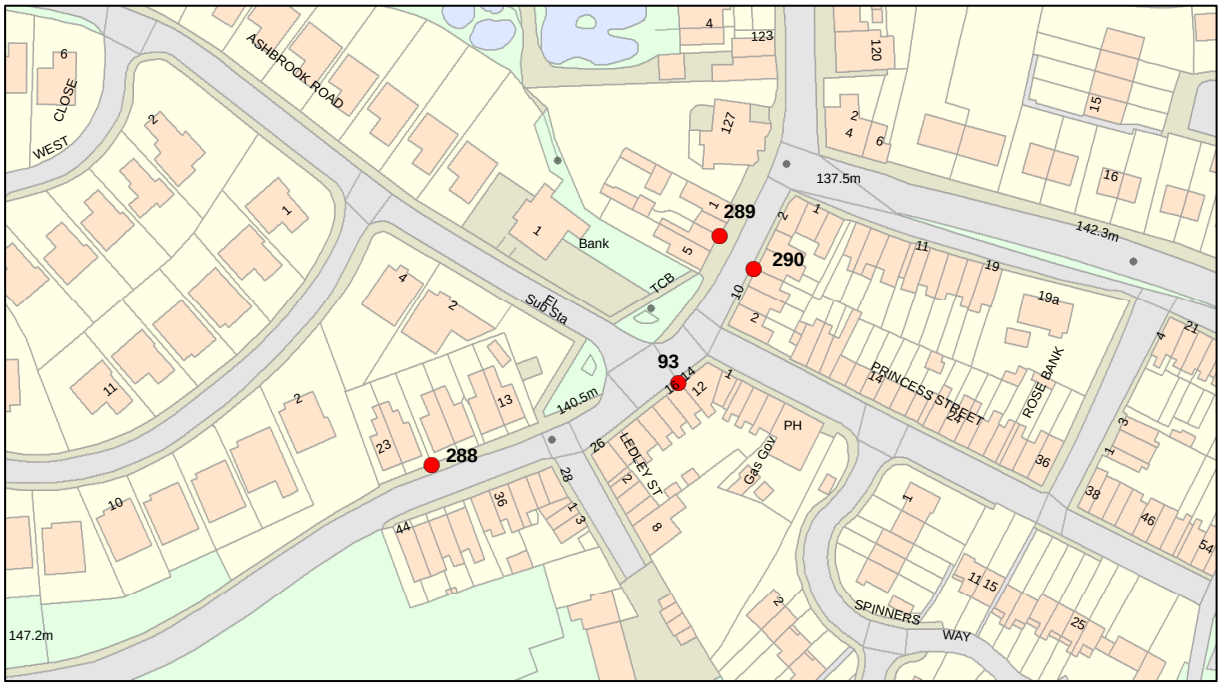

Figure D.45 - Bollington

Figure D.46 – Broken Cross, Macclesfield AQMA

Figure D.47 – Chester Road Macclesfield

Figure D.48 – Cumberland Street, Macclesfield

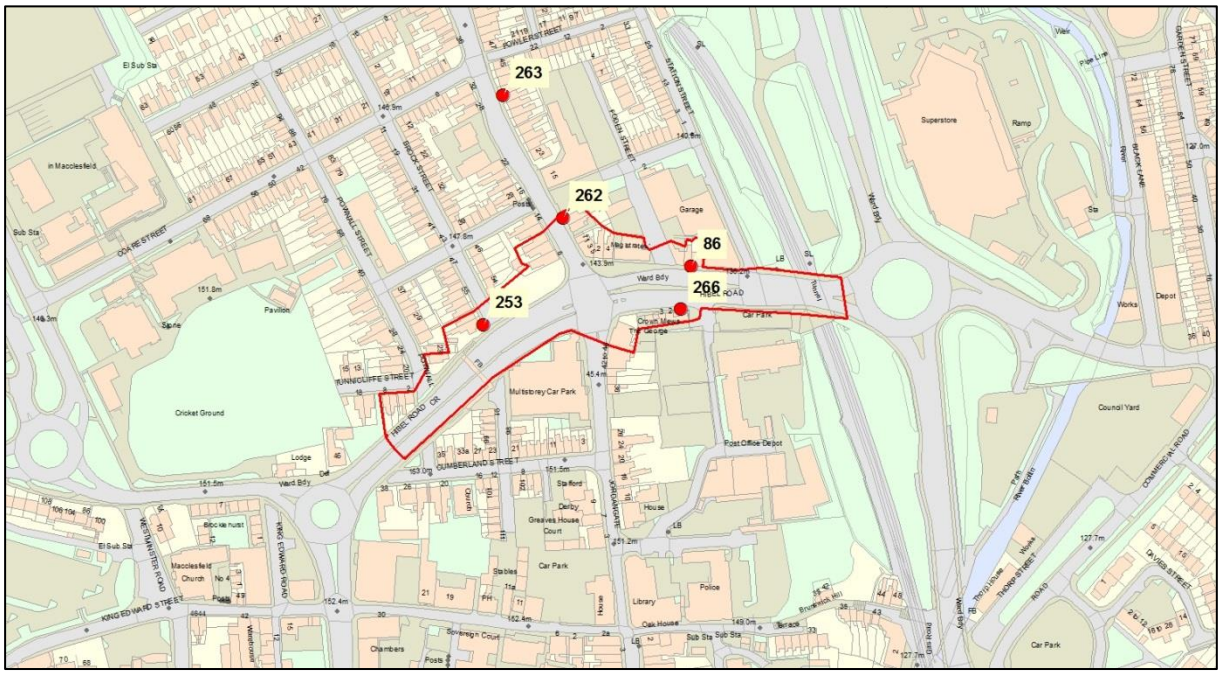

Figure D.49 – Hibel Road, Macclesfield AQMA

Figure D.50 – Park Lane, Macclesfield AQMA

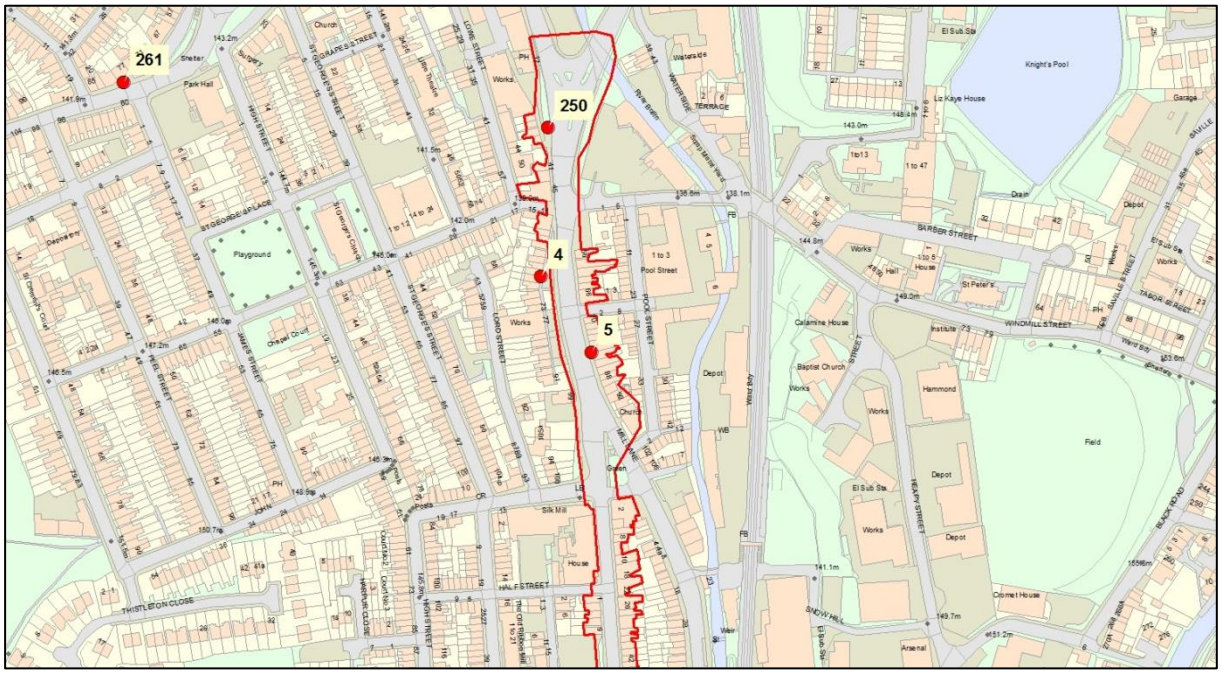

Figure D.51 – London Road Macclesfield AQMA (North)

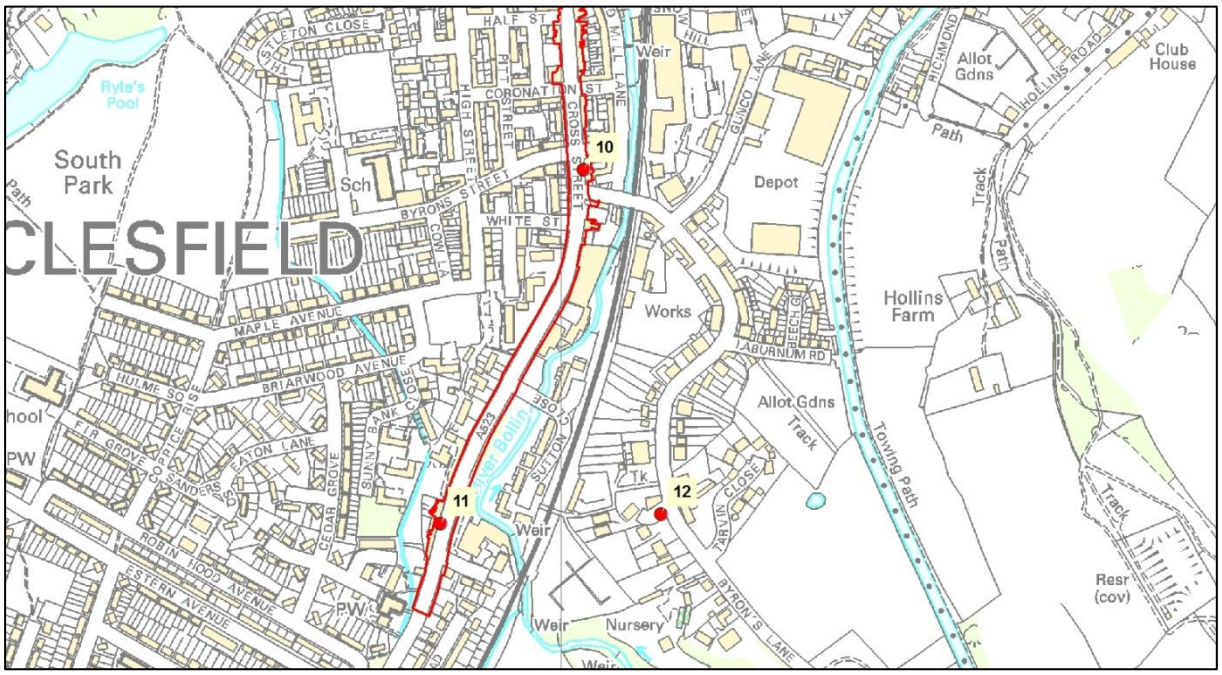

Figure D.52 – London Road Macclesfield AQMA (South)

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

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

Appendix F: Detailed Assessments

This section provides basic information on Detailed Assessment work carried out by Cambridge Environmental Research Consultants; full technical information is contained with the report referenced FM1182/R2/18 dated 6th of August 2018.

Detailed Assessments have been undertaken for the following areas within Cheshire East, where diffusion tube monitoring data has indicated a potential exceedance of the annual mean objective for Nitrogen Dioxide;

- Peel Lane, Astbury;
- Henshall Road, Bollington;
- Chelford Road, Knutsford; and
- Lewin Street, Middlewich.

Information is provided on diffusion tube monitoring data, local conditions (topographical, highways etc), modelled map outputs and any other considerations that have been taken into account. For each area recommendations and/or conclusions have been provided.

Note that in the modelling result below, Figure F.2, Figure F.4, Figure F.6 and Figure F.8, the areas coloured yellow and orange show exceedances of the NO_2 annual mean objectives, with green and blue showing areas which meet the objectives.

Peel Lane Astbury - Diffusion tube location:

There are three diffusion tubes located within the Astbury area and shown in Figure F.1. These sites are located approximately 40 metres from each other.

Diffusion tube site CE127 has been operational since 2012 and is representative of an area of Peel Lane where the road narrows; bounded by the Church Wall to the South and the Egerton Arms Public House to the North. This creates a canyon effect. Monitored concentrations at this site demonstrated an exceedance of the

annual standard in both 2013 (40.02 µg/m3) and then again in 2016 (40.39 µg/m^3). The lack of consecutive years of exceedence has meant that this site has been kept under review supported by additional monitoring being undertaken in the area as detailed below.

Diffusion tube site CE 294 was created in 2017 (Egerton Arms, Peel Lane).

At diffusion tube site CE 295 (South View Cottage) the road opens out, removing the canyon effect. As a result monitored concentrations levels for 2017 are much lower in comparison with CE 127 and CE 294.

For 2017 monitored results from all three sites were;

- CE 127 - 35.39 µg/m3
- CE 294 - 35.60 µg/m^3
- CE 295 - 21.14 µg/m^3

Monitoring data from these sites did not exceed the annual average NO_2 concentration for 2017. In addition, modelling results depicted by F.2 did not show any predicted exceedance of the objective value for nitrogen dioxide in the Astbury monitoring area.

As a consequence of these finding there is no requirement for Cheshire East to take any further action. However the Council will continue to monitor in the area to ensure that this position does not change and will report accordingly in future Annual Status Reports.

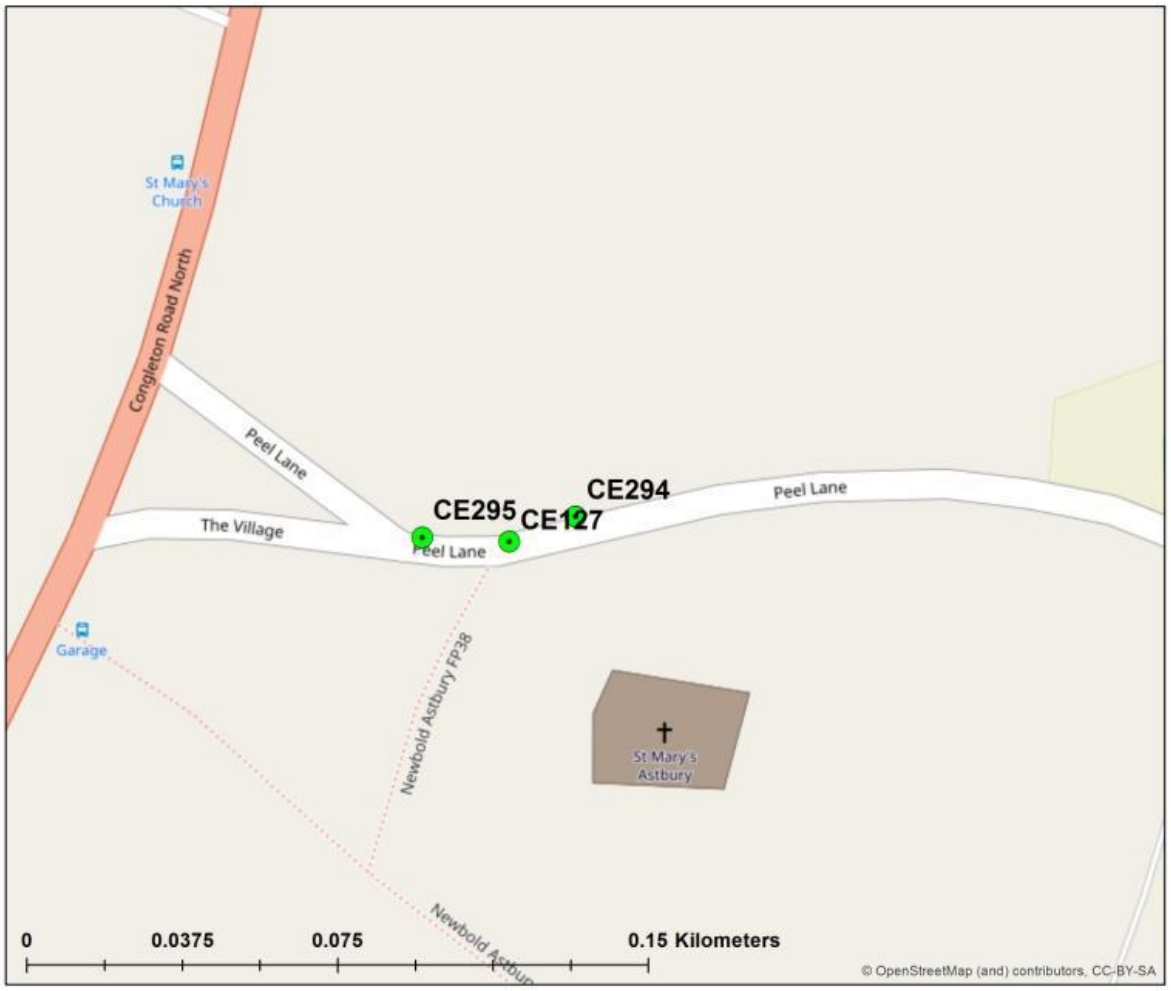

Figure F.1 - Astbury diffusion tube locations

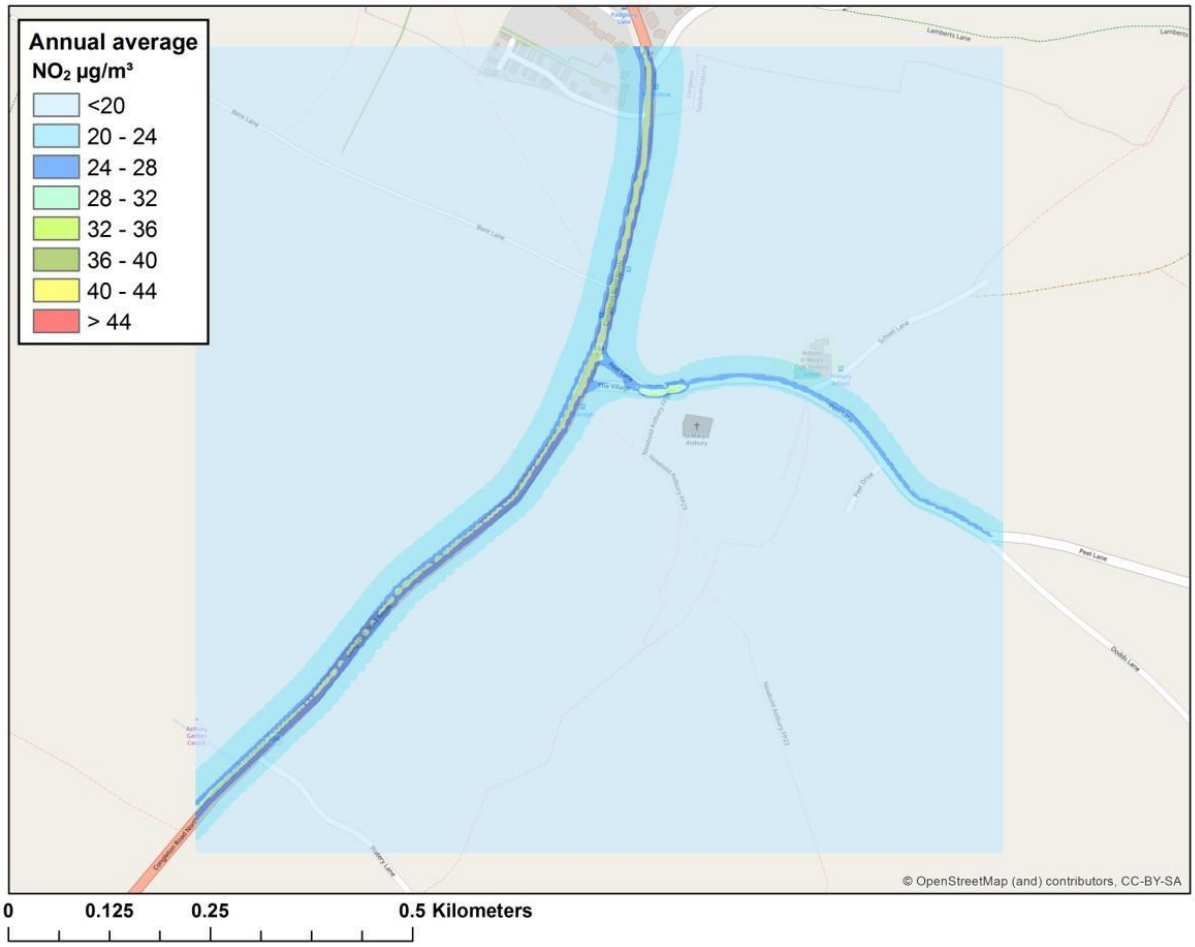

Figure F.2 - Modelled annual average NO_2 concentrations within Astbury (µg/m³)

Henshall Road, Bollington - Diffusion tube locations:

There are four diffusion tubes within the Bollington area as shown in Figure F.3. Diffusion tube site CE93 (16 Henshall Road) has been operational since 2016. As such a full year monitoring was not available, but the data obtained at this site was annualised, bias adjusted and distance corrected. This resulted in the final concentration of 40.90 µg/m^3, which exceeds the NO_2 annual mean objective.

Therefore, extra diffusion tubes were installed in 2017 to monitor the NO_2 annual mean objective excedance boundary and obtain robust data to help understand the air quality trend in that area. These diffusion tubes were placed at CE288 (19/21 Henshall Road), CE289 (3 The butchers, Henshall Road) and CE290 (6/8 Henshall Road). However in 2017, none of these sites exceeded the NO_2 annual mean objective.

2017 monitored results from all four sites were;

- CE93 – 36.82 µg/m^3
- CE288 – 25.94 µg/m^3
- CE289 – 23.10 µg/m^3
- CE290 – 33.39 µg/m^3

In addition, modelling results depicted by F.4 did not show any predicted exceedance of the objective value for NO_2 in the Bollington monitoring area.

As a consequence of these finding there is no requirement for Cheshire East to take any further action. However the Council will continue to monitor in the area to ensure that this position does not change and will report accordingly in future Annual Status Reports.

Figure F.3 - Bollington area diffusion tube locations

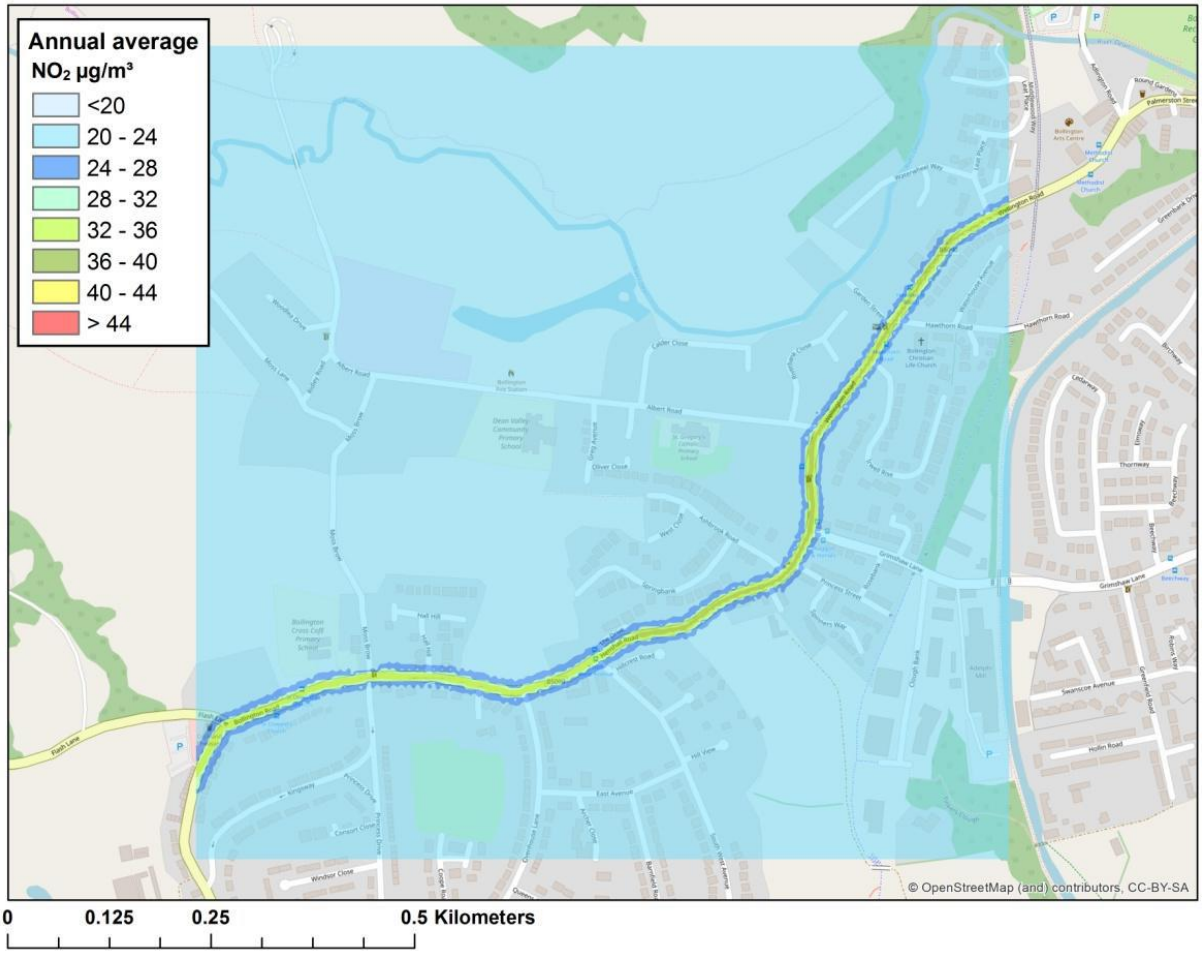

Figure F.4 - Modelled annual average NO_2 concentrations within Bollington (µg/m³)

Chelford Road, Knutsford - Diffusion tube locations:

There are three diffusion tubes monitoring sites within the Knutsford area as shown in Figure F.5.

Diffusion tube site CE94 (15 Chelford Road, Knutsford) is situated around a small number of properties located very close to the road and where traffic queues ttowards Knutsford, especially at peak times. Monitoring at this location commenced in May 2016. However, two months data were lost due to laboratory errors on analysis, which left only 6 months worth of data to evaluate.

TG16 paragraph 7.190, suggests that it would be necessary to perform an annualisation on any monitoring sites with fewer than 9 months' worth of data and a minimum of three months monitoring is required for annualisation to be completed. As such the CE94 monitoring data was annualised and the resulting annualised annual mean for 2016 was 52.66 µg/m^3; significantly over the annual mean objective of 40 µg/m^3.

Therefore, extra diffusion tubes were then put in place in 2017 to monitor the NO_2 annual mean objective exceedance boundary and obtain robust data to help understand the air quality trend that area. These diffusion tubes were placed at CE286 (The Willows, Chelford Road) and CE291 (Park Cottage, 19 Chelford Road).

2017 monitored results from all three sites were;

- CE94 – 45.06 µg/m^3
- CE286 – 30.20 µg/m^3
- CE291 – 24.08 µg/m^3

Monitoring data from diffusion tube site CE94 in 2017 exceeded the annual mean objective, while results from CE286 and CE291 did not exceed the NO_2 annual mean objective. In addition, the modelling result (Figure F.6) showed predicted exceedances of the objective value for annual average NO_2 concentrations along main roads within Chelford Road, Knutsford but no predicted exceedances where there are sensitive receptors.

As such, the model result recommends that there is no need to declare an AQMA. However, because of the exceedance observed at diffusion site CE94, the Council will work towards declaring the relevant parts as an AQMA within the next 12 months.

The Council will continue to monitor in the area to ensure that robust data which will help understand the air quality trend in that location is gathered.

It is worthy to note that the road traffic data used along this road for the modelling was from DfT and a speed of 30kph assumed. Therefore with more data available in this area, such as any details on traffic queuing, and more detail on speeds and flows, then a clearer picture of the situation could be gained in the future.

Figure F.5 - Knutsford area diffusion tube locations

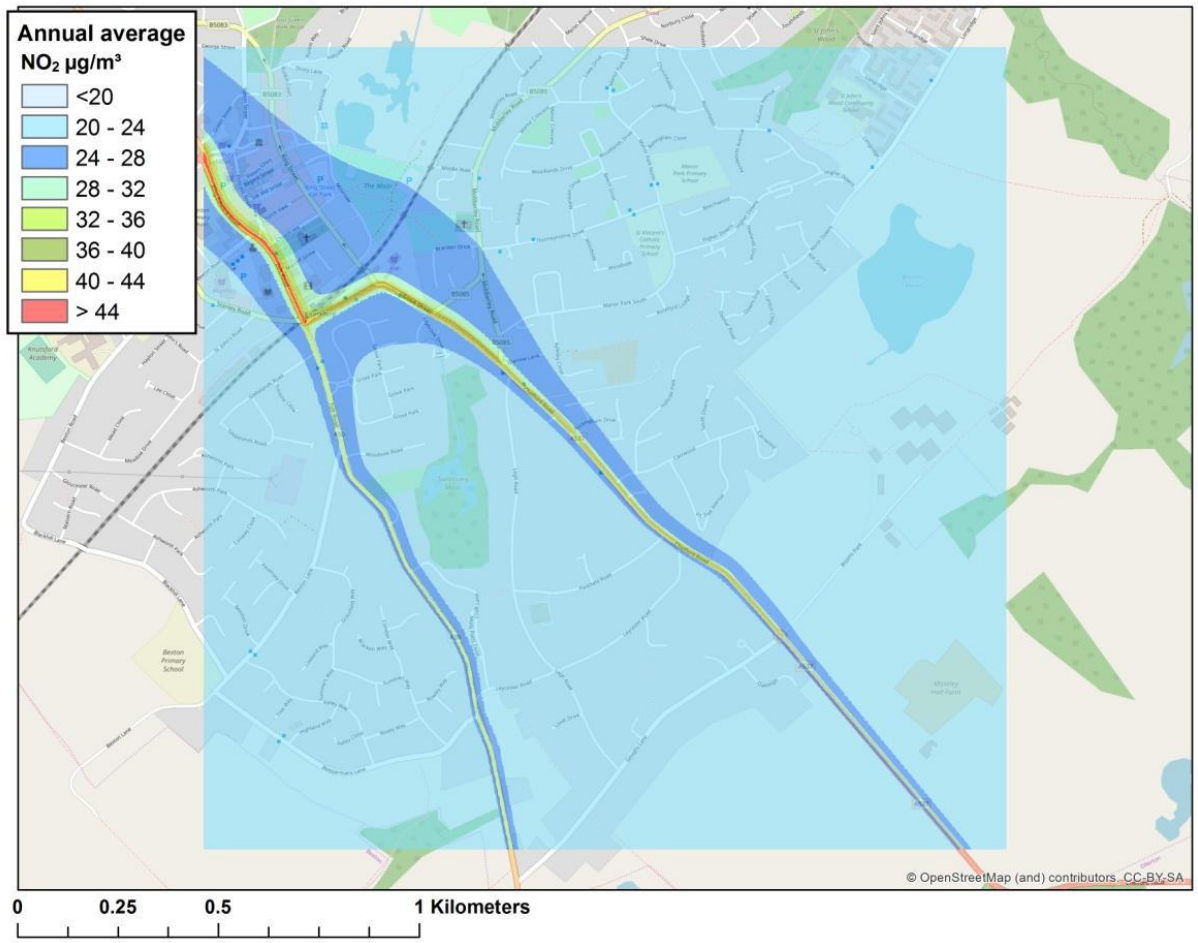

Figure F.6 - Modelled annual average NO_2 concentrations within Knutsford (µg/m³)

Lewin Street, Middlewich - Diffusion tube locations:

There are four diffusion tubes within the area of Lewin Street, Middlewich as shown in Figure F.7.

Monitoring data at tube CE134 (White horse, Lewin street) shows that it exceeded the annual mean objective in 2013 (41.40 µg/m^3). However, monitoring data at this site for the following years was close to the annual mean objective ranging from 35.91 µg/m^3 – 39.39 µg/m^3. As such, more tubes were placed in 2017 to obtain more robust data, verify the exceedance boundary and observe the air quality trend.

The tubes installed are CE269 (35 Lewin Street), CE270 (Longcross Court, Lewin Street) and CE282 (DIY Shop, Lewin Street).

2017 monitored results from all four sites were;

- CE134 – 36.02 µg/m^3
- CE269 – 40.34 µg/m^3
- CE270 – 30.69 µg/m^3
- CE282 – 42.83 µg/m^3

Diffusion tubes site CE269 and CE282 exceeded the annual mean objective of 40µg/m^3. In addition, modelling results depicted by Figure F.8 show predicted exceedances of the objective value for annual average NO_2 concentrations along main roads within Middlewich. However, there were no exceedances at relevant locations of public exposure; as such the modelling suggests the area should not be declared as an AQMA.

It is worthy to note that the only measured exceedances here are for a single year of data, it is advisable to obtain more monitoring data to gain a full understanding of the air quality. As such the Council will continue to monitor in the area to ensure that robust data is gathered which will help understand the air quality trend in that location.

However, as the annual mean, based on the short term monitoring, has exceeded the NO_2 annual mean objective, the Council will take precautionary approach and will work towards declaring the relevant part of Lewin Street as an AQMA within the next 12 months.

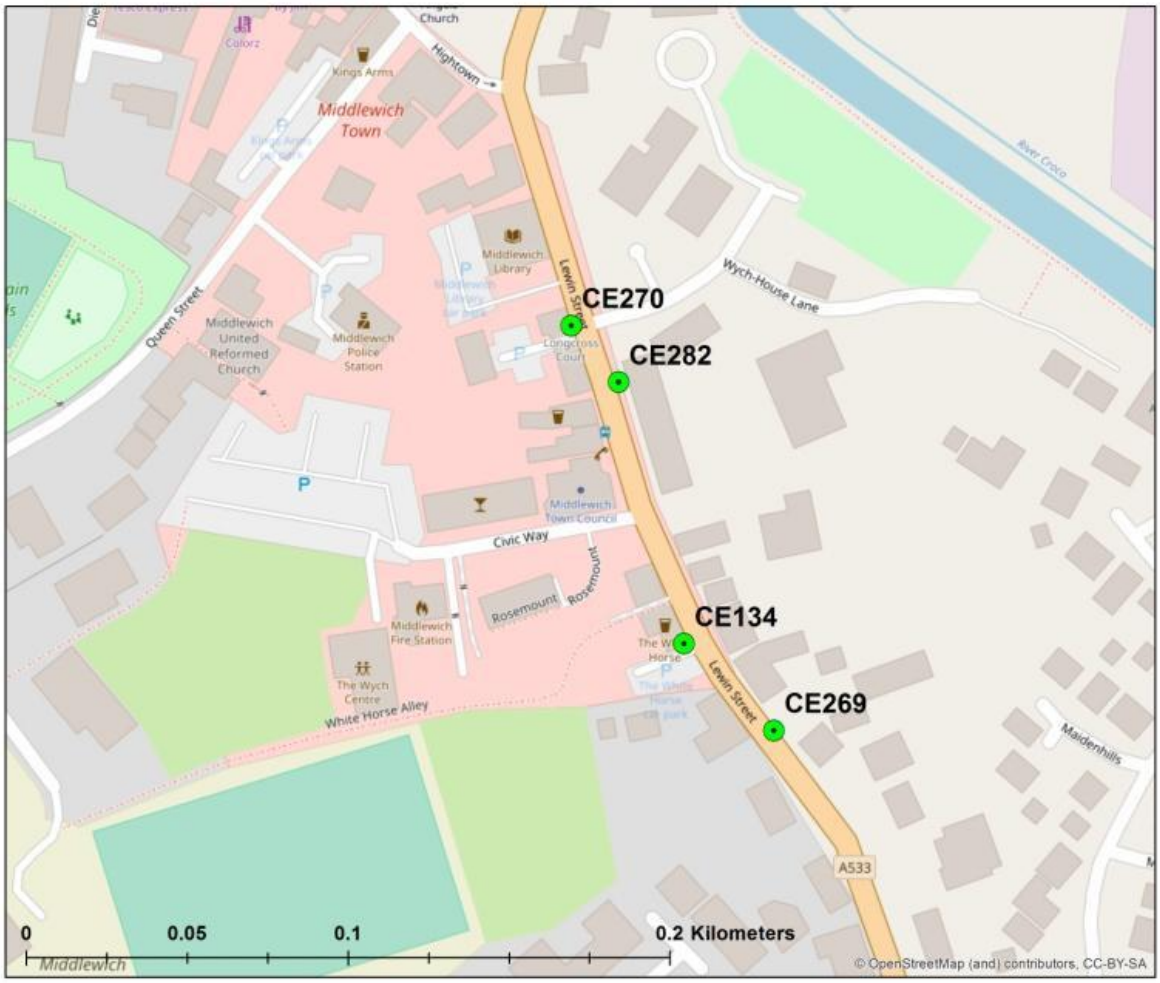

Figure F.7 - Middlewich area diffusion tube locations

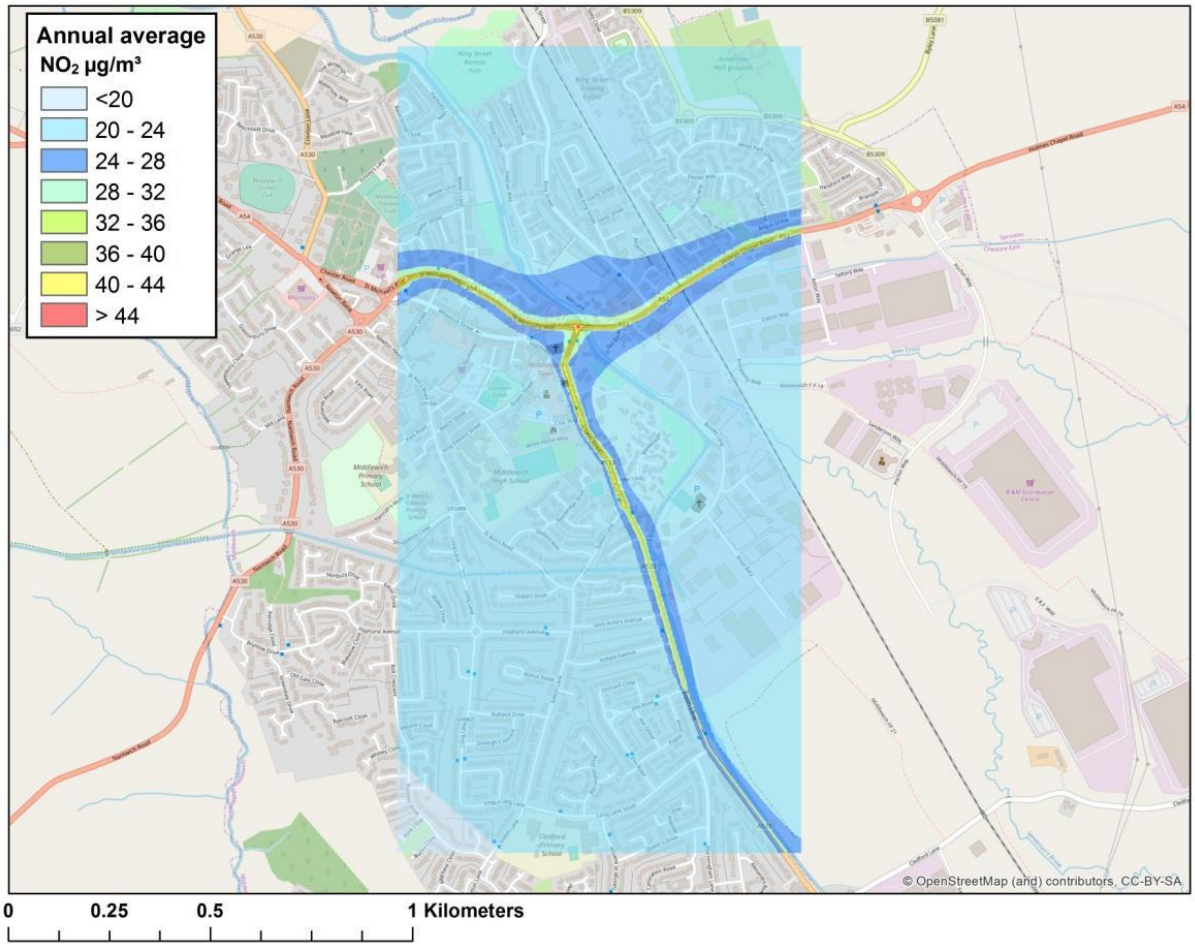

Figure F.8 - Modelled annual average NO_2 concentrations within Middlewich (µg/m³)

Appendix G: 'Significant Difference' Statistics

Table F.1 shows the pairs of years that are statistically significant differ as discussed in section 3.2.1.1. A one-way Analysis of Variance (ANOVA) test was used to test for statistical significant difference between measurement years (2012 -2017). The result showed F (5, 123) = 5.19, $p < 0.001$. Since the *p*-value corresponding to the F-statistic of the one-way ANOVA is < 0.001, it suggests that one or more years of measurement are statistically different. As such a Post-Hoc test was used to identify which exact pairs of years are significantly different from each. The Post-Hoc test performed is the Bonferroni and Holm multiple comparison test. The test showed the significant difference between exact years:

Table G. 1 - Post-Hoc test result showing exact pairs of years that are significantly different from each other

Post-Hoc Test	Paired years	p-value
Bonferroni and Holm multiple comparison	2013 vs 2015	$P < 0.05$
	2013 vs 2017	$P < 0.01$
	2014 vs 2017	$P < 0.01$
	2016 vs 2017	$P < 0.05$

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
AQS	Air Quality Strategy
ASR	Air Quality Annual Status Report
CERC	Cambridge Environmental Research Consultants
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
GIS	Geographical Information System
LAQM	Local Air Quality Management
LES	Low Emission Strategy
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office for Low emission Vehicles
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
U.K.A.S.	United Kingdom Accreditation Service