2017 Air Quality Annual Status Report (ASR)

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

June 2017

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Executive Summary: Air Quality in Our Area

The 2017 Annual Status Report is designed to provide the public with information relating to local air quality in Harlow, to fulfil Harlow Council's statutory duty to review and assess air quality within its area, and to determine whether or not the air quality objectives are likely to be achieved.

Air Quality in Harlow

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

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

Traffic emissions are the most significant source of air pollution in Harlow. The main roads in the District are the M11 and the A414. In addition, there a number of industrial processes. The majority of these are located in the two main industrial areas of the town: Templefields (to the North) and the Pinnacles (to the North West).

The Council recognises the importance of working with partnering Authorities such as with Essex County Council to make improvements to local transport infrastructure and also to fulfil its own regulatory responsibility towards industrial processes.

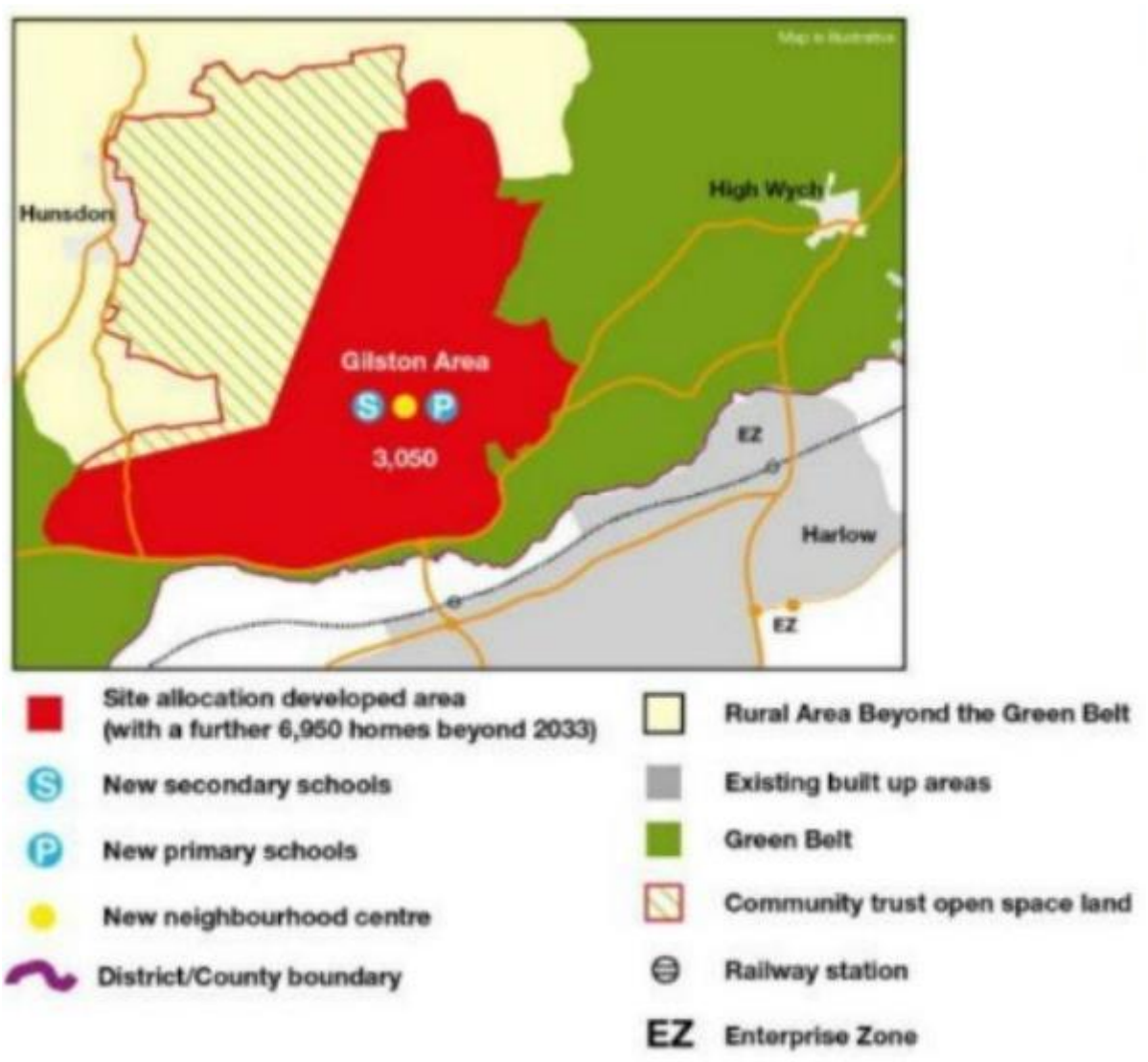
Air pollution is considered to be generally low in Harlow and monitoring of local Air Quality has measured no exceedances of air quality objective at relevant exposure. The trend of results across all monitored sites indicates that Air Quality is improving. A graph can be found in Appendix A that shows monitoring results from 2011 to 2016.

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

Local Priorities and Challenges

Harlow Council are co-operating as a planning authority with East Herts District Council and Epping Forest District Council with regard to the proposed new garden town at Gilston. The Gilston Area forms part of the emerging East Herts District Council Local Plan and is immediately to the north of Harlow, across the River Stort in East Hertfordshire.

Figure i.1 Proposed Gilston Area Development



The Gilston Area could provide up to 10,000 homes and along with committed employment and housing developments in Harlow, there is an expectation that traffic will significantly increase. It is important that the Council continues to assess development through the planning process to ensure that an increase in traffic does not reduce air quality.

The proposal for a new junction 7a on the M11 is anticipated to reduce the strain on the local and wider road network. This junction would create a significant change to how traffic would access Harlow and a number of preliminary traffic management options have been identified to prevent HGVs using smaller residential roads moving to priority routes.

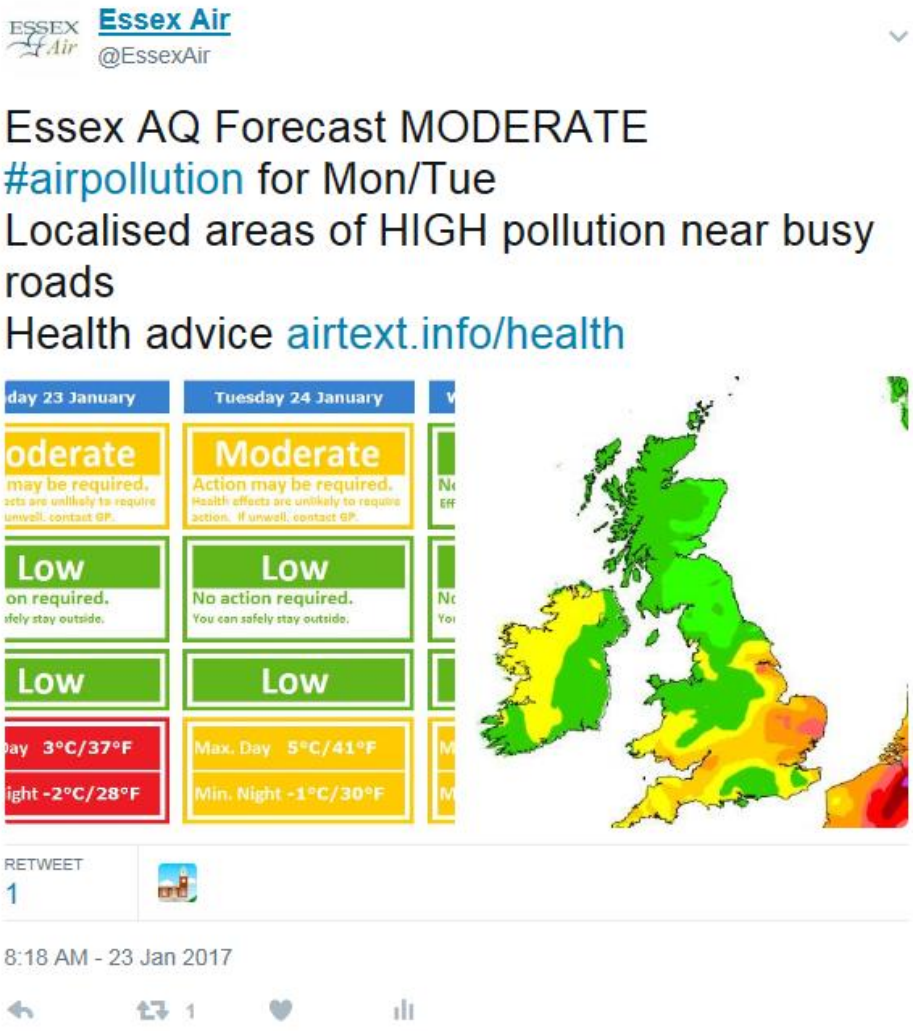
Conclusions and Priorities

Air quality in Harlow meets the national Air Quality Objectives. As such, Harlow Council does not have an Air Quality Strategy or Action Plan. However, Harlow Council has prioritised a Clean and Green Environment. As part of this commitment, the Council have adopted a new carbon management plan which will reduce its carbon footprint and improve air quality indicators.

Local Engagement and How to Get Involved

Harlow Council is a member of the Essex Air Quality consortium. The purpose of the Essex Air is to promote improvements in air quality related issues. The Essex Air web site provides a daily forecast of air pollution. Also the @EssexAir twitter feed provides localised weekly air pollution forecasts.

Figure i.2 Essex Air Twitter Air Quality Notifications



Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

Essex County Council has worked closely with Liftshare to develop the Essex Car Share scheme. This operates across Harlow and provides commuters with a car sharing service which could cut congestion and air pollution whilst saving money.

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

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

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

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Progress and Impact of Measures to address Air Quality in Harlow

Harlow Council does not have an Air Quality Management Area or associated Action Plan. Details of all measures completed, in progress or planned are set out in Table 2.1 below.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Essex Liftshare	Alternatives to private vehicle use	Car & lift sharing schemes	Essex County Council	N/A	2014	Number of Users	No AQMA	Ongoing	N/A	
2	Travel Budi	Alternatives to private vehicle use	Car & lift sharing schemes	Harlow Council	N/A	2007	Number of Users	No AQMA	Ongoing	N/A	
3	Member of Essex Air	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Essex Air	N/A	N/A	N/A	No AQMA	Ongoing	N/A	
4	Environmental Permit Inspection & Enforcement	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	Harlow Council	N/A	N/A	Operator compliance with Environmental Permit	No AQMA	Ongoing	N/A	

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
5	M11 J7a and associated Improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Essex County Council	2016	2018	Monitored Air Quality	No AQMA	Development of Initial Options	2020	
6	A414 Route Improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Essex County Council	2016	2019	Monitored Air Quality	No AQMA	Scheme Development	N/A	Road investment and congestion management programme for Harlow

2.2 $PM_{2.5}$ – 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.

Harlow Council does not monitor $PM_{2.5}$ concentrations however notes the Public Health Outcomes Framework indicator 3.01 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution which for 2015 gave a value of 5.3% which has reduced from 5.8% in 2013. These values are broadly similar to other authorities within the region.

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

- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of $PM_{2.5}$
- Working with Essex County Council (highway authority) to deliver Major Transport improvement **schemes** to alleviate congestion. In addition to reduced exhaust emissions, these schemes will reduce non-exhaust emissions from brake and tyre wear by making traffic flows smoother.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Harlow Council undertook non- automatic (passive) monitoring of NO_2 at 9 sites during 2016. Table A.1 in Appendix A shows the details of the sites.

No exceedances have been identified and monitored concentrations have trended downwards over the past five years. Details of this can be found in Figure A.1 in Appendix A which compares the bias adjusted monitored NO_2 annual mean concentrations for the past 7 years with the air quality objective of 40µg/m^3.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

3.2.1 Nitrogen Dioxide (NO_2)

The air quality monitoring results presented in this section has been adjusted for bias. Further details on adjustments are provided in Appendix C.

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

Appendix A: Monitoring Results

Table A.1 – 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)
HAR 8	East Park	Suburban	546942	211186	NO_2	No	11.0	23.2	No	2
HAR 9	Gardiners	Urban Background	546888	209435	NO_2	No	7.6	1.2	No	2
HAR10	Dadds Wood	Urban Background	544434	209709	NO_2	No	12.5	33.4	No	2
HAR11	Town Centre	Kerbside	544680	210016	NO_2	No	31.3	21.5	No	2
HAR12	Allende Avenue	Roadside	544396	211101	NO_2	No	13.2	6.3	No	2
HAR13	Guilfords	Suburban	547524	212479	NO_2	No	14.2	1.0	No	2
HAR15	Gilden Way	Roadside	548662	212013	NO_2	No	14.0	1.5	No	2
HAR16	Chalk Lane	Rural	549466	211599	NO_2	No	20.0	0.75	No	2
HAR17	Rivermill	Kerbside	544297	210988	NO_2	No	0	4.7	No	2

Notes:

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)					
					2011	2012	2013	2014	2015	2016
HAR 8	Suburban	Diffusion Tube		92%	29.92	31.42	27.66	28.24	27.55	24.95
HAR 9	Urban Background	Diffusion Tube		100%	32.42	33.6	28.28	29.76	28.68	27.93
HAR10	Urban Background	Diffusion Tube		100%	32.88	32.68	29.78	29.09	24.83	26.19
HAR11	Kerbside	Diffusion Tube		100%	37.43	38.8	33.02	33.56	31.04	29.75
HAR12	Roadside	Diffusion Tube	100%	25%	**43.18**	32.76	29.91	28.42	26.64	25.62
HAR13	Suburban	Diffusion Tube		100%	N/A	N/A	N/A	20.79	17.45	16.72
HAR15	Roadside	Diffusion Tube		91.2%	N/A	N/A	N/A	N/A	21.59	25.37
HAR16	Rural	Diffusion Tube		100%	N/A	N/A	N/A	N/A	18.09	20.36
HAR17	Kerbside	Diffusion Tube	100%	67%	N/A	N/A	N/A	N/A	N/A	21.91

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

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

Historic data has not been distance corrected for relevant exposure. 2016 data has been distance corrected and can be found in Table B.1 in Appendix B.

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 Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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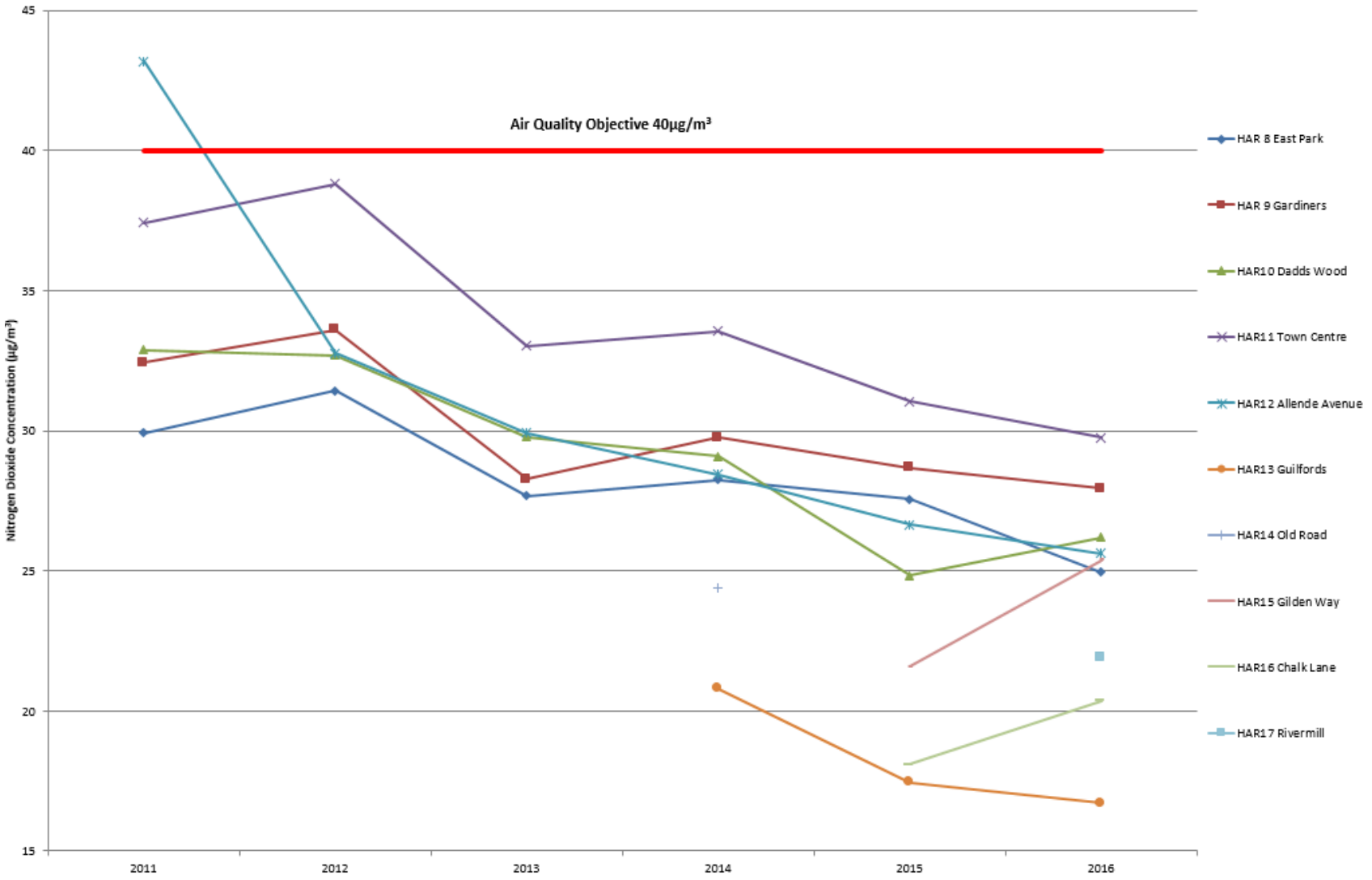
Figure A.1 – Trends in Annual Mean NO_2 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2016

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

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
HAR 8 East Park	45.8	Missing	25.8	32.6	32.4	24	24.7	23.6	33.1	28.8	37.1	48.5	32.40	24.95	22.82
HAR 9 Gardiners	48.1	41.1	34.2	37.6	24.4	28.1	31.2	28.9	33.9	33.1	45.8	48.8	36.27	27.93	22.54
HAR10 Dadds Wood	44.6	43.3	34	33.1	25	26.3	24.9	26.2	34.1	29.4	38.2	49	34.01	26.19	23.74
HAR11 Town Centre	48.8	40.1	32.6	40.4	38.2	34.7	29	29.8	45.2	35.8	45.3	43.8	38.64	29.75	22.75
HAR12 Allende Avenue	43	37.6	33.8	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	38.13	25.62	21.77
HAR13 Guilfords	32.5	25.2	20.2	18.9	18.4	13.7	15.4	18.9	20.8	19.1	25.3	32.1	21.71	16.72	15.77
HAR15 Gilden Way	Missing	30.4	34	36.2	25.7	24.1	26.7	27.4	33.6	36.5	40.8	47	32.95	25.37	20.05
HAR16 Chalk Lane	31.6	28.7	24.9	28.1	25.6	18.3	26.1	17.2	25.5	23.7	28	39.6	26.44	20.36	16.97
HAR17 Rivermill	N/A	N/A	N/A	N/A	31.5	26	22.1	23.8	32.2	35.3	37.5	46.8	31.90	21.91	21.91

HAR12 Allende Avenue – Site Discontinued April 2015

HAR17 Rivermill – New Site May 2015

☒ **National bias adjustment factor used**

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tubes QA/QC

Harlow Council undertook monitoring at 9 nitrogen dioxide diffusion tubes sites in 2016.

The diffusion tubes were supplied by Environmental Scientifics Group (ESG Didcot) (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.

The AIR NO_2 proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2016:

Table C.1 – AIR PT Results 2016

AIR PT Round	AIR PT AR006	AIR PT AR007	AIR PT AR009	AIR PT AR010
Round conducted in the period	January – February 2016	April – May 2016	July – August 2016	September – October 2016
ESG Didcot	100%	75%	75%	100%

Diffusion tube Bias Adjustment Factors

Harlow Council uses the national bias adjustment figure for calculating diffusion tubes results.

The Diffusion Tube Bias Adjustment Factors Spreadsheet 03/17v2 identified that for ESG (Didcot) 50% TEA in acetone diffusion tubes in 2016, a bias adjustment factor of 0.77 should be used. This was derived from orthogonal regression analysis of 30 studies.

Diffusion Tube Data Annualisation

Data annualisation was carried out for two sites HAR12 and HAR17 as they less than 75% capture rate in 2016. The nearby Chignal St James background air quality monitoring station in Chelmsford was used for the calculations.

Table D.2 HAR12 Allende Avenue Data Annualisation

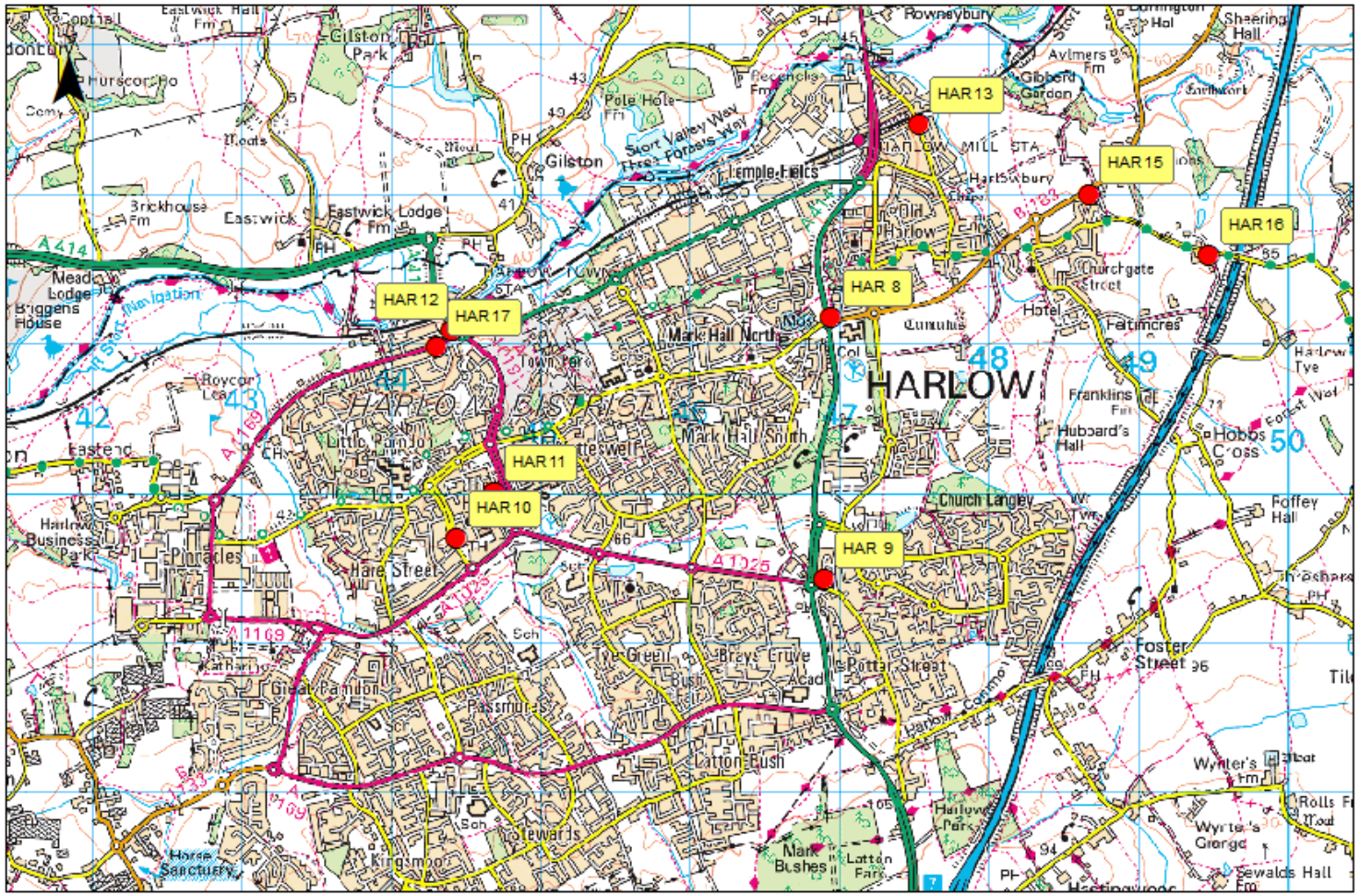
Start Date	End Date	B1 (Chignal, Chelmsford Background AQMS)	D1 (HAR12)	B1 when D1
6th January	3th February	19.21	43	19.21
3th February	2nd March	16.50	37.6	16.50
2nd March	30th March	13.24	33.8	13.24
30th March	27th April	13.23		
27th April	25th May	12.24		
25th May	29th June	7.91		
29th June	27th July	8.70		
27th July	24th August	7.74		
24th August	28th September	13.63		
28th September	26th October	11.18		
26th October	30th November	17.28		
30th November	4th January	29.97		
Average		14.24	38.13	16.32
Annualisation Factor		0.87		
Annualised Concentration		33.27		

Table D.3 HAR17 Rivermill Data Annualisation

Start Date	End Date	B1 (Chignal, Chelmsford Background AQMS)	D1 (HAR17)	B1 when D1
6th January	3th February	19.21		
3th February	2nd March	16.50		
2nd March	30th March	13.24		
30th March	27th April	13.23		
27th April	25th May	12.24	31.5	12.24
25th May	29th June	7.91	26	7.91
29th June	27th July	8.70	22.1	8.70
27th July	24th August	7.74	23.8	7.74
24th August	28th September	13.63	32.2	13.63
28th September	26th October	11.18	35.3	11.18
26th October	30th November	17.28	37.5	17.28
30th November	4th January	29.97	46.8	29.97
Average		14.24	31.90	14.24
Annualisation Factor		0.89		
Annualised Concentration		28.46		

Appendix D: Map of Monitoring Locations

Figure D.1 – Map of Monitoring Locations in Harlow



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
TEA	Triethanolamine – substance used for absorbing nitrogen dioxide in diffusion tubes
UKAS	United Kingdom Accreditation Service

References

Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at; https://laqm.defra.gov.uk/assets/databasediffusiontubebiasfactorsv0317v2.xls

Defra LAQM Summary of Laboratory Performance in AIR NO_2 PT Scheme available at; https://laqm.defra.gov.uk/assets/airptrounds7to18apr2015feb2017.pdf

Defra LAQM Policy Guidance LAQM.PG16 available at; http://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf

Defra LAQM Technical Guidance LAQM.TG16 available at; http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Essex Air Quality Consortium available at; http://www.essexair.org.uk/AQInEssex/LA/Chelmsford.aspx

EssexCarShare.com available at; https://essex.liftshare.com/

Essex Air Twitter Feed available at; https://twitter.com/essexair

Essex County Council: Harlow Improvement Schemes available at; http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Major-Schemes/Harlow-Improvement-schemes.aspx

Harlow Council Hackney Carriage Licensing Standard Conditions available at; http://www.harlow.gov.uk/sites/harlow/files/documents/files/Hackney%20Carriage%20vehicle%20licence%20-%20conditions%20for%20existing%2055%20licences%20April%202015.pdf

Harlow Carbon Management Plan April 2016 – March 2021 available at; http://moderngov.harlow.gov.uk/documents/s7194/Carbon%20Management%20Plan%202016-2021.pdf

Harlow Infrastructure available at; http://www.harlow.gov.uk/infrastructure

Proposal for new junction 7a on M11 (Harlow) available at; http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Major-Schemes/Proposal-for-Junction-7a-on-M11-Harlow.aspx

Public Health Outcomes Framework Indicator 3.01 available at; http://www.phoutcomes.info/