2018 Air Quality Annual Status Report (ASR)

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

June 2018

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Executive Summary: Air Quality in Our Area

Air Quality in Knowsley

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].

Local monitoring data, the planning system, traffic information and control of industries by Environmental Permits have been utilised so that there is a continuing examination of the local air quality to ensure that all Air Quality Objectives set by the Government are met.

Previous Updating and Screening Assessments have been undertaken and all the pollutants included for the purpose of Local Air Quality Management were reassessed individually and the outcome of these reviews was that none of the Air Quality Objectives were predicted to be exceeded by the due dates and that a Detailed Assessment was not required.

The Council's background urban air quality monitoring site (2008–2017) indicates a stable level of pollutants and based on the findings of the most recent Updating and Screening Assessment, Knowsley Council has found that the levels of nitrogen dioxide and particulates (PM_{10}) do not exceed the specific Air Quality Objectives. No AQMA's have been declared in Knowsley.

The main sources of air pollution in Knowsley, as identified from previous air quality review and assessments and the work carried out in the Merseyside Atmospheric Emissions Inventory are from road traffic vehicle emissions and from industrial sources. Knowsley is home to a wide range of industrial and commercial developments and is an important location for employment in the Liverpool City

[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

Region and a major source of workers for the area. The borough has a large industrial base concentrated mainly on Knowsley Business Park in Kirkby, the Huyton, Kings and Prescot Business Parks, as well as the Jaguar Land Rover car plant in Halewood.

Neighbouring authorities also house large industries that can have an impact on the air quality in Knowsley. For example, Fiddlers Ferry power station in Warrington lies to the south of the borough and the Shell oil refinery and petro-chemical complex in Ellesmere Port lie to the south west of Knowsley as well as major glass manufacturing sites in St Helens.

Traffic movements within the borough also play a significant role when considering air quality. Knowsley has a variety of road communication links. The M57 is the 'backbone' of the Borough, running North West to South East. The M62 and A580 (East Lancashire Road) link with the M57 and cut through the Borough East to West. The southerly extension to the M57 has been given the Route Number A5300. The motorway and main A-roads are connected via a network of smaller roads which link the many towns in Knowsley.

Knowsley Council continues to work with other Liverpool City Region authorities, Merseytravel, Environment Agency and other partners to improve air quality within the borough.

In late 2017 a preliminary study to identify opportunities in the Liverpool City Region (LCR) to improve air quality, and achieve associated benefits to health and well-being, whilst supporting regional growth and development aspirations was started. The options study was finalised in March 2018 and approved by the Liverpool City Region Combined Authority (AECOM, 2018).

Actions to Improve Air Quality

As part of the Liverpool City Region, Knowsley will also contribute to regional initiatives to improve air quality. A preliminary options study of various air quality intervention has been prepared by AECOM in consultation with Merseytravel and the LCR Combined Authority and was published in March 2018.

Key completed measures in Knowsley are:

- The formation of an Air Quality Steering Group and the appointment of a chair.
- The commencement of passive monitoring of NO_2 in the area around the Cronton Road automatic monitoring station.
- The production of the Annual Status Report 2018.
- One double-headed electric vehicle charge point was installed at Stretton Way Depot for the Council's new electric fleet vehicles.
- Electric vehicle charge points have been installed in car parks at Cyprus Street Prescot and Archway Road, Huyton.
- A communication strategy has been developed to encourage public engagement, deliver key messages related to air quality and to ensure effective joint working with external partners.
- Better Bus Corridors - Infrastructure improvements throughout Knowsley to improve timings and efficiencies of buses within the borough and passing through Knowsley.
- M62 Junction 5 improvements (NPIF) to reduce congestion, support walking and cycling movements and improve air quality.
- Approximately 900m of on road cycle route constructed on Tarbock Road and a toucan crossing constructed at Stockbridge Lane to encourage cycling in the area.

Conclusions and Priorities

Monitoring of air quality in Knowsley in 2017 demonstrated no exceedances of air quality objectives. However, it is clear that there is an air quality problem in the Cronton Road area that could potentially result in AQMA being declared. There are only four months of passive monitoring data from 2017 for this location to use and therefore the priority for Knowsley in 2018 will be to further monitor and assess the air quality in this location. Monitoring will also be increased in other parts of the borough including the towns of Kirkby and Prescot. Knowsley Council faces significant budget cuts from central government and continuing to provide projects and services related to monitoring and improving air quality will be a major challenge.

Local Engagement and How to get Involved

The public can help improve air quality in Knowsley by:

- Reducing the use of cars by, walking, cycling, car-sharing or using public transport instead.
- Considering electric or hybrid vehicles when buying a new car.
- Not leaving vehicles idling. Turn off the engine instead and use the stop start technology in newer vehicles where available.
- Not burning waste on bonfires or wood burners. Dispose of household waste using the waste collection service or compost garden waste instead.
- Use the Energy Savings Trust website (www.energysavingtrust.org.uk) for advice on saving energy in the home and business.

Further information and live air quality information from Knowsley Council's automatic monitoring site is available from our website:

http://www.knowsley.gov.uk/residents/bins-waste-and-environment/air-quality

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1 Local Air Quality Management

This report provides an overview of air quality in Knowsley during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Knowsley currently does not have any AQMAs. For reference, a map of Knowsley Council's monitoring locations is available in Appendix D.

2.2 Progress and Impact of Measures to address Air Quality in Knowsley

Defra's appraisal of last year's ASR concluded that it is well structured, detailed and provides the information specified in the Guidance. The following comments are made to inform future reports.

1. Distance correction has been applied to the data to ensure results are representative of relevant exposure. However, the figure for "Receptor distance from receptor to kerb" appears to be incorrect for the Huyton example calculation. Given that the figure for "Distance [of monitoring site] to relevant exposure" in table A.1 is given as 17, we suggest the correct distance of the receptor to the kerb is 19.1m (the distance of the site from relevant exposure plus the distance of the site to the kerb). This would reduce the annual NO_2 mean for Huyton to 28.6 $\mu g/m^3$. It is therefore of great importance that the local authority review their calculation processes in future reports, and ensure the final results are accurately corrected.

   KMBC comments – This is due to the distance attenuation being applied to a property on the opposite side of the road, but slightly further from the kerb than the monitor. Whilst it is understood that the model should not necessarily be applied in this manner it was agreed with the LAQM helpdesk following these comments it was an adequate solution to provide an estimate.

2. It appears the given grid reference for Kirby sites is incorrect, suggesting this site is located near Preston.

   KMBC comments – The typographical error has been corrected in revisions of the report

Knowsley MBC has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. More detail on these measures can be found in the following documents;

- Joint Strategic Needs Assessment (Environment)

This report has been prepared jointly by Knowsley Council and Knowsley Clinical Commissioning Group (CCG) and it is one of a series of reports that contributes to

Knowsley's Joint Strategic Needs Assessment (JSNA). Its purpose is to provide an analysis of the environment and related issues in order to address questions such as:

- How much impact do these issues have on local people?
- Can this impact be reduced through local action?
- Can local action reduce health inequalities?
- Will local action on this help address other issues too?

This report, along with others produced as part of the JSNA, will be used to inform strategies and plans produced by the Council and its partners. In particular, the JSNA meets the statutory responsibility that the Council and CCG share to study the needs of local people in order to inform the development of a Joint Health and Wellbeing Strategy. The JSNA is also the main source of intelligence used to develop the Knowsley Partnership's 'Strategy for Knowsley'.

- The Sustainable Transport Enhancements Package

The Sustainable Transport Enhancements Package (STEP) is a package of sustainable transport infrastructure measures integral to the Liverpool City Region (LCR) Growth Plan and Strategic Economic Plan (SEP). Although in its infancy, investment in STEP will be shaped around four interrelated strategic packages of works. These align with those set out in the SEP Investment Pipeline for the City Region and are as follows;

- Transport Investment for Growth;
- Sustainable Access to Employment and Opportunity;
- Transport and Low Carbon Opportunities; and
- Travel for the Visitor Economy.

Investment will be directed into seven Growth Zones, which align with the key areas for investment and development across the City Region, based on the growth sites identified in the SEP. The Environmental Impact Assessment concludes there is likely to be a slight beneficial impact on local and regional air quality as a result of the scheme.

As part of the Liverpool City Region, Knowsley will also contribute to regional initiatives to improve air quality. A preliminary options study of various air quality

intervention has been prepared by AECOM in consultation with Merseytravel and the LCR Combined Authority and was published in March 2018.

Key completed measures in Knowsley are:

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

- Recommence automatic monitoring of NO_2, PM_{10} and $PM_{2.5}$ in Kirkby in a new location that would provide a better indicator of public exposure to air pollution.
- Expand passive monitoring of NO_2 into the towns of Prescot and Kirkby
- Increased engagement and participation with events and promotion of Clean Air Day
- A tender exercise will be competed to find an external contractor who will expand the number of electric vehicle charging points in the borough.
- Knowsley Council have already agreed in 2018 to the 100% Clean Energy City Pledge to devise plans to achieve 100% clean energy locally by 2050 and to work with partners to promote the principles of the 100% Clean Energy City Pledge with the aim of making a material contribution to emissions reductions.

- Sustainable Transport Enhancement Schemes walking and cycling routes are being constructed :
    - The initial phase of the Huyton to Prescot Gateway Link consists of 0.5km newly constructed cycle / shared use path, 6 newly constructed uncontrolled crossings, 6 upgraded uncontrolled crossings and 2 new shared use (Toucan) controlled crossings at Archway Road
    - The Connect Whiston scheme consists of 0.5km newly constructed cycle / shared use path
- At present each local authority has its own air quality pages, hosted within the Council websites and these vary in terms of design, amount of information and type of content. Funding has been secured from DEFRA air quality grants to create a stand-alone website which will have content which is pertinent to all the Local Authorities within the LCR. A substantial element of the web platform will be dedicated to providing educational resources for primary and secondary schools to utilise.

Knowsleys priorities for the coming year are to expand the monitoring network within the borough. This will include monitoring by automatic monitoring station(s) and diffusion tubes and is likely to focus on towns that have not been monitored in recent years such as Prescot and Kirkby.

The principal challenges and barriers that Knowsley Council anticipates facing, regarding the implementation of projects and services relating to air quality, include significant budget cuts from central government. It is also anticipated that there will be a significant increase in the number of new housing and commercial developments within the borough. These include Sustainable Urban Extensions (SUE).which will increase the urban area of the borough at the cost of rural land. The associated increase in road traffic is likely to have a negative impact on air quality, however the extent of impact will need to be assessed via the planning system.

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.

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

- Continue to monitor, analyse and report on $PM_{2.5}$ at our two automatic monitoring sites. Any future monitoring sites introduced as part of the expansion of the monitoring network will include $PM_{2.5}$ monitoring as standard.
- Identify developments that could increase $PM_{2.5}$ levels though the planning regime and Environmental Permitting and where necessary use conditions or enforcement to secure improvements. $PM_{2.5}$ will be a key focus for new planning applications and Environmental Permitting.
- Identify existing measures already in place that can help with reducing levels of $PM_{2.5}$
- The Public Health Outcome Framework for $PM_{2.5}$ is considered as part of Knowsley's JSNA Report. This outcome indicator is the percentage of all-cause death in adults over 30 attributed to small (<2.5 µm) particulate, man-made air pollution. It is a modelled estimate based on the relative risk incurred per 10 $\mu g/m^3$ increase above local average background levels. The attributable fraction in England is 5.4%, whilst for the North West as a whole this is lower, at 4.6%. In Knowsley the attributable fraction is 4.8%.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Knowsley undertook automatic (continuous) monitoring at 3 sites during 2017. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/.

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

3.1.2 Non-Automatic Monitoring Sites

Knowsley undertook non- automatic (passive) monitoring of NO_2 at 12 sites during 2017. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

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

For diffusion tubes, the full 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 200 µg/m^3, not to be exceeded more than 18 times per year.

A marginal exceedance of the annual objective is noted at the passive monitoring site 3. An ambient concentration of 40.2 µg/m^3 is noted in comparison to the guideline of 40.0 µg/m^3. However, after cafeful consideration and discussion with the LAQM help desk (see email in Appendix C) it was decided not to move to declaring an AQMA at this time. This is considering that only four months of data has been collected and the automatic and other passive monitoring sites in the area are below the threshold. The site will be reassessed in 2019 when a full years data set can be considered.

Monitoring of NO_2 at the Kirkby site ceased at the beginning of 2017 due to equipment failure. The data from the Kirkby monitoring location had shown that concentrations of NO_2 had slightly declined following a noticable peak in 2014, however levels were consistently and significantly below the limit.

Less than two years of automatic monitoring at the Huyton and Halewood monitoring locations exists and therefore no trends in the data can be identified.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

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

No exceedances of the air quality objectives were recorded.

The data from the Kirkby monitoring location shows that concentrations of PM_{10} have been steady for the last 5 years and have not been close to exceeding statutory limits. This was considered as a reason to decommission the Kirkby monitoring site in November 2017 in favour of a new site within or near to the town centre.

Less than two years of automatic monitoring at the Huyton and Halewood monitoing locations exists and therefore no trends in the data can be identified.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

Although there is no air quality objective for the England, it is noted that the recorded levels are below the EU Air Quality standard (25 µg/m^3) for all three sites.

The data from the Kirkby monitoring location shows that concentrations of $PM_{2.5}$ have been steady for the last 5 years and have not been close to exceeding statutory limits. This was considered as a reason to decommission the Kirkby monitoring site in November 2017 in favour a new site within the town.

Less than two years of automatic monitoring at the Huyton and Halewood monitoring locations exists and therefore no trends in the data can be identified.

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)
Kirkby	Briery Hey Avenue, Northwood	Urban Background	345552	433175	PM2.5 PM10,	NO	BAMS	35	16	2.5
Huyton	Cronton Road, Huyton	Roadside	345552	389413	NO_2; PM2.5 PM10,	NO	Chemiluminescent, TEOMS	18	2	2
Halewood	Higher Road, Halewood	Roadside	345213	384691	NO_2; PM2.5 PM10,	NO	Chemiluminescent, TEOMS	10	2	2

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)
1	Station co-location	Roadside	345552	389413	NO_2	NO	18	2	YES	2
2	Outside 2 Whitefield Lane	Roadside	345536	389406	NO_2	NO	2.3	1.3	NO	2.5
3	Outside1 Whitefield Lane	Kerbside	345563	389399	NO_2	NO	2.7	0.7	NO	2.5
4	Opp Smithford Walk	Roadside	345516	389326	NO_2	NO	7.1	1.6	NO	2.5
5	Sevenoak Grove	Roadside	345675	389363	NO_2	NO	2.9	1.3	NO	2.5
6	Wilson Rd Jct	Roadside	345878	389437	NO_2	NO	N/A	3.8	NO	2.5
7	Tarbock Island	Roadside	345996	389471	NO_2	NO	20.4	1.6	NO	2.5
8	Natruscot	Roadside	345301	389479	NO_2	NO	30.5	2.5	NO	2.5
9	Outside 29 Southford Walk	Suburban	345596	389180	NO_2	NO	5.4	0.5	NO	2.5
10	Outside 9 Ribchester Way	Suburban	345424	389325	NO_2	NO	6.7	1.3	NO	2.5
11	Outside 12 Windy Arbor Brow	Suburban	346329	389782	NO_2	NO	5	1.3	NO	2.5
12	Halsnead development	Roadside	346425	389669	NO_2	NO	N/A	3	NO	2.5

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/m³) (3)				
					2013	2014	2015	2016	2017
Kirkby	Urban Background	Automatic	0	0	21	26.9	18.7	17.7	N/A
Huyton	Roadside	Automatic	99.7	99.7	N/A	N/A	N/A	38.8	36.2
Halewood	Roadside	Automatic	99.9	99.9	N/A	N/A	N/A	32.3	27.8
1	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	40.0
2	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	39.9
3	Kerbside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	**47.7**
4	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	26.7
5	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	25.1
6	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	29.2
7	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	36.2
8	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	26.7
9	Suburban	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	26.3
10	Suburban	Diffusion Tube	34.5	25.2	N/A	N/A	N/A	N/A	22.9
11	Suburban	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	28.6
12	Roadside	Diffusion Tube	34.5	34.5	N/A	N/A	N/A	N/A	35.5

☒ **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.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

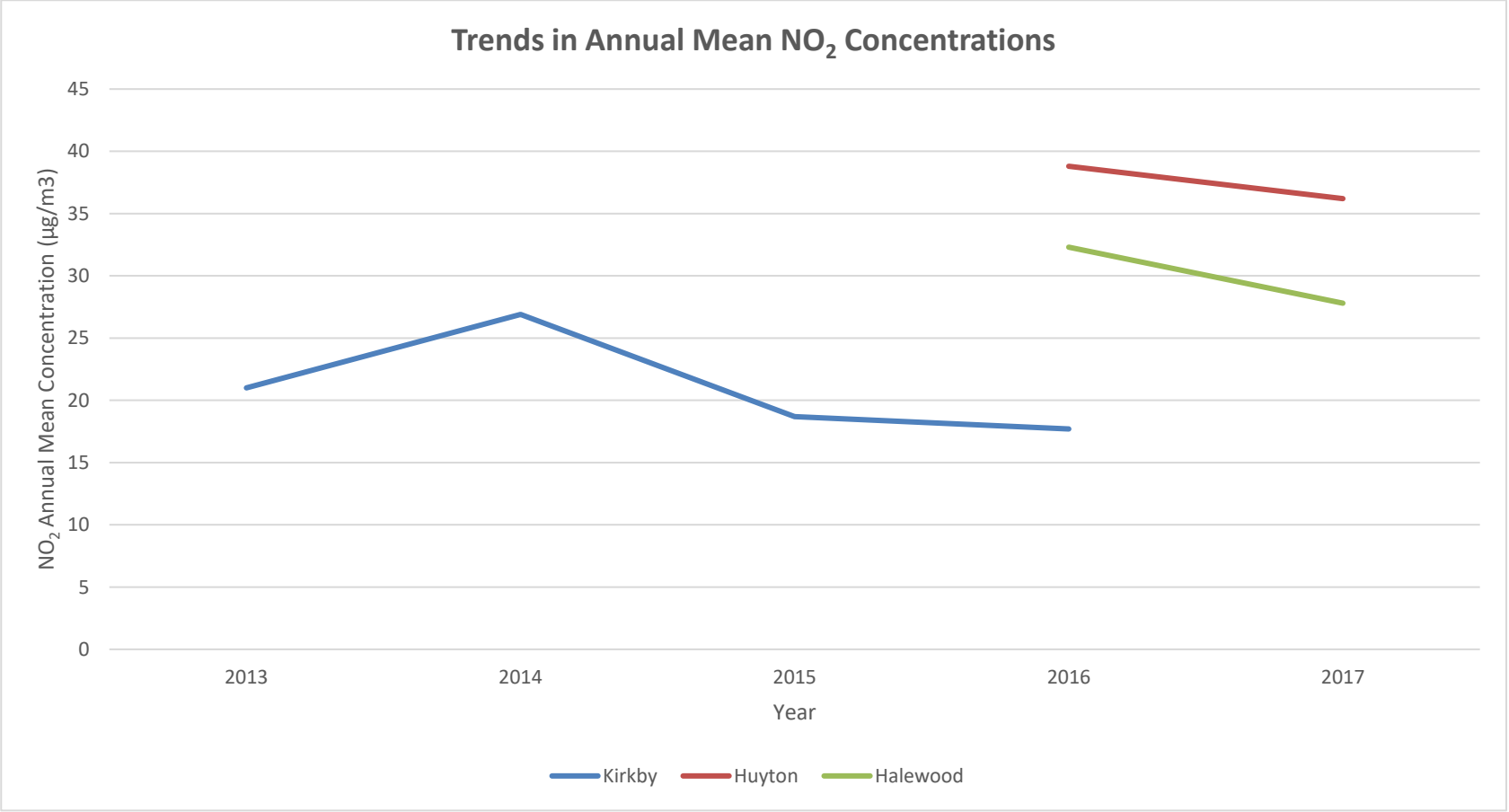


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
Kirkby	Urban Background	Automatic	0	0	0	0 (112.2)	0	0 (87.8)	N/A
Huyton	Roadside	Automatic	99.7	99.7	N/A	N/A	N/A	0 (130.4)	0
Halewood	Roadside	Automatic	99.9	99.9	N/A	N/A	N/A	0 (117.0)	0

Notes:

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
Kirkby	Urban Background	94.1	78.4	25	18	16.5	17.9	19.6
Huyton	Roadside	99.5	99.5	N/A	N/A	N/A	20	22.5
Halewood	Roadside	97.8	97.8	N/A	N/A	N/A	24.8	20.8

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

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ are shown in **bold.**

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

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

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

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

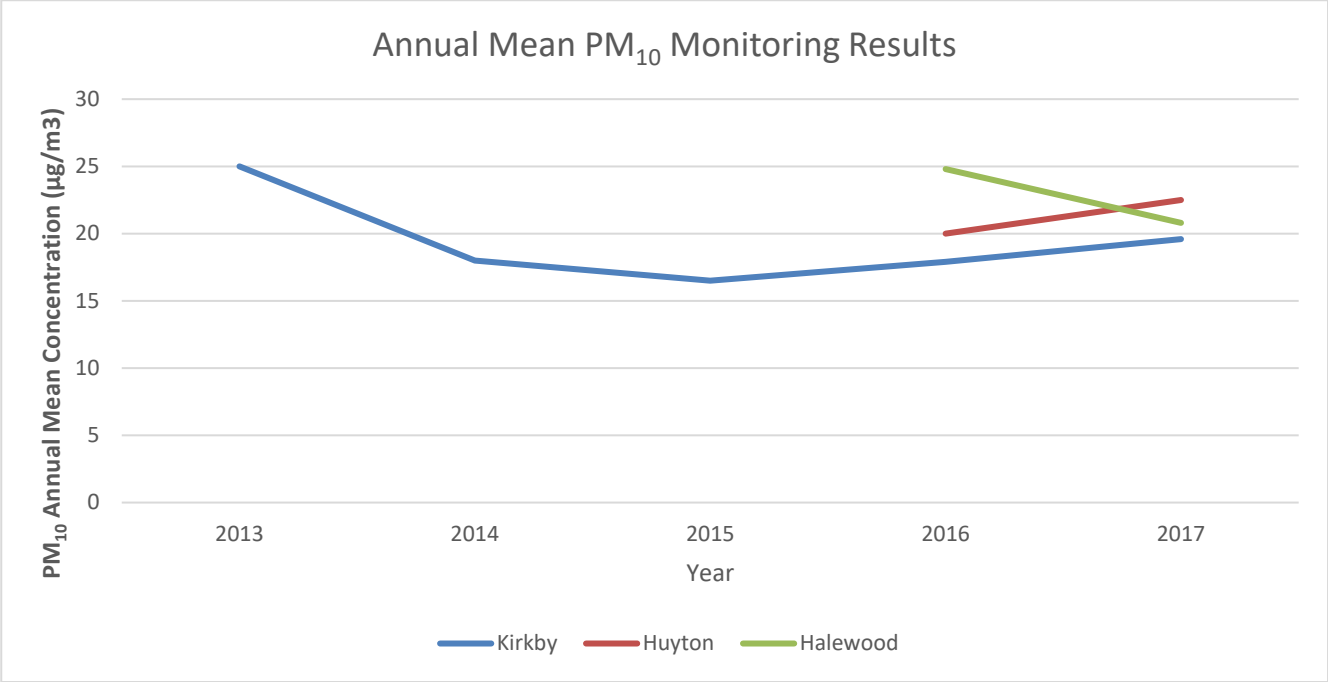


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2013	2014	2015	2016	2017
Kirkby	Urban Background	94.1	78.4	14	8	4 (30.8)	0	0 (27.5)
Huyton	Roadside	99.5	99.5	N/A	N/A	N/A	2 (32.9)	5
Halewood	Roadside	97.8	97.8	N/A	N/A	N/A	8 (43)	5

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
Kirkby	Urban Background	95.1	79.2	N/A	N/A	6.8	10.9	8.4
Huyton	Roadside	97.5	97.5	N/A	N/A	N/A	10.1	9.5
Halewood	Roadside	99.2	99.2	N/A	N/A	N/A	11.1	8.6

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

Notes:

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

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

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

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 (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1								47.5	51.5	55.5	56.4		52.7	40	38.5
2								44.9	50.2	61.3	53.8		52.5	39.9	37.3
3								51.8	61.5	63.6	74.1		62.7	47.7	40.2
4								29.1	34.5	40.6	36.2		35.1	26.7	23.9
5								24.9	30.7	38.7	37.7		33.0	25.1	23.9
6								31.2	35.4	44.4	42.8		38.4	29.2	N/A
7								41.3	46.8	54.9	47.7		47.7	36.2	26.0
8								25.0	30.5	42.9	42.2		35.1	26.7	21.4
9								27.9	32.6	37.5	40.3		34.6	26.3	22.9
10								21.9	26.5	34.4			27.6	22.9	21.3
11								31.8	35.7	40.4	42.5		37.6	28.6	25.6
12								38.4	45.5	49.0	53.8		46.7	35.5	N/A

☐ **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**

N.B. Exposure periods differed from the DEFRA recommended calendar. Exposure periods still fell within the 4 to 5 week period as recommended by TG-16 and therefore a simple mean was used to calculate the average. Monitoring was stopped on 19 December 2017, in order for 2018 exposure periods to be syncronised in accordance with the recommended calendar. Monitoring periods are shown below for reference.

August - 16/8/17 to 12/9/17

September - 12/9/2017 to 13/10/17

October - 13/10/2017-16/11/17

November - 16/11/17-19/12/17

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

C.1 Significant changes to sources

The following sources have been identified as part of the planning regime as being new sources of pollution in 2017

Planning Reference: 17/00291/FUL

Address: Land Opposite, 33 - 53 Delph Lane, Prescot, Knowsley.

Proposal: Creation of Car Park (419 Car Parking Spaces) including Vehicular / Pedestrian Access, Lighting, Associated Works and Landscaping.

Notes: An air quality report was submitted with the application and reviewed prior to determination of the planning application. The report used the Design Manual for Road and Bridges methodology and worst case scenarios and concluded that the development was not significant with regards to air quality and would highly unlikely to lead to a breach in DEFRA Air Quality objectives. The report was approved by the Local Planning Authority and planning permission was granted. As part of development two EV charging points will be installed.

Planning Reference: 17/00559/FUL

Address: Land at Junction of County Road/Hall Lane and to Rear of St. Chads Parade Together With Land at Cherryfield Crescent / Adrians Way/Eagles Court & Spicer Grove, Kirkby

Proposal: Demolition of existing Buildings and Construction of a Mixed-Use Development, Comprising a Foodstore and Non-Food Retail Shops (Use Class A1), Food & Drink and Leisure Uses (Use Classes A3/A5/D2), Petrol Filling Station, Car Parking, Landscaping, Highway Improvements and other Associated Works (including 2no. Electricity Substations) on Land Bound By Norwich Way, Hall Lane, County Road and Irlam Drive; and the Construction of a Car Park Together with Associated Works on Land off Cherryfield Drive and Cherryfield Crescent

Notes: An air quality report was submitted with the application and reviewed prior to determination of the planning application. The report used a detailed Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) and worst case scenarios and concluded that the development was not significant with regards to air quality

and would highly unlikely to lead to a breach in DEFRA Air Quality objectives. The report was approved by the Local Planning Authority and planning permission was granted. As part of development two EV charging points will be installed.

Knowsley Metropolitan Borough Council has identified no new significant 'Road Traffic Sources" or other transportation sources in 2017.

C.2 QA/QC of monitoring data

The Kirkby station uses Beta Attenuation Monitors (BAM) to monitor particles matter as per TG16 the BAM meets the equivalence criteria for monitoring providing the results are corrected for slope. The data in this report has had the correction factor applied so it can be compared to the National Air Quality Objectives.

Data from an analyser is stored on the logger as 'raw' or 'uncorrected' data, therefore data needs to be corrected or 'validated'. To validate data, the analysers need to be checked against a referenced standard of 'zero' air and 'span' gas.

There are two methods available to correct data by using calibration checks to verify that the analyser is corrected for any response change:

- Daily automatic calibration checks
- Fortnightly manual calibration checks

The air quality monitoring stations use manual calibration checks

A regular manual calibration is performed at the AQMS. This check is performed to verify the response of the analyser in reference to the 'zero' and 'span' by introducing a high concentration of NO gas. These results are also used to validate the data for the NOx analyser.

All of the calibration results are then used to create a calibration factor, which is used to correct the data.

Conversion factors for ppb to µg/m3

Conversion rates at 20°C and 101.3kPa:

- NO_2

1.91 x ppb = µg/m^3

Annualisation of data for Nitrogen Dioxide (Huyton Diffusion tubes)

Sites 1-9 & 11 -12

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Huyton	LA	36.2	39.0	0.93
Halewood	LA	27.8	29.0	0.96
Speke	AURN	18	16.8	1.07
			Average	0.987

Sites 10

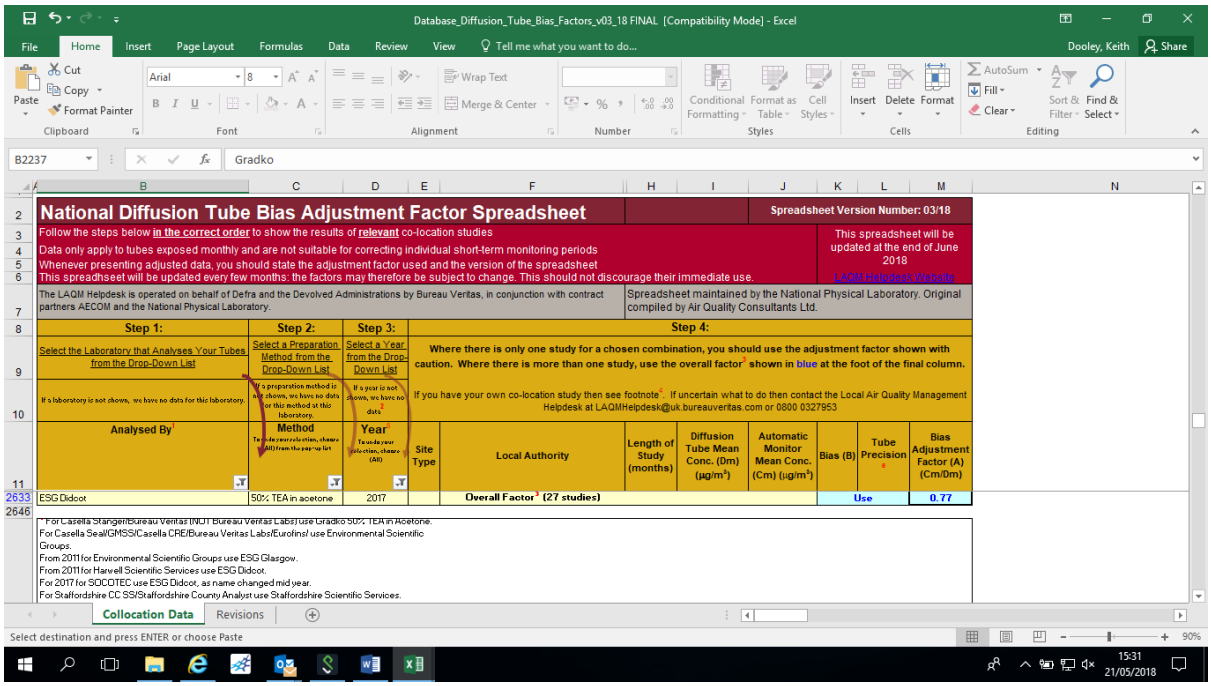
Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Huyton	LA	36.2	38.4	0.94
Halewood	LA	27.8	26.2	1.06
Speke	AURN	18	14.7	1.22
			Average	1.077

Site	Period Mean (µg/m3)	Applicable Ratio	Annual Mean (µg/m3)
1	52.7	0.987	52.0
2	52.5	0.987	51.9
3	62.7	0.987	61.9
4	35.1	0.987	34.6
5	33.0	0.987	32.6
6	38.4	0.987	37.9
7	47.7	0.987	47.1
8	35.1	0.987	34.7
9	34.6	0.987	34.1
10	27.6	1.077	29.7
11	37.6	0.987	37.1
12	46.7	0.987	46.1

Bias adjustment

The national bias adjustment factor was used instead of the local bias adjustment. Although co-location of diffusion tubes with the Huyton automatic monitoring site was carried out, only four months of passive monitoring were completed. Therefore it was determined that national bias adjustment factors would be more accurate. The laboratory was ESG Didcot using 50% TEA in Acetone for the year 2017.

Bias adjustment factor = **0.77**



Distance correction.

Local annual background mean of NO_2 =18.2 µg/m3 (source: DEFRA: Background Mapping data for local authorities)
The results below are from the DEFRA Nitrogen Dioxide fall off with distance calculator (ver. 4.1)

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration (µg/m^3)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
1.0	2.0	2.7	18.2	40.0	*38.5*
2.0	1.3	2.3	18.2	39.9	*37.3*
3.0	0.7	2.7	18.2	47.7	**40.2**
4.0	1.6	7.1	18.2	26.7	23.9
5.0	1.3	2.9	18.2	25.1	23.9
7.0	1.6	20.4	18.2	36.2	26.0
8.0	2.5	30.5	18.2	26.7	21.4
9.0	0.5	5.4	18.2	26.3	22.9
10.0	1.3	6.7	18.2	22.9	21.3
11.0	1.3	5.0	18.2	28.6	25.6

Email form LAQM helpdesk

From: fang.lin@uk.bureauveritas.com [mailto:fang.lin@uk.bureauveritas.com] **On Behalf Of** LAQMHelpdesk@uk.bureauveritas.com
Sent: 24 May 2018 10:45
To: Dooley, Keith <Keith.Dooley@knowsley.gov.uk>
Subject: Re: 4826_NO2 advice - Knowsley

Hi Keith,

Thank you for contacting the LAQM Helpdesk. Your query has been allocated the unique reference code 4826 and you should use this as a reference for any further follow up regarding the following

response.

It is agreed that declaring an AQMA on a single exceedence which has been calculated using only four months of diffusion tube data would be disproportionate. Especially when the exceedence is only 0.2ug/m3. I think it is reasonable to wait until a full years worth of diffusion tube data has been collected before making a decision on AQMA declaration. This should also allow the boundary of the AQMA to be more robustly defined.

Regards,
Fang Lin

LAQM Helpdesk Team

Email: LAQMHelpdesk@uk.bureauveritas.com
Website: http://laqm.defra.gov.uk/
FAQs: http://laqm.defra.gov.uk/laqm-faqs/
What's New: http://laqm.defra.gov.uk/whatsnew.html
Telephone: 0800 032 7953

To: LAQMHelpdeskmail@VERITAS
cc:

Attn: Fang Lin/GBR/VERITAS

Subject: 4826_NO2 advice - Knowsley

Hi

I contacted the LAQM help desk a few days age to discuss this matter, however I would appreciate a written response to confirm our position.

We have operated an automatic AQ station in a location in the town of Huyton since May 2016.

2016 data showed NO2 levels close to, but not exceeding the limit. As a result we distributed passive monitoring tubes in the area in August 2017.

Therefore, we have four months of diffusion tube data for2017. After all corrections are applied (bias, adjustment, annualisation and distance correction) we have one location that measures NO2 levels of 40.2 µg/m3.

In my opinion it would be disproportionate to declare an AQMA based on a single location with only 4 months data. 0.2 is well within a margin of error and even rounding error.

Is it reasonable for us to wait until we have collected the full years data for 2018 to make a decision.

Kind Regards

Keith Dooley
Environmental Protection Officer
Environmental Health and Consumer Protection

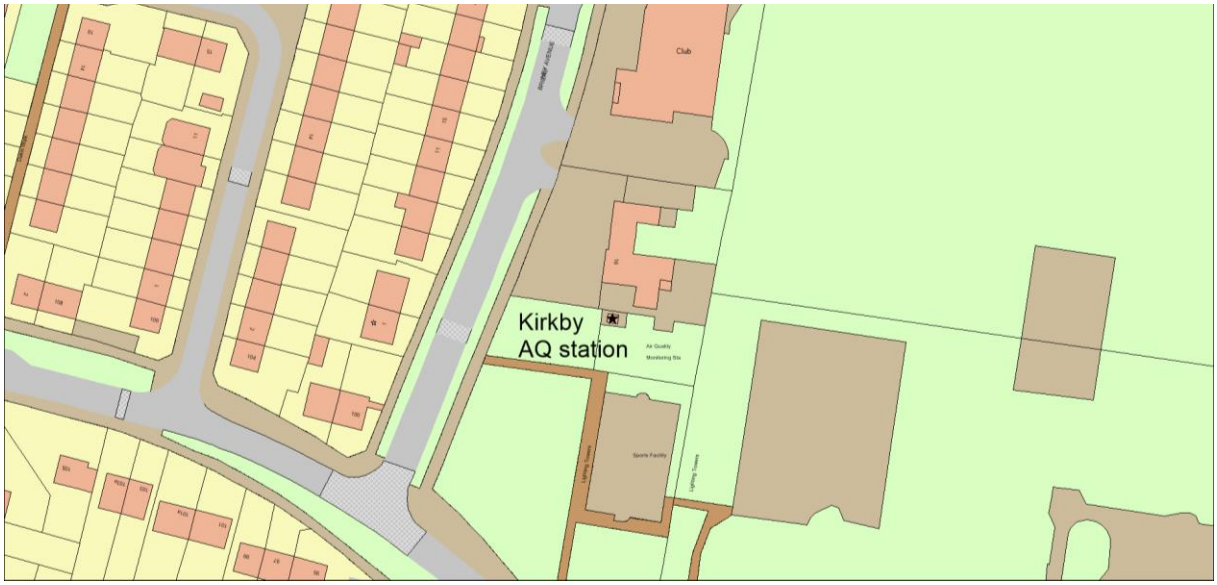
Tel: 0151 443 2859 Email: keith.dooley@knowsley.gov.uk
Knowsley Council 2nd Floor Yorkon Building Archway Road Huyton L36 9FB

Appendix D: Maps of Monitoring Locations and AQMAs

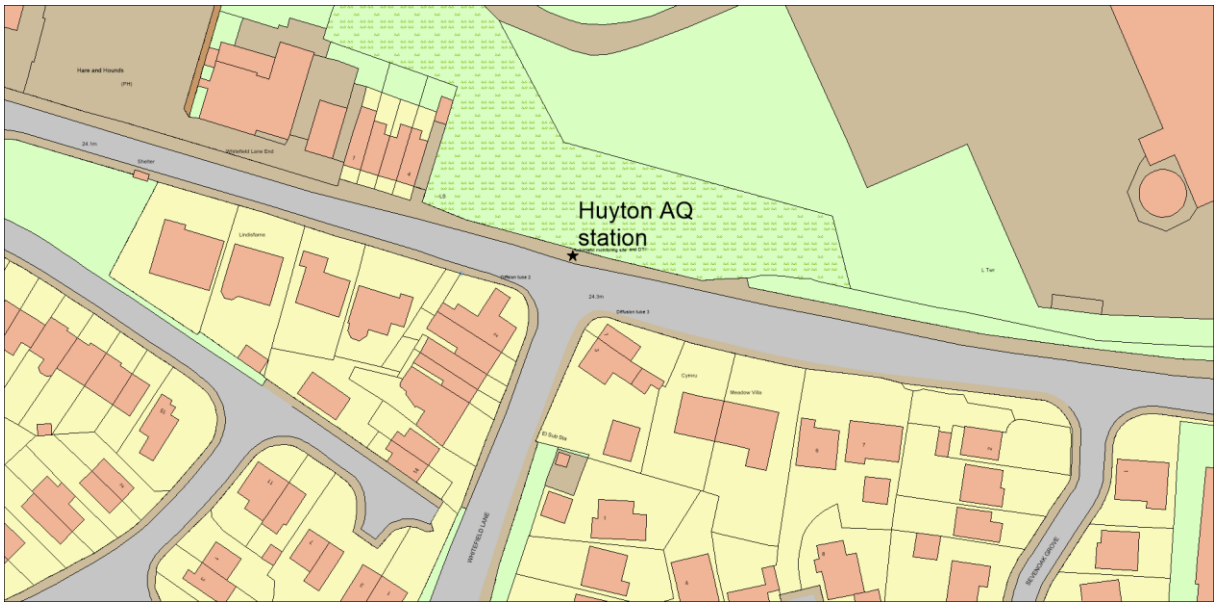
Map 1- Passive monitoring sites near M62/M57 motorway junction (west)

Map 2- Passive monitoring sites near M62/M57 motorway junction (north)

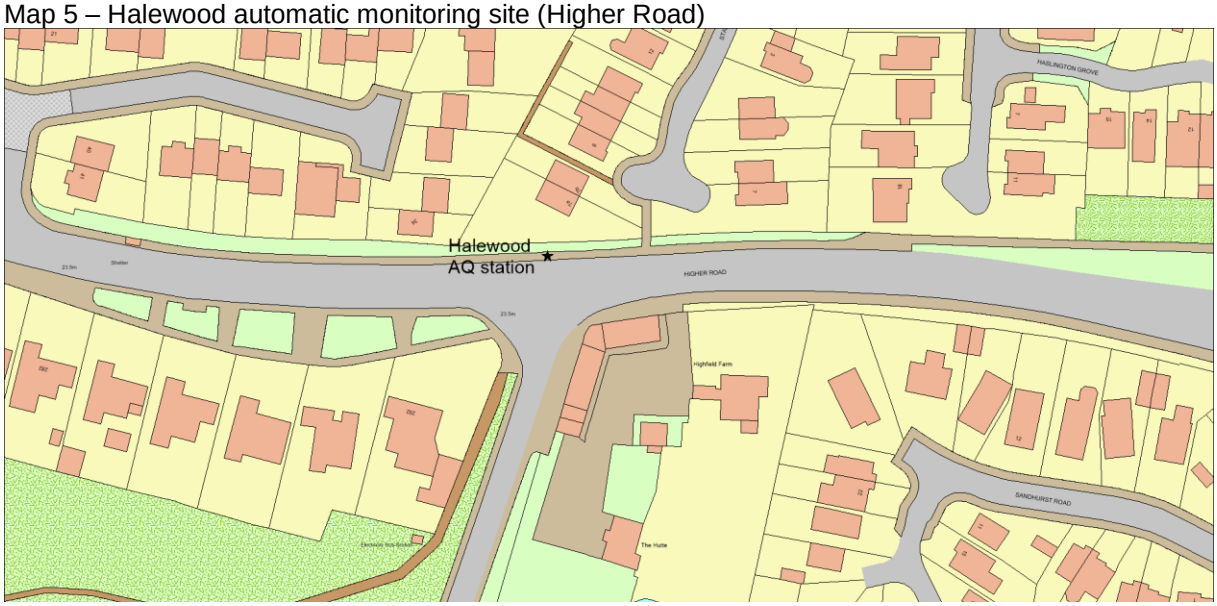
Map 3 – Kirkby automatic monitoring site (Briery Hey Avenue)



Map 4 – Huyton automatic monitoring site (Cronton Road)



Map 5 – Halewood automatic monitoring site (Higher Road)



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 micrograms of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LCR	Liverpool City Region
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
…	…

References

- AECOM (2018) Liverpool City Region Preliminary Air Quality Options Study
- DEFRA (2016) Local Air Quality Management, Technical Guidance LAQM. TG(16)
- Knowsley Council (2016) Joint Strategic Needs Assessment Report (Environment)
- Liverpool City Region Combined Authority (2015) Sustainable Transport Enhancements Package. http://www.merseytravel.gov.uk/about-us/local-transport-delivery/Pages/STEP.aspx