South Tyneside Council

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CHANGE IS HAPPENING

# 2019 Air Quality Annual Status Report (ASR)

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

June 2019

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| Date | 24th June 2019 |

# Executive Summary: Air Quality in Our Area

## Air Quality in South Tyneside

South Tyneside Council adopts a collaborative, corporate-wide approach to air quality led by its Development Services Team. Within Development Services, the Environmental Health Unit is responsible for overseeing local air quality management, including air quality monitoring and reporting results to the Department of Environment, Food and Rural Affairs (Defra). Close working relationships with transport, public health and spatial planning colleagues are important to improve air quality as a consequence of transport and public health initiatives and also through routine planning applications that may impact upon air quality.

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].

There are several principal air pollutants produced by industrial, domestic and traffic sources they include: sulphur dioxide; nitrogen oxide/ nitrogen dioxide ($NO_2$); $PM_{10}$ and $PM_{2.5}$; ozone and volatile organic compounds; toxic organic micro pollutants; 1-3 butadiene; benzene; carbon monoxide; lead and heavy metals.

Historically, the main air pollutants have been high levels of smoke and sulphur dioxide emitted by combustion of sulphur containing fossil fuels i.e. coal, however currently the main air pollutant threat occurs from traffic emissions.

Nitrogen Dioxide ($NO_2$) and Nitric Oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NOx). All combustion processes produce NOx emissions, largely in the form of nitric oxides, which is then converted to

[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

nitrogen dioxide ($NO_2$). Nitric oxide (NO) is mainly derived from road transport emissions and other combustion processes such as the electricity supply industry.

The principal source of Nitrogen Dioxide is road transport; combustion processes such as power generation and industrial processes also provide a significant contribution. The main contribution within South Tyneside is from road traffic.

South Tyneside Council ceased monitoring Sulphur Dioxide due to continued compliance during previous rounds of review and assessment.

Together, Environmental Health, Transport and Public Health colleagues are striving to reduce pollutant levels throughout the Borough even further to improve air quality and the health and wellbeing of residents. Various initiatives are discussed within this report and further information can be found in the links provided.

We shall continue to undertake continuous and non-continuous monitoring; all monitoring results can be found within Appendix A.

Air quality is everyone's business and there are various ways that residents and businesses can improve local air quality.

## South Tyneside feasibility study in relation to Government ministerial direction to reduce $NO_2$ along the A194

In August 2017, Defra released the National Air Quality Plan for nitrogen dioxide concentrations. The plan is targeted to problem areas which national modelling suggests will continue to have air pollution problems in 2021, mostly in cities and towns.

In January 2018, the Council received correspondence from Defra that the A194 carriageway (from the Hedworth Lane junction through to the John Reid Road junction) has defined $NO_2$ exceedance in 2018, but this reduces to compliant levels

by 2019.

Following a high court ruling in February 2018, Central Government issued a Ministerial Direction to 33 local authorities, including South Tyneside, to bring forward $NO_2$ compliance.

As a result of the Ministerial Direction on 23rd February 2018, the Council was requested to complete a targeted feasibility study on the A194 corridor by the end of July 2018 which would define a set of interventions to bring forward compliance.

The targeted feasibility study was completed at the end of July. As part of the study a local dispersion modelling exercise (using updated information to that carried out by the national PCM model) was undertaken to assess annual mean $NO_2$ concentrations across the A194 PCM exceedance stretches. The model used up to date ANPR (actual number plate recognition) survey data with AADF (annual average daily flow), fleet composition, Euro composition and diurnal profiling, this up to date information was not used in the original PCM modelling exercise. Local monitoring was also used to verify the model.

The predicted concentrations from the modelling exercise were below the limit value for $NO_2$. Defra accepted the findings of the study and no further action was required to reduce $NO_2$ along these stretches.

# Actions to Improve Air Quality

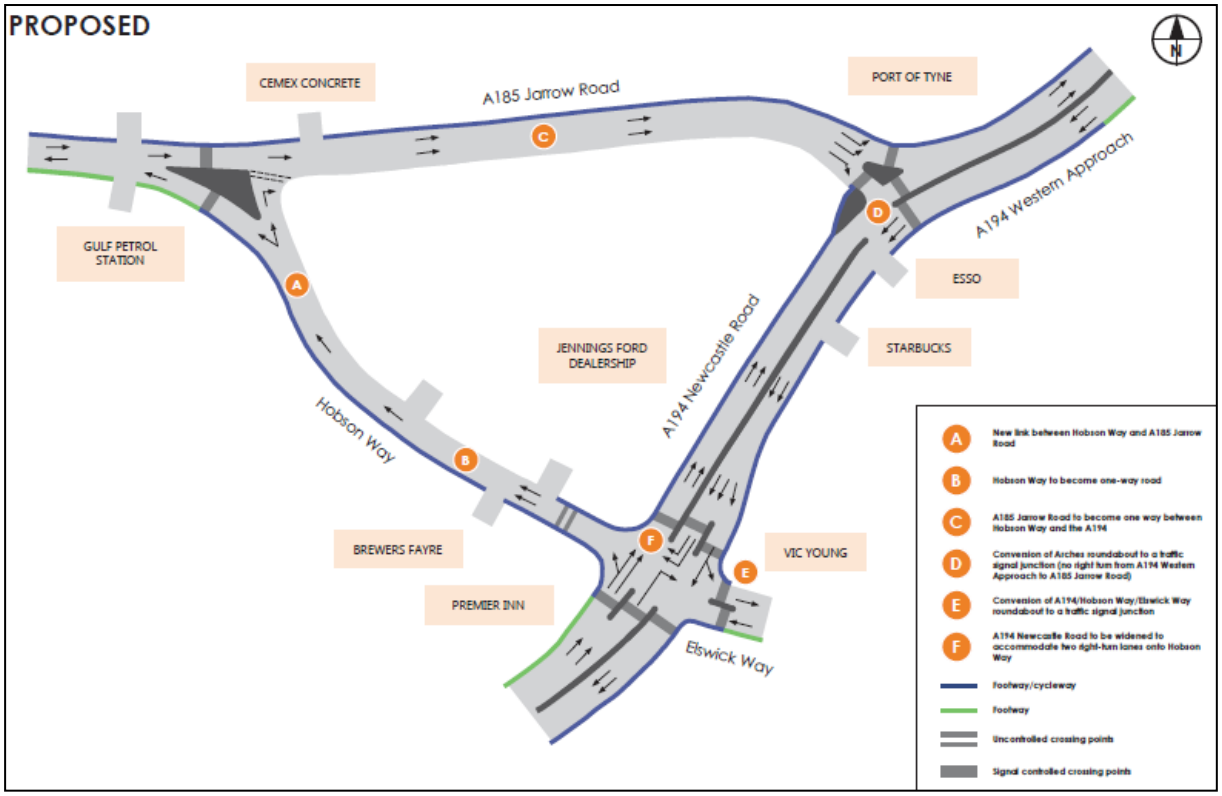
## Major Schemes

### A194 / A185 (The Arches) Major Scheme Proposal

The Council has completed an improvement scheme at the A194 / A185 (The Arches) junction in 2018/19, the following enhancements were completed:-,

- Widening the A194 on the westbound approach to the A194 / Elswick Way / Hobson Way roundabout to 3 lanes to accommodate the ahead movement in one lane and the right turn onto the A185 in two lanes;
- Extending Hobson Way to connect with the A185 to the east of the existing filling station;

- Converting the A185 between the Hobson Way Link and the Arches to one way eastbound and using the former westbound lane to create a two-lane eastbound approach to the Arches;
- Adding signals to the A194 / Elswick Way / Hobson Way and Arches roundabouts with traffic and pedestrian phases; and
- Improvements to NMU routes;
- Air Quality Improvements.




**Arches Improvement Scheme**

The scheme commenced onsite in March 2018 with construction completed in March 2019. Together with the Lindisfarne scheme, the Council has started to develop a Strategic Western Gateway. This includes the significant links for motorists accessing key employment sites as well as the movement of goods between businesses.

## South Shields Town Centre and Public Transport Interchange

The South Shields Transport Interchange scheme will see consolidation of the Bus and Metro services in the centre of the town. Detailed planning permission for this scheme has been obtained and a Compulsory Purchase Order for the acquisition of land has been confirmed. Funding from the NELEP, NECA and Nexus has also been obtained.

The scheme started in March 2018. It is expected that the interchange building will be completed in September 2019; the associated public realm is expected to be complete in Spring 2020.

**South Shields Public Transport Interchange**

In addition to the introduction of the Public Transport Interchange facility, the Council is also realigning the highway junction improvements throughout South Shields Town Centre including some improvements on the A194. All of the proposed measures will look at bus re-routing through the Town Centre and will intend to reduce congestion, increase walking and cycling and improve air quality.

## Highways England Improvements – Testos and Downhill Lane

The A19 corridor is s key regional economic corridor and a fundamental transport link into the Borough. Highways England are proposing to spend £120million on highway infrastructure improvements at the A19 / A184 Testo's junction and at the A19 / A1290 Downhill Lane junction. The Testo's scheme will see the implementation of a fly-over arrangement for the A19 in place of the existing grade separated roundabout. For Downhill Lane junction, there will be the provision of an additional bridge and grade separated roundabout in place of the existing road bridge provision. Both schemes are seen to improve road safety, reduce congestion and improve air quality, with the schemes being constructed from 2019 and completed in 2022.

**Testo's and Downhill Lane Major Improvement Scheme**

## International Advanced Manufacturing Park

Both South Tyneside and Sunderland Councils are investing in the development of an International Advanced Manufacturing Park on land to the North of the Nissan Manufacturing Plant, close to the A19 corridor. This £100m investment will bring over 150ha of development land with over 7,000 jobs by 2024 to the region. In order to facilitate the development, the Councils and NECA are to spend in excess of £45m on highway infrastructure to remove congestion and improve air quality; this will include the dualling of the A1290 road and provision of a new road bridge across the A19.

**Map of proposed IAMP Development**

## A19 Northbound – Lane Gain / Lane Drop

South Tyneside Council has been successful in a National Productivity Investment Fund bid to improve the Northbound A19 congestion. This scheme will see the introduction of an additional carriageway constructed alongside the existing A19 Northbound carriageway. The additional lane will be completed between the Lindisfarne on-slip and the Hebburn / Jarrow off-slip, just prior to the Tyne Tunnel entrance. It is considered that this scheme will reduce congestion, improve air quality and enable the A19 to operate more strategically. The scheme is to be implemented from 2019.

## A194 / Mill Lane Corridor

The Council was also successful in National Productivity Funding for a road improvement scheme on the A194 / Mill Lane roundabout, this scheme will see the implementation of traffic signals which will coordinate the traffic flows on the A194 and will reduce congestion and improve air quality. The scheme is to be implemented from 2019/20.

## Clean Bus Technology Fund Bid

In 2018, the Council in working with the local bus operators (Stagecoach and Go North East) was successful in a funding bid to the Clean Bus Technology Fund. This will see 29 buses retrofitted across the fleet of the local bus operators from 2018 through to 2020. Further to this, the Council has been awarded a further £133,000 to improve 8 additional buses. This will see the vast improvements in the engine specification of buses operating within South Tyneside.as above EURO 6 engine specification. The improvements will be on the following bus routes:

- Stagecoach – E1,E2,E6 and 17,18 bus services
- Go North East – 5 and 50 bus services

## Active Travel and Physical Activity

We know transportation plays an important role in supporting daily activities; however we also know active travel (cycling, walking and use of public transport) can increase physical activity levels and improve physical and mental wellbeing. Prioritisation of active travel can also reduce over reliance on motorised transport, contributing to improved air quality and a reduction in road injuries. Re-allocation of road space to support walking and cycling; restricting motor vehicle access; introducing road-user charging and traffic calming schemes; and creating create safe routes to schools. Such changes have prompted substantial shifts from car transport to walking and cycling. This is further expanded within the physical activity strategy for the borough, where it is bold in its commitments:

- To develop a traffic free cycle/walkway connecting South Tyneside to the IAMP and over 5000 new jobs
- All of our children will achieve the early learning goal in physical activity
- More children will travel to school by foot, bike, scoot, bus and metro than anywhere else in the region.
- We will ensure that physical activity forms part of quality GP and health professional conversations

This will also contribute to the continued action required to reduce our high obesity rates right across the lifecourse. The latest data for South Tyneside (2017/2018) shows:

- Prevalence rate of obesity, reception children is 10.4% against the England rate of 9.5%
- Prevalence rate of obesity for Year 6 children is 24.2% against the England rate of 20.1%
- Prevalence rate of overweight and obese for adults (aged 18 +) is 71.6% against the England rate of 62.0%.

**Defra – National Air Quality Grant Funding**

South Tyneside Council has been awarded £314,000 from Defra as part of the National Air Quality Grant Funding program to improve air quality along the A194 corridor by aiming to reduce $NO_2$ emissions, improve sustainability, promote active travel and clean air within the school curriculum and increase the use of electric vehicles.

Real time air quality monitoring sensors for monitoring NO, NO2, CO, noise, humidity and temperature will be co-located with UTMC equipment. The UTMC equipment includes traffic signals, with ANPR for journey time monitoring and CCTV to monitor the junctions and to increase throughput of vehicles by ensuring the signals are operating on dynamic timings rather than fixed. The impact of the traffic management measures will be investigated and consideration given to how best to improve air quality by optimising public transport and congestion with the view to remove 'stop-start' traffic. This work stream will help to develop strategies to optimise traffic conditions.

The data will contribute towards a study, which will analyse in detail the local air quality and the impact of changes to traffic flow resulting from traffic signal changes. It will report on findings and the way forward. Lessons will be drawn for application through strategy implementation across the region. The study will investigate the use of air quality data to support traffic management, including best practice and findings from the work stream.

The grant funding will be used to implement a number of measures which also include working with local schools to encourage behaviour change. A specific project

to work with schools in the vicinity of the defined area of the A194 will be undertaken. Active travel will be promoted via 'bikeability' scheme, classroom/ assembly sessions. Low cost sensors will be used to help educate the children with regard to air quality and how increased traffic can have a detrimental effect on it. A low cost sensor will be deployed at the entrance of the school to monitor levels of NO2 during school pick up/ drop offs. The data can be compared against levels during school holidays to assess whether there is an increase in NO2 levels during peak times and whether further intervention is required. The overall aim of the project is to establish a culture of traveling actively with pupils and parents both for the school journey and beyond.

The project will be delivered using in house resources from March 2019 and will be completed March 2020.

## Conclusions and Priorities

South Tyneside Council is currently meeting local air quality objectives for $NO_2$ and $PM_{10}$. No exceedances of the national objective levels have been recorded across the borough and we have not declared any new air quality management areas (AQMA's) or had to amend/extend our current AQMA's at Edinburgh Road/ Lindisfarne roundabout and Boldon Lane/ Stanhope Road. Non continuous (diffusion tube) data collected in 2018 has not demonstrated any exceedances of the national annual average for nitrogen dioxide; the data collected from continuous monitoring stations has not identified any exceedance of the national objective levels for $NO_2$ or $PM_{10}$ over the last five years.

Defra's Local Air Quality Management technical guidance (TG16) states that an air quality management area can be revoked following a detailed assessment or if there is a robust evidence base including monitoring over a sufficient period i.e. several years to reflect national trends in emissions; Other factors such as works carried out as part of the action plan associated with the AQMA that may have had an effect on pollutant levels can also be taken into account. Based on guidance the authority considers it appropriate to undertake detailed assessments at both AQMA sites with a view to beginning the revocation process for both sites following review of these assessments. Revocation of the AQMA's is subject to internal review and approval via a formal corporate process which will begin after completion of the detailed assessments.

The Council will continue to liaise with Gateshead, Newcastle and North Tyneside to ensure that any plans for clean air zones within their areas do not have an adverse effect upon air quality within South Tyneside by introducing more traffic trying to avoid these clean air zones.

These Local Authorities (Newcastle, North Tyneside and Gateshead) as part of the Ministerial Direction have recently undertaken a consultation exercise on a proposed Low Emission Zone and Clean Air Zone, with South Tyneside Council formally responding to reference concerns with traffic redistribution.

One of the key priorities for the local authority in addressing air quality for the coming year includes combating the cumulative impact of major development within South Tyneside. The Tyneside planning application validation statement currently requires that an air quality assessment is undertaken for developments over a certain size. The concern is that although separately these developments may have a negligible effect on air quality, cumulatively they could have a more detrimental effect. To ensure that this issue is addressed the Council have updated the Local Development Plan (LDP) documents embedding air quality in the new Local Plan to ensure that relevant mitigation is required to be incorporated into scheme design from the outset via air quality and transport requirements. The draft Local Plan is currently being prepared and is expected to be endorsed by Cabinet in early 2020.

South Tyneside has developed a draft Air Quality Strategy that sets out our objectives for managing air quality holistically. The strategy contains an action plan that will be appraised and updated on an annual basis. The strategy is currently under corporate review and will be available to view on the Council website once formally approved through our corporate process.

South Tyneside Council continues to work with Highways England in terms of constructing the Testo's and Downhill Lane schemes.

Finally, the Council will work with Sunderland City Council to implement the IAMP development, with the 1st phase of the development commencing in June 2018. The wider Development Consent Order is expected to be submitted from early 2019, with the overall development completed by 2024.

# Local Engagement and how to get involved

A significant proportion of air pollution is a result of road traffic sources, the two main pollutants of concern being $NO_2$ and $PM_{10}$. Making changes to your daily life including walking short journeys, using public transport and car sharing when you can will ultimately reduce levels of $NO_2$ and $PM_{10}$.

South Tyneside Council, along with other local authorities within Tyne and Wear are part of the 'Go Smarter' programme introduced by the Department for Transport and the North East Combined Authority to encourage the uptake of sustainable modes of transport. The Go Smarter team within South Tyneside have continued to encourage residents to cycle, walk, and use alternative methods of transport. More information relating to the programme can be found at http://www.gosmarter.co.uk

Other measures that residents can undertake to improve air quality include:

- Purchasing low emission electric and/or hybrid vehicles
- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NOx (and carbon) emissions.

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# 1 Local Air Quality Management

This report provides an overview of air quality in South Tyneside Council during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

# 2 Actions to Improve Air Quality

## 2.1 Air Quality Management Areas

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

A summary of AQMAs declared by South Tyneside can be found in Table 2.1: Maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=251

There has been continued compliance with national air quality objective levels for nitrogen dioxide at Lindisfarne Roundabout/ Leam Lane and at the Boldon Lane/Stanhope Road AQMA's. Continued compliance has been demonstrated in the last five years of continuous monitoring data along with non-continuous monitoring data for the last 3 years. Appendix D: Maps of Monitoring locations and AQMA'S, provides a map of air quality monitoring locations in relation to the AQMA(s).

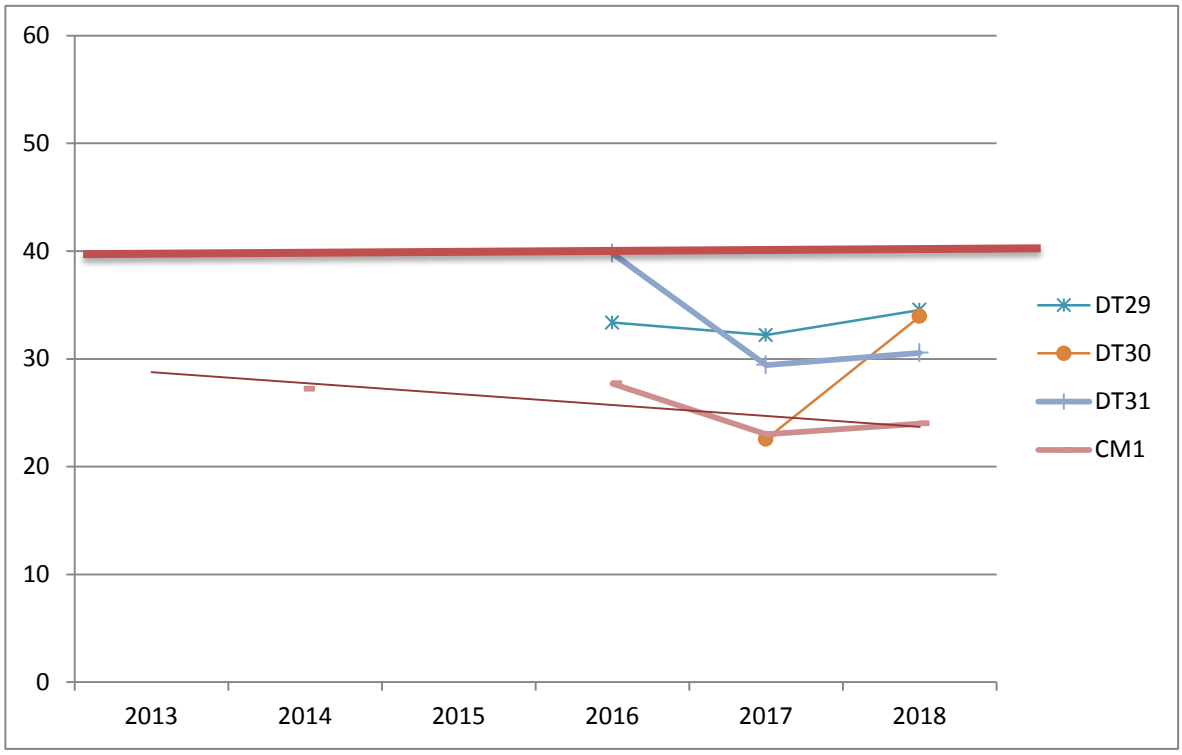
**Boldon Lane/ Stanhope Road AQMA**

The Council is aware that delays are experienced throughout the Boldon Lane / Stanhope Road area. As a result of this, the Council intends to work collectively with the North East Urban Traffic Management Control team to determine if we can appraise the potential to introduce measures that will improve traffic movements throughout the whole corridor, high level costs and benefit analysis are still to be undertaken and progress shall be updated in the next report.

South Tyneside have put forward this scheme for inclusion in the North East Transforming Cities Fund bid which is currently being drafted and will be considered by the Department for Transport in June 2019, with a final decision expected in March 2020.

There are a number of traffic signalised junctions along the corridor with additional formalised crossing facilities. The Council is to determine whether the associated traffic lights can be coordinated so that journey time variability is improved and congestion reduced. The corridor is heavily used by buses, so it is important that traffic throughput is improved along the whole corridor.

**Figure A.1.1 – Boldon Lane/ Stanhope Road AQMA**




The figure above shows the results of continuous monitoring and non-continuous monitoring data within the Boldon Lane/ Stanhope Road AQMA. It can be seen that $NO_2$ levels have increased by 1µg/m³ at CM1 from 2017. DT29 and DT31 both show a slight increase from 2017 data. DT30 shows over a 10 µg/m³ increase. When analysing monthly data for this tube it is apparent that there was had a recorded level of 59.92µg/$m^3$ in June. This concentration is significantly higher than other months levels recorded at this site. The concentration at this site in June is also significantly higher than neighbouring sites around Boldon Lane/ Stanhope Road and could be considered an outlier concentration, however the conservative approach was taken and the result was left in. There is no obvious reason for the increased concentration at this location at this time. South Tyneside Council will continue to monitor concentrations to assess levels at this site. Despite the small increases at CM1, DT29 and DT31 and the more significant increase at DT30 all results remain below the national annual average objective level for $NO_2$.

## Lindisfarne Roundabout/ Leam Lane AQMA

**Figure A.1.2 – Lindisfarne Roundabout/ Leam Lane AQMA**

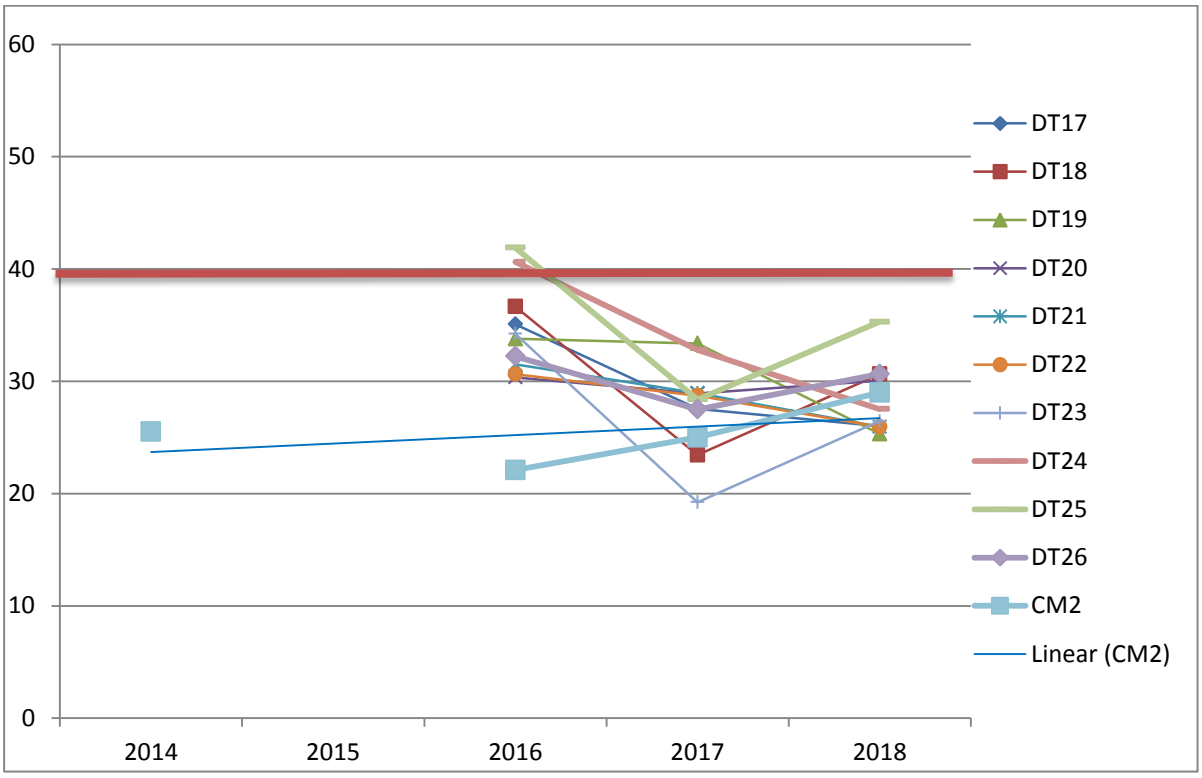



Figure A.1.2 – Lindisfarne roundabout/ Leam Lane AQMA shows all levels remain well below the national annual average objective level for $NO_2$. There was an increase of 1 µg/m³ to annual mean $NO_2$ levels at Edinburgh Road continuous monitoring data in 2018 from 2017 concentrations. Diffusion tube data has been gathered over the past three years, concentrations have remained below the target concentration of 40 µg/m³. There is a downward trend reduction in NO2 concentrations from DT19-DT22. There are slight increases in NO2 concentrations from DT17,DT18 AND DT23-26. The highest concentration recorded was 35.25 µg/m³ from DT24 (opposite 173 Hadrian Road.) The increase in concentration could be due to the increase of traffic due to works undertaken at A194 / A185 (The Arches), further consideration to this site will be given in next reporting year.

## Table 2.1 – Declared Air Quality Management Areas

| AQMA Name | Date of Declaration | Pollutants and Air Quality Objectives | City / Town | One Line Description | Is air quality in the AQMA influenced by roads controlled by Highways England? | Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure) | | | | Action Plan | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | At Declaration | | Now | | Name | Date of Publication | Link |
| Lindisfarne Roundabout/ Leam Lane | 1st March 2006 | $NO_2$ | Jarrow | A number of properties around Lindisfarne Roundabout, extending along Leam Lane and the A19. | No | 43 | µg/m3 | 26 | Select Units | . Action Plan for Edinburgh Road | Under review - refer to broad measures in table 2.2 | 43 |
| Boldon Lane/ Stanhope Road | 1st March 2006 | $NO_2$ | South Shields | Commercial high street with residential properties extending along Boldon Lane and a short distance up Stanhope Road. | No | 41 | µg/m3 | 24 | Select Units | . Action Plan for Boldon Lane | Under review - refer to broad measures in table 2.2 | 41 |

☒ **South Tyneside Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

## 2.2 Progress and Impact of Measures to address Air Quality in South Tyneside

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

**Maps of all monitoring sites outside of the AQMA's should be included within any subsequent reports.** Maps of all monitoring sites within South Tyneside can be found using the following link:

https://drive.google.com/open?id=1mRyjjoiCBuFuU7S8XqtGZsfKXJUso-q3&usp=sharing

**Whilst air quality within the area is far below objective limits, further years (at least 1-2 years) should be captured before both AQMA's located at Lindisfarne Roundabout/ Leam Lane and Boldon/ Lane Stanhope Road can be revoked.** Currently there is 5 years' worth of continuous monitoring data from monitoring stations located within both AQMA's and 3 years' worth of valid non continuous monitoring data.

The Feasibility study undertaken at Lindisfarne in response to the Ministerial direction imposed upon the authority in 2018 included dispersion modelling using up to date input information. The results of the dispersion modelling concluded that there were no exceedances identified within the AQMA. The maximum annual mean $NO_2$ concentration at discrete receptor location was predicted to be 36.4µg/$m^3$.

The air quality assessment contained in the IAMP One Environmental Statement which included detailed dispersion modelling to predict changes in NO2, PM10 and PM2.5 concentrations as a result of increased traffic generated by the Proposed Development considered sensitive receptors located in the Lindisfarne/ Leam Lane Air Quality Management Area. The report concluded that the effect of increased emissions from traffic generation associated with the Proposed Development on local air quality at existing sensitive receptors locations is judged to be negligible.

As per the LAQM TG (16) guidance and Defra appraisal commentary it is deemed more conservative to gather a further one years' worth of monitoring data before revoking these sites. Detailed Assessments will be undertaken at both AQMA's in January 2020 following evaluation of both continuous and non-continuous data collected in 2019 to determine whether revocation process should be pursued for both sites.

South Tyneside Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans i.e. Integrated Transport Plan and Physical Activity Strategy Key completed measures are:

- Completion of the Arches transport scheme
- Delivery of ten new EV charging points 2018-19 following successful funding bids to central Government t via the On-street charging point.

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

- Completion of the A194 Clean Bus Technology funding bid
- Approval and implementation of the South Tyneside Council Air Quality Strategy which provides a holistic approach to improving air quality in the borough. Clear objectives will be set within the strategy, a live action plan linking to our strategic objectives will set our short/ medium and long term measures to improve air quality. Progress will be monitored annually to ensure that we continue to strive to improve air quality.
- Work has commenced on a package of measures used to improve air quality along the A194 corridor aiming to reduce $NO_2$ emissions, improve sustainability, promote active travel and clean air within the school curriculum and increase the use of electric vehicles. The project uses Defra grant funding to procure real time air quality monitoring sensors for monitoring NO, NO2, CO, noise, humidity and temperature will be co-located with UTMC equipment. The UTMC equipment includes traffic signals, with ANPR for journey time monitoring and CCTV to monitor the junctions and to increase throughput of vehicles by ensuring the signals are operating on dynamic timings rather than fixed. The impact of the traffic management measures will be investigated and consideration given to how best to improve air quality by optimising public transport and congestion with the view to remove ‘stop-start’ traffic. This work stream will help to develop strategies to optimise

traffic conditions. The project is due for completion March 2020; an update on the project will be included in next year's ASR.

- Detailed assessments will be carried out at both AQMA'S, once completed and reviewed the revocation progress will commence, an update on the status of revocation will be given in next year's ASR.

South Tyneside Council anticipates that the measures stated above and in Table 2.2 will help improve air quality in both AQMA'S.

## Table 2.2 – Progress on Measures to Improve Air Quality

| 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 | North East Freight Quality Partnership | Freight and Delivery Management | Delivery and Service plans | North East Combined Authority (NECA) | N/A | Complete | Measures to assist freight movements including freight consolidation centres | No direct improvement | Yearly Service Delivery plans | Ongoing | http://www.northeastfreightpartnership.info/ |
| 2 | North East Freight Maps | Freight and Delivery Management | Route Management Plans/ Strategic routing strategy for HGV's | NECA | N/A | Complete | Limiting freight movements to the strategic routes around the region | No direct improvement | Ongoing | Ongoing | http://www.northeastfreightpartnership.info/ |
| 3 | Set up a multi-disciplinary air quality steering group to drive forward STC clean air agenda | Policy Guidance and Development Control | Regional Groups co-ordinating programmes to develop area wide strategies to reduce emissions and improve air quality | STC | N/A | Complete | Ensure that all external funding opportunities are considered | No direct improvement | Ongoing | Ongoing | Quarterly meeting undertaken |
| 4 | Set Up a Regional Air Quality Group | Policy Guidance and Development Control | Regional Groups co-ordinating programmes to develop area wide strategies to reduce emissions and improve air quality | NECA | N/A | Expected 2019 | Ensure that air quality is considered in a trans boundary manner, maximise funding opportunities for combined authority bids | No direct improvement | - | Set up end of 2019- ongoing thereafter | Quarterly meetings |
| 5 | Local Air Quality Strategy | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | STC | N/A | Oct 2019 | | No Direct Improvement | Draft 1 complete | Oct 2019 | |
| 6 | Ensure Air Quality is considered at pre application stage to allow effective use of planning conditions | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | STC | N/A | Updated Validation of applications document Mar 2019 | Ensure all planning applications comply with requirements to ensure air quality is not adversely affected by development | No Direct Improvement | Ongoing | Ongoing | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | Completion of the Local Delivery Plan and Infrastructure delivery plan | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | STC | Ongoing | 2020 | All new development will adhere to the prescribed guidance in the LDP and IDP to ensure that developments are compliant | No Direct Improvement | Draft of LDP and IDP due | 2020 | |
| 8 | Ensure new developments have adequate travel plans that are continuously reviewed and updated | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | STC | N/A | Complete | Increase the number of travel plans within the borough | No Direct Improvement | Ongoing | Ongoing | |
| 9 | North East Air Quality Strategy | Policy Guidance and Development | Air Quality Strategy | NECA | Ongoing | Expected in 2018 | Reduced $CO_2$ emissions | No direct improvement | complete | 2018 | North East Combined Authority Leading on this |
| 10 | North East Combined Authority Sustainable Transport Group | Policy Guidance and Development | Regional Groups to develop Area wide Strategies to reduce emissions | NECA | Ongoing | 2018 | Air Quality Improvements | No direct improvement | Ongoing | 2018 | |
| 11 | STC promoting electric vehicles through an employer car lease scheme | Promoting Low Emission Transport | Company Vehicle Procurement - Prioritising uptake of low emission vehicles | STC | Complete | Ongoing | Reduced emissions | No direct improvement | Ongoing | Ongoing | |
| 12 | Investment in Electric Charging Infrastructure | Promoting Low Emission Transport | Priority parking for LEV's | STC | Complete | Ongoing | Reduced emissions, Improved air quality | No direct improvement | Ongoing | Ongoing | 10 additional charging points will be implemented following a successful external funding bid. |
| 13 | Council Fleet to investigate options for electric fleet including Taxi's | Promoting Low Emission Transport | Prioritising uptake of low emission vehicles | STC | 2019 | Expected in 2019 | Reduced emissions, improved air quality | No direct improvement | Ongoing | 2019/2020 | |
| 14 | Council have installed EV Charging Points | Promoting Low Emission Transport | Prioritising uptake of low emission vehicles, | STC | Complete | Ongoing | Reduced emissions, improved air quality | No direct improvement | Ongoing | Ongoing | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | Travel Planning through Planning Process | Promoting Travel Alternatives | Intensive active travel campaign & infrastructure | NECA & STC | Ongoing | Ongoing | Reduced emissions, Improved air quality, | Limited improvements | Ongoing | Ongoing | |
| 16 | New South Shields Public Transport Interchange | Transport Planning and Infrastructure | Public transport improvements- interchanges stations and services | NEXUS / STC | 2019 | Ongoing | Reduced emissions, Improved air quality, | No direct improvement | Construction started in 2018 | 2019 | |
| 17 | A19 Testos and Downhill lane junction improvements | Transport Planning and Infrastructure | Public transport improvements- interchanges stations and services | Highways England | ongoing | 2018 | Providing a safe and serviceable road network | Improved Air Quality | Construction from 2019 | 2021 | http://www.highways.gov.uk/roads/road-projects/a19-testos-junction-improvements/ |
| 18 | Go Smarter Work stream | Vehicle Fleet Efficiency | Driver training and ECO driving aids | NECA | Ongoing | Ongoing | Reduced emissions, Improved air quality, | Limited improvements | Ongoing | Ongoing | |
| 19 | Travel Information through the UTMC centre | Traffic planning and management | UTC, Congestion management, traffic reduction | NECA / STC | Ongoing | Ongoing | Reduced emissions, Improved air quality, | Yes | Ongoing | Ongoing | |
| 20 | Junction Improvements within the borough | Traffic Planning and Management | UTC, Congestion management, traffic reduction | STC | Ongoing | Ongoing | Reduced emissions, Improved air quality, | Yes | Ongoing | Ongoing | |
| 21 | Intelligent Transport Solutions at Key Junctions | Traffic Planning and Management | UTC, Congestion management, traffic reduction | STC | Ongoing | Ongoing | Reduced emissions, Improved air quality, | Yes | Ongoing | Ongoing | |
| 22 | Successful Clean Bus Fund Bid | Promoting Travel Alternatives | Public transport improvements- interchanges stations and services | STC | Ongoing | Ongoing | Reduced emissions, Improved air quality, | Yes | Ongoing | Ongoing | |

## 2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM-PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less).

There is now an extensive body of evidence that long-term exposure to everyday air pollutants over several years contributes to the development of cardiovascular disease (CVD), lung cancer, and respiratory disease. PM is inhaled into the lungs and ultrafine PM0.1 is thought to pass into the blood causing many adverse outcomes including systemic inflammation. Air pollution is strongly associated with all-cause mortality statistics. The all-cause mortality statistic captured in Public Health Outcomes Framework (PHOF) indicator[4] 3.01, ranks air pollution in the top 5-7 causes of mortality in polluted areas, ahead of many other PHOF preventable mortality indicators like road deaths, excess winter deaths or communicable diseases[5].

**Impacts on Health Outcomes**

Residents of South Tyneside generally have a lower life expectancy than the national average Public Health data reports:

| | Male | Female |
|---|---|---|
| South Tyneside | 77.6 years | 81.5 years |
| National Average | 79.5 years | 83 years |

There is evidence to suggest that long term exposure to poor air quality increases the risk of premature mortality from cardiovascular and respiratory diseases. The premature mortality rates for cardiovascular, respiratory diseases and cancer are given below. It is important to note that other lifestyle factors such as smoking, etc. do influence these figures.

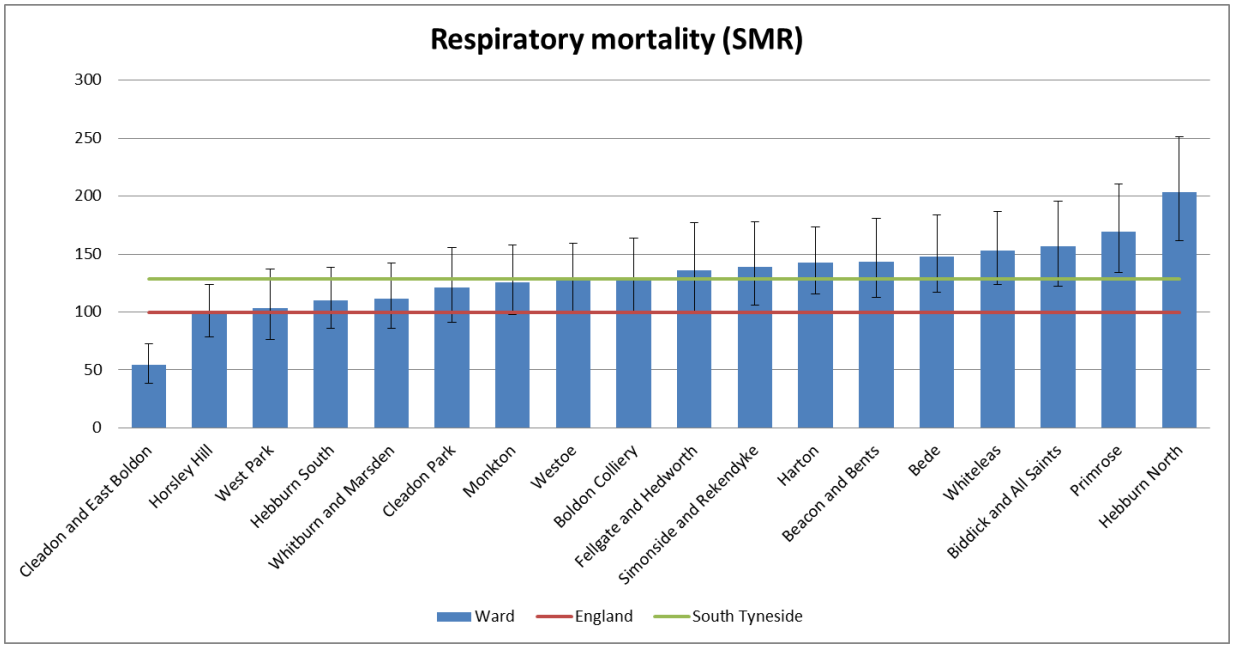
[4] Public Health Outcomes Framework

[5] http://webarchive.nationalarchives.gov.uk/20130123231223/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_132373.pdf

- Premature (under 75 years) mortality rates from all cardiovascular disease of 74.6 per 100,000 as compared to 73.5 per 100,000 for England; of this 47.3 per 100,000 were preventable.
- Premature (under 75 years) mortality rates from respiratory disease of 53.6 per 100,000 as compared to 33.8 per 100,000 for England; of this 36.4 per 100,000 were preventable.
- Premature (under 75 years) mortality rates from cancer of 162.7 per 100,000 as compared to 136.8 per 100,000 for England; of this 95.7 per 100,000 were preventable.

The mortality rates for respiratory disease can be broken down further into South Tyneside Ward areas as shown in the table below, benchmarked against England and South Tyneside as a whole.

**Chart 2.3. Deaths from respiratory diseases, all ages, standardised mortality ratio, by Ward 2011-2015:**




To note two of these wards (Biddick & All Saints, Bede) include air quality management areas.

Additional data shows:

- Emergency admissions for chronic obstructive pulmonary disease are significantly worse in South Tyneside at 844 per 100,000 population in comparison to England at 417 per 100,000[6].
- Hospital admissions for asthma in children (birth to 9 years) are 403.2 per 100,000 as opposed to the England rate of 259.8 per 100,000.[7]
- The hospital admission rates for young people aged 10 -18 is 264 per 100,000, double that of the England rate. This has seen a continual increase from 2010. We should note however the numbers associated with this rate are fairly low at 38.[8]

It is worth noting that variations that are statistically significant do not in themselves establish a causal relationship and that a wide range of factors affect mortality rates and associated hospital admissions , including rates of smoking, general health, , deprivation and historic industrial exposures.

Nonetheless, diseases that can be worsened by poor air quality emphasises the importance of continued monitoring of air quality to reduce the impact of air pollution on the health of our residents.

South Tyneside Council is undertaking the measures detailed in the executive summary and detailed in table 2.2. These measures will have a positive effect in reducing $NO_2$ and $PM_{10}$ and would have similar effect upon levels of $PM_{2.5}$.

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.

[6] Emergency hospital admissions for COPD South Tyneside
[7] Admissions for asthma for children aged 0 to 9 South Tyneside
[8] Admissions for asthma for young people aged 10 to 18 South Tyneside

# 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.

South Tyneside Council undertook automatic (continuous) monitoring at 3 sites during 2018. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1, 3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. 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

South Tyneside Council undertook non- automatic (passive) monitoring of $NO_2$ at 44 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in:

https://drive.google.com/open?id=1mRyjjoiCBuFuU7S8XqtGZsfKXJUso-q3&usp=sharing

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 2018 dataset of monthly mean values is provided in Appendix B.

A.1.3- Trends **in Annual Mean $NO_2$ data**

**A.1.4 – Trends in annual mean $NO_2$ Port of Tyne concentrations.**

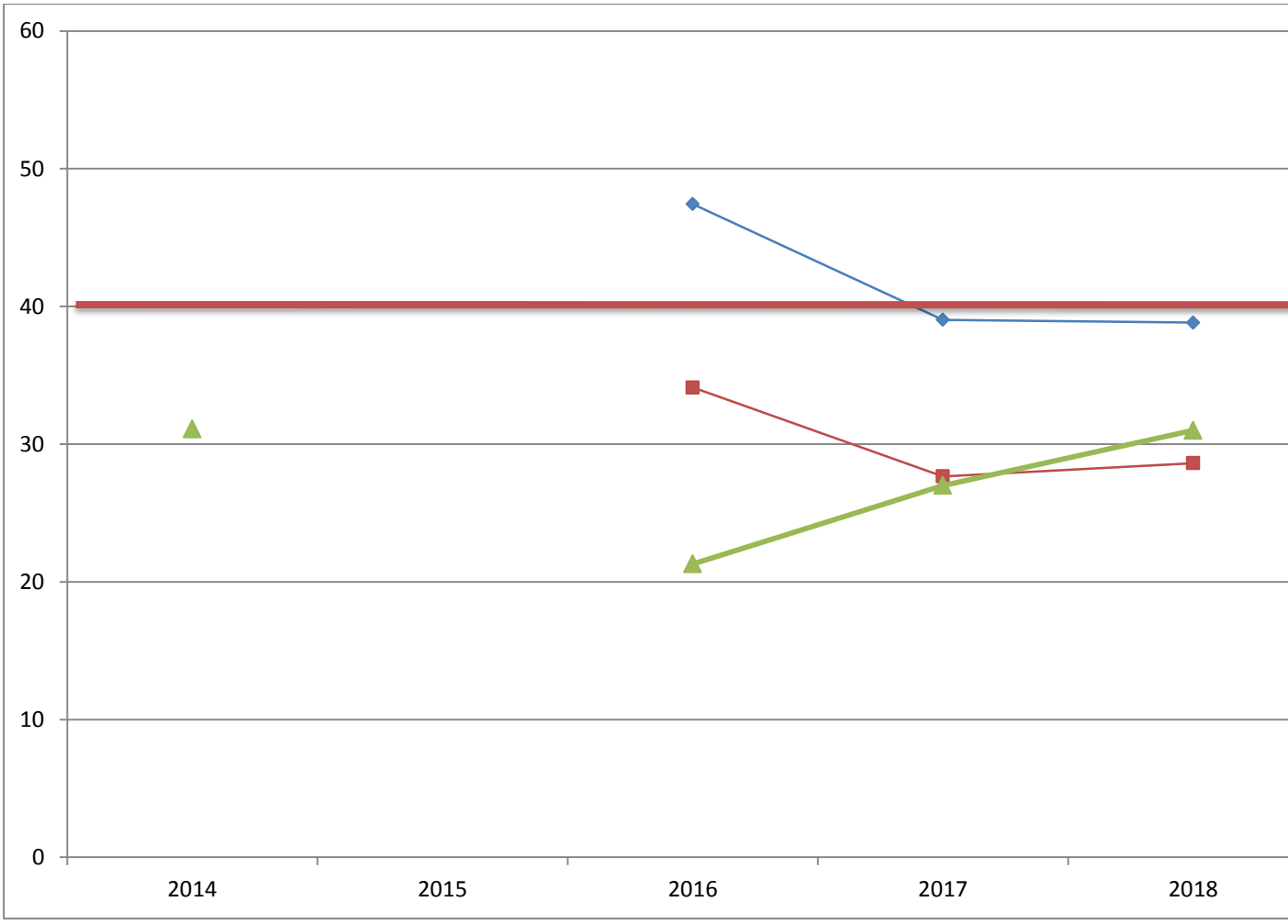



Table A.4 in Appendix A compares the ratified continuous monitored $NO_2$ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m$^3$, not to be exceeded more than 18 times per year.

During the reporting year changes to the diffusion tube locations were made,

The following tubes were added:

- Campbell Park Road (DT41) – This tube was added to to further assess NO2 levels in Hebburn given the housing developments that are planned/ recently undertaken
- West Park Road Roundabout (DT42) - This diffusion tube was added to further assess NO2 levels at this busy roundabout where a nursery school is located.
- Readhead Park (DT43) - This diffusion tube was added to further characterise NO2 levels around the Westoe area as concerns were raised over the increased concentrations at the Westoe area (DT34) in 2017.
- Imeary Park (DT44) - This diffusion tube was added to further characterise NO2 levels around the Westoe area as concerns were raised over the increased concentrations at the Westoe area (DT34) in 2017.
- Several diffusion tubes within the non continous monitoring regime had less than 75% data they included:
  - Southlands A19 (DT9)
  - Victoria Road (DT11)
  - Campbell Park Road (DT41)
  - West Park Roundabout (DT42)
  - Redhead Park (DT43)
  - Imeary Street (DT44)

Annualisation of the tubes has been undertaken in accordance with LAQM (TG16) guidance using Newcastle City Centre and Middlesbrough. These continous stations form part of the AURN network and were the closest available stations.

DT11 had a recorded level of 8.15µg/$m^3$ during the period of June this figure has been considered an outlier and removed from the results.

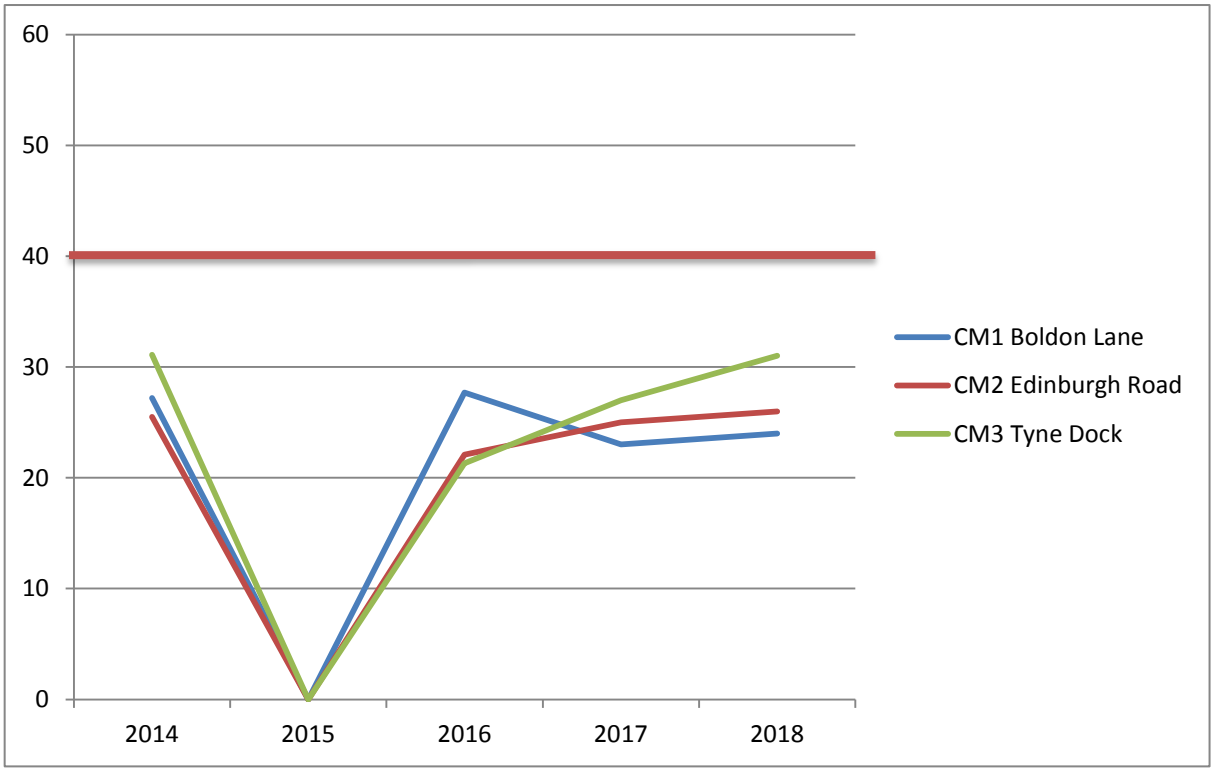
DT29 had a recorded level of <0.49 µg/$m^3$ during the period of May this figure has been considered an outlier and removed from the results.

DT41 had a recorded level of 2.89µg/$m^3$ during the period of June this figure has been considered an outlier and removed from the results.

DT30 Stanhope Road had a recorded level of 59.92µg/m$^3$ in June. This concentration is significantly higher than other months levels recorded at this site. The concentration at this site in June is also significantly higher than neighbouring sites around Boldon Lane/ Stanhope Road in June. There is no obvious reason for the increased concentration at this location at this time.

As no diffusion tubes have a concentration of over 60 µg/m$^3$, this indicates that the hourly objective of 200 µg/m$^3$ not to be exceeded more than 18 times a year has not been breached.

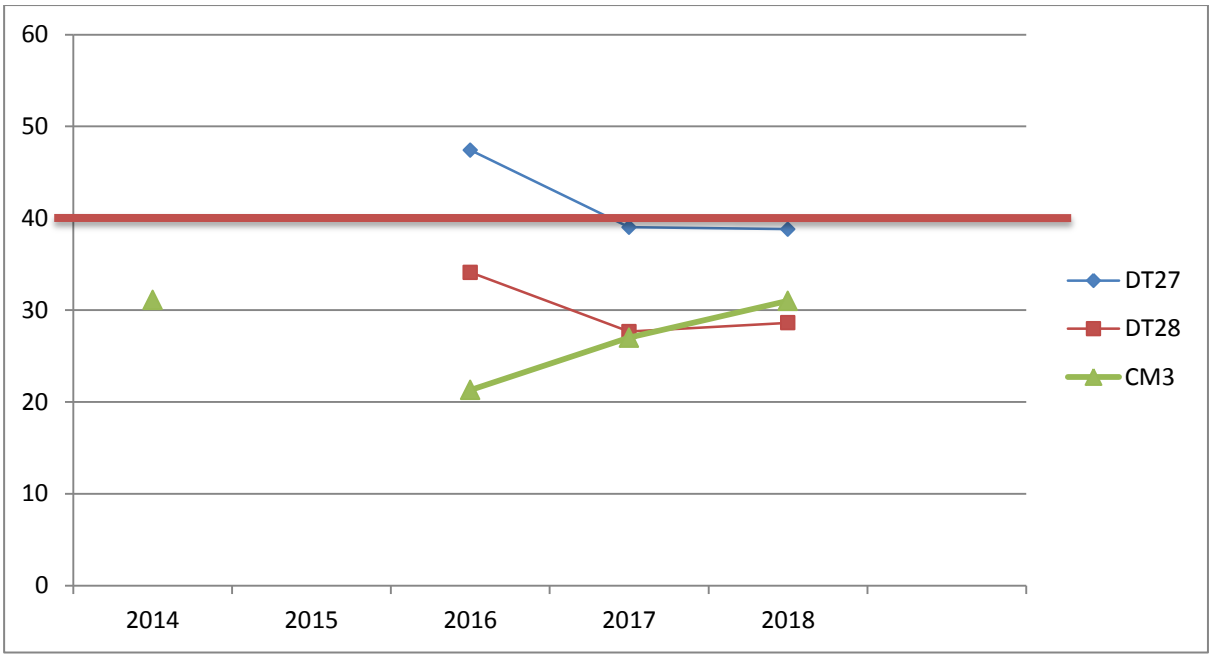
## A.1.3- Trend in Annual Mean $NO_2$ data




Continous monitoring data is available 2014, 2016, 2017 and 2018; analysis of this data shows that annual mean $NO_2$ levels have increased slightly (1µg/m³) at both Edinburgh Road and Boldon Lane in the past year, and that there has been a 4 µg/m³ increase in $NO_2$ at Tyne Dock over the last year. It is likely that an increase in concentration has been attributed from congestion caused by major transport works at the Arches. The scheme was completed in March 2019.

Trend analysis of the AQMA sites can be found within the AQMA section of the report.

## A.1.4 – Trends in Annual Mean $NO_2$ Port of Tyne




There has been a reduction to the annual mean $NO_2$ level at Tyne Dock continous monitoring station from 2014-2016 with a reduction of 9.8 µg/m³ to an annual mean figure of 21.3 µg/m³ In 2016. The annual concentration has increased to 27 µg/m³ in 2017 and 31 µg/m³ in 2018. The two nearest diffusion tubes Western Approach near Port of Tyne (DT27) and Commercial Road (DT28) measured 39.03 µg/m³ and 27.66 µg/m³ in 2017 and 38.82 µg/m³ and 28.62 µg/m³ in 2018. The A194 / A185 (The Arches) major traffic improvement works were complete March 2019. Increased congestion due to works were experienced throughout the duration of the works may explain the increase in $NO_2$ around Tyne Dock. It is expected that an improvement in $NO_2$ levels will be expected moving forward, however further consideration will be given to these sites during the next reporting year.

### 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.

South Tyneside Council have not recorded any exceedances of the air quality annual mean objective for $PM_{10}$.

At Edinburgh Road (CM2) monitoring station a maximum daily mean of 67µg/$m^3$ was recorded, the daily mean limit value was exceeded on 2 days.

At Tyne Dock (CM3) monitoring station a maximum daily average mean of 64 µg/$m^3$ was recorded, the daily mean was exceeded on 3 days.

There has been a slight increase in $PM_{10}$ concentrations in most recent 2018 data. There has been a 3 µg/$m^3$ increase in $PM_{10}$ at Edinburgh Road (CM2)

Regionally $PM_{10}$ concentrations have been slightly higher in 2018 than in 2017.

There has been a 1 µg/$m^3$ increase in $PM_{10}$ concentration at Tyne Dock (CM3)

As explained The Arches Major improvement works were only completed in March 2019. During the works delays were experienced near the Edinburgh Road and Tyne Dock monitoring vicinites. The increase in congestion and delays during the period the works were undertaken may have lead to the increase in concentrations of PM10. South Tyneside Council will continue to monitor concentrations to assess whetehr concentration levels are reduced next reporting year.

### 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.

Local authorities are not legally obliged to monitor $PM_{2.5}$. South Tyneside started to report on $PM_{2.5}$ in 2016. As detailed in Policy Guidance LAQM.PG16 (Chapter 7) $PM_{2.5}$ levels can be estimated from $PM_{10}$ levels by using a nationally derived correction ratio of 0.7. Table A.7 provides $PM_{2.5}$ data converted using the correction ratio with $PM_{10}$ data collected in 2018.

The last 3 years worth of monitoring shows that the $PM_{2.5}$ has remained fairly constant and below that target value. A slight increase in $PM_{10}$ at both Tyne Dock (CM3) and Edinburgh Road (CM2) means that the PM $_{2.5}$ that has been derived is slightly higher.

# Appendix A: Monitoring Results

## Table A.1 – Details of Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Monitoring Technique | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Inlet Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| CM1 | Boldon Lane, South Shields | Roadside | 435,949 | 564,456 | NO2 | Y | Chemiluminescent | Y (15.0m) | 3.0m | 1.5 |
| CM2 | Lindisfarne Roundabout, Jarrow | Roadside | 434,068 | 563,695 | NO2 & PM10 | Y | Chemiluminescent; TEOM | Y (27.0m) | 1.0m | 2 |
| CM3 | Tyne Dock, South Shields | Roadside | X: 435,565 | Y: 565,040 | NO2 & PM10 | N | Chemiluminescent; TEOM | Y (12.0m) | 14.0m | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT1 | Sunderland Road Jolly Sailor - Whitburn | Roadside | 440,820 | 561,821 | NO2 | No | 9.3 | 1.7 | No | 2.3 |
| DT2 | Sunderland road - Cleadon | Roadside | 438,542 | 562,321 | NO2 | No | 8.3 | 1.5 | No | 2.65 |
| DT3 | Front Street Cleadon – Café | Roadside | 438,539 | 562,329 | NO2 | No | 0 | 2.5 | No | 2.7 |
| DT4 | Station Road East Boldon | Roadside | 437,053 | 561,418 | NO2 | No | 5 | 1.5 | No | 2.5 |
| DT5 | Front Street / Grange Terrace | Kerbside | 436,524 | 561,275 | NO2 | No | 4 | <1 | No | 2.3 |
| DT6 | Front Street / Boker Lane | Roadside | 436,021 | 561,368 | NO2 | No | 11.5 | 1.5 | No | 2.5 |
| DT7 | Arnold Street | Roadside | 434,623 | 561,746 | NO2 | No | 0 | 1.5 | No | 2.5 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DT8 | Holland Park Drive (A19) | Roadside | 433,883 | 562,644 | NO2 | No | 0 | 30 | No | 2 |
| DT9 | Southlands (A19) | Roadside | 433,739 | 562,070 | NO2 | No | 19 | 40 | No | 2.9 |
| DT10 | Mill Lane / A185 Junction | Roadside | 430,469 | 563,040 | NO2 | No | 3 | 28 | No | 2.5 |
| DT11 | Victoria Road West | Roadside | 430,538 | 563.420 | NO2 | No | 1.6 | 20 | No | 2 |
| DT12 | Victoria Road West / South Drive | Roadside | 430,587 | 563,671 | NO2 | No | 3 | 9 | No | 2 |
| DT13 | Station Road Hebburn – on PJ Hairdressers | Roadside | 430,976 | 564,378 | NO2 | No | 0 | 3.8 | No | 2.6 |
| DT14 | Victoria Road East – Junction with Park Road | Kerbside | 432,169 | 564,962 | NO2 | No | 12.5 | <1 | No | 2.5 |
| DT15 | Ellison Street roundabout – Pizza addict | Kerbside | 432,676 | 565,443 | NO2 | No | 16.2 | 2.2 | No | 2.5 |
| DT16 | Epinay Walk | Roadside | 433,093 | 564,998 | NO2 | No | 8 | 28 | No | 2 |
| DT17 | Hadrian Road | Roadside | 433,658 | 563,497 | NO2 | No | 2 | 5 | No | 2.5 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DT18 | Lindisfarne Road (55) | Roadside | 433,698 | 563,825 | NO2 | No | 10 | 8 | No | 2.5 |
| DT19 | Hadrian Road/Finchale Terrace Junction | Roadside | 433,780 | 563,692 | NO2 | No | 3 | 13.5 | No | 3 |
| DT20 | Edinburgh Road monitoring station | Roadside | 434,068 | 563,695 | NO2 | Yes | 30 | <1m | Yes | 2.9 |
| DT21 | Edinburgh Road monitoring station | Roadside | 434,068 | 563,695 | NO2 | Yes | 30 | <1m | Yes | 2.9 |
| DT22 | Edinburgh Road monitoring station | Roadside | 434,068 | 563,695 | NO2 | Yes | 30 | <1m | Yes | 2.9 |
| DT23 | John Reid Road, Junction with Stirling Avenue | Roadside | 433,232 | 565,006 | NO2 | No | 19.2 | 1.8m | No | 2.85 |
| DT24 | Opposite 173 | Roadside | 434,313 | 563,963 | NO2 | No | 25 | 3.5 | No | 2.35 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hadrian Road | | | | | | | | | |
| DT25 | Opposite 237 Newcastle Road | Roadside | 434,402 | 563,976 | NO2 | No | 32 | 3.2 | No | 2.4 |
| DT26 | Stanhope Road / Newcastle Road | Roadside | 434,303 | 563,977 | NO2 | No | 18 | 22 | No | 2,5 |
| DT27 | A194 Arches Roundabout | Kerbside | 435,330 | 564,846 | NO2 | No | 15 | <1 | No | 2.2 |
| DT28 | Commercial Road | Roadside | 435,565 | 565,221 | NO2 | No | 3.8 | 1.5 | No | 2.6 |
| DT29 | Corner of Boldon Lane / Stanhope Road | Kerbside | 435, 930 | 564,600 | NO2 | Yes | 6.5 | 1 | No | 2.4 |
| DT30 | Stanhope Road | Kerbside | 435,980 | 564,641 | NO2 | Yes | 1 | 4 | No | 2.5 |
| DT31 | Boldon Lane | Roadside | 435,965 | 564,329 | NO2 | No | 2 | 1.7 | No | 2.3 |
| DT32 | King George Road | Roadside | 437,438 | 564,391 | NO2 | No | 4 | 13 | No | 2.5 |
| DT33 | Sunderland Road, next to the Cranny | Roadside | 437,816 | 564,338 | NO2 | No | 7 | 2 | No | 2.3 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DT34 | Westoe Road | Roadside | 436,981 | 565,906 | NO2 | No | 7 | 2 | No | 2.35 |
| DT35 | Imeary Street/ The Glebe | Roadside | 436,729 | 566,375 | NO2 | No | 14 | 4 | No | 2.7 |
| DT36 | Chichester Metro | Kerbside | 436,483 | 565,887 | NO2 | No | 18.9 | <1 | No | 2.25 |
| DT37 | Western Approach | Roadside | 436,220 | 566,620 | NO2 | No | 11.5 | 2.5 | No | 2.5 |
| DT38 | Alice Street | Kerbside | 436,168 | 565,875 | NO2 | No | <1 | 27 | No | 2.5 |
| DT39 | A194 Reed Street Roundabout | Roadside | 436,102 | 565,894 | NO2 | No | 3.5 | 8.5 | No | 2.5 |
| DT40 | Anderson Street | Roadside | 436,595 | 567,298 | NO2 | No | 10 | 2 | No | 2.5 |
| DT41 | Campbell Park Road | Kerbside | 431,432 | 564,498 | NO2 | No | 25 | 6.5 | No | 2.5 |
| DT42 | West Park Roundabout | Kerbside | 436,370 | 565,000 | NO2 | No | 5 | 1.5 | No | 2.5 |
| DT43 | Redhead Park | Kerbside | 437,165 | 565,576 | NO2 | No | 10 | 2.5 | No | 2.5 |
| DT44 | Imeary Street | Kerbside | 436,923 | 565,966 | NO2 | No | <1 | 2 | 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 2018 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| | | | | | | | | | |
| CM1Boldon Lane | Roadside | Automatic | 98.4 | 98.4 | 27.2 | | 27.7 | 23 | 24 |
| CM2 Edinburgh Road | Roadside | Automatic | 98.8 | 98.8 | 25.5 | | 22.1 | 25 | 26 |
| CM3 Tyne Dock | Roadside | Automatic | 98.7 | 98.7 | 31.1 | | 21.3 | 27 | 31 |
| DT1 | Roadside | Diffusion Tube | 100 | 100 | _ | | 30 | 25.88 | 24.34 |
| DT2 | Roadside | Diffusion Tube | 100 | 100 | _ | | 37.6 | 31.74 | 28.75 |
| DT3 | Roadside | Diffusion Tube | 100 | 100 | _ | | 29.41 | 21.5 | 20.31 |
| DT4 | Roadside | Diffusion Tube | 83.3 | 83.3 | _ | | 28.92 | 20.53 | 19.49 |
| DT5 | Roadside | Diffusion Tube | 100 | 100 | _ | | 31.45 | 24.06 | 23.89 |
| DT6 | Roadside | Diffusion Tube | 100 | 100 | _ | | | 31.85 | 34.30 |
| DT7 | Roadside | Diffusion Tube | 100 | 100 | _ | | 35.47 | 24.61 | 24.05 |
| DT8 | Roadside | Diffusion Tube | 91.6 | 91.6 | _ | | | 18.32 | 21.01 |
| DT9 | Roadside | Diffusion Tube | 66.6 | 66.6 | _ | | | 21.74 | 21.315[3] |
| DT10 | Roadside | Diffusion Tube | 100 | 100 | _ | | 38.21 | 27.88 | 27.32 |
| DT11 | Roadside | Diffusion | 58.3 | 58.3 | _ | | | 24.04 | 29.095[3] |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tube | | | | | | | |
| DT12 | Roadside | Diffusion Tube | 100 | 100 | _ | | | 18.89 | 22.54 |
| DT13 | Roadside | Diffusion Tube | 91.6 | 91.6 | _ | | 36.64 | 23.43 | 24.17 |
| DT14 | Kerbside | Diffusion Tube | 100 | 100 | _ | | 34.9 | 29.95 | 26.18 |
| DT15 | Kerbside | Diffusion Tube | 100 | 100 | _ | | 28.88 | 22.42 | 24.83 |
| DT16 | Roadside | Diffusion Tube | 100 | 100 | _ | | 32.64 | 24.37 | 24.59 |
| DT17 | Roadside | Diffusion Tube | 100 | 100 | _ | | 35.08 | 27.56 | 30.64 |
| DT18 | Roadside | Diffusion Tube | 100 | 100 | _ | | 36.65 | 23.43 | 25.32 |
| DT19 | Roadside | Diffusion Tube | 91.6 | 91.6 | _ | | 33.78 | 33.37 | 30.05 |
| DT20 | Roadside | Diffusion Tube | 100 | 100 | _ | | 30.35 | 28.9 | 25.94 |
| DT21 | Roadside | Diffusion Tube | 100 | 100 | _ | | 31.5 | 28.95 | 25.95 |
| DT22 | Roadside | Diffusion Tube | 100 | 100 | _ | | 30.64 | 28.73 | 26.46 |
| DT23 | Roadside | Diffusion Tube | 100 | 100 | _ | | 34.23 | 24.24 | 27.53 |
| DT24 | Roadside | Diffusion Tube | 100 | 100 | _ | | **40.63** | 32.79 | 35.29 |
| DT25 | Roadside | Diffusion Tube | 100 | 100 | _ | | 41.9 | 28.38 | 30.65 |
| DT26 | Roadside | Diffusion Tube | 91.6 | 91.6 | _ | | 32.23 | 28.03 | 28.99 |
| DT27 | Kerbside | Diffusion Tube | 91.6 | 91.6 | _ | | 47.43 | 39.03 | 38.82 |
| DT28 | Roadside | Diffusion Tube | 100 | 100 | _ | | 34.11 | 27.66 | 28.62 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DT29 | Kerbside | Diffusion Tube | 91.6 | 91.6 | _ | | 33.36 | 32.21 | 34.53 |
| DT30 | Kerbside | Diffusion Tube | 91.6 | 91.6 | _ | | | 22.55 | 33.94 |
| DT31 | Roadside | Diffusion Tube | 75 | 75 | _ | | 39.79 | 29.43 | 30.55 |
| DT32 | Roadside | Diffusion Tube | 100 | 100 | _ | | 28.94 | 27.01 | 25.82 |
| DT33 | Roadside | Diffusion Tube | 91.6 | 91.6 | _ | | 32.72 | 28.28 | 28.21 |
| DT34 | Roadside | Diffusion Tube | 100 | 100 | _ | | 37.6 | 36.57 | 32.65 |
| DT35 | Roadside | Diffusion Tube | 100 | 100 | _ | | 27.35 | 25.91 | 26.69 |
| DT36 | Kerbside | Diffusion Tube | 91.6 | 91.6 | _ | | 29.82 | 29.21 | 29.24 |
| DT37 | Roadside | Diffusion Tube | 100 | 100 | _ | | 40.24 | 32.84 | 34.03 |
| DT38 | Kerbside | Diffusion Tube | 83.3 | 83.3 | _ | | | 22.55 | 21.18 |
| DT39 | Roadside | Diffusion Tube | 100 | 100 | _ | | | 25.7 | 24.06 |
| DT40 | Roadside | Diffusion Tube | 91.6 | 91.6 | _ | | 29.31 | 27.73 | 26.74 |
| DT41 | Kerbside | Diffusion Tube | 100 | 58.3 | _ | | | | 27.52[3] |
| DT42 | Kerbside | Diffusion Tube | 100 | 41.66 | _ | | | | 34.72[3] |
| DT43 | Kerbside | Diffusion Tube | 100 | 66.66 | _ | | | | 28.57[3] |
| DT44 | Roadside | Diffusion Tube | 100 | 66.66 | _ | | | | 29.06[3] |
| | | | | | | | | | |
| | | | | | | | | | |

☒ **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.1.1 – Trends of $NO_2$ concentration Boldon Lane/ Stanhope Road AQMA**

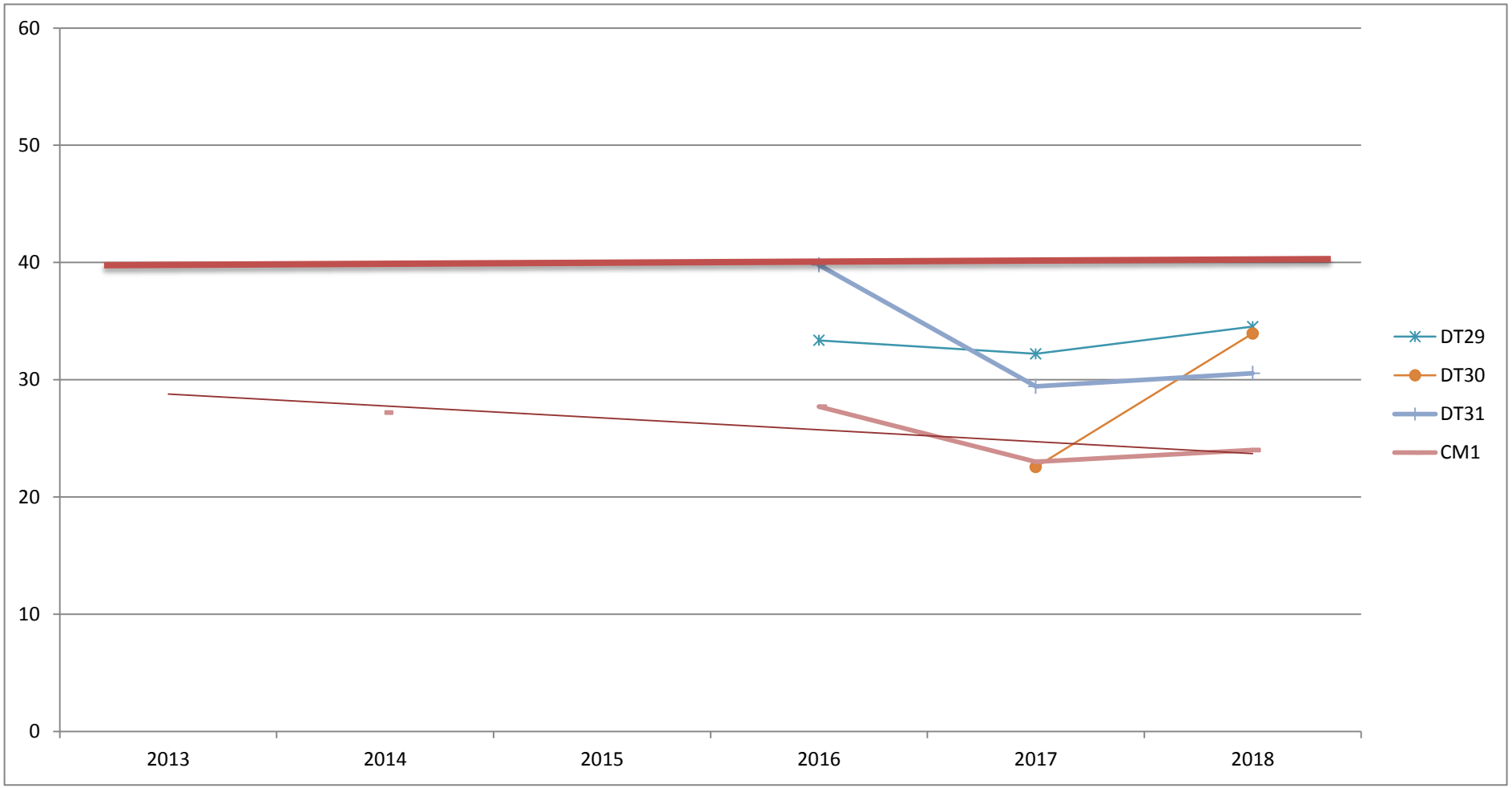
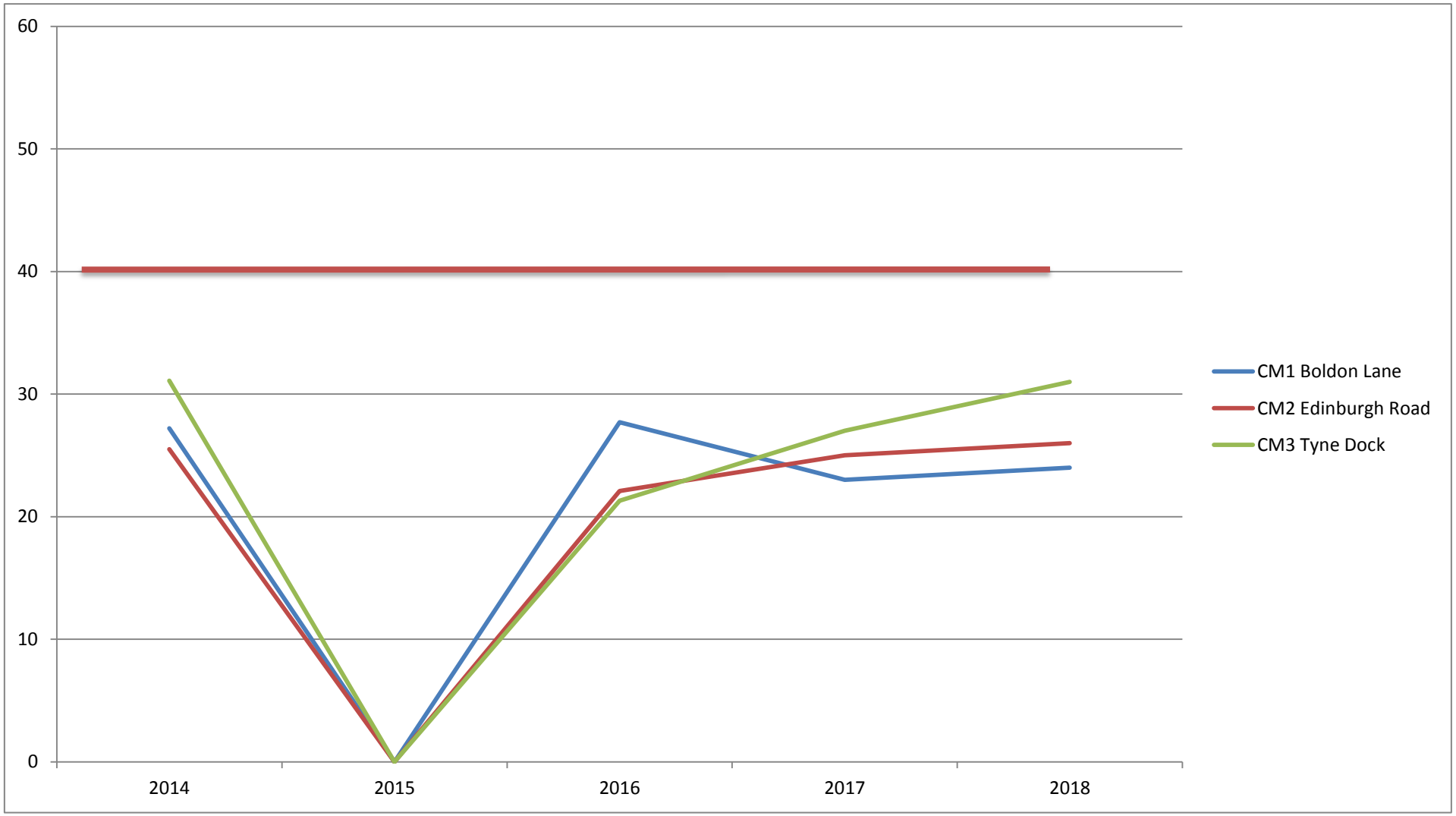
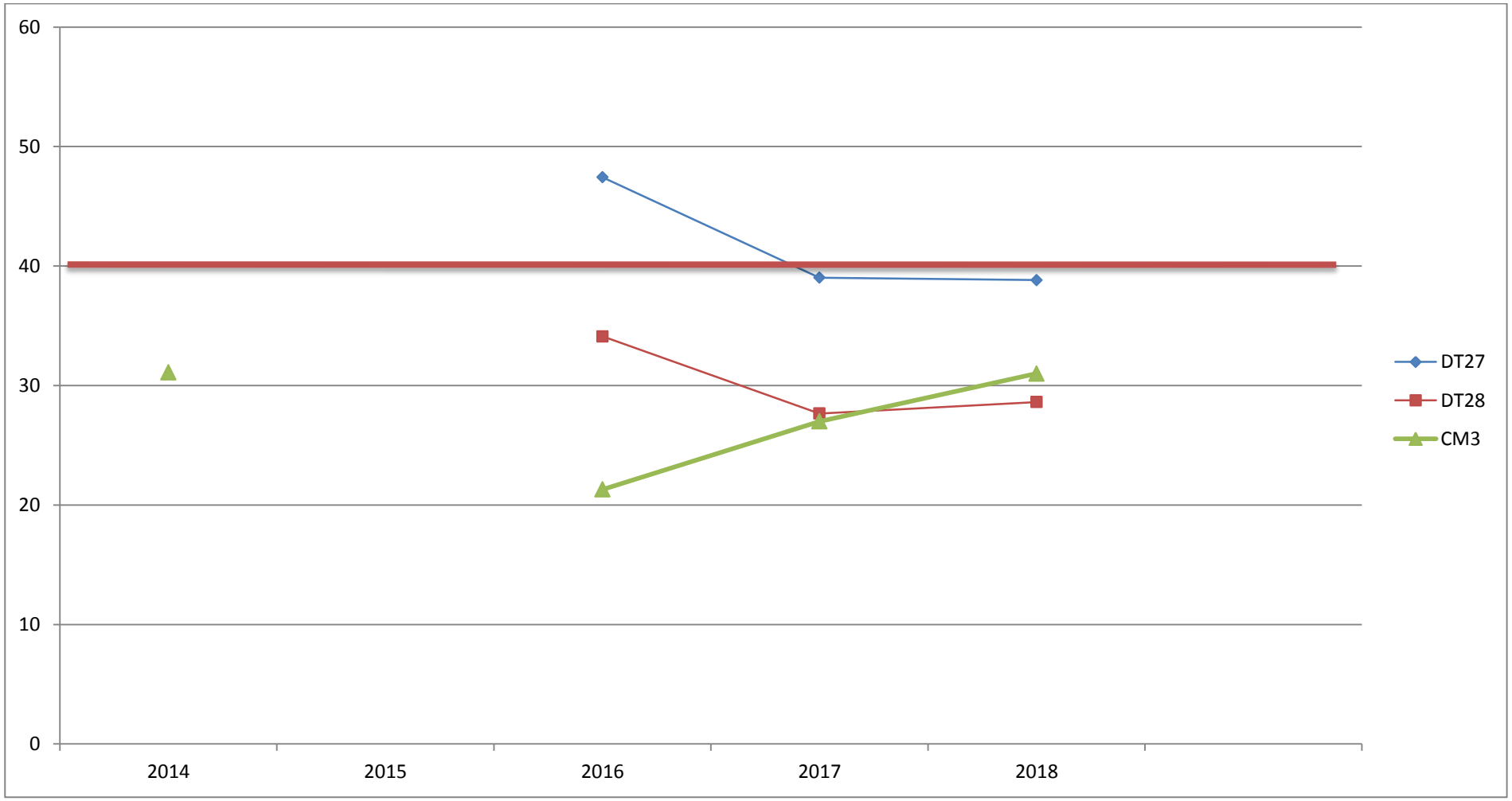


**Figure A.1.2 – Trends of $NO_2$ concentration Lindisfarne Roundabout/ Leam Lane AQMA**

## A.1.3- Trends in Annual Mean $NO_2$ data



## A.1.4 – Trends in annual mean $NO_2$ Port of Tyne 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 2018 (%) (2) | $NO_2$ 1-Hour Means > 200µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| CM1Boldon Lane | Roadside | Automatic | 98.4 | 98.4 | 0 | | 0 | 0 | 0 |
| CM2 Edinburgh Road | Roadside | Automatic | 98.8 | 98.8 | 0 | - | 0 | 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 99.8$^{th}$ 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 2018 (%) (2) | $PM_{10}$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| CM2 Edinburgh Road | Roadside | 97.3 | 97.3 | 16.8 | | 14.3 | 15 | 18 |
| CM3 Tyne Dock | Roadside | 97.9 | 97.9 | 18.9 | | 17.3 | 18 | 19 |

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

**Notes:**

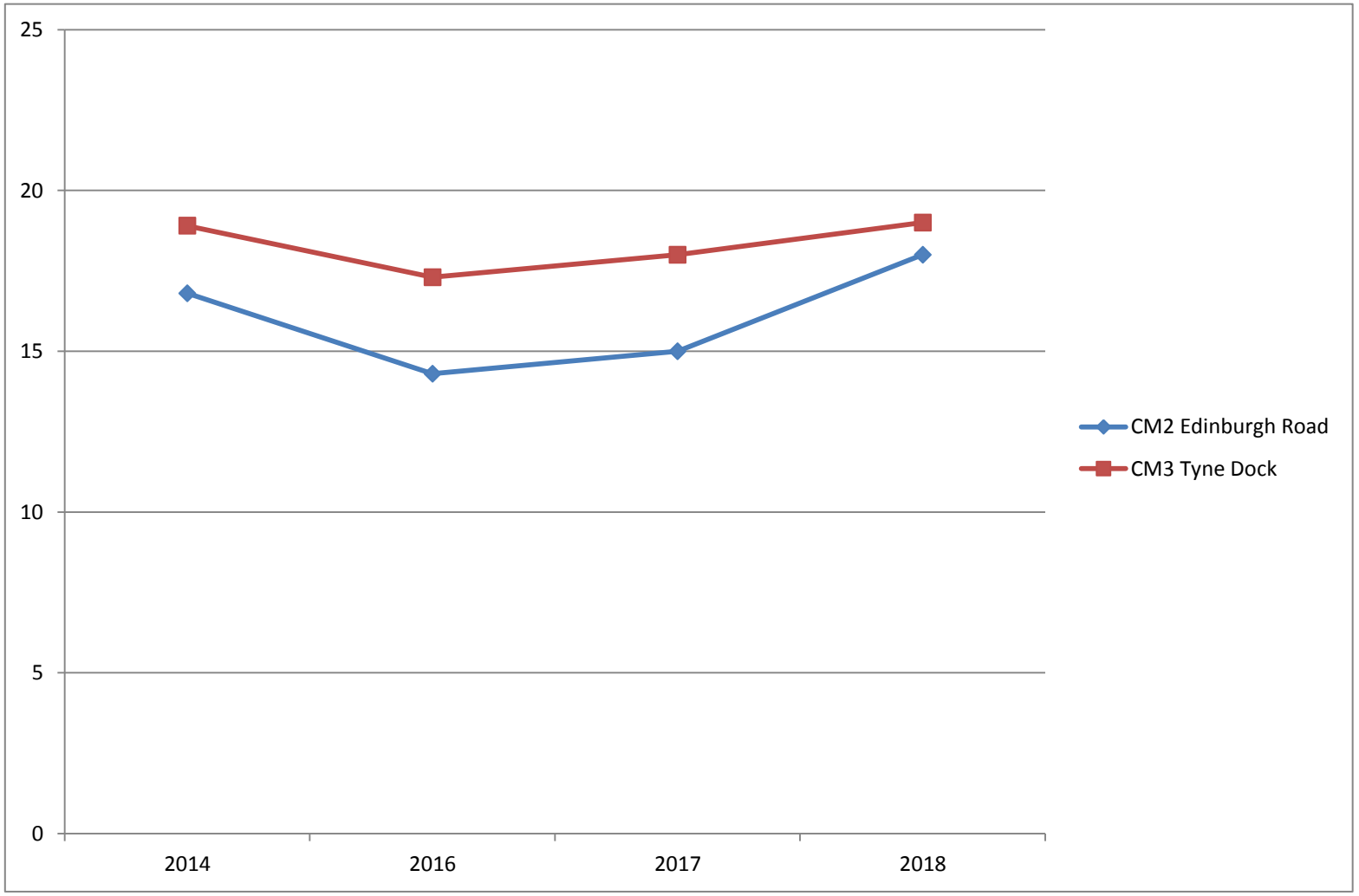
Exceedances of the $PM_{10}$ annual mean objective of $40\mu g/m^3$ are shown in **bold.**

(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.1.5 – 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 2018 (%) (2) | $PM_{10}$ 24-Hour Means > 50µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| CM2 Edinburgh Road | Roadside | 97.3 | 97.3 | 2 | | 0 | 1 | **2 (67)** |
| CM3 Tyne Dock | Roadside | 97.9 | 97.9 | 2 | | 2 | 3 | **3 (64)** |

**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 90.4$^{th}$ 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 2018 (%) (2) | $PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| CM2 Edinburgh Road | Roadside | 97.3 | 97.3 | 11.76 | | 10.01 | 10.5 | 12.6 |
| CM3 Tyne Dock | Roadside | 97.9 | 97.9 | 13.23 | | 12.11 | 12.6 | 13.3 |

☒ **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 2018

## Table B.1 – $NO_2$ Monthly Diffusion Tube Results - 2018

| 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 (0.93) and Annualised (1) | Distance Corrected to Nearest Exposure (2) |
| DT1 | 25.96 | 26.29 | 29.81 | 25.40 | 26.08 | 22.05 | 25.06 | 22.75 | 18.45 | 28.21 | 33.44 | 30.55 | 26.17 | 24.34 | |
| DT2 | 32.27 | 29.25 | 32.72 | 30.90 | 23.98 | 22.32 | 27.37 | 26.19 | 31.53 | 34.35 | 37.90 | 42.22 | 30.92 | 28.75 | |
| DT3 | 23.31 | 24.42 | 26.01 | 20.11 | 20.68 | 13.73 | 17.62 | 17.30 | 17.00 | 24.82 | 26.61 | 30.42 | 21.84 | 20.31 | |
| DT4 | 22.10 | 26.48 | 27.17 | 20.10 | 16.47 | 17.27 | 17.52 | 16.38 | 21.50 | 24.58 | | | 20.96 | 19.49 | |
| DT5 | 26.01 | 32.57 | 30.73 | 22.14 | 19.78 | 17.40 | 22.34 | 19.56 | 24.51 | 24.32 | 38.20 | 30.66 | 25.69 | 23.89 | |
| DT6 | 34.82 | **42.53** | **44.24** | 39.12 | 32.39 | 30.15 | 34.98 | 28.80 | 32.40 | 38.94 | **43.10** | **41.06** | 36.88 | 34.30 | |
| DT7 | 28.33 | 31.21 | 30.31 | 24.03 | 22.38 | 18.66 | 22.27 | 20.11 | 24.36 | 31.14 | 27.52 | 30.05 | 25.86 | 24.05 | |
| DT8 | 20.84 | 26.86 | | 22.72 | 21.58 | 15.77 | 19.14 | 17.97 | 17.34 | 24.25 | 33.38 | 29.02 | 22.62 | 21.01 | |
| DT9 | 21.74 | 24.86 | 27.74 | | 22.64 | 15.20 | 17.49 | | 14.31 | 18.43 | | | 20.30 | 21.3 | |
| DT10 | 30.12 | 30.94 | 34.84 | 28.78 | 28.31 | 21.24 | 24.17 | 22.79 | 24.69 | 31.34 | **41.70** | 33.63 | 29.38 | 27.3 | |
| DT11 | | | | | 24.41 | | 22.12 | 19.99 | 20.39 | 32.08 | **40.61** | 34.36 | 27.71 | 29.095[3] | |
| DT12 | 26.09 | 30.77 | 27.09 | 29.38 | 21.03 | 16.26 | 18.55 | 17.04 | 15.95 | 23.74 | 34.18 | 30.76 | 24.24 | 22.54 | |
| DT13 | 22.54 | | 30.43 | 24.28 | 25.56 | 22.73 | 25.86 | 19.61 | 19.98 | 26.93 | 36.24 | 31.77 | 25.99 | 24.17 | |
| DT14 | | 32.35 | 31.77 | 26.62 | 25.43 | 22.58 | 24.32 | 21.61 | 22.50 | 32.26 | 37.61 | 32.59 | 28.15 | 26.18 | |
| DT15 | 35.31 | 26.87 | 30.48 | 23.89 | 20.50 | 18.04 | 20.21 | 19.95 | 21.80 | 30.22 | 38.21 | 34.95 | 26.70 | 24.83 | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT16 | 24.88 | 29.86 | 32.82 | 24.95 | 23.64 | 20.52 | 22.45 | 20.46 | 21.41 | 28.26 | 33.98 | 34.05 | 26.44 | 24.59 | |
| DT17 | 27.42 | 37.34 | 39.40 | 32.21 | 31.53 | 27.33 | 35.39 | 27.20 | 22.80 | 31.49 | **46.57** | 36.67 | 32.94 | 30.64 | |
| DT18 | 20.41 | 33.93 | 31.45 | 30.66 | 30.89 | 24.63 | 25.40 | 17.55 | 15.96 | 27.58 | **42.07** | 26.21 | 27.23 | 25.32 | |
| DT19 | 33.79 | 36.01 | 37.11 | 31.98 | 24.23 | 17.98 | 28.27 | 30.21 | 28.82 | | **44.83** | **42.20** | 32.31 | 30.05 | |
| DT20 | 29.35 | 26.94 | 34.24 | 26.62 | 25.49 | 23.53 | 25.09 | 22.53 | 23.19 | 28.85 | 33.65 | 35.26 | 27.89 | 25.94 | |
| DT21 | 29.26 | 29.63 | 35.06 | 27.16 | 26.49 | 21.48 | 22.43 | 22.23 | 24.89 | 31.55 | 32.92 | 31.72 | 27.90 | 25.95 | |
| DT22 | 38.34 | 33.73 | 32.82 | 26.38 | 21.69 | 19.21 | 23.48 | 22.30 | 24.66 | 30.17 | 34.17 | 34.46 | 28.45 | 26.46 | |
| DT23 | 28.65 | 32.99 | 34.26 | 29.32 | 31.31 | 26.29 | 24.70 | 22.20 | 23.87 | 31.80 | 36.98 | 32.88 | 29.60 | 27.53 | |
| DT24 | **40.95** | 37.65 | **42.91** | 37.81 | 30.28 | 30.58 | 33.00 | 28.73 | 33.76 | 39.85 | **48.37** | **51.45** | 37.95 | 35.29 | |
| DT25 | 30.95 | 36.17 | 36.91 | 32.82 | 30.26 | 26.04 | 26.55 | 27.14 | 31.08 | 38.96 | 42.71 | 35.85 | 32.95 | 30.65 | |
| DT26 | 33.22 | 34.95 | 34.96 | 28.02 | 23.21 | 21.48 | | 27.47 | 26.80 | 31.94 | 43.13 | 37.75 | 31.18 | 28.99 | |
| DT27 | **40.62** | | **50.47** | **47.53** | 35.47 | 35.03 | **42.31** | 27.90 | 37.15 | **44.37** | **53.90** | **44.36** | **41.74** | 38.82 | |
| DT28 | 29.69 | 34.44 | 37.40 | 32.90 | 26.54 | 27.08 | 28.10 | 24.01 | 25.43 | 28.24 | 36.83 | 38.60 | 30.77 | 28.62 | |
| DT29 | 42.14 | 40.94 | 43.90 | 38.88 | | 28.19 | 33.21 | 29.76 | 30.80 | 39.32 | **40.22** | **41.01** | 37.13 | 34.53 | |
| DT30 | 35.25 | 34.50 | 38.20 | 32.82 | 25.77 | **59.92** | 26.84 | 27.50 | 32.80 | 39.24 | **48.61** | | 36.50 | 33.94 | |
| DT31 | 33.49 | | 38.52 | 32.67 | 29.59 | 30.09 | 31.81 | 25.57 | 26.85 | | **47.08** | | 32.85 | 30.55 | |
| DT32 | 29.42 | 32.03 | 32.92 | 23.67 | 21.86 | 19.15 | 20.70 | 22.12 | 26.28 | 31.22 | 38.55 | 35.28 | 27.77 | 25.82 | |
| DT33 | 33.16 | 29.95 | 31.77 | 30.55 | 22.85 | 20.81 | 26.61 | 29.03 | | 33.39 | 38.55 | 37.00 | 30.33 | 28.21 | |
| DT34 | 37.71 | 39.64 | 37.79 | 30.55 | 27.50 | 24.01 | 30.23 | 26.71 | 36.53 | **40.25** | **42.12** | **48.30** | 35.11 | 32.65 | |
| DT35 | 28.54 | 35.50 | 33.72 | 26.68 | 26.36 | 22.53 | 22.63 | 20.44 | 23.20 | 32.77 | 35.18 | 36.84 | 28.70 | 26.69 | |
| DT36 | 30.24 | 38.10 | 38.54 | 32.96 | 23.60 | 22.43 | 28.99 | | 23.96 | 29.54 | **42.43** | 35.10 | 31.44 | 29.24 | |
| DT37 | 36.97 | 22.89 | 41.40 | 36.98 | 39.73 | 34.51 | 37.97 | 34.09 | 32.11 | 37.29 | **42.57** | **42.63** | 36.59 | 34.03 | |
| DT38 | 25.32 | | 29.86 | 18.20 | | 14.40 | 18.56 | 19.01 | 19.51 | 24.84 | 29.04 | 28.94 | 22.77 | 21.18 | |
| DT39 | 28.85 | 29.96 | 34.42 | 27.24 | 23.81 | 19.45 | 22.12 | 20.68 | 22.35 | 29.39 | 21.26 | 30.90 | 25.87 | 24.06 | |
| DT40 | 31.06 | 34.05 | 32.95 | 25.98 | 20.39 | 18.55 | 24.14 | 23.48 | | 32.25 | 39.03 | 34.36 | 28.75 | 26.74 | |
| DT41 | | | | | 19.45 | | 24.35 | 21.53 | 23.94 | 25.26 | 34.55 | 34.36 | 26.21 | 27.52[3] | |
| DT42 | | | | | | | | 28.46 | 31.10 | 35.69 | **40.92** | **43.34** | 35.90 | 34.72[3] | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT43 | | | | | 28.47 | 26.52 | 29.02 | 27.25 | 27.78 | 27.35 | 34.90 | 36.31 | 29.70 | 28.57[3] | |
| DT44 | | | | | 21.16 | 18.06 | 24.11 | 21.96 | 20.19 | 30.41 | 39.26 | 38.16 | 26.66 | 29.06[3] | |
| | | | | | | | | | | | | | | | |

☒ **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.

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

## Major Development

### IAMP

The International Advanced Manufacturing Park (IAMP) is one the most important development sites in the North of England, with the North East seen as an exemplar in this industry. Both Sunderland and South Tyneside Councils have allocated 150 hectares of development land to the north of Nissan UK and adjacent to the A19 trunk road. The IAMP was designated a 'Nationally Significant Infrastructure Project' (NSIP) by the UK Government, with a Development Consent Order expected from 2019.

In order to facilitate the first phase of development, both Councils adopted the International Advanced Manufacturing Park Area Action Plan on 30 November 2017. A planning application for IAMP ONE was approved by Sunderland City Council in May 2018 and the construction is expected to commence during 2018, with the first site occupiers expected in early 2019.

The second phase of the IAMP scheme 'IAMP two' is currently going through the planning process. An EIA scoping report was appraised by both South Tyneside Council and Sunderland Council.

### Diffusion Tube Bias Adjustment Factors

Diffusion tubes are supplied and analysed by Gradko International Ltd, Winchester, Hampshire. The preparation method used is 20% triethanolamine TEA and acetone. The bias adjustment factor of 0.87 was obtained from the Spread sheet version 03/18 v2.

### PM Monitoring Adjustment

$PM_{10}$ is monitored at two locations using TEOM instruments. The data has been adjusted using the volatile correction model (VCM) accessed at http://www.volatile-correction-model.info/ .

### QA/QC of continuous monitoring stations

The QA/QC procedures of South Tyneside Council are based on the AUN Site Operator's manual along with training received from our original equipment suppliers, Casella Group.

Maintenance / Calibration of equipment:

- A qualified engineer services automatic analysers every 6 months under a contracted service agreement. The analysers are calibrated during service visits.
- Matt's Monitors Ltd are under contract to maintain the stations, staff visit each monitoring station at least once every 4 weeks to ensure all of the equipment is working within normal parameters and to conduct zero and span checks of the equipment. The filters at each site are changed during these visits.
- If a problem is noted with any of the stations, a call-out is initiated and a service engineer will visit the site within 2 days to correct the fault.

### Data Validation

AQDM are now under contract with South Tyneside Council to validate and ratify continuous monitoring data. Monthly reports of the data are produced and e-mailed to South Tyneside Council. They review the data daily to ensure that:

- Telecommunications to the station are operational
- The air quality station is operational
- Individual analysers are operational
- Air quality exceedances are identified
- Operational information such as TEOM filter loading, does not invalidate data
- Obvious data errors are identified

### Data Ratification

In addition to the initial data screening process (validation), data are further scrutinised in monthly blocks by AQDM in order to provide a final ratified data set.

Data is reviewed for erroneous data such as:

- Daily calibration spikes
- Routine or service visit errors
- Analyser faults
- Site faults, such as power outages

## QA/QC Diffusion Tubes

Gradko has full U.K.A.S. accreditation for compliance with ISO-IEC 17025 for laboratory management system. The accuracy and consistency of analytical methods is regularly monitored using external proficiency schemes such as

- Workplace analysis scheme for proficiency (W.A.S.P.)
- Laboratory Environmental Analysis Proficiency (L.E.A.P.)

## Distance correction for diffusion tubes

Where diffusions tubes are not located immediately next to a desired receptor, DEFRA have provided an Excel spreadsheet to help predict levels using required data.
This Excel tool has been developed to help local authorities derive the $NO_2$ concentration at locations relevant for exposure as it is not always possible to measure concentrations at precisely the desired location. The calculator allows you to predict the annual mean $NO_2$ concentration for a location ("receptor") that is close to a monitoring site. The monitoring can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be.

The methodology consists of comparing the monitored annual mean $NO_2$ concentrations at a given point against known relationships between $NO_2$ concentrations and the distance from a road source.

Any further information with regards to the use of this tool is provided within LAQM.TG (16).

A few of the diffusion tubes within our non-continuous monitoring network had less than 9 months' worth of data therefore annualisation was necessary using the method described in LAQM (TG16) guidance. Continuous monitoring stations Newcastle City Centre and Middlesbrough were used as they were the closest Background sites within a 50 mile radius as per guidance. Included below are working for all annualisation of diffusion tubes:

DT9:

| Background Site | Annual Mean AM | Period Mean PM | Ratio Ra | | |
|---|---|---|---|---|---|
| A Newcastle | 28.56 | 26.7 | 1.069663 | | |
| B Middlesbrough | 14.45 | 14.02 | 1.03067 | | |
| | | Ra | 1.05 | Ra*DT9 PM | 21.315 |

| | jan | feb | mar | apr | may | jun | jul | aug | sept | oct | nov | dec | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT9 | 21.74 | 24.86 | 27.74 | | 22.64 | 15.20 | 17.49 | | 14.31 | 18.43 | | | 20.3 |
| | 34.55 | 37.85 | 30.14 | | 22.44 | 17.08 | 17.42 | | 25.34 | 28.79 | | | 26.7 |
| | 18.06 | 17.98 | 17.35 | | 13.68 | 11.66 | 8.34 | | 9.72 | 15.35 | | | 14.02 |

DT11:

| Background Site | Annual Mean AM | Period Mean PM | Ratio Ra | | |
|---|---|---|---|---|---|
| A Newcastle | 28.56 | 27.44 | 1.040816 | | |
| B Middlesbrough | 14.45 | 13.5 | 1.07037 | | |
| | | Ra | 1.05 | Ra*DT9 PM | 29.0955 |

| | jan | feb | mar | apr | may | jun | jul | aug | sept | oct | nov | dec | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT11 | | | | | 24.41 | | 22.12 | 19.99 | 20.39 | 32.08 | 40.61 | 34.36 | 27.71 |
| | | | | | 22.44 | | 17.42 | 21.62 | 25.34 | 28.79 | 38.28 | 38.16 | 27.44 |
| | | | | | 13.68 | | 8.34 | 7.41 | 9.72 | 15.35 | 19.41 | 20.58 | 13.5 |

DT41:

| Background Site | Annual Mean AM | Period Mean PM | Ratio Ra | | |
|---|---|---|---|---|---|
| A Newcastle | 28.56 | 27.44 | 1.040816 | | |
| B Middlesbrough | 14.45 | 13.5 | 1.07037 | | |
| | | Ra | 1.05 | Ra*DT9 PM | 27.5205 |

| | jan | feb | mar | apr | may | jun | jul | aug | sept | oct | nov | dec | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT41 | | | | | 19.45 | | 24.35 | 21.53 | 23.94 | 25.26 | 34.55 | 34.36 | 26.21 |
| | | | | | 22.44 | | 17.42 | 21.62 | 25.34 | 28.79 | 38.28 | 38.16 | 27.44 |
| | | | | | 13.68 | | 8.34 | 7.41 | 9.72 | 15.35 | 19.41 | 20.58 | 13.5 |

DT42:

| Background Site | Annual Mean AM | Period Mean PM | Ratio Ra | | |
|---|---|---|---|---|---|
| A Newcastle | 28.56 | 30.44 | 0.938239 | | |
| B Middlesbrough | 14.45 | 14.5 | 0.996552 | | |
| | | Ra | 0.967 | Ra*DT44 PM | 34.7153 |

| | jan | feb | mar | apr | may | jun | jul | aug | sept | oct | nov | dec | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT42 | | | | | | | | 28.46 | 31.10 | 35.69 | 40.92 | 43.34 | 35.9 |
| | | | | | | | | 21.62 | 25.34 | 28.79 | 38.28 | 38.16 | 30.44 |
| | | | | | | | | 7.41 | 9.72 | 15.35 | 19.41 | 20.58 | 14.5 |

DT43:

| Background Site | Annual Mean AM | Period Mean PM | Ratio Ra | | |
|---|---|---|---|---|---|
| A Newcastle | 28.56 | 26.14 | 1.092578 | | |
| B Middlesbrough | 14.45 | 13.27 | 1.088922 | | |
| | | Ra | 1.09 | Ra*DT9 PM | 28.5689 |

| | jan | feb | mar | apr | may | jun | jul | aug | sept | oct | nov | dec | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT43 | | | | | 28.47 | 26.52 | 29.02 | 27.25 | 27.78 | 27.35 | 34.90 | 36.31 | 26.21 |
| | | | | | 22.44 | 17.08 | 17.42 | 21.62 | 25.34 | 28.79 | 38.28 | 38.16 | 26.14 |
| | | | | | 13.68 | 11.66 | 8.34 | 7.41 | 9.72 | 15.35 | 19.41 | 20.58 | 13.27 |

DT44:

| Background Site | Annual Mean AM | Period Mean PM | Ratio Ra | | |
|---|---|---|---|---|---|
| A Newcastle | 28.56 | 26.14 | 1.092578 | | |
| B Middlesbrough | 14.45 | 13.27 | 1.088922 | | |
| | | Ra | 1.09 | Ra*DT44 PM | 29.0594 |

| | jan | feb | mar | apr | may | jun | jul | aug | sept | oct | nov | dec | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT44 | | | | | 21.16 | 18.06 | 24.11 | 21.96 | 20.19 | 30.41 | 39.26 | 38.16 | 26.66 |
| | | | | | 22.44 | 17.08 | 17.42 | 21.62 | 25.34 | 28.79 | 38.28 | 38.16 | 26.14 |
| | | | | | 13.68 | 11.66 | 8.34 | 7.41 | 9.72 | 15.35 | 19.41 | 20.58 | 13.27 |

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

## Boldon Lane AQMA


## Lindisfarne AQMA

# Appendix E: Summary of Air Quality Objectives in England

### Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective[9] | |
|---|---|---|
| | 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 |

[9] 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 |
| $NO_2$ | 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