Report No: PP5/21

Eden District Council

Overview and Scrutiny Committee

4 February 2021

Air Quality Monitoring in Penrith

Portfolio:	Housing and Health Portfolio
Report from:	Assistant Director Communities
Wards:	Penrith
OPEN PUBLIC ITEM	

1 Purpose

1.1 This report sets out what air quality surveys have or will take place within Penrith, together with the air pollution levels and actions that have been taken, and is in response to a request by the Housing and Communities Scrutiny Committee.

2 Recommendation

It is recommended that Members note the contents of the report and the proposed actions.

3 Background

3.1 In accordance with section 82 of the Environment Act (1995) (Part IV), Local Authorities are required to periodically review and assess air quality within their area of jurisdiction, under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and future air quality levels against the national Air Quality Objectives (AQO) defined by Defra and based on health standards.

3.2 The pollutants under consideration were originally, Carbon Monoxide, Benzene, 1,3-Butadiene, Lead, Nitrogen Dioxide, Particulates with a diameter less than 10microns (PM_{10}) and Sulphur Dioxide. In 2016 this was reduced to Nitrogen Dioxide, (NO_2), Particulate Matter (PM_{10}) and ($PM_{2.5}$) and Sulphur Dioxide (SO_2) in recognition of the fact that all of the objectives for the other pollutants have been met for several years and are well below limit values.

This means that over the last twenty years, officers of the Environmental Protection Team have been monitoring pollutants, reviewing and assessing air quality across the district as well as in Penrith, and reporting the results annually. The annual reports are available on the Council's website at https://www.eden.gov.uk/your-environment/pollution/air-quality/about-air-quality/. Each year Defra considers the reports and makes recommendations for the future. Appendix I gives the most recent commentary.

3.3 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. We know

for example, from the health statistics that Cumbria has generally very good air quality and the proportion of mortality believed to be attributable to particulate matter, for example, is 3.8% below the national figure of 4.72%. Across the whole of Cumbria it has been estimated that in 2010 the deaths of 195 people in Cumbria **may** have been attributable to $PM_{2.5}$. Incidentally there is no objective level or standard for PM2.5.

3.4 It should be noted that because the health studies which provide the basis for the air quality studies are based on data for individuals within a population, therefore the exposure should relate to that of an individual. This means that for example Nitrogen Dioxide, we need to consider the annual mean at the façade of places where people spend the majority of their time, for example, residential properties, schools, hospitals etc.

3.5 We also need to consider the source of the pollutant and how it reaches the receptor, thus:

3.5.1 Nitrogen Dioxide is a product of the combustion of fossil fuels, but the greatest contributor to the levels in the air that we breathe, is from road transport and to a lesser extent by industrial combustion and power generation. These sources produce Nitrogen Oxides which is then converted to Nitrogen Dioxide. Nitrogen Dioxide levels are at their highest at the kerbside, but fall rapidly with distance from it, so that a level of $40ug/m^3$ (micrograms per metre cubed) of Nitrogen Dioxide will be reduced to $26ug/m^3$ at 3 metres from the kerbside.

3.5.2 Sulphur Dioxide is produced when fossil fuels containing sulphur are burnt, typically from power stations, oil refineries and industrial plants. Volcanoes and forest fires will also produce Sulphur Dioxide. However the reduction of heavy industry, particularly the iron and steel sector, and the change in the home from open fires to gas-powered central heating, have reduced ambient levels significantly. Monitoring in the Castletown area of Penrith around fifteen years ago was undertaken to see if the numbers of open fires could be an issue for the health of residents locally. The results of the monitoring showed that Sulphur Dioxide levels were not a problem pollutant in Penrith, even in an area where there are a large number of houses that may still have open fires or multi-fuel stoves.

3.5.3 Particulates (PM_{10} and $PM_{2.5}$) can be produced directly and indirectly and can be difficult to quantify because the source can be transitory, for example from sea spray or the ploughing of fields. The highest contributors nationally are road transport and industrial processes. Road transport produces Particulates directly from the combustion of fuel, but also from clutch and tyre wear against the road surface. As a general principal, the smaller the particle, the more likely it is to be carried by meteorological conditions, and the further into the lung it can travel. The chemical and physical composition of particles is also believed to be relevant to the health impacts of them.

3.6 Given that the main source of pollution in Penrith is road traffic, the Council has historically undertaken monitoring by diffusion tubes which are small open-ended tubes that are installed close to people's houses that are alongside heavily trafficked roads and are put out for a month at a time and then chemically analysed to see the average amount of Nitrogen Dioxide in the air. They are relatively cheap to install, but have an accuracy of only **+**

25% and do not give any information about pollution episodes, and the 24-hour mean) if any occur.

3.7 Penrith currently has nineteen diffusion tube locations based on narrow congested streets with residential properties close by, or roads with high flows of heavy goods vehicles or busy roads and junctions with more than 10,000 vehicles per day and residential properties. In previous years there have been up to forty tubes, but Defra guidance is to remove those that show no risk of breaching the objective level for Nitrogen Dioxide. The current tubes' locations are shown in Appendix II. In the 2019 report there were only two tubes which exceeded the annual mean, and these were on Castlegate.

3.8 Officers also undertake assessments which use a range of screening methods, such as the identification of specific air pollution sources, like busy roads or junctions, certain industrial processes and local pollution monitoring data. Screening considers whether there is a possibility of exceeding any of the national Air Quality Objectives. If this initial screening assessment suggests that there is a risk of a breach of any of these standards, the Council is required to carry out a more in-depth study called a Detailed Assessment to obtain data that is more accurate. Appendix III gives the example of how road traffic sources are screened and assessed.

3.9 In 2012 high levels of Nitrogen Dioxide measured at Eamont Bridge, Castlegate and along Bridge Lane/King Street, meant that the Council employed consultants to undertake a Detailed Assessment using computer modelling of the roads and the other likely industrial emission sources. Whilst the Detailed Assessment identified that these were areas of concern, the measured levels of Nitrogen Dioxide then started to decline and have done so for several years. This is a pattern consistent with other areas and is believed to reflect improvements in vehicle exhausts and a greater proportion of cleaner vehicles being on the road.

3.10 The only street in Penrith that is now of concern is Castlegate; We know that vehicles going uphill at a slow speed and sometimes idling, and the houses alongside located very close to the carriageway are likely to lead to increased levels of pollutants. Levels of Nitrogen Dioxide that are measured in the diffusion tubes are highly variable and inconsistent, and for this reason, the Environmental Protection Team has bought two pieces of monitoring equipment which will be located on lamp-posts and will record real-time levels of Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ which can be displayed on the Council's website. The equipment needs to be located in position for at least one year to properly assess seasonal variations, but thereafter can be moved to any area of concern. Officers are currently in correspondence with the County Council to seek their approval to install the equipment on two lamp columns.

3.11 Officers are currently waiting for the annual laboratory results to commence the data analysis for 2020. However due to the pandemic starting in March 2020 and the laboratory closing, officers already know that there will not be a full year's worth of data. Nevertheless a report will go to the Portfolio Holder Housing and Health in due course.

3.12 As well as the monitoring and screening assessments undertaken in Penrith, officers also contribute to planning applications, particularly those that may

adversely affect air quality or be affected by it, or both. This includes all of the areas of new housing at the edge of the town. Planning Officers are always advised by the Environmental Protection staff if they believe air quality to be an issue that needs addressing, but are not required to follow officer recommendation, if they believe that other wider planning considerations are carry more weight.

3.13 Environmental Protection officers are responsible for recommending specific air quality policies in the Eden Local Plan.

3.14 Air Quality is also a priority for the Cumbria Joint Public Health Strategy and the Eden Implementation Plan. Officers from the Environmental Protection Team attend the meetings of the Health and Wellbeing Partnership to advise on the link between air quality and health.

3.15 Finally the Environmental Protection Team puts messages out on social media from time to time, including Clean Air Day, which this year will be 17 June 2021. The day aims to raise awareness of the problems of air pollution and the different ways that people can work towards making the air cleaner.

4 Policy Framework

4.1 The Council has four corporate priorities which are:

- Sustainable;
- Healthy, safe and secure;
- Connected; and
- Creative

4.2 This report meets the sustainable and healthy, safe and secure corporate priorities.

5 Consultation

5.1 All the annual reports are published on the website for everyone to see and to respond to if wanted. Officers also consulted with the residents of Castlegate between 8 August 2013 and 31 September 2013 about the possibility of an Air Quality Management Area, but had no responses from any residents of the street. The details of this consultation were reported to the Executive on 3 December 2013.

6 Implications

6.1 Financial and Resources

6.1.1 Any decision to reduce or increase resources or alternatively increase income must be made within the context of the Council's stated priorities, as set out in its Council Plan 2019-2023 as agreed at Council on 7 November 2019.

6.1.2 There are no proposals in this report that would reduce or increase resources.

6.2 Legal

6.2.1 The Council is statutorily required to assess and report annually on air quality in fulfilment of Part IV of the Environment Act 1995.

6.3 Human Resources

6.3.1 There are no human resource implications to this report.

6.4 Statutory Considerations

Consideration:	Details of any implications and proposed measures to address:
Equality and Diversity	None
Health, Social Environmental and Economic Impact	There is a link between deprivation and social inequality and air quality which can then lead to poor health. However, it is not usually possible to prove a causal link between a particular pollutant and a particular health condition.
Crime and Disorder	None
Children and Safeguarding	Children and older people may be more susceptible to poor air quality, but the national and international standards that Defra uses, do take this into account.

6.5 Risk Management

Risk	Consequence	Controls Required
Reputational if Council fails to meet statutory obligation	Chief Executive would be notified by Defra if Annual Progress Reports were not carried out.	Not required
Public health	Adverse impact of air pollution upon public health.	Controls already in place through planning system, permitting regime, Health and Wellbeing etc.

7 Other Options Considered

7.1 This section is not applicable to this report.

8 Reasons for the Decision/Recommendation

8.1 Report is for information.

Background Papers: **E/96/12/13**

Appendices: **Appendix I Example of screening assessment for one type of source – road transport.**

Appendix II Location of current monitoring positions in Penrith

Appendix III Evaluation of most recent Air Progress Report from Defra 9 January 2020

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APPENDIX I

Table 7.1 – Screening Assessment of Road Traffic Sources

Road Source Category	Pollutant of Concern	Objectives of Concern (1)	Criteria	What to Report	Action if Screening Confirms Potential Issue	Notes
1 - Narrow congested streets with residential properties close to the kerb.	NO_2	Long and Short-Term	5,000 vehicles/day- exposure within 2m from kerb - slow moving traffic with frequent stop/start	Roads matching criteria	Carry out NO_2 monitoring survey(2) - Use results in next yearly LAQM report to determine whether an AQMA needs to be declared	Monitoring is recommended, as screening models generally fail to identify actual exceedances in these areas
2 - Busy streets where people may spend 1 hour or more close to traffic	NO_2	Short-Term	10,000 vehicles/day - exposure within 5m from kerb >= 1-hour	Results of DMRB Screening Assessment(4) to identify annual mean concentrations > 60µg/m^3	Carry out monitoring survey(2) and/or detailed dispersion modelling - to identify annual mean concentrations > 60µg/m^3 (3)	If AQMA already declared for NO_2 annual mean, only amend AQMA and AQAP to include 1-hour mean
3 - Roads with a high flow of HDVs	NO_2 / PM_{10}	Long and Short-Term	2,500 HDVs/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	Results of DMRB Screening Assessment(4) to identify exceedances	Carry out monitoring survey(2) and/or dispersion modelling(3)	If AQMA already declared for one of the objectives, only amend AQMA and AQAP to include the additional objectives exceeded
4 - Junctions	NO_2 / PM_{10}	Long and Short-Term	10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	Results of DMRB Screening Assessment(4) to identify exceedances	Carry out monitoring survey(2) and/or dispersion modelling(3)	Where two or more roads intersect, the traffic flows from each arm of the junction should be summed to give a combined total, which should then be divided by two before comparison against the screening criteria.
5 - New roads constructed or proposed since the last round of	NO_2 / PM_{10}	Long and Short-Term	if no air quality assessment available from planning application - 10,000 vehicles/day - exposure within	air quality assessment available: exceedances predicted in submitted assessment	Declare AQMA / Carry out additional dispersion modelling beforehand if deemed necessary	

Road Source Category	Pollutant of Concern	Objectives of Concern [1]	Criteria	What to Report	Action if Screening Confirms Potential Issue	Notes
Review and Assessment			10m from kerb (20m in conurbations > 2m inhabitants)	No air quality assessment available: results of DMRB Screening Assessment[4] to identify exceedances	Carry out monitoring survey[2] and/or dispersion modelling[3]	If the new road has increased traffic flow on existing roads where concentrations are likely to be below but close to the objectives (typically within 10%), then these should also be assessed
6 - Roads with significantly changed traffic flows	NO_2 / PM_{10}	Long and Short-Term	25% traffic increase on roads > 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants) - Roads previously identified at risk of exceeding (within 10% of objective)	Results of DMRB Screening Assessment[4] to identify exceedances	Carry out monitoring survey[2] and/or dispersion modelling[3]	
7 - Bus and coach stations	NO_2	Long and Short-Term	2,500 bus/coach movements/day [5] - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	Results of DMRB Screening Assessment[4] to identify exceedances	Carry out monitoring survey[2] and/or dispersion modelling[3]	If AQMA already declared for NO_2 annual mean, only amend AQMA and AQAP to include 1-hour mean.

[1] Long-term refers to annual mean - Short-term refers to 1-hour mean (for NO_2) or 24-hour mean (for PM_{10})

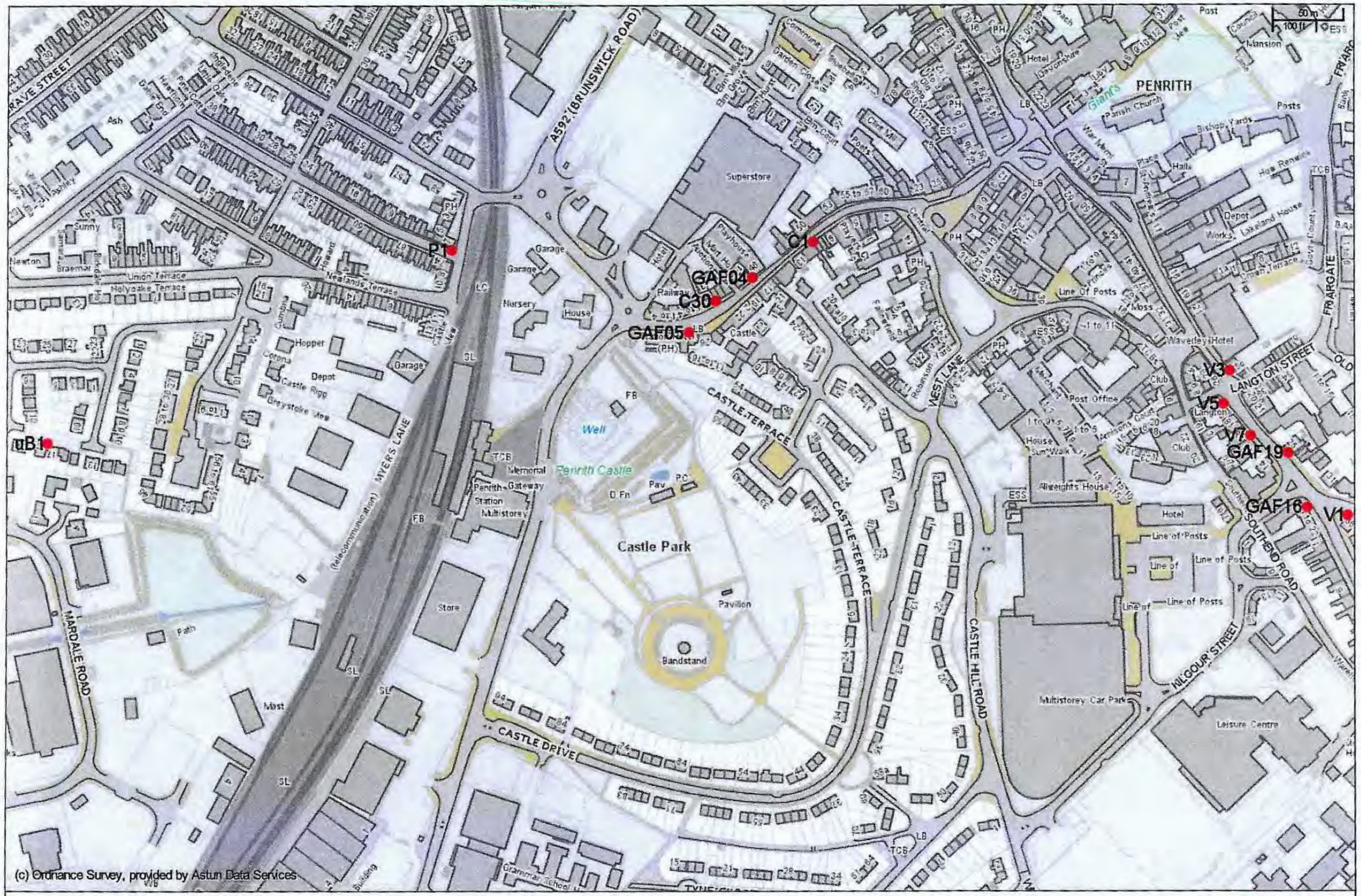
[2] Monitoring survey should be carried out for a minimum 6-month period

[3] Local authorities in England and Wales may decide to declare an AQMA straightaway at this stage. Other local authorities will need to proceed with additional technical information such as specific monitoring and/or modelling and report findings in a Detailed Assessment or the next ASR/APR before deciding whether an AQMA needs to be declared

[4] See para 7.80 for details on the DMRB air quality screening tool and methodology

[5] A bus movement considers a bus either arriving, or leaving the station. A bus arriving then leaving therefore counts for 2 movements

APPENDIX II



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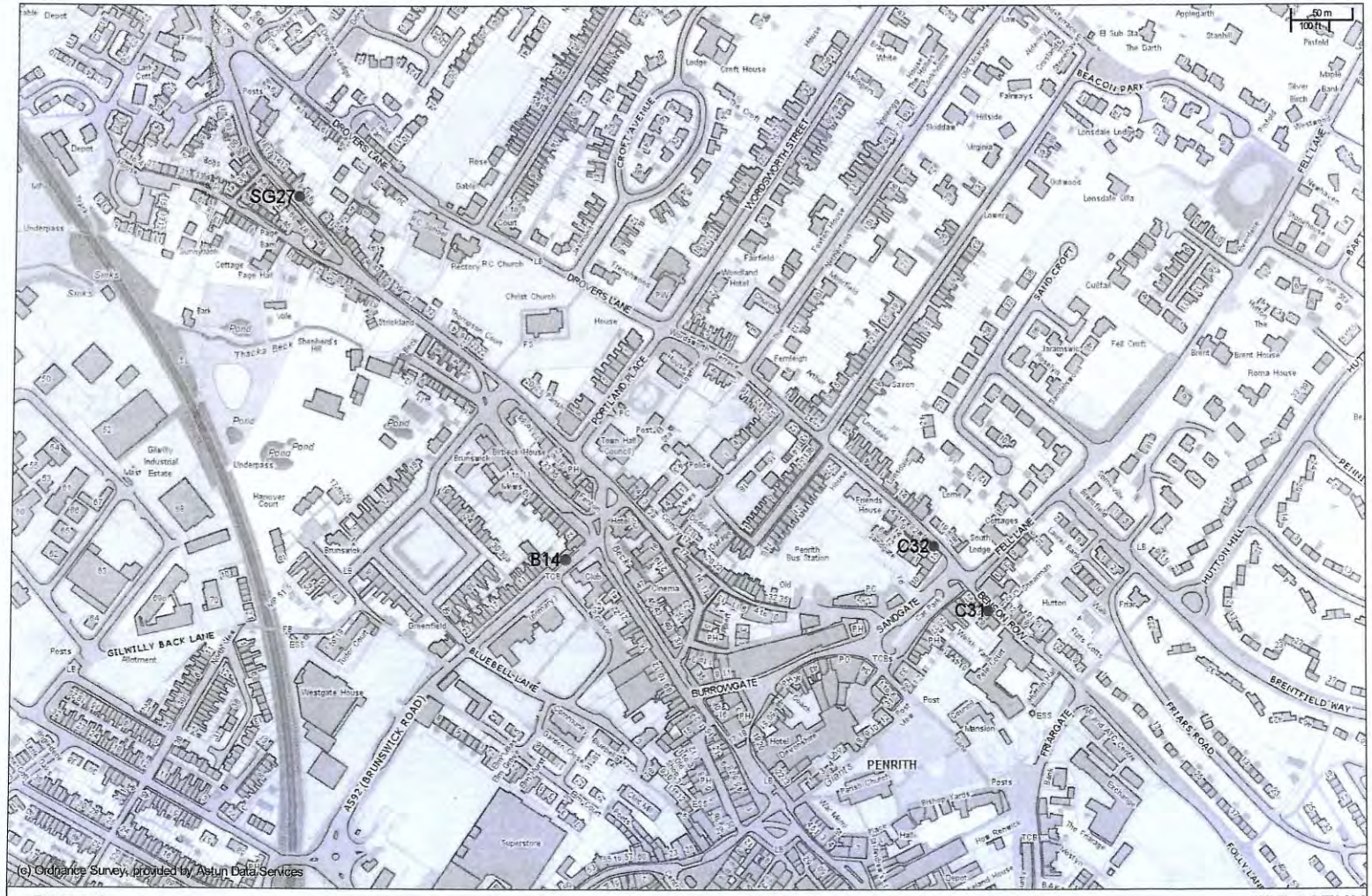
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B14
C32
C31
PENRITH
BURROWGATE
SANDGATE
BLUEBELL LANE
GILWILLY BACK LANE
A592 (BRUNSWICK ROAD)
DROVERS LANE
PORTLAND PLACE
CROFT AVENUE
WORDSWORTH STREET
BEACON PARK
FELL LANE
SANDCROFT
BRENTFIELD WAY
FRIARS ROAD
FRARGATE
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Local Authority:	**Eden District Council**
Reference:	**ASR19-0220**
Date of issue	**December 2019**

Annual Status Report Appraisal Report

The Report sets out the Annual Status Report, which forms part of the Review & Assessment process required under the Environment Act 1995 and subsequent Regulations.

Eden District Council have no Air Quality Management Areas (AQMAs) declared currently although they are considering introducing an AQMA in Castlegate due to regular breaches of annual mean nitrogen dioxide (NO_2) concentrations. Establishing the extent of the affected area and designating the AQMA with an associated appropriate Action Plan would be the next steps for the council to undertake. It is disappointing to see no increase in monitoring surrounding this area during 2018 as was suggested in the previous report. However, the 2018 report cites a small team and budget as the reasons for their restricted progress

Automatic monitoring was not undertaken within the borough during 2018.

Non-automatic (passive) monitoring of NO_2 was conducted at 19 sites during 2018. Two exceedances of the annual mean objective were measured. Both were recorded along Castlegate, one of these monitoring sites had been added in 2017 to investigate previous Castlegate NO_2 annual mean exceedances. Data capture during 2018 was good at all monitoring locations so no annualisation was required.

The report contains a small amount of discussion on existing measures to improve air quality that would also act to reduce $PM_{2.5}$ emissions. Background levels from Defra monitoring indicates the background in the Eden district is considered to be less than half of the annual mean objective.

Some QA/QC procedures have been applied with a national bias adjustment factor being used. No annualisation of monitoring sites were conducted as data capture for all monitoring locations was at least 75%. Distance corrections were conducted for sites not representative of relevant exposure. The report provides clear examples of calculations undertaken and historical NO_2 annual means are presented from 2014 where available.

There is discussion of the measures taken during 2018 to tackle air quality, the council recognises commuter traffic from rural areas as a key problem to tackle and includes

initiatives to reduce this for example improving public transport in Penrith. The start dates and progress of these projects is not made clear as the activities are not part of an Action Plan and therefore not within the standard table.

On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants. Following the completion of this report, Eden District Council should submit an Annual Status Report in 2020. They should move to expand monitoring in the Castlegate area in order to proceed to declaring an AQMA.