Air Quality Assessment:
Land South of A617, Newark & Sherwood

March 2021

Experts in air quality management & assessment

Document Control

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Job Number	J4404

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Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J4404A/1/F3	12 March 2021	Final	Penny Wilson (Associate Director)

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Executive Summary

The air quality impacts associated with the proposed residential development on land south of the A617, Rainworth have been assessed. The development will provide up to 95 residential dwellings.

The assessment has demonstrated that future residents of the proposed development will experience acceptable air quality, with pollutant concentrations below the air quality objectives.

The proposed development will generate additional traffic on the local road network, but the assessment has shown that there will be no significant effects at any existing sensitive receptor.

Overall, the operational air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed residential development on land south of the A617 in Rainworth (hereafter referred to as the Site). The proposed development will consist of up to 95 residential dwellings (hereafter referred to as the proposed development).

1.2 The proposed development will introduce new residential exposure within approximately 25 m of the A617, thus an assessment is required to determine the air quality conditions that future residents will experience. It will also generate additional traffic on local roads, which may impact on air quality at existing sensitive locations along the affected road network. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The location and setting of the proposed development are shown in Figure 1.

Figure 1: Proposed Development Setting

1.4 This report describes existing local air quality conditions in the year 2018 (which is the latest year of available air quality monitoring data in proximity to the Site).

1.5 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Newark & Sherwood District Council.

2 Policy Context

2.1 The United Kingdom formally left the European Union (EU) on 31 January 2020; until the end of 2020 there will be a transition period while the UK and EU negotiate additional arrangements. During this period EU rules and regulations will continue to apply to the UK. All European legislation referred to in this report is written into UK law and will remain in place, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

Air Quality Strategy

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

2.3 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero

2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Planning Policy

National Policies

2.6 The National Planning Policy Framework (NPPF) (2019a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

2.7 To prevent unacceptable risks from air pollution, Paragraph 170 of the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality".

2.8 Paragraph 180 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".

2.9 More specifically on air quality, Paragraph 180 makes clear that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as

possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".

2.10 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019b), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified".

2.11 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

2.12 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*".

2.13 Regarding the need for an air quality assessment, the PPG states that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".

2.14 The PPG sets out the information that may be required in an air quality assessment, making clear that:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

2.15 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

Local Policies

2.16 The Newark & Sherwood District Council's Amended Core Strategy (Newark & Sherwood District Council, 2019) was adopted in March 2019, however there are no policies within the document which refer to air quality.

Local Transport Plan

2.17 The Nottinghamshire Local Transport Plan (LTP) 2011-2026 (Nottinghamshire County Council, 2011) details the transport strategy for the whole of the county of Nottinghamshire (including Rainworth) for the fifteen year period 1 April 2011 to 31 March 2026. The LTP sets out three transport goals within which the local transport objectives have been identified. With regards to air quality the third LTP goal states:

"to minimise the impacts of transport on people's lives, maximise opportunities to improve the environment and help tackle carbon emissions".

National Air Quality Plan

2.18 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

3 Assessment Criteria

3.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

3.2 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective was to be achieved by 2020.

3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2018b). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

3.4 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

3.5 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3 [a]
Fine Particles ($PM_{2.5}$) [b]	Annual Mean	25 µg/m^3

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2018b).

[b] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Screening Criteria for Road Traffic Assessments

3.6 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)[1] recommend a two-stage screening approach to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

3.7 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A1) inside an AQMA are a change in flows of more than 25 heavy duty vehicles or 100 light duty vehicles per day; outside of an AQMA the thresholds are 100 heavy duty vehicles or 500 light duty vehicles. Where these criteria are exceeded, a detailed assessment is likely to be required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

3.8 While these screening criteria are specifically intended to act as a trigger for a detailed assessment, they can also sometimes be used to identify the extent of the road network that requires assessment. Where the change in traffic on a given road link is less than the relevant screening threshold, it is unlikely that a significant impact would occur, and these links can be disregarded unless there are additional development-related emissions affecting receptors along the link.

[1] The IAQM is the professional body for air quality practitioners in the UK.

4 Assessment Approach

Consultation

4.1 The assessment follows a methodology agreed with Newark & Sherwood District Council through email correspondence between Jim Hemstock (Environmental Health Technical Officer at Newark & Sherwood District Council) and Guido Pellizzaro (Air Quality Consultants) on 14 December 2020. Specifically, the following key points were discussed and agreed (see Appendix A3):

- traffic generated by the proposed development will not exceed the EPUK/IAQM screening criteria (see Paragraphs 3.6 to 3.8); and
- the assessment uses the latest air quality monitoring data to determine the impacts of existing sources of air quality on future residents of the proposed development.

Existing Conditions

4.2 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- information on existing air quality has been obtained by collating the results of monitoring carried out by Newark & Sherwood District Council and Mansfield District Council. This covers both the study area and nearby sites, the latter being used to provide context for the assessment;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2021a). These cover the whole of the UK on a 1x1 km grid;
- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2020a); and
- whether or not there are any exceedances of the annual mean EU limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020) (2021c). These maps are used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to EU data quality standards, to report exceedances of the limit value to the EU. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2021c), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2018.

Road Traffic Impacts

4.3 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.6 and detailed further in

Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

4.4 The impact of emissions from road traffic upon future occupants has been assessed qualitatively, taking into account baseline conditions and proximity of receptors to busy roads.

Assessment of Significance

4.5 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A2. Full details of the EPUK/IAQM approach are provided in Appendix A1.

5 Baseline Conditions

Relevant Features

5.1 The proposed development is located in the village of Rainworth approximately 5 km to the east of Mansfield. The application site is bound to the south by existing residential development whilst undeveloped green space is located to the east and west of the site. The A617 Rainworth bypass runs along the northern boundary of the site and the B6020 is located approximately 70 m from the southwestern boundary.

5.2 Newark & Sherwood District Council have reviewed air quality as part of their LAQM regime. As part of their review no exceedance, or likely exceedance, of an air quality objectives have been identified and as such Newark & Sherwood Council has not had to declare an AQMA.

Industrial sources

5.3 No significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

Newark & Sherwood District Council Air Quality Monitoring

5.4 Newark & Sherwood District Council undertake air quality monitoring at 13 sites using nitrogen dioxide diffusion tubes prepared and analysed by Gradko (using the 20% TEA in water method). The closest diffusion tube location operated by Newark & Sherwood District Council to the Site is approximately 10 km to the north in Ollerton. Given the distance of the closest monitor to the Site, monitored concentrations are not considered to be representative of air quality conditions at the Site and have not been considered further.

Mansfield District Council Air Quality Monitoring

5.5 The neighbouring Mansfield District Council operates 14 monitoring sites using nitrogen dioxide diffusion tubes prepared and analysed by Gradko (using the 20% TEA in water method). This includes a diffusion tube site located in Rainworth, approximately 350 m south west of the Site on Southwell Road East, adjacent to the B6020. Further diffusion tube site are located alongside major roads in Mansfield

5.6 Annual mean results for the years 2014 to 2018 for the 12 diffusion tube sites in and around Mansfield are summarised in Table 2. Exceedances of the objectives are shown in bold. The monitoring locations are shown in Figure 2. The monitoring data have been taken from Mansfield District Council's 2019 Annual Status Report (Mansfield District Council, 2019).

Table 2: Summary of Annual Mean NO_2 Monitoring (2014-2018) (µg/m^3) [a]

Site No.	Site Type	Location	2014	2015	2016	2017	2018
AR	Roadside	Abbott Road	30	30	32	31	23
CRN	Roadside	Chesterfield Road North	**44**	**42**	**43**	38	32
DL	Roadside	Debdale Lane	38	37	**47**	37	36
FT 1	Roadside	Forest Town 1	26	25	36	23	23
FT 2	Roadside	Forest Town 2	24	20	21	21	16
HL	Roadside	Hermitage Lane	-	-	**43**	26	21
LLS	Roadside	Leeming Lane South	30	29	31	28	25
NR	Roadside	Nottingham Road	-	35	37	38	31
OML	Roadside	Old Mill Lane	-	-	**49**	28	25
SRE	Roadside	Southwell Road East	22	20	22	20	18
SA	Roadside	Stopford Associates	26	24	37	25	25
TL	Roadside	Toothill Lane	24	24	25	23	21
Objective			**40**				

[a] Exceedances of the objectives are shown in bold.

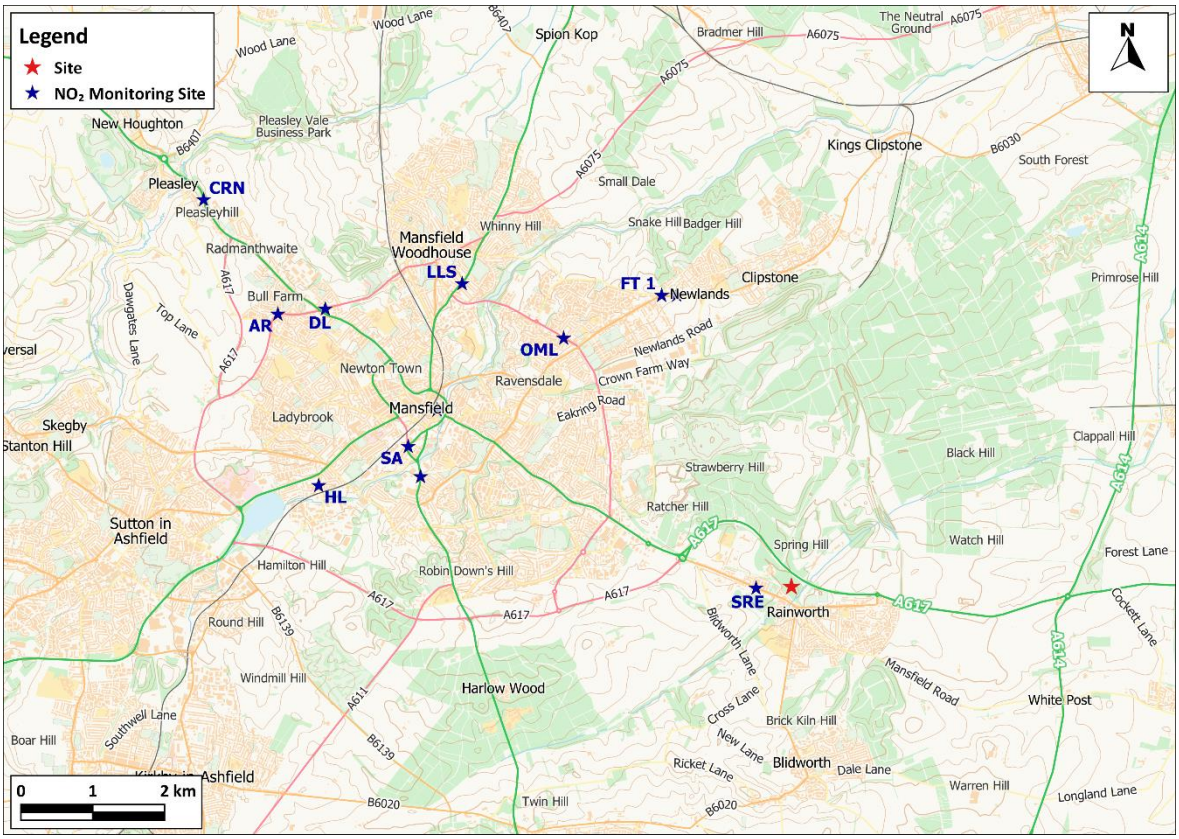

Figure 2: Monitoring Locations

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5.7 As shown in Table 2, measured nitrogen dioxide concentrations did not exceed the annual mean objective in either 2017 or 2018 at any monitoring site in the area. At the monitoring site SRE, which is nearest to the proposed development, the annual mean concentrations were well below the objective throughout 2014-2018.

5.8 No monitoring of PM_{10} or $PM_{2.5}$ concentrations was undertaken in either Newark & Sherwood District Council or Mansfield District Council.

Exceedances of EU Limit Value

5.9 There are no AURN (Defra, 2021e) monitoring sites within 1 km of the application site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2021c), which are used to report exceedances of the limit value to the EU, do not identify any exceedances within 1 km of the application site in 2018.

Background Concentrations

5.10 Estimated background concentrations at the Site for the year 2018 (to be consistent with the latest year of monitoring data) are set out in Table 3 and show estimated concentrations are all well below the objectives.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2018 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2018	10.4	14.0	8.4
Objectives	**40**	**40**	**25** [a]

[a] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

6 Impact Assessment

Impacts at Existing Receptors

6.1 The proposed development is expected to generate a total of 492 daily light vehicle trips and is not expected to generate any heavy duty vehicles; these daily trip rates are below the screening threshold of 500 LDVs recommended for use outside of an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.7). As such, it is judged that the relevant screening thresholds will not be exceeded and there is no requirement for a detailed assessment of road traffic impacts at existing receptors; it can be concluded that the proposed development will not have a significant impact on local roadside air quality.

Impacts of Existing Sources on Future Residents of the Development

6.2 The proposed development is located approximately 25 m from the busy A617. However, data from monitoring sites in the area which are adjacent to roads with comparable traffic flows suggest that no exceedances of annual mean or 1-hour nitrogen dioxide objectives occurred in 2017 and 2018. Furthermore, all the monitoring sites are located at most 6 m away from the kerb and are unlikely to be representative of conditions at the proposed development. Defra's Technical Guidance (Defra, 2018b) states that "*concentrations fall-off rapidly on moving away from the source*", hence it is expected the concentrations at the proposed development, at least 25m from the A617, will be closer to the background levels which are well below the objectives (see Table 3). Background concentrations of PM_{10} at the proposed development are also well below the objectives. Thus, it can be concluded that future residents will experience acceptable air quality, and there is no need for more detailed assessment.

Significance of Operational Air Quality Effects

6.3 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A1, and takes account of the assessment that:

- pollutant concentrations within the proposed development will all be below the objectives, thus future residents will experience acceptable air quality; and
- additional traffic generated by the proposed development will fall below recognised screening thresholds and will not affect local air quality conditions.

7 Mitigation

7.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The proposed development incorporates green infrastructure separating the proposed residential dwellings and the A617. The proposed green infrastructure has the potential to act as a screen between the Site and emissions from vehicles on the A617.

7.2 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law).

8 Conclusions

8.1 The air quality impacts associated with the proposed development on land south of the A617, Rainworth have been assessed. The assessment has demonstrated that pollutant concentrations at the proposed development will be well below the objectives that the emissions from the additional traffic generated by the proposed development will have no adverse effects on local air quality.

8.2 The overall operational air quality effects of the proposed development are judged to be 'not significant'.

Policy Implications

8.3 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 180 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 181, as it will not affect compliance with relevant limit values or national objectives.

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10 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
EU	European Union
EV	Electric Vehicle
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
µg/m^3	Microgrammes per cubic metre
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles

PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide

11 Appendices

A1 EPUK & IAQM Planning for Air Quality Guidance

A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A1.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A1.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A1.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A1.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A1.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A1.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

A2 Professional Experience

Penny Wilson, BSc (Hons) CSci MIEnvSc MIAQM

Ms Wilson is an Associate Director with AQC, with more than 20 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including odours. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning applications. She has provided expert evidence to a number of Public Inquiries, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Guido Pellizzaro, BSc (Hons) MIAQM MIEnvSc PIEMA

Mr Pellizzaro is an Associate Director with AQC, with more than 14 years' experience in the field of air quality management and assessment. His main experience relates to managing and delivering air quality assessments for major planning applications and EIA development. He is a Member of the Institution of Environmental Sciences and of the Institute of Air Quality Management, and a Practitioner of the Institute of Environmental Management and Assessment.

Tomáš Liška, BSc (Hons)

Mr Liška is an Assistant Consultant with AQC, having joined in September 2020. He holds a BSc in Meteorology and Climate Science from the University of Leeds and is currently finishing his PhD at the University of Edinburgh, which investigates population exposure to air pollution and its inequality in the UK. Tomáš has a keen interest in modelling and data science. He is now gaining experience in the field of air quality monitoring and assessment.

A3 Consultation with the Local Authority

From: Pollution@newark-sherwooddc.gov.uk <Pollution@newark-sherwooddc.gov.uk>
Sent: 14 December 2020 15:18
To: Guido Pellizzaro <guidopellizzaro@aqconsultants.co.uk>
Subject: RE: Residential development, Rainworth, Air Quality Scope

Hello Guido,

I can confirm acceptance of the proposed methodology for air quality assessment,

Kind Regards,

Jim Hemstock

Environmental Health Technical Officer
Newark & Sherwood District Council
Castle House
Great North Road
Newark
NG24 1BY
Tel: 01636 655430

E-mail: jim.hemstock@nsdc.info

From: Guido Pellizzaro <guidopellizzaro@aqconsultants.co.uk>
Sent: 14 December 2020 14:56
To: Pollution <Pollution@newark-sherwooddc.gov.uk>
Subject: Residential development, Rainworth, Air Quality Scope

Dear Jim,

We have been appointed to carry out an Air Quality Assessment to support the planning application for the outline planning application of a residential scheme on land south of the A617 in Rainworth. I have attached a file showing the site location and indicative plan.

The proposed development is entirely residential. I note Newark and Sherwood Council have not designated an AQMA and the closest nitrogen dioxide concentration at monitoring site DT SRE in Rainworth (undertaken by Mansfield Council) showed annual mean nitrogen dioxide concentration of 18.1 µg/m^3 in 2018. For other monitoring sites on roads with similar vehicle flows to the A617, the objective was also met. Therefore I am proposing to screen out the need for an assessment of air quality for future occupants. In addition, the proposed development will generate 492 AADT LDVS, which is below the IAQM screening criterion of 500 AADT outside of an AQMA.

Base on the above, we are proposing the following methodology:

- Defining baseline conditions, including identifying monitoring data and existing sources or pollutants in the area;
- Setting out why air quality is not a constraint to development (as above); and
- Identifying the need for any mitigation measures to be applied during operation of the development.

I would be grateful if you could confirm whether the approach set out above is acceptable, and also let me know if you have any further comments that may be helpful.

Thanks

Guido Pellizzaro

Associate Director

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