



The Old Bowling Green Phase 2

Air Quality Assessment

Bagnall Heights Ltd

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SLR Consulting Limited

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Basis of Report

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1.0 Introduction

SLR Consulting Ltd (SLR) has been commissioned by Bagnall Heights Ltd to undertake an Air Quality Assessment (AQA) to accompany the change-of-use planning application at the Bagnall Heights Care Home, Leek Road, Cellarhead (the 'Site'). The change-of-use application comprises:

- The conversion of the extant communal lounge building to comprise two bungalows; and
- The conversion of the existing ground floor of the adjacent commercial building from a beauty salon to the communal lounge.

The above amendments are hereafter referred to as the 'Proposed Development'.

1.1 Background

A planning application was submitted to Staffordshire Moorlands District Council (SMDC) in 2023 for the *construction of 9 extra care units (C2), communal lounge/office and associated works* (SMDC planning reference: SMD/2023/0496). As part of this application, SLR provided an AQA¹ in response to formal consultation comments from the Environmental Heath Officer (EHO) at SMDC, requesting consideration of air quality impacts upon proposed receptors due to the Site's proximity to the Cellarhead Air Quality Management Area (AQMA). The application was granted consent in 09/08/2024. This extant permission is hereby referred to as 'Phase 1'.

The Site is located at the approximate National Grid Reference (NGR): x395800, y347600. The surrounding area comprises:

- Open agricultural land to the north and east; and
- The A52 Kingsley Road immediately to the south, beyond which are 22 dwellings built on the car park of the former Hope and Anchor public house (SMDC planning reference: SMD/2013/0976).

Primary vehicular access to the Site is via the A520 Leek Road, which borders the Site to the west. The Proposed Development will not change the access provision in comparison to that approved as part of that approved under Phase 1.

1.2 Scope of Assessment

Consultation with the EHO at SMDC was undertaken to agree upon the extent and methodology of the AQA². The following scope of works has been undertaken as part of this AQA as agreed with SMDC:

- Baseline Evaluation – Assessment of existing air quality in the local area;
- Operational Phase – Identification and assessment of potential air quality impacts associated with the operational phase of the Proposed Development;
- Site-suitability Assessment - Identification and assessment of pollutant concentrations at the Site, to ensure new receptors are not introduced into an area of existing poor air quality; and

¹ SLR Consulting Ltd, 402.065154.00001 'The Old Bowling Green, Leek Road: Air Quality Assessment', December 2023.

² Email correspondence between SLR Consulting Ltd and Daniel McCrory (Principal Pollution Officer), dated 20th April 2026.



- Mitigation Measures – Identification of mitigation measures, as appropriate.

As agreed with SMDC, a construction phase dust risk assessment has been scoped out of this assessment as the Proposed Development does not constitute any exterior amendments or additional construction beyond that agreed as part of Phase 1.



2.0 Background Context

2.1 Legislation

A dual set of regulations, applicable to National and Local Government separately are currently operable within the UK.

2.1.1 National Obligations

2.1.1.1 Air Quality Standards

The Air Quality Standards Regulations 2010³ (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC), and the Fourth Daughter Directive (2004/107/EC) within UK legislation, in order to align and mirror European obligations. The AQSR includes Limit Values which are legally binding ambient concentration thresholds, however, must be assessed at specific locations (micro and macroscale sampling points). Carriageways or central reservations of roads and any location where the public do not have access (e.g. industrial sites) are exempt. If the sampling point does not comply with the siting locations (Schedule 1: AQSR), then strict comparison cannot be made.

Following the UK's withdrawal from the EU, the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020⁴ was introduced to mirror revisions to supporting EU legislation. The fine particulate matter (PM_{2.5}) Limit Value is 20µg/m³ (to be met by 2020).

The responsibility of achieving the AQSR (and European equivalent Directives) is a national obligation for Central Government and Devolved Administrations who undertake assessments on an annual basis. Local Authorities have no responsibility to achieve the AQSR or the European equivalent Directives, unless otherwise instructed to assist Central Government under Ministerial Direction.

In response to persistent exceedences, the Government published its 2017 plan⁵ for reducing roadside nitrogen dioxide (NO₂) concentrations in order to achieve compliance in the shortest time possible. This has resulted in the introduction of Clean Air Zones across England. However, SMDC were not identified as required to conduct a feasibility study to achieve compliance.

2.1.1.2 Environment Targets (Fine Particulate Matter) Regulations

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023⁶ introduced an annual mean concentration target of 10µg/m³ to be met across England by 2040. Central Government and Devolved Administrations is responsible for meeting this target, however not until 2040. Local Authorities have no responsibility to achieve this target.

2.1.2 Local Obligations

Part IV of the Environment Act 1995 (as amended) requires the Secretary of State to review the national Air Quality Strategy (AQS) every five years and modify if required. It also

³ The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

⁴ The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument No. 1313, The Stationary Office Limited.

⁵ UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations, 2017.

⁶ The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. UK Statutory Instruments 2023 No. 96.



established the system of Local Air Quality Management (LAQM) for Local Authorities to regularly review and assess air quality within its area.

The Air Quality (England) Regulations 2000 (as amended) ('the Regulations') provide the statutory basis for the Air Quality Objectives Local Authorities must adhere to under LAQM in England. PM_{2.5} is not currently cited within the Regulations; however, in line with the AQS and the '*PM_{2.5} Targets: Interim Planning Guidance*' issued by the Department for Environment, Food & Rural Affairs (Defra) in October 2024⁷, Local Authorities are however required to work towards reducing PM_{2.5}.

The Air Quality Objectives apply at locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period (relevant exposure). Table B provides an indication of those locations. Where any of the prescribed Air Quality Objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective.

The latest AQS for England was published in 2023⁸. The AQS provides the delivery framework for air quality management across England for local authorities and summarises the air quality standards and objectives operable within England for the protection of public health and the environment.

The ambient air quality standards of relevance this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table A. These are primarily based upon the Air Quality Objectives Local Authorities are responsible for achieving – reflective of the Local Planning Authority's duties. The PM_{2.5} AQSR AQAL has also been included for completeness, to provide an indicative assessment (as the sampling point may not comply with the siting locations prescribed under Schedule 1: AQSR).

Table A: Relevant Ambient AQALs

Pollutant	AQAL (µg/m ³)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)
Particles (as PM ₁₀)	40	Annual mean
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)
Particles (as PM _{2.5})	20	Annual mean
Note: The PM_{2.5} AQAL is not prescribed within the Air Quality (England) Regulations 2000 / 2002 and there is no requirement for local authorities to meet it. Exceedences are only valid at specific siting locations (Schedule 1: AQSR).		

⁷ Defra, PM_{2.5} Targets: Interim Planning Guidance, (2024).

⁸ Air Quality Strategy: Framework for Local Authority Delivery, Department for Environment Food and Rural Affairs, April 2023.



Table B: Human Health Relevant Exposure

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
Annual Mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

2.1.3 Environmental Protection Act 1990

The Environmental Protection Act 1990⁹ sets out provisions for the regulation of statutory nuisances. Section 79 sets out this statutory nuisance as, '*any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*'.

Section 79 requires that, where a complaint of a statutory nuisance is made to it by a person living within its area, a Local Authority must take steps as are reasonably practicable to investigate the complaint and decide whether the associated emission (i.e. dust, for example) is prejudicial to health or a nuisance.

Fractions of dust greater than 10µm (i.e. greater than PM₁₀) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.2 Policy

2.2.1 National Policy

2.2.1.1 Clean Air Strategy

The 2019 Clean Air Strategy¹⁰ sets out the Government's proposals aimed at delivering cleaner air in England and indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

2.2.1.2 Environment Improvement Plan 2025

In England, the newly published Environment Improvement Plan 2025 (EIP 2025)¹¹ establishes revised air quality commitments which follow the statutory Environment Act 2021 targets.

Under "Goal 2: Clean Air", the EIP sets an annual mean PM_{2.5} concentration target of 10µg/m³ to be achieved by December 2030 – advancing the previous target date of 2040.

⁹ The Environmental Protection Act 1990. Available at <http://www.legislation.gov.uk/ukpga/1990/43/contents>.

¹⁰ The Clean Air Strategy, Defra. January 2019.

¹¹ <https://www.gov.uk/government/publications/environmental-improvement-plan-2025/environmental-improvement-plan-eip-2025>.



The EIP further sets a population PM_{2.5} exposure reduction target of 30% by the same date and proposes tighter regulation of emissions sources, including agricultural activities and small combustion plants, alongside the decarbonisation of transport.

2.2.1.3 National Planning Policy Framework

The December 2024 update to the National Planning Policy Framework¹² (NPPF) sets out planning policy for England. The NPPF states that the planning system should contribute to and enhance the natural and local environment, by preventing new development from contributing to or being adversely affected by unacceptable concentrations of air pollution and development should, wherever possible, help to improve local environmental conditions such as air quality.

In specific relation to air quality policy, the document states:

“Chapter 15 - Conserving and Enhancing the Natural Environment

Para 199: 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.”

The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG)¹³ which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

“The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant 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.”

“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).”

The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating 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. [...] Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact”*.

¹² National Planning Policy Framework, Ministry of Housing, Communities & Local Government. 2024.

¹³ Planning Practice Guidance: Air Quality. Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government. November 2019.



2.2.2 Local Policy

The Staffordshire Moorlands Local Plan¹⁴ was adopted in September 2020, and sets out the development strategy, strategic and development management policies and land designations for the district for the period 2014 to 2033. Within the Local Plan, the following policy relates to air quality:

*“Policy SD4: Pollution and Water Quality The Council will protect people and the environment from unsafe, unhealthy and polluted environments by ensuring proposals avoid potential adverse effects; and
only permitting proposals that are deemed (individually or cumulatively) to result in pollution (including air / water / noise / vibration / light / ground contamination) if after mitigation, potential adverse effects are deemed acceptable. This may be achieved by the imposition of planning conditions or through a planning obligation.
[...].”*

The above policy has been considered as part of this assessment.

2.3 Assessment Guidance

This assessment has been carried out in accordance with the following principles contained within the guidance documents below.

- Department for Environment Food and Rural Affairs (Defra): Local Air Quality Management Technical Guidance (LAQM.TG(22))¹⁵;
- Defra: COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021¹⁶;
- Defra: PM_{2.5} Targets: Interim Planning Guidance⁷ (the ‘PM_{2.5} IPG’);
- Environmental Policy Implementation Community (EPIC) (previously Environmental Protection UK (EPUK)) and the Institute of Air Quality Management (IAQM): Land-Use Planning and Development Control: Planning for Air Quality¹⁷ (hereafter referred to as the ‘EPIC & IAQM Guidance’);
- IAQM: Use of 2020 and 2021 Monitoring Datasets¹⁸; and
- National Highways: Design Manual for Roads and Bridges, LA105 - Air Quality (Vertical Barriers)¹⁹ (the ‘DMRB LA 105’ guidance).

¹⁴ Staffordshire Moorlands District Council, Staffordshire Moorlands Local Plan, September 2020.

¹⁵ Local Air Quality Management Technical Guidance (22), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. May 2025.

¹⁶ Defra and the Greater London Authority, COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021. April 2021.

¹⁷ EPIC and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, v1.2 2017.

¹⁸ IAQM, Use of 2020 and 2021 Monitoring Datasets, v1.1, December 2023.

¹⁹ National Highways, DMRB, LA 105 – Air Quality (Vertical Barriers), (2024).



3.0 Assessment Methodology

3.1 Operational Phase

3.1.1 Road Traffic Emissions Assessment

The assessment of potential air quality effects in relation to the operation of the Proposed Development has been undertaken qualitatively, in accordance with the EPIC & IAQM Guidance.

The EPIC & IAQM Guidance provides a series of '*indicative criteria for assessment*' where, if exceeded, requires further consideration to determine the potential effect on air quality. If the change in road traffic movements on the local road network is found not to exceed any of the relevant indicative criteria presented, then a detailed impact assessment is consequently not required. Impacts can therefore be described as having an 'insignificant' effect on local air quality.

The indicative screening criteria relevant for this assessment is as follows:

- Outside of an AQMA:
 - A change of Light-Duty Vehicle (LDV: defined as <3.5t) flows of more than 500 as a 24-hour annual average daily traffic (AADT) flow; and/or
 - A change of Heavy-Duty Vehicles (HDV: defined as >3.5t) flows of more than 100 as a 24-hour AADT.
- Within, or adjacent to, an AQMA:
 - A change of LDV flows of more than 100 as a 24-hour AADT flow; and/or
 - A change of HDV flows of more than 25 as a 24-hour AADT flow.

3.1.2 Site Suitability Assessment

A Site Suitability assessment is required to assess the likely exposure that future residents associated with the Proposed Development may experience to ensure the Site is suitable for residential use.

This has been undertaken with reference to Defra's *NO₂ fall Off With Distance Calculator* tool referred to within the AQA¹ provided for Phase 1. Further consideration has been given to the EPIC & IAQM Guidance¹⁷, the Defra PM_{2.5} IPG⁷ and with reference to local monitoring data relative to the AQALs. The exposure assessment considers:

- Background and future baseline air quality and whether this will likely approach or exceed an AQAL;
- The presence and location of an AQMA as an indicator of local hotspots where the AQALs may be exceeded; and
- The presence of any heavily trafficked roads / potential emission sources, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO₂ and PM_{2.5}), that could cause unacceptably high exposure for users of the new development.

Guidance for determining operational phase effects associated with air quality is provided by EPIC & IAQM, which states: "*where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means*".



4.0 Baseline Environment

4.1 LAQM Review and Assessment

SMDC, in fulfilment of statutory requirements, has conducted an on-going exercise to review and assess air quality within their administrative area. The latest publicly available LAQM report for SMDC at the time of writing is the 2025 Air Quality Annual Status Report²⁰ (ASR).

SMDC currently has two AQMAs, both of which have been declared for exceedences of the annual mean NO₂ AQAL at location of relevant public exposure. The closest is the Cellarhead AQMA, which was declared in 2019 and is located adjacent to the Site. Within the SMDC 2025 ASR, The Cellarhead AQMA is described as:

“The area encompasses the area known locally as the Cellarhead crossroads, which is a busy junction between the A52 and the A520. The AQMA extends 250m (A520) North, 230m South (A520), 480m East (A52) and 210m West (A52) of the junction.”

Reference should be made to Figure 1 for an illustration of the extents of the Cellarhead AQMA relative to the Site.

It is noted that the SMDC 2025 ASR discusses the intention to revoke the Cellarhead AQMA during 2025 due to five years of continued compliance with the annual mean NO₂ AQAL within the designation. However, at the time of writing, the Cellarhead AQMA remains in place.

4.2 Review of Air Quality Monitoring

4.2.1 Automatic Air Quality Monitoring

SMDC do not presently undertake any automatic monitoring within their administrative area.

The nearest Automatic Urban and Rural Network (AURN) automatic monitor is situated approximately 6km to the south-west of the Site (the ‘Stoke-on-Trent A50 Roadside’ AURN). Given the separation distance between this monitor and the Site and the differences in local characteristics, comparable pollutant concentrations are not anticipated. Therefore, this source of data has not been considered.

4.2.2 Passive Diffusion Tube Monitoring

Passive NO₂ diffusion tube monitoring was undertaken by SMDC at numerous locations within its administrative area during 2024.

The details and results of the monitoring location considered to be most relevant to this assessment is presented in Table C and Table D, respectively, whilst also shown in Figure 1. All monitoring data presented has been ratified by SMDC.

²⁰ Staffordshire Moorlands District Council, 2025 Air Quality Annual Status Report, June 2025.



Table C: Local NO₂ Diffusion Tube Monitoring Sites: Details

Site ID	Site Type	NGR (m)		Height (m)	Within AQMA?	Distance (m) and Direction to Site
		X	Y			
69	Roadside ²¹	395712	347594	2.5	Yes	34
55	Roadside	395754	347560	2.6	Yes	12
49	Roadside	395811	347530	2.5	Yes	10
53	Roadside	395727	347570	2.7	Yes	21
56	Roadside	395699	347577	2.7	Yes	46
70	Roadside	395719	347565	2.6	Yes	29
42 (A&B)	Roadside	395704	347562	2.7	Yes	44
39 (A&B)	Roadside	395702	347553	2.5	Yes	50
38 (A&B)	Roadside	395702	347548	2.6	Yes	54
54 (A)	Roadside	395732	347575	2.6	Yes	37
Note: (A) Monitoring location '54' has been discontinued. However, the 2019 monitoring result from this location was utilised within the AQMA ¹ for Phase 1 to calculate the predicted annual mean NO ₂ concentration at the building façade of the Site.						

Table D: Local NO₂ Diffusion Tube Monitoring Sites: Results

Site ID	2024 Data Capture %	Annual Mean NO ₂ Concentration (µg/m ³)				
		2020 (A)	2021 (A)	2022	2023	2024
69	100	-	-	-	24.0	22.2
55	100	23.6	25.9	27.1	27.1	22.3
49	100	18.7	20.0	20.0	21.4	19.1
53	90.6	28.4	30.2	32.0	31.2	26.1
56	73.6	27.6	27.3	30.4	32.4	25.1
70	75.5	-	-	-	26.0	23.0
42 (A&B)	100	30.6	32.8	34.6	32.5	28.5
39 (A&B)	100	32.4	35.1	35.0	33.4	30.9
38 (A&B)	100	32.0	35.6	35.3	32.9	30.2
54 (A)	N/A	17.4	19.3	20.0	-	-
Note: (A) As per guidance published by Defra ¹⁶ and the IAQM's Position Statement ¹⁸ , monitoring results obtained in 2020 and 2021 are likely to be atypical due to the impacts of the COVID-19 pandemic. The IAQM's Position Statement ¹⁸ further states "the 2022 (or later year) monitoring data is likely to represent a post-pandemic baseline".						

As shown in Table D, there have been no exceedences of the annual mean NO₂ AQAL within the Cellarhead AQMA during the period 2020 to 2024. Moreover, none of these

²¹ Roadside site classification defined by LAQM.TG(22) as: "A site sampling typically within one to five metres of the kerb of a busy road".



locations have recorded an annual mean NO₂ concentration in excess of 90% of the AQAL, supporting SMDCs intention to revoke the AQMA.

In 2024, the highest monitored annual mean NO₂ concentration was 30.9µg/m³, representing 77.3% of the AQAL. The majority of locations recorded an annual mean NO₂ concentration 'well-below' the AQAL (i.e. <75%).

Since 2022 (i.e. following the "atypical" concentrations recorded as a result of the COVID-19 pandemic), there has been a downward trend in annual mean NO₂ concentrations at each of the monitoring locations within the Cellarhead AQMA.

The empirical relationship given in LAQM.TG(22) states that exceedences of the 1-hour mean NO₂ AQAL is unlikely to occur where annual mean concentrations are <60µg/m³. This indicates that an exceedence of the 1-hour mean AQAL was unlikely to have occurred at the above location in between 2020 and 2024.

4.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average concentration estimates for NO₂, PM₁₀ and PM_{2.5} using a base year of 2021 (the year in which comparisons between modelled and monitoring are made).

The Defra mapped background concentrations for the base year (2024) and the earliest predicted completed opening year of the Proposed Development (2028), for the grid square which covers the Site, are presented in Table E below.

All of the mapped background concentrations presented are "well-below" the respective annual mean AQALs.

Table E: Defra Mapped Background Pollutant Concentrations

Grid Square (X, Y) (m)	Year	Annual Mean Concentration (µg/m ³)		
		NO ₂	PM ₁₀	PM _{2.5}
395500, 347500	2024	6.9	10.0	6.1
	2028	6.1	9.8	5.8
AQAL		40	40	20

4.4 Defra's Pollution Climate Mapping Model

The Pollution Climate Mapping (PCM) model comprises a suite of models that provide annual mean pollutant concentrations across the UK. It includes predictions at roadside locations for major roads and serves as Defra's primary mechanism for reporting compliance with National Obligations (see Section 2.1.1).

Modelled concentrations reflect roadside exposure, based on receptors located 4m from the road at a height of 2m. Concentrations are expected to decline with increasing distance from the road.

The latest PCM dataset includes semi-empirical roadside annual mean concentration estimates for NO₂, PM₁₀ and PM_{2.5} based on a 2023 reference year (the year in which



modelled outputs are compared against monitoring data)²². This provides a conservative baseline as air quality is expected to improve in future years.

The PCM road link nearest to the Site is the A52 Cellarhead Road (Census ID: 802056537), situated approximately 30m to the west of the Site at its closest extent (Figure 1). Reported values are presented in Table F, alongside the relevant AQALs.

Table F: Defra PCM 2023 Modelled Annual Mean Concentrations

Road Link	Census ID	Year	Annual Mean Concentration (µg/m ³)		
			NO ₂	PM ₁₀	PM _{2.5}
A52 Cellarhead Road	802056537	2023	12.3	11.5	6.9
Relevant AQAL			40	40	20

All modelled PCM concentrations are well below the relevant annual mean AQALs.

²² Defra PCM (2023 Reference Year), https://uk-air.defra.gov.uk/data/modelled-data?base_year=2023.



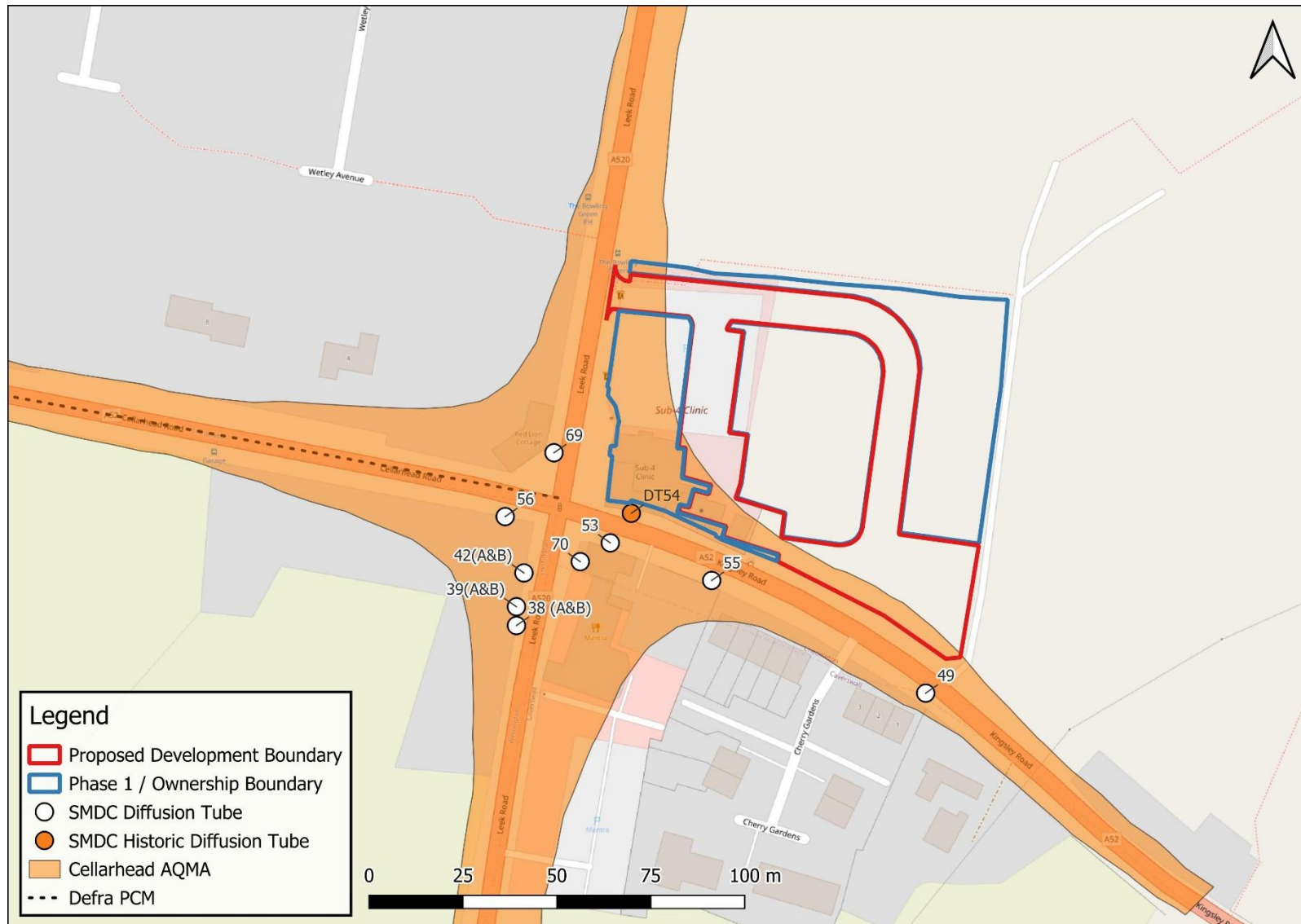


Figure 1: Site Setting and Baseline Air Quality Datasets



5.0 Operational Phase Assessment

This section presents the potential air quality impacts and effects associated with the operational phase of the Proposed Development.

5.1 Road Traffic Screening Assessment

Traffic data used for screening purposes was sourced from the Transport Statement²³ submitted in support of the consented Phase 1 planning application, with further guidance provided by the appointed transport consultant to the applicant – Focus Transport Planning (Focus). Focus have indicated that, given the scale of the Proposed Development (i.e. Phase 2), their involvement is not considered necessary. Input from Phase 1 has therefore been utilised for the purposes of the Proposed Development.

A review of the total vehicle TRICs output, as shown in Page 5 of Appendix TS4 of the Transport Statement, has been undertaken. The TRICs output indicates a total trip generation of 3.193 per dwelling. By multiplying this value by the number of proposed dwellings (2), a trip generation of 6 vehicles per day (rounded from 6.386) is derived.

To calculate the total HDV trip generation, Page 7 of Appendix TS4 of the Transport Statement has further been reviewed. The TRICS output for OVGs (Ordinary Goods Vehicles – defined as >3.5 tonnes in weight²⁴) indicates a total trip generation of 0.04 per dwelling. By multiplying this value by the number of proposed dwellings, a trip generation of 0.08 vehicles per day (i.e. <1 per day) is derived.

Confirmation of this approach was sought from Focus during consideration of the Phase 1 impacts²⁵, whom confirmed:

“The TRICS data [...] doesn’t include any site outside the period 7am-7pm, so arguably the daily trip rate could be higher. However, given we’re talking about a very specific use here, [...] the nature of the use is that there will be very few additional movements outside of that period. [...] add 10% to account for any potential movements outside those hours.”

Following this approach, the predicted trip generation associated with the Proposed Development is summarised in Table G.

Table G: Maximum Development Trip Generation: Proposed Development, Phase 2

Scenario	AADT		
	All	LDVs	HDVs
Proposed Use	7 (A)	7 (A)	<1 (0.088)
EPIC & IAQM Screening Criteria (B)		100	25
Notes: (A) Figures rounded to the nearest whole number from 7.0246. (B) Based upon areas <i>within an AQMA</i> .			

As shown in Table G, the maximum generated trips are not predicted to exceed the relevant criteria, with the AADT values expected to further reduce once distributed onto the local road

²³ Focus Transport Planning, The Old Bowling Green, Leek Road, Cellarhead, Staffordshire, ST9 0JQ – Transport Statement, October 2023.

²⁴ Therefore, mirroring the relevant ‘HDV’ classification as stated in air quality guidance.

²⁵ Email communication between SLR Consulting Ltd and Focus Transport Planning, dated 14th December 2023.



network. Effects associated with the operation of the Proposed Development can therefore be considered as 'insignificant' in reference to the stated EPIC & IAQM guidance and require no further consideration.

To consider cumulative effects of Phase 1 and Phase 2, Table H below shows the combined trip generation from both Phases.

Table H: Cumulative Trip Generation

Scenario	AADT		
	All	LDVs	HDVs
Proposed Use (i.e. Phase 2)	7	7	<1
Consented Use (i.e. Phase 1) ^(A)	32	32	<1
Cumulative	39 ^(B)	39 ^(B)	<1 (0.484)
EPIC & IAQM Screening Criteria ^(C)		100	25
Notes:			
(A) As quoted in the Phase 1 AQA ¹ .			
(B) Figures rounded to the nearest whole number from 38.6353.			
(C) Based upon areas <i>within an AQMA</i> .			

As shown in Table H, the maximum generated cumulative trips are not predicted to exceed the relevant criteria, with the AADT values expected to further reduce once distributed onto the local road network. Effects associated with the operation of the Proposed Development in addition to Phase 1 can therefore be considered as 'insignificant' in reference to the stated EPIC & IAQM guidance and require no further consideration.

5.2 Site Suitability Assessment

The EPIC & IAQM Guidance requires a site suitability to determine whether future occupants of the scheme are likely to be exposed to existing levels of poor air quality. The Defra PM_{2.5} IPG emphasises the need to assess exposure to PM_{2.5} concentrations and requires applicants to minimise exposure to PM_{2.5} emission sources whenever feasible and appropriate.

5.2.1 NO₂

An NO₂ fall-off with distance calculator tool²⁶ has been produced to assist LAQM practitioners by means of a simple equation which allows NO₂ monitored concentrations made at one distance from a road to be used to predict concentrations at a different distance from the same road. This calculator was utilised within the assessment of site-suitability for Phase 1. Reference should be made to the AQA¹ approved as part of Phase 1 for wider details.

The NO₂ fall-off with distance calculator utilised a historic monitoring location which has since been discontinued: DT54 (as discussed in Section 4.2.2 and shown in Figure 1). DT54 was determined to be the only suitable monitoring location for use within the calculator in accordance with the requirements of LAQM.TG(22). This remains to be the case for the current monitoring locations. At the time of assessment, the most appropriate annual mean dataset from DT54 was 2019, given the implications of the COVID-19 pandemic on

²⁶ <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/no2-falloff/>.



subsequent datasets. The calculator tool was used to predict an annual mean NO₂ concentration at a distance of 5.8m from the kerbside of the road. This assessed the façade of the communal lounge, for which the Proposed Development seeks to convert into two bungalows. The resulting 2019 annual mean NO₂ concentration predicted at the façade of the building was 24.0µg/m³, representing 60% of the AQAL (i.e. 'well-below'). It is noted that the separation distance between the Salon, for which the Proposed Development seeks to convert into the communal lounge, and the kerbside is also approximately 5.8m. Therefore, the resultant concentration as predicted through the NO₂ fall-off with distance calculator presented in the Phase 1 AQA remains robust and relevant to the Proposed Development.

There is a clear trend of improving air quality in the vicinity of the Proposed Development. This is evidenced by the monitored data within the extent of the Cellarhead AQMA, SMDC's intention to revoke the Cellarhead AQMA, and the removal of DT54 as a monitoring location.

As shown and discussed in Section 4.0, the monitoring data within the vicinity of the Site and within the extent of the Cellarhead AQMA shows a clear downward trend in annual mean NO₂ concentrations, with all locations recording 2024 annual mean NO₂ concentrations <90% of the AQAL, supporting the revocation of the AQMA. The SMDC 2025 ASR states:

"All eight (8) monitoring sites recorded annual mean NO₂ concentrations below 36µg/m³ (i.e. below 10% of the annual mean NO₂ objective). The maximum concentration was 30.9µg/m³ at Site 39, which is a duplicate site located at Cellarhead Junction.

Concentrations at all existing sites decreased on average by 3.9µg/m³ compared to 2023 data. Concentrations at all sites also decreased compared to 2020, 2021 and 2022 data.

Cellarhead AQMA has been compliant for the past five years reported (2020 to 2024). Due to the impact of the COVID-19 pandemic restrictions on traffic volumes, 2020 and 2021 are not considered representative of long-term trends in pollutant concentrations. The revocation of Leek [sic] AQMA is being considered following three consecutive years of compliance i.e. 10% below the relevant objective at the point of exposure."

Further to this, the discontinuation of monitoring location DT54 used in the NO₂ Fall-Off Assessment for Phase 1 indicates that SMDC consider there to be no risk of exceeding the annual mean NO₂ AQAL in this location, in accordance with the procedural guidance of LAQM.TG(22):

"[...] Monitoring networks have also been progressively extended to identify all potential hot spots, whilst a number of sites have been relocated to more relevant areas, or discontinued in areas where data has shown that compliance is achieved."

It is therefore considered that annual mean NO₂ concentrations do not pose a constraint to development at the Site. Furthermore, with reference to the 2020 – 2024 monitored concentrations and the predicted 2019 annual mean NO₂ concentration predicted at the façade of the Proposed Development, based upon the methodology presented within LAQM.TG(22)²⁷ exceedences of the 1-hour mean NO₂ AQAL are considered unlikely.

5.2.2 Particulate Matter (PM₁₀ & PM_{2.5})

A review of aerial imagery of the Site setting indicates there are considered to be no sources of dust that may affect amenity for future occupants of the Proposed Development. It is

²⁷ LAQM.TG(22) states: "[...] exceedences of the NO₂ 1-hour mean are unlikely to occur where the annual mean is below 60µg/m³."



noted that there are existing uses of relevant exposure to the annual mean and 24-hour mean AQALs (as defined in Table B) in all directions to the Site. At these existing receptors, there are no PM₁₀ / PM_{2.5} AQMAs indicating no existing hotspot locations whereby annual mean or 24-hour AQALs may be exceeded.

With reference to the AQA¹ approved as part of Phase 1, a review of SMDC's LAQM – Detailed Modelling Study report²⁸ was undertaken. This review demonstrated that there are no predicted exceedences of the annual mean PM₁₀ or PM_{2.5} AQALs, or the 24-hour mean PM₁₀ AQAL, at any location within the SMDC's LAQM – Detailed Modelling Study report domain, including at the Site. A review of the Site setting indicates that there have been no new sources of particulate matter (as either PM₁₀ or PM_{2.5}) in the interim since this review was undertaken.

Furthermore, it is noted that background concentrations²⁹ and road traffic emissions³⁰ are forecast to reduce year-on-year due to improvements in the vehicle fleet-mix, for example. Therefore, as the SMDC's LAQM – Detailed Modelling Study report predictions are based upon a 2019 base-year, and the Proposed Development is not anticipated to be completed and operational until 2028, it is reasonable to conclude that absolute annual mean PM₁₀ and PM_{2.5} concentrations would be lower in 2028 in comparison to those predicted in 2019.

5.2.3 Summary

Overall, the findings of the site suitability assessment show the Site is suitable for the proposed residential use, and no further assessment is required. Effects associated with the likely exposure of future occupants in relation to NO₂, PM₁₀ and PM_{2.5} concentrations are considered to be 'not significant' and no further mitigation measures are required.

²⁸ Staffordshire Moorlands District Council, Detailed Modelling Study, December 2022.

²⁹ <https://uk-air.defra.gov.uk/data/laqm-background-home>.

³⁰ <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/>.



6.0 Mitigation Measures

In accordance with the EPIC & IAQM Guidance, road traffic impacts associated with the operation of the Proposed Development can be considered as having an 'insignificant' effect on local air quality. Furthermore, the Proposed Development is found to be suitable for residential purposes with no predicted exceedences of the considered AQALs at the Site, with air quality effects considered to be 'insignificant'.

As such, long-term scheme-specific mitigation measures in relation to operational effects arising from road traffic emissions are therefore not considered to be necessary.



7.0 Conclusions

SLR has been commissioned by Bagnall Heights Ltd to undertake an AQA to accompany the change-of-use planning application at the Bagnall Heights Care Home, Leek Road, Cellarhead.

The Proposed Development is expected to generate road traffic volumes below the relevant *indicative criteria for assessment* as presented within EPIC & IAQM Guidance. Therefore, road traffic emission impacts associated the operation of the Proposed Development are considered to have an 'insignificant' effect on local air quality and existing human receptors.

A Site Suitability Assessment has been undertaken in line with EPIC & IAQM Guidance and the Defra PM_{2.5} IPG, which show that the Site is suitable for its proposed use. Effects associated with the likely exposure of future occupants in relation to NO₂, PM₁₀ and PM_{2.5} concentrations are considered to be 'not significant' in reference to the stated EPIC & IAQM Guidance and no further mitigation measures are required.





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