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College Farm, Shortstown

Air Quality Baseline Review

Date: February 2020

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Document Reference: WIE15761-105-AQ-TN-1-1-2

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1. Introduction

1.1. This Technical Note presents the details of the existing air quality conditions in relation to the proposed residential development of College Farm, Shortstown (hereafter referred to as the 'Site'), to accompany the promotion of the Site under an approved planning framework for a residential led Development. The Site is located within the administrative boundary of Bedford Borough Council (BBC)

1.2. This air quality baseline assessment includes a review of BBC's air quality monitoring data as well as a desk-based review of traffic data.

2. National Air Quality Framework

2.1. The Environment Act 1995[1] required the preparation of a national air quality strategy setting health–based air quality objectives for specified pollutants and outlining measures to be taken by Local Planning Authorities (LPAs) in relation to meeting these (the Local Air Quality Management system).

2.2. The UK Air Quality Strategy (AQS) 2007[2], sets out standards and objectives for the eight main health-threatening air pollutants in the UK (benzene, 1,3 butadiene, carbon monoxide, lead, nitrogen dioxide, particles, sulphur dioxide and ozone). The standards are based on an assessment of the effects of each pollutant on public health, based on recommendations by the Expert Panel on Air Quality Standards, The European Union Air Quality Daughter Directive and the World Health Organisation. Local Authorities are responsible for seven of the eight air pollutants under Local Air Quality Management (LAQM). National objectives have also been set for the eighth pollutant, ozone, as well as for nitrogen oxides and sulphur dioxide in relation to vegetation and ecosystems.

2.3. Part IV of the Environment Act 1995 provides a system of LAQM under which Local Planning Authorities (LPAs) are required to review and assess the existing and future quality of the air within their administrative boundaries by way of a staged process. If this process suggests that any of the

[1] Office of the Deputy Prime Minister (ODPM), 1995. 'The Environment Act 1995', HMSO.
[2] Defra, 2007. 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'

AQS Objectives will not be met by the target dates, the LPA must consider the declaration of an Air Quality Management Area (AQMA) and the subsequent preparation of an Air Quality Action Plan (AQAP) to improve the air quality in that area in pursuit of the Objectives.

2.4. The UK AQS Objectives of air pollutants considered relevant (due to the potential health impacts) to the operation of a proposed mixed-use redevelopment on the Site are summarised in **Table 1**.

Table 1: Summary of Relevant UK AQS Objectives

Pollutant	Objective		Date by which Objective to be Met
	Concentration	Measured as	
Nitrogen Dioxide (NO_2)	200µg/m^3	1 hour mean not to be exceede more than 18 times per year	31/12/2005
	40µg/m^3	Annual Mean	31/12/2005
Particulate Matter (PM_{10}) (a)	50µg/m^3	24 hour mean not to be exceeded more than 35 times per year	31/12/2004
	40µg/m^3	Annual Mean	31/12/2004
Particulate Matter ($PM_{2.5}$) (b)	Target of 15% reduction in concentrations at urban background locations	Annual Mean	Between 2010 and 2020
	25µg/m^3	Annual Mean	01/01/2015

Notes: a) Particulate matter with a mean aerodynamic diameter less than 10 microns (µm)
b) Particulate matter with a mean aerodynamic diameter less than 2.5 microns (µm)

3. Planning Policy

National Planning Policy

National Planning Policy Framework, 2019

3.1. The National Planning Policy Framework (NPPF)[3], sets out the Government's planning policies for England and how these should be applied.

3.2. Paragraph 103 states *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making"*

3.3. Paragraph 170 states: *"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 and water quality, taking into account relevant information such as river basin management plans…"*

[3] Department for Communities and Local Government, 2019, 'National Planning Policy Framework'. DCLG, London.

3.4. 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."*

3.5. Furthermore, Paragraph 181 states *"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".*

Planning Practice Guidance

3.6. The Government's Planning Practice Guidance (PPG)[4] states that air quality concerns are more likely to arise where development is proposed within an area of existing poor air quality, or where it would adversely impact upon the implementation of air quality strategies and / or action plans. The PPG notes that when deciding whether air quality is relevant to a planning application, considerations would include whether the development would lead to:

- Significant effects on traffic, such as volume, congestion, vehicle speed, or composition;
- The introduction of new point sources of air pollution, such as furnaces, centralised boilers and Combined Heat and Power (CHP) plant; and
- Exposing occupants of any new developments to existing sources of air pollutants and areas with poor air quality.

Local Planning Policy

Bedford Borough Local Plan 2030, 2020

3.7. Bedford Borough Council has prepared a local plan that sets out how much growth there should be in the borough in coming years (housing, jobs and associated infrastructure) and where it should take place. The Bedford Borough Local Plan 2030[5] was adopted by Full Council on 15 January 2020. Policy 47S – Pollution, disturbance and contaminated land states:

"All development proposals will be required to:

i. Prevent the emission of significant levels of pollutants into the soil, air or water and

ii. Avoid noise giving rise to significant adverse impacts on health and quality of life or, where appropriate, mitigate and reduce its impact and

iii. Avoid any significant impact of artificial light on local amenity. Details of any external lighting scheme required as part of a new development should be submitted with the application and

iv. Reduce as far as practicable other potential impacts including from: vibration, dust, mud on the highway, smoke, fumes, gases, odours, litter, birds or pests and

[4] DCLG (2014), 'Planning Practice Guidance: Air Quality (ID 32)' (06 March 2014).
[5]

v. Be appropriate for their location, having regard to the existing noise, air quality, ground stability or pollution environment, including the proximity of pollutants, hazardous substances and noise generating or disruptive uses and

vi. Remediate and mitigate despoiled, degraded, derelict, contaminated and unstable land so that it is suitable for its proposed use.

All minerals and waste development proposals will be expected to demonstrate that an adequate buffer zone exists between the proposed development and neighbouring existing or proposed sensitive land uses. The Council will resist development proposals within the buffer zone that could be adversely affected by the mineral or waste operation or could prejudice the ability of the operator to work the permission."

Developers are required to submit sufficient information to enable development proposals to be properly assessed."

4. Site Location

4.1. The Site is located on the outskirts of Shortstown, south of Bedford in Bedfordshire. The Site comprises large areas of agricultural land with scattered farm buildings within the north (College Farm). The Site wraps the village of Shortstown, covering the area immediately north, west and south. Old Harrowden Road runs east to west through the northern section of the Site and High Road (A600) runs immediately west of the southern section of the Site in a north – south direction connecting to the A421 south of Bedford.

5. Air Quality Baseline Conditions

Bedford Borough Council Review and Assessment Process

5.1. An AQMA is designated where there is public exposure (e.g. residential properties) in areas exceeding the AQS Objectives.

5.2. In 2005 BBC declared four AQMA's within its administrative boundary. The declarations were made in relation to exceedances of the annual mean and 1-hour mean AQS Objective for nitrogen dioxide (NO_2) associated with localised vehicle congestion. Following the 3rd round of review and assessment these AQMA's were revoked in 2009 and replaced with one AQMA for the entire town centre. The AQMA encompasses the majority of properties within the town centre of Bedford, declared for exceedances of the annual mean NO_2 Objective.

5.3. The Site is not located within an AQMA. The Town Centre AQMA is located approximately 2.5km north of the site.

5.4. In 2008 BBC issued the AQAP[6], which sets out the actions which would improve air quality throughout BBC. The main aims include:

- Encouraging sustainable transport;
- Increasing accessibility and social inclusion; and
- Improving quality of life, safety and the environment;

[6] Bedford Borough Council (2008) Air Quality Action Plan for the Bedford Borough Council November 2007 Amended as of July 2008

Local Monitoring

5.5. BBC currently undertake air quality monitoring at two locations using automatic monitors. The automatic monitors are roadside sites, located at Prebend Street, approximately 4.1 km from the Site and at Lurke Street, approximately 4.1km from the site both monitor NO_2 only.

5.6. The monitoring results at the Prebend Street and Lurke Street automatic monitors are presented in **Table 2** for the most recent years of available data.

Table 2: Monitored NO_2 concentrations at the BBC automatic monitors

Location	Pollutant	Averaging Period	AQS Objective	Year		
				2016	2017	2018
Prebend Street (CM1)	NO_2	Annual Mean	40µg/m^3	33	28	29
		1-Hour Mean	200µg/m^3 not to be exceeded more than 18 times per year	0	0	0
Lurke Street (CM2)	NO_2	Annual Mean	40µg/m^3	**41**	28	26
		1-Hour Mean	200µg/m^3 not to be exceeded more than 18 times per year	0	0	0

Notes: Data obtained from BBC 2019 Annual Air Quality Status Report
Exceedances of the AQS objectives highlighted in **BOLD**

5.7. The monitoring results in **Table 2** show the NO_2 AQS Objectives were met at all locations between 2016 and 2018 except in 2016 at the Lurke Street monitoring location.

5.8. In addition to the automatic monitoring, NO_2 is measured at 55 locations using diffusion tubes within BBC. **Table 3** presents the annual mean NO_2 monitored concentrations for the closest monitoring locations to the Site (within 3km of the Site).

Table 3: Monitored Annual Mean NO_2 Concentrations (µg/m^3) at the closest BBC diffusion tubes to the Site

Site ID	Location	Approx. Distance to Site (km)	2018
DT10	1 Kirkstall Close, Bedford	1.8	24
DT65	43 London Road	2.9	31
DT25	London Road Crossroad	3.0	39
DT71	174 Ampthill Road	3.0	32
DT72	150 Ampthill Road	3.0	36

Notes: Data obtained from BBC 2019 Annual Air Quality Status Report

5.9. The monitoring results in **Table 3** indicate that the annual mean NO_2 objective of 40µg/m^3 was not exceeded at either of the diffusion tube monitoring locations closest to the Site for all years.

5.10. As set out in section 4 the A600 High Road runs immediately west of the southern section of the Site . The diffusion tube DT65 is located on the A600 London Road, albeit in the centre of Bedford, and is considered to be representative of concentrations on the Site particularly the southern section close to the A600. The Design Manual for Roads and Bridges guidance[7] states that roads 200m away from a receptor are unlikely to make a significant contribution to pollutant

[7] Highways Agency (2007) Design Manual for Roads and Bridges Volume 11 Environmental Assessment Section 3 Environmental Assessment Techniques Part 1 HA207/07 Air Quality

concentrations and therefore concentrations in the western and northern sections of the Site are likely to experience concentrations lower than those presented in **Table 3**.

Defra Air Quality Background Maps

5.11. In addition to the monitoring undertaken by BBC, background concentrations of NO_x, NO_2, PM_{10} and $PM_{2.5}$ are available from the Defra Air Quality Archive for 1 x 1km grid squares for assessment years between 2017 and 2030. **Table 4** presents the Defra background concentrations for the year 2018 for the grid square the Site is located in (507500,246500).

Table 4: Defra Background Map in 2018 for the Grid Square at the Location of the Site

Pollutant	Annual Mean Concentration (µg/m^3)	AQS Objective
NO_x	15.7	-
NO_2	11.5	40µg/m^3
PM_{10}	15.7	40µg/m^3
$PM_{2.5}$	10.1	25µg/m^3

5.12. The data in **Table 4** shows that the NO_2 objective of 40µg/m^3 from the 2018 Defra background maps is met. All other pollutants are also below the respective AQS objectives.

5.13. Overall air quality concentrations at the Site are potentially localised and are influenced by traffic emissions using the A600. The Defra background maps show away from the main roads it is expected air pollution concentrations improve and concentrations across the Site are likely to be below the relevant AQS Objectives.

6. Potential Air Quality Constraints and Opportunities

Traffic Emissions

6.1. The Department for Transport (DfT) publishes traffic flow data for main roads in the UK. **Table 5** shows the traffic data on the A4 which is adjacent to the site.

Table 5: DfT 2018 Traffic flows on the A600 adjacent to the site

Road Name	AADT	HDV
A600	15,787	674 (4.3%)

6.2. Given that the A600 is adjacent to the Site and the diffusion tube (DT65) is also located on the A600 (albeit in the centre of Bedford), it is likely that the NO_2 concentrations on the Site will currently meet the annual mean NO_2 objective.

Surrounding Land Uses

6.3. Air quality sensitive land uses relate mainly to residential properties and other sensitive locations where the public may be exposed for protracted periods (e.g. schools and hospitals). In addition, vegetation and ecosystems can be sensitive to air pollutants. Air pollutants could arise as a result

of construction activities (e.g. dust) and operational activities i.e. emissions from any centralised combustion plant and changes in vehicles emissions generated by the proposed uses on Site.

6.4. The Site is located within a mix of residential and commercial use. The nearest sensitive receptors are located on the north eastern boundary of the site, these include Shortstown Lower School and residential receptors.

Potential Impact of the Development on Surrounding Land Uses

6.5. There are existing air quality sensitive land uses within 50m of the Site in terms of residential properties. Therefore, there is the potential for dust nuisance during construction works which would require mitigation at source through appropriate site management and control practices. However, commitment to best practice methods (as part of a Construction Environmental Plan) will ensure that predicted impacts can be minimised, and the effects are insignificant.

6.6. Construction traffic and construction plant emissions would be temporary and short-term. In addition, demolition and construction traffic logistics would be agreed with BBC to ensure that any predicted effects are reduced and minimised. With appropriate mitigation the effects are predicted be insignificant

6.7. The operation of the Development as a result of changes in traffic emissions as well as any potential emissions from a centralised combustion plant has the potential to impact the local air quality as well as the nearest local residential receptors. These impacts would need to be quantified as part of an air quality assessment and applicable mitigation measures adopted.

6.8. Mitigation measures which would reduce the impact of air quality from the operational Development on surrounding sensitive receptors could include:

- provision of sustainable travel options to reduce transport emissions (limited car parking spaces/ provision of cycle spaces/ provision of electric infrastructure/ inclusion of cycle and pedestrian routes);
- green planting (to include trees on busy roads to provide a buffer between pedestrians and traffic);
- provision of energy and thermal efficient housing;
- servicing strategy for commercial elements;
- provision of a Travel Plan; and
- ensuring an optimum height of the flue for any proposed combustion plant.

Impact of Surrounding Land Uses on the Development

6.9. As described in the baseline section, annual mean NO_2 concentrations are associated with local vehicle emissions. Simple air quality design principles would be investigated and included at the detailed design stage of the Development (such as the location of air quality sensitive land uses) to ensure that future air quality conditions are not a constraint to future users.

6.10. The A421 which lies to the north of the site is located approximately 250m from the site boundary, inclusive of the third phase expansion option, given the distance of the A421 it will not have an impact on future users of the development.

Recommendations and Further Work

6.11. It is recommended the Development should demonstrate how air quality has been considered within the design and operation of the Development in line with measures set out in the BBC AQAP, including measures to reduce reliance on vehicles as well as promoting zero emission vehicles and encouraging sustainable transport (such as the provision of cycle and pedestrian routes).

7. Summary

7.1. Overall, based on the latest air quality monitoring data and surrounding uses; air pollutant concentrations are not a constraint to development at the Site.