

KRUTON (NO. 2) LTD.

HIGH ROAD, FINCHLEY

AIR QUALITY REPORT

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DOCUMENT CONTROL SHEET

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1.0 INTRODUCTION

1.1 Ardent Consulting Engineers (ACE) have been commissioned by Kruton (No. 2) Ltd. to undertake work to address part 'a' of the following planning condition attached to the development at 822 – 824 High Road, Finchley, which states that:

"a) - Before development commences, a scheme of proposed air pollution mitigation measures shall be submitted to and approved in writing by the Local Planning Authority.

b) The approved mitigation scheme shall be implemented in its entirety in accordance with details approved under this condition before any of the development is first occupied or the use commences and retained as such thereafter.

REASON: To ensure that the amenities of occupiers are protected from the poor air quality in the vicinity in accordance with Policy DM04 of the Development Management Policies DPD (adopted September 2012), the Sustainable Design and Construction SPD, and Policy 5.3 of the London Plan 2015."

1.2 The development comprises retail land use at ground-floor level and six residential apartments at first to third floor levels.

Scope

- 1.3 This report describes existing baseline air quality within the site and surrounding area and compares likely concentrations of pollutants (nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5})) within the site to the relevant objectives.
- 1.4 Taking into consideration the likely air quality conditions within the site, this report recommends the appropriate level of mitigation required to ensure that future users and residents of the development will experience acceptable air quality. Proposed mitigation measures are set out and compared to the established level of mitigation that will be necessary to discharge the planning condition to determine their suitability.
- 1.5 This air quality report has been prepared taking into consideration all relevant regional and national guidance, policy and legislation. The scope and methodology used within this report has been discussed and agreed with the London Borough of Barnet's (LBB's) Department of Development and Regulatory Services.

2.0 LEGISLATION, POLICY AND GUIDANCE

National Air Quality Legislation and Strategy

The Air Quality Strategy

- 2.1 The Air Quality Strategy (DEFRA, 2007) established the policy framework for ambient air quality management in the UK, with the objective of ensuring a quality of ambient air for all that would not pose a significant risk to health or quality of life. This document set out the National Air Quality Objectives (NAQOs) and the policy for achieving them. It followed part IV of the Environment Act (UK Government, 1995) which introduced a system of Local Air Quality Management (LAQM) requiring local authorities to regularly review and assess air quality within their boundary and appraise plans in light of these assessments.
- 2.2 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) which should include measures expected to ensure that the NAQOs are met within the AQMA.

National Air Quality Objectives

- 2.3 NAQOs were defined by The Air Quality Strategy (DEFRA, 2007) and enshrined in regulations by the Air Quality Standards Regulation (Statutory Instrument, 2010, No 1001) and Air Quality Standards (Amendment) Regulations (Statutory Instrument, 2016 No. 1184), which implemented the European Union Directive on ambient air quality and cleaner air for Europe (Directive 2008/50/EC).
- 2.4 Directive 2008/50/EC set legally binding limits (i.e. the EU Limit Values) for a number of air pollutants and consolidated the previous directive relating to ambient air quality assessment and management along with its three daughter directives. The EU Limit Values remained unchanged, however, member states were given a time extension for compliance subject to approval. For most pollutants of interest, these documents set out average concentrations as either Objectives or Limit Values, however, for PM_{2.5}, exposure reduction targets were also set.
- 2.5 Relevant objectives are set out in **Table 2-1**, below.

Pollutant	Time Period	Objective		
Nitrogen Dioxide	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year		
(NO ₂)	Annual mean	40 µg/m³		
Particulate	24-hour mean	50 μ g/m ³ not to be exceeded more than 35 ¹ times a year		
Matter (PM ₁₀)	Annual mean	40 µg/m ^{3 2}		
	Annual mean	25 µg/m ^{3 3}		
Particulate	Annual mean	20 µg/m ^{3 4}		
Matter (PM _{2.5})	Exposure reduction target	15% reduction between 2010 and 2020 at Urban Background sites		

Table 2-1:	NO ₂ .	PM10 a	and PM _{2.5}	Obiectives
	1102/	1 1.170 6	ATTM T 112.5	Objectives

- 2.6 Analysis of long-term monitoring data suggests that if the annual mean NO_2 concentration is less than $60 \ \mu g/m^3$ then the 1-hour mean NO_2 objective is unlikely to be exceeded where road transport is the main source of pollution. This concentration has therefore been used in this AQA to screen whether an exceedance of the 1-hour mean objective is likely. Similarly, an annual mean PM_{10} concentration of 32 $\ \mu g/m^3$ is used to screen whether an exceedance of the 24-hour mean PM_{10} objective is likely.
- 2.7 The London Local Air Quality Management (LLAQM) Technical Guidance 2016 (LLAQM.TG(16)), (Mayor of London, 2016) provides guidance to local authorities in London as to where objectives apply. The definition of relevant exposure used in this assessment, as based on the LLAQM guidance, are set out in Error! Reference source not found..

¹ 7 times a year for Scotland

 $^{^{2}}$ 18 µg/m³ for Scotland

 $^{^{3}}$ 12 µg/m³ for Scotland

⁴ Indicative stage 2 limit value post 2020

Averaging Period	Relevant Locations	NAQOs should apply	NAQOs don't usually apply
Annual mean	Where individuals are exposed for a cumulative period of 6 month in a year	Facades of residential properties, schools and hospitals	Gardens, facades of offices, hotels and shops or kerbside sites
24-hour mean	Where individuals are expected to be exposed for 24-hours or longer	As above, with the addition of hotels and gardens of residences	Kerbside sites and areas where the public is unlikely to spend significant time
1-hour mean	Where individuals are expected to spend one hour or longer	As above, with the addition of locations with regular access such as car parks, bus stations, parks and cafes	Locations not publicly accessible or where occupation is not regular

Table	2-2: R	elevant	Exposure
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National Air Quality Plan for Nitrogen Dioxide (NO2) in the UK

- 2.8 The National Air Quality Plan for Nitrogen Dioxide (NO₂) in the UK (DEFRA and DfT, 2017) was written as a joint venture between the Department for Environment, Food and Rural Affairs (DEFRA) and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO₂ in the UK. It includes a number of measures such as those aimed at investing in Ultra-Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.
- 2.9 The plan requires all local authorities in England with areas expected not to meet the EU Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in "*the shortest time possible*". These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the local authority may need to consider implementation of a Clean Air Zone (CAZ) which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

Clean Air Strategy

2.10 The Clean Air Strategy (DEFRA, 2019) sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 µg/m³ by 50% by 2025.

National Planning Policy

- 2.11 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019a) sets out the Government's planning policies for England and how they expect these to be implemented. Consideration of air quality within planning is considered an important element of this framework which recommends that transport and the potential impact on the environment should be considered at an early stage in order to allow for mitigation or even avoidance of impacts through location and layout of developments.
- 2.12 It is recommended that the risk to new development from existing pollution be taken into account when planning policy is drafted and specified contributing to compliance with relevant objectives and should be consistent with any local AQAP.
- 2.13 The NPPF also recommends that "existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."
- 2.14 The Planning Practice Guidance (PPG) provides guidance on how planning can enact the policies set out in NPPF. It is set out as separate papers for different sectors and therefore PPG Air Quality (Ministry of Housing, Communities and Local Government, 2019b) is aimed at addressing policy relating specifically to air quality. This document gives guidelines for when air quality is likely to be relevant to a planning decision:

"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."

2.15 The 'Air Quality' PPG also states that more detailed information such as whether the development could have a significant impact on air quality, baseline air quality and whether occupiers of the development could experience poor air quality may be required in order to make an informed decision. Further, it notes that any assessment should be proportionate, taking into account the scale of the proposed development, as well as any potential impacts. 2.16 Some suggestions on mitigation measures are set out within the PPG, such as separation distances, filtration/ventilation, green infrastructure, promotion of low emission forms of transport, control of dust and emissions from construction and, finally, contributing funding to measures such as those identified in AQAPs to offset impacts from the development.

Regional Policy and Guidance

The London Plan

- 2.17 In London, a new 'Publication London Plan' has been developed (Mayor of London, 2020). This includes a number of references to air quality, however, these are incorporated into Policy SL1: Air Quality, which states that:
 - A. "Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.
 - *B.* To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:
 - 1. 1 Development proposals should not:
 - *a) lead to further deterioration of existing poor air quality*
 - b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits
 - *c) create unacceptable risk of high levels of exposure to poor air quality.*
 - 2. In order to meet the requirements in Part 1, as a minimum:
 - a) development proposals must be at least Air Quality Neutral⁵
 - b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to postdesign or retro-fitted mitigation measures
 - c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

⁵ This requirement does not apply to the development, which does not fall within the relevant criteria for requiring an 'air quality neutral' assessment.

- d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure..."
- 2.18 Whilst the new London Plan has not yet been formally published, it is considered that it will carry material weight at this time. Until the new London Plan is published the policies outlined in the current London Plan are still applicable, including the Policy 7.14 'Improving Air Quality' which includes the requirement that development proposals should "*Minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans".*

Sustainable Design and Construction SPG

2.19 Supplementary Planning Guidance (SPG) on 'Sustainable Design and Construction' (GLA, 2014a) was developed as part of the Implementation Framework for the London Plan (GLA, 2016). In relation to air quality, the guidance identified as a significant priority that "*Developments should be designed to minimise and mitigate against increased exposure to poor air quality*".

The London Environment Strategy

- 2.20 The London Environmental Strategy (Mayor of London, 2018) considers policies aimed at improving the environment in London, across a number of different areas such as air quality, noise and climate change. There are a number of objectives but notable in relation to air quality is the objective: "for London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities."
- 2.21 Chapter 4 of the Environmental Strategy relates specifically to air quality and identifies a number of key issues to be addressed, including achieving legal compliance as quickly as possible.

3.0 BASELINE CONDITIONS

Methodology

- 3.1 Information regarding current baseline air quality has been obtained by collating the results of monitoring carried out by LBB and referring to maps of AQMAs and Air Quality Focus Areas (AQFAs) and any measured or predicted exceedances of the EU Limit Values. Background concentrations have been defined based on the national pollution maps published by DEFRA (DEFRA, 2020a).
- 3.2 A 'current' baseline air quality year of 2020 has been considered as this is the most recent year for which local monitoring data is available. As air quality conditions in 2020 were not considered to be typical, due to the COVID-19 pandemic, consideration has also been given to data from previous years. Air quality in the UK is generally anticipated to improve over the next decade, and so it is worst-case to assume 2020 or earlier air quality conditions, as opposed to the actual year that the proposed development becomes operational.

Site Context

3.3 The development site is bounded to the west by High Road (A1000)and is surrounded by existing commercial and residential properties.

EU Limit Values

3.4 There are no predicted exceedances of the annual mean NO₂, PM₁₀ or PM_{2.5} EU Limit Values in close proximity to the development in the 'current' year (2020) (DEFRA, 2020b). Additionally, as there are no nearby Automatic Urban and Rural Network (AURN) monitoring sites, there are no measured concentrations of the EU Limit Values.

LLAQM

3.5 LBB has assessed air quality within its area as part of its responsibilities under LLAQM and has declared a whole-borough AQMA (Barnet AQMA) in April 2001 (amended in July 2010) as a result of exceedances of the annual mean and 1-hour mean NO₂ objectives and the 24-hour mean PM₁₀ objective. The development is located within this AQMA.

AQFAs

3.6 The Greater London Authority (GLA) has declared 187 AQFAs within Greater London. AQFAs are locations that exceed the annual mean NO₂ EU Limit Value as well as being locations with high levels of human exposure. The development is located within an AQFA (AQFA 15, 'North Finchley Town Centre'). However, it should be noted that the AQFAs were declared in 2013 and have not since been reviewed since, and so conditions within these areas may have since changed.

Monitoring

- 3.7 In 2020 LBB carried out monitoring of NO₂ at two automatic monitoring sites, one of which (Tally Ho (ABN1)) is located approximately 285 m to the south of the development. LBB has also undertaken monitoring of NO_2 at a number of diffusion tube monitoring sites, however, none of these are located in close proximity to the development with the exception of a site co-located with automatic monitoring site ABN1: this site has not been considered as automatic monitoring data is more reliable and is available for 2020, whereas the latest year for which diffusion tube data is available is 2019. Details of monitoring site ABN1 and monitoring results for the last five years are presented in **Table 3-1** and **Table 3-2**.
- 3.8 In 2020 no exceedances of either the annual mean or the 1-hour mean NO_2 objectives were measured at site ANB1. An exceedance of the annual mean objective was measured in 2017, though it should be noted the change in measured concentration in 2017 as compared to previous and following years is unusually great, indicating that this data may be not reliable. No exceedances of the 1-hour mean objective were measured from 2016 to 2019. A weak trend of decreasing measured annual mean concentrations is apparent at the site.

Site	Site Name	Site Type	Measured Annual Mean Concentrations (µg/m ³)				
ID			2016	2017	2018	2019	2020 a
ABN1	Tally Ho	Kerbside	39	50	36	38	32
	Objective				40		

Table 3-1: Measured Annual Mean NO₂ Concentrations (µg/m³)

Exceedances of the annual mean objective are highlighted in **BOLD**.

2016 - 2019 data have been taken from LBB's Air Quality Annual Status Report (ASR) for 2019 (LBB, 2020). 2020 data have been taken from the Air Quality England (AQE) website (AQE, 2020). ^a Provisional data only.

Site	Site Name	Site Type	Number of Hours >200 µg/m³				
ID			2016	2017	2018	2019	2020 ª
ABN1	Tally Ho	Kerbside	0	1	0	0	0
Objective					18		

Table 3-2: Measured Number of Hours >200 μ g/m³

2016 - 2019 data have been taken from LBB's Air Quality ASR for 2019 (LBB, 2020). 2020 data have been taken from the AQE website (AQE, 2020).

^a Provisional data only.

3.9 Site ABN1 also measured concentrations of PM₁₀ in 2020. Details of the site and monitoring results for the last five years are presented in Table 3-3 and Table 3-4. Concentrations of $PM_{2.5}$ were not measured at any sites located in close proximity to the development in 2020.

3.10 Measured annual mean concentrations of PM_{10} at site ABN1 were well below the annual mean PM_{10} objective from 2016 to 2020, and no exceedances of the 24hour mean were measured during this time period. A weak trend of decreasing measured concentrations is apparent at site ABN1.

Table 3-3: Measured Annual Mean PM₁₀ Concentrations (µg/m³)

Site	Site Name	Site Type	Measured Annual Mean Concentrations (µg/m³)				
ID			2016	2017	2018	2019	2020 ª
ABN1	Tally Ho	Kerbside	23	21	21	20	18
Objective					40		

2016 – 2019 data have been taken from LBB's Air Quality ASR for 2019 (LBB, 2020). 2020 data have been taken from the AQE website (AQE, 2020).

^a Provisional data only.

Site	Site Name	Site Type	Nun	ıber of	Hours	>50 µg	/ m ³
ID	Site Name	Site Type	2016	2017	2018	2019	2020 a
ABN1	Tally Ho	Kerbside	4 (35)	6 (32)	1	4	1
	Objective				18 (50))	

Table 3-4: Measured Number of Days >50 μ g/m³

Where the period of valid data is <85% of a full year the 90.4^{th} Percentile is shown in brackets after the number of exceedances.

2016 – 2019 data have been taken from LBB's Air Quality ASR for 2019 (LBB, 2020). 2020 data have been taken from the AQE website (AQE, 2020).

^a Provisional data only.

Predicted Background Concentrations

- 3.11 Predicted 2020 background concentrations have been obtained from national maps provided by DEFRA (DEFRA, 2020a) and are presented in **Table 3-5**.
- 3.12 The predicted annual mean background concentrations within the development site are well below the relevant objectives in 2020.
- 3.13 It should be noted that the predicted background concentrations are based on modelling and measurement carried out prior to the COVID-19 pandemic and that the concentrations are therefore those that would have been expected prior to those disruptions.

Table 3-5: Predicted Annual Mean Background Concentrations within the Development Site (μ g/m³)

Year	Location	NO ₂	PM 10	PM _{2.5}
2020	Development Site	19.2	16.6	11.1
Objective		40	40	20

4.0 PREDICTED IMPACTS WITHOUT MITIGATION

- 4.1 The proposed development will introduce new areas of land use that will be sensitive to impacts from existing air quality within the site. The proposed residences will be sensitive to the annual mean and 1-hour mean NO₂ objectives, the annual mean and 24-hour mean PM₁₀ objectives and the annual mean PM_{2.5} objective, whilst the proposed retail land use will be sensitive to only the 1-hour mean NO₂ objective.
- 4.2 The location of automatic monitoring site ABN1 is considered to be comparable to that of the development, in terms of air quality conditions, as both are close to the same main road (High Road (A1000)). However, it is likely that concentrations of pollutants present at site ABN1 are slightly greater than concentrations present at the development, as the monitoring site is located between two sections of High Road (A1000) in close proximity to a set of traffic lights where slowed traffic / congestion is likely to result in increased levels of traffic emissions. Furthermore, site ABN1 is set back from the nearest road by 0.5 m whilst the development is set back by approximately 3.8 m; as concentrations of pollutants from traffic emissions drop off rapidly with increased distance from the road, this is also likely to result in lower concentrations at the facade of the development site when compared to those measured at site ABN1. The inlet height of ABN1 is 3 m, whilst ground-floor level exposure is likely to be lower (i.e. closer to road level and therefore more worst-case in terms of height), however, taking into consideration all of the outlined factors it is still reasonable to expect that air quality conditions at site ABN1 will be worse than conditions at ground-floor level of the development. Furthermore, as concentrations of pollutants decrease rapidly with height above a road, concentrations of pollutants within the residential areas of the development may be assumed to reduce with increased height above ground level.
- 4.3 No exceedances of the 1-hour mean NO₂ objective have been measured at site ABN1 in recent years (see **Table 3-2**), therefore, it is reasonable to assume that no exceedances of the 1-hour mean objective will occur at sensitive ground-floor locations within the development (i.e. the retail land use).
- 4.4 Regarding the residences within the development, as no exceedances of the longterm or short-term NO₂ or PM₁₀ exceedances have been measured by site ABN1 in 2020 (see **Table 3-1**, **Table 3-2**, **Table 3-3** and **Table** 3-4), and only one exceedances of the annual mean NO₂ objective was measured during the period 2016 – 2020 (and this instance may not be reliable, see Paragraph 3.8), it is likely that pollutant concentrations will be below the relevant objectives within residential areas of the development, though concentrations of NO₂ may be close to the annual mean objective.
- 4.5 Taking into consideration the above it is, therefore, judged that mitigation is advised as a precautionary step to ensure that air quality conditions within the development, will be suitable for the development land use.

5.0 MITIGATION

Proposed Mitigation

5.1 It is currently proposed that the development will be served by a Mechanical Ventilation Heat Recovery (MVHR) system. The proposed MVHR intake will be located on the rear of the property where concentrations of pollutants will be comparatively lower, as this location is set well back from High Road (A1000) and also because the development building will act as a barrier between emissions associated with High Road (A1000) and the intake location. The system proposed will have the capacity to create positive air pressure, thus ensuring that the building can be provided with air taken from the rear of the building, even when windows within the development are open.

Suitability of Proposed Mitigation

5.2 The proposed mitigation is considered sufficient to ensure that residents and users of the development will experience acceptable air quality.

6.0 CONCLUSIONS

- 6.1 This report considers the baseline air quality within the development and the level of mitigation required to ensure that residents and users of the development experience acceptable air quality. It also outlines the proposed mitigation and determines its suitability to ensure that it meets the requirements of part 'a' of the relevant planning condition.
- 6.2 The installation of a MVHR system is proposed to provide the development with air taken from the rear of the development building, which will be comparatively of better quality than the air at the front of the building (fronting onto High Road (A1000).
- 6.3 With this mitigation in place, concentrations of pollutants will be below the relevant objectives within the development and, therefore, this mitigation is considered sufficient to ensure that air quality conditions are suitable for the development retail and residential land uses.
- 6.4 It is concluded that implementation of the proposed mitigation should satisfy the relevant planning condition. With this mitigation in place, residents and users of the development will experience acceptable air quality.

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Appendix A Glossary

Abbreviations	Meaning		
ACE	Ardent Consulting Engineers		
AQAP	Air Quality Action Plan		
AQFA	Air Quality Focus Area		
AQMA	Air Quality Management Area		
ASR	Annual Status Report		
AURN			
CAZ	Clean Air Zone		
DEFRA	Department for Environment, Food and Rural Affairs		
DfT	Department for Transport		
Diffusion Tube	A passive sampler used for collecting NO2 in		
Dillusion Tube	the air		
GLA	Greater London Authority		
LAQM	Local Air Quality Management		
LLAQM	London Local Air Quality Management		
LBB	London Borough of Barnet		
	National Air Quality Objective as set out in Air		
NAQO	Quality Strategy and the Air Quality		
	Regulations		
NO ₂	Nitrogen Dioxide		
	Nitrogen Oxides, generally considered to be		
	nitric oxide and NO ₂ . The main source is from		
NOx	combustion of fossil fuels, including petrol and		
	diesel used in road vehicles and natural gas		
	used in gas-fired boilers.		
NPPF	National Planning Policy Framework		
PM ₁₀ or PM _{2.5}	Small airborne particles less than 10/2.5 μ g in		
	diameter		
PPG	Planning Practice Guidance		
SPG	Supplementary Planning Guidance		
ULEV	Ultra-Low Emission Vehicles		