

Air Quality Assessment
Station Road, Reading

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Executive Summary

Redmore Environmental Ltd was commissioned by TE Station Road Ltd to undertake an Air Quality Assessment in support of a planning application for a residential development at 1 Station Road, Reading.

The development may lead to the exposure of future residents to elevated pollution levels, as well as adverse air quality effects at sensitive locations. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential impacts as a result of the scheme.

Dispersion modelling was undertaken in order to predict pollutant concentrations across the proposed development site as a result of emissions from the local highway network. Outputs were subsequently verified using local monitoring data.

The dispersion modelling assessment indicated that predicted pollution levels were below the relevant criteria at all locations across the development. The site is therefore considered suitable for the proposed use from an air quality perspective.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the relevant screening criteria. As the development comprises less than ten units and does not include any parking spaces, road vehicle exhaust emission impacts were not predicted to be significant.

Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by TE Station Road Ltd to undertake an Air Quality Assessment in support of a planning application for a residential development at 1 Station Road, Reading.

1.1.2 The development may lead to the exposure of future residents to poor air quality, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential impacts associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located at 1 Station Road, Reading, at approximate National Grid Reference (NGR): 471494, 173605. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise a second and third floor rear extension to the existing building to provide three residential dwellings. Reference should be made to Figure 2 for a site layout plan.

1.2.3 Reading Borough Council (RBC) has declared an Air Quality Management Area (AQMA) due to exceedences of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO₂). The development is located within the AQMA. Subsequently, there are concerns that the proposals will introduce future residents to exceedences of the relevant AQO. As such, concentrations at the site have been assessed in the following report in order to consider location suitability for the proposed end-use and define any requirement for mitigation. Potential impacts associated with the operational phase of the scheme have also been considered as necessary.

2.0 LEGISLATION AND POLICY

2.1 European Directives

2.1.1 European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new Air Quality Limit Values (AQLVs) for particulate matter with an aerodynamic diameter of less than 2.5µm. The consolidated Directives include:

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient AQLVs for NO₂, oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and,
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

2.1.2 The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

2.2 UK Legislation

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Air Quality Target Values for an additional 5 pollutants.

2.2.2 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for

Environment, Food and Rural Affairs (DEFRA) and published in July 2007¹. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.2.3 Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (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
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

2.2.4 Table 2 summarises the advice provided in DEFRA guidance² on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

¹ The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

² Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.3 Local Air Quality Management

- 2.3.1 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 National Planning Policy

- 2.4.1 The revised National Planning Policy Framework³ (NPPF) was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

³ NPPF, Ministry of Housing, Communities and Local Government, 2019.

2.4.2 The purpose of the planning system is to contribute to the achievements of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

"c) - 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."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It 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, or 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 [...]"

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states 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."

2.4.5 The implications of the NPPF have been considered throughout this assessment.

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance⁴ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

2.5.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6 Local Planning Policy

2.6.1 The Reading Borough Local Plan⁵ was adopted by RBC on 4th November 2019. It provides the legal framework for the development and use of land within Reading for the period up to 2036. It also provides the context for determining local planning applications.

2.6.2 A review of the Local Plan indicated the following policy of relevance to the report:

⁴ <https://www.gov.uk/guidance/air-quality--3>.

⁵ Reading Borough Local Plan, RBC, 2019.

"EN15: Air Quality

Development should have regard to the need to improve air quality and reduce the effects of poor air quality.

i. Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:

- Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;
- Whether the development is within, or accessed via, an Air Quality Management Area; and
- Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.

ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.

iii. Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring."

2.6.3 The implications of this policy were taken into consideration throughout the undertaking of the assessment.

3.0 BASELINE

3.1 Introduction

- 3.1.1 Existing air quality conditions in the vicinity of the development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

3.2 Local Air Quality Management

- 3.2.1 As required by the Environment Act (1995), RBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean NO₂ concentrations are above the AQO within the borough. As such, one AQMA has been declared. This is described as follows:

"An area covering Reading Town Centre, areas along the major radial road routes into Reading (including J11 of the M4) and along the railway lines where they pass through built-up areas."

- 3.2.2 The development is located within the AQMA. As such, there is the potential for the exposure of future residents to poor air quality and vehicles travelling to and from the site to increase pollution in this sensitive area. These issues have been considered throughout the assessment.
- 3.2.3 RBC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMA's have been designated

3.3 Air Quality Monitoring

- 3.3.1 Monitoring of pollutant concentrations is undertaken by RBC throughout their area of jurisdiction. Recent annual mean NO₂ results recorded in the vicinity of the development are shown in Table 3. Exceedences of the relevant AQO are shown in **bold**.

Table 3 Monitoring Results - NO₂

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)		
		2016	2017	2018
DT39	Friar Street nr Nandos	52	50	42

3.3.2 As shown in Table 3, annual mean NO₂ concentrations were above the AQO at the DT39 - Friar Street monitor during recent years. As this site is positioned at a roadside location within an AQMA, exceedences are to be expected. Reference should be made to Figure 3 for a map of the survey position.

3.3.3 RBC do not undertake monitoring of PM₁₀ concentrations in the vicinity of the site

3.4 Background Pollutant Concentrations

3.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 471500, 173500. Data for this location was downloaded from the DEFRA website⁶ for the purpose of the assessment and is summarised in Table 4.

Table 4 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2018	2019	2021
NO ₂	27.70	26.68	24.77
PM ₁₀	16.15	15.88	15.46

3.4.2 As shown in Table 4, predicted background NO₂ and PM₁₀ concentrations are below the relevant AQOs at the development site.

⁶ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>.

4.0 METHODOLOGY

4.1 Introduction

- 4.1.1 The proposed development has the potential to expose future residents to poor air quality and increase pollution levels as a result of operational phase vehicle exhaust emissions. These issues were considered in accordance with the following methodology, which was agreed with Ross Jarvis, Senior Environmental Health Officer at RBC, on 7th November 2019.

4.2 Potential Exposure

- 4.2.1 Dispersion modelling was undertaken in order to predict NO₂ and PM₁₀ concentrations across the site using the ADMS-Roads dispersion model (version 4.1.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.
- 4.2.2 Modelling was undertaken for 2018 to allow verification against recent monitoring results and 2021 to represent the development opening year.
- 4.2.3 The model requires input data that details the following parameters:
- Assessment area;
 - Traffic flow data;
 - Vehicle emission factors;
 - Spatial co-ordinates of emissions;
 - Street width;
 - Meteorological data;
 - Roughness length (z_0); and,
 - Monin-Obukhov length.
- 4.2.4 Additional options can also be selected within the ADMS-Roads interface to take account of site specific characteristics that may affect model output, such as canyons.

4.2.5 The relevant inputs are detailed in the following Sections.

Assessment Area

4.2.6 Ambient concentrations were predicted over the area NGR: 471440, 173550 to 471550, 173660. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

4.2.7 It should be noted that although the grid only covered the proposed site, road links were extended in order to ensure the impact of all relevant vehicle emissions in the vicinity of the development were considered.

4.2.8 Reference should be made to Figure 4 for a graphical representation of the assessment grid extents.

Traffic Flow Data

4.2.9 Baseline traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as Heavy Duty Vehicle (HDV) proportion, was obtained from the Department for Transport (DfT)⁷. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2018. It should be noted that the DfT web tool is referenced in DEFRA guidance⁸ as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

4.2.10 Traffic data for Friar Street and Station Road was not available from the DfT. As such, flows from Kings Road were applied to these links as the most representative road with available information.

4.2.11 The baseline traffic data was converted to the opening year of the development utilising a factor obtained from TEMPro (Version 7.2). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

⁷ <http://www.dft.gov.uk/traffic-counts/>.

⁸ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

4.2.12 Road widths were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table 5.

Table 5 Traffic Data

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		2018	2021			
L1	Friar Street	3,425	3,604	17.84	7.0	25
L2	Station Road east of Friar Street	3,425	3,604	17.84	7.1	25
L3	Station Road north of Friar Street	3,425	3,604	17.84	7.3	25

4.2.13 Reference should be made to Figure 4 for a graphical representation of the road link locations.

Street Canyons

4.2.14 Where buildings or walls surround roads, pollutant dispersion patterns are altered which can lead to high pollutant concentrations. These street canyons can significantly influence air quality along a road and therefore it is important to take consideration of their effects when undertaking dispersion modelling.

4.2.15 The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which have been retained in version 4.1.1.0. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

4.2.16 Canyons have five principle effects on dispersion which can influence pollutant concentrations. These are:

- Pollutants are channelled along street canyons;
- Pollutants are dispersed across street canyons by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon through gaps between buildings - as if there was no canyon; and,

- Pollutants leave the canyon from the canyon top.

4.2.17 The combined modelling of these effects will result in concentration patterns unique to each canyon.

4.2.18 The parameters used in the assessment are outlined in Table 6.

Table 6 Canyon Parameters

Link	Parameter (m)							
	Canyon Width to Left	Average Height of Buildings to Left	Canyon Length Left	Building Length Left	Canyon Width Right	Average Height of Buildings to Right	Canyon Length Right	Building Length Right
L1	8.2	15.0	174.6	174.6	8.7	12.5	174.6	174.6
L2	8.7	18.0	55.3	55.3	9.6	18.0	55.3	55.3
L3	9.4	15.0	82.6	82.6	7.2	18.0	82.6	82.6

4.2.19 A choice of two modes is provided for use in the advanced canyon module. Standard mode assumes that each road is part of a continuous network of roads with similar canyon properties. Network mode analyses the road network to determine transport of pollutants between adjoining street canyons, allows for varying concentrations along the canyon and accounts for transport of pollutants out of the end of a canyon. Network mode is considered most accurate for detailed local analysis and as such was selected for use in the model.

Emission Factors

4.2.20 Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 9.0). This has been produced by DEFRA and incorporates COPERT 5 vehicle emission factors and fleet information.

4.2.21 There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2018 emission factors were utilised in preference to the development opening year in order to provide robust concentration

predictions. As predictions for 2018 were verified, it is considered the results are an indication of worst case concentrations during the operation of the proposals.

Meteorological Data

- 4.2.22 Meteorological data used in the assessment was taken from Heathrow Airport meteorological station over the period 1st January 2018 to 31st December 2018 (inclusive). Heathrow Airport is located at NGR: 506947, 176515, which is approximately 35.2km north-west of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.
- 4.2.23 All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 for a wind rose of the utilised meteorological data.

Roughness Length

- 4.2.24 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1.0m was used to describe the modelling extents. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'cities and woodlands'.
- 4.2.25 A z_0 of 0.3m was used to describe the meteorological site. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (max)'.

Monin-Obukhov Length

- 4.2.26 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

4.2.27 A minimum Monin-Obukhov length of 100m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'large conurbations >1 million'.

Background Concentrations

4.2.28 Background NO₂ and PM₁₀ concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the site, as shown in Table 4.

4.2.29 Similarly to emission factors, background concentrations from 2018 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO₂ Conversion

4.2.30 Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 7.1) provided by DEFRA, which is the method detailed within DEFRA guidance⁹.

Verification

4.2.31 The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

4.2.32 Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

⁹ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

4.2.33 For the purpose of the assessment model verification was undertaken for 2018 using traffic data, meteorological data and monitoring results from this year.

4.2.34 Monitoring of NO₂ concentrations was undertaken at one location within the vicinity of roads included within the model in 2018. The result was obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance¹⁰. The monitored annual mean NO₂ concentration and calculated road NO_x concentration is summarised in Table 7.

Table 7 NO_x Verification - Monitoring Result

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
DT39	Friar Street nr Nandos	42	30.96

4.2.35 The annual mean road NO_x concentration predicted from the dispersion model and the calculated 2018 road NO_x monitoring result is summarised in Table 8.

Table 8 NO_x Verification - Modelling Result

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
DT39	Friar Street nr Nandos	30.96	13.11

4.2.36 The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 2.3614 was required to be applied to all modelling results.

4.2.37 Monitoring of PM₁₀ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM₁₀ model predictions in lieu of more accurate data in accordance with DEFRA guidance¹¹.

¹⁰ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

¹¹ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018

4.3 Potential Development Impacts

4.3.1 The development has the potential to increase concentrations of NO₂ and PM₁₀ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the Institute of Air Quality Management (IAQM) 'Land-Use Planning & Development Control: Planning for Air Quality'¹² guidance to determine the potential for trips generated by the development to affect local air quality.

4.3.2 The following criteria are provided to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

A. If any of the following apply:

- 10 or more residential units or a site area of more than 0.5ha; or,
- more than 1,000 m² of floor space for all other uses or a site area greater than 1ha.

B. Coupled with any of the following:

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

4.3.3 Should these criteria not be met, then the IAQM guidance¹³ considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

4.3.4 Should screening of the relevant data indicate that the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance¹⁴.

¹² Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

¹³ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

¹⁴ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

5.0 ASSESSMENT

5.1 Introduction

- 5.1.1 There is the potential for air quality impacts as a result of the operation of the proposed development. These are assessed in the following Sections.

5.2 Potential Exposure

- 5.2.1 The proposed development has the potential to cause the exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Section 4.0 to quantify air quality conditions at the site. Reference should be made to Figure 6 and Figure 7 for graphical representations of predicted annual mean NO₂ and PM₁₀ concentrations.
- 5.2.2 As shown in Figure 6, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level at the boundary was 28.16µg/m³. As such, future residents are not predicted to be exposed to NO₂ concentrations above the AQO.
- 5.2.3 As shown in Figure 7, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level at the boundary was 16.20µg/m³. As such, future residents are not predicted to be exposed to PM₁₀ concentrations above the AQO.
- 5.2.4 It should be noted that pollutant levels decrease with distance from pollutant sources, such as roads. As annual mean NO₂ and PM₁₀ concentrations were predicted to be below the relevant AQOs at second floor level, further assessment above this height was not considered necessary.
- 5.2.5 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs at any location within the proposed extension. As such, the site is considered suitable for the proposed use from an air quality perspective.

5.3 **Potential Development Impacts**

- 5.3.1 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. However, the proposals comprise less than 10 residential dwellings and do not include any car parking spaces. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM¹⁵ screening criteria shown in Section 4.3.

¹⁵ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.0 CONCLUSION

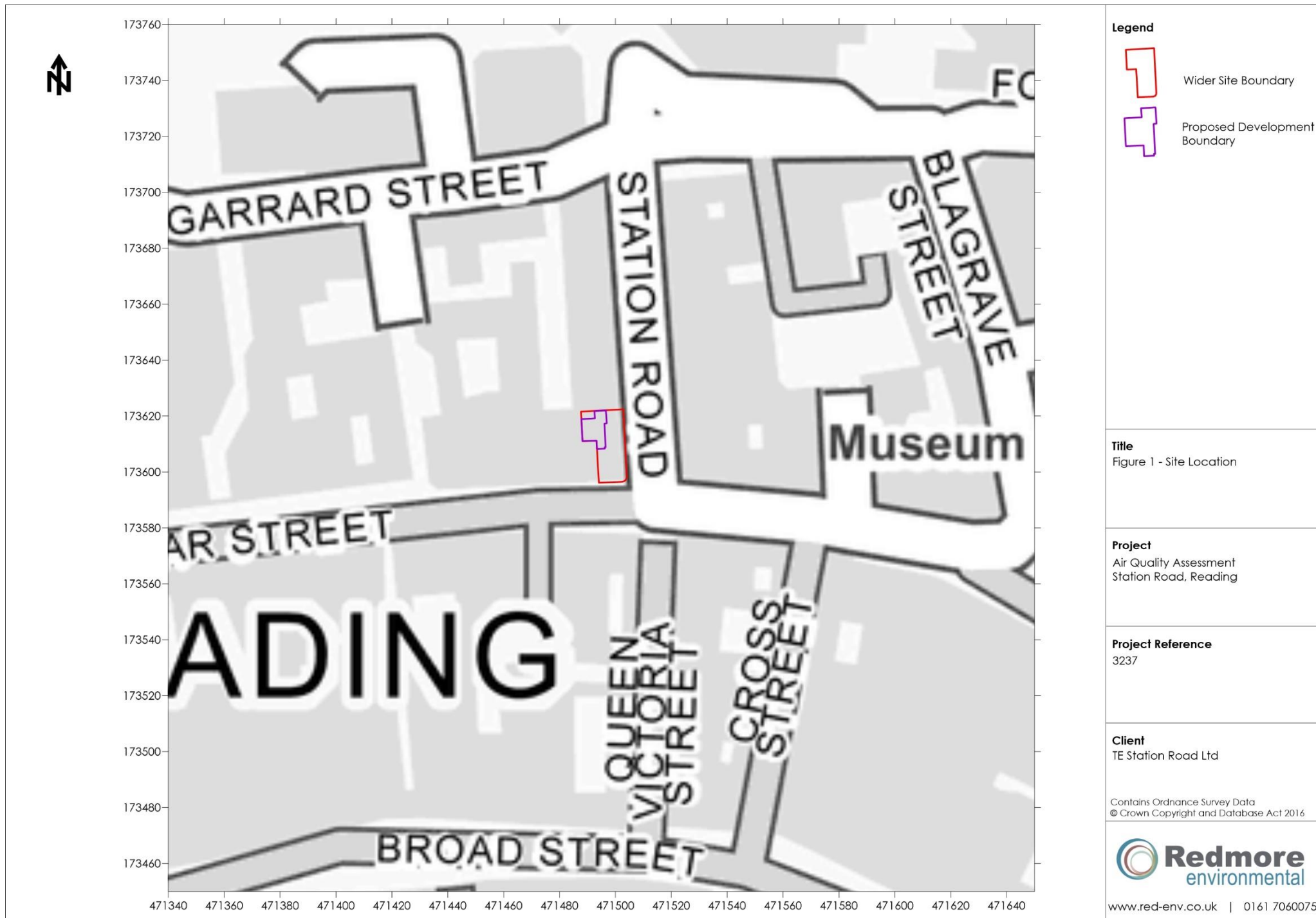
- 6.1.1 Redmore Environmental Ltd was commissioned by TE Station Road Ltd to undertake an Air Quality Assessment in support of a planning application for a residential development at 1 Station Road, Reading.
- 6.1.2 The development may lead to the exposure of future residents to elevated pollution levels, as well as adverse air quality effects at sensitive locations. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential impacts as a result of the scheme.
- 6.1.3 Dispersion modelling was undertaken in order to predict pollutant concentrations across the proposed development site as a result of emissions from the local highway network. Outputs were subsequently verified using local monitoring data obtained from RBC.
- 6.1.4 The results of the dispersion modelling assessment indicated that predicted annual mean NO₂ and PM₁₀ concentrations were below the relevant AQOs across the development. The site is therefore considered suitable for the proposed end use from an air quality perspective.
- 6.1.5 Potential impacts during the operational phase of the proposed development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within the IAQM¹⁶ guidance document. As the proposals comprise less than 10 dwellings and do not include any car parking spaces, road traffic impacts were predicted to be **not significant**.
- 6.1.6 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

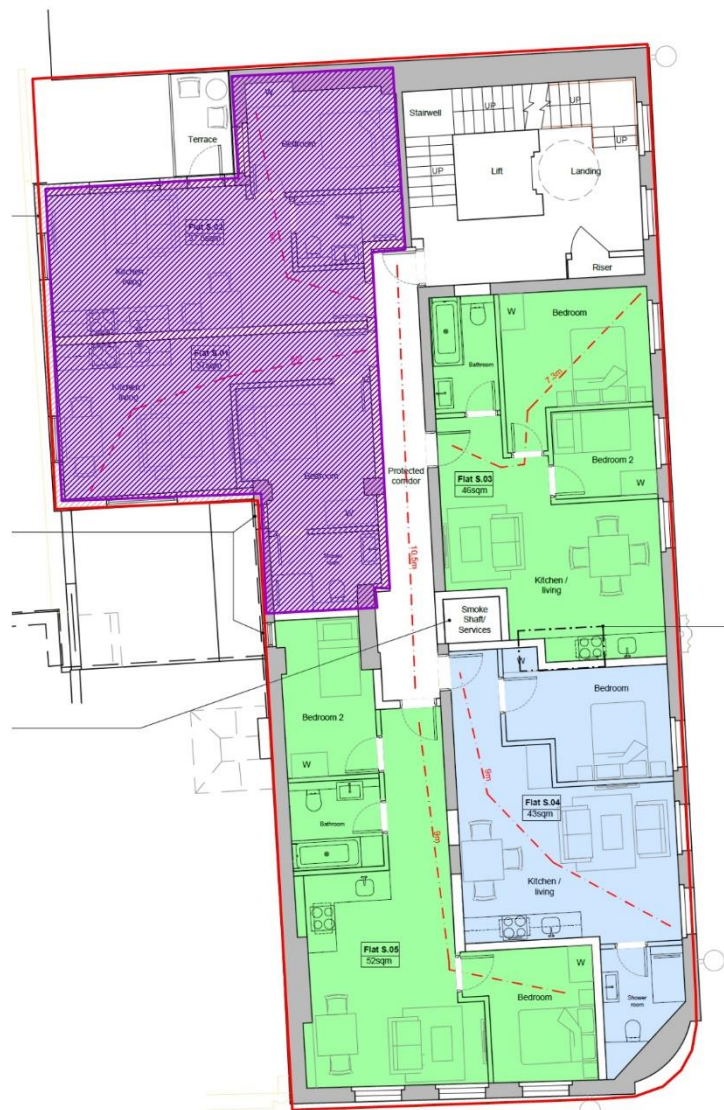
¹⁶ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

7.0 **ABBREVIATIONS**

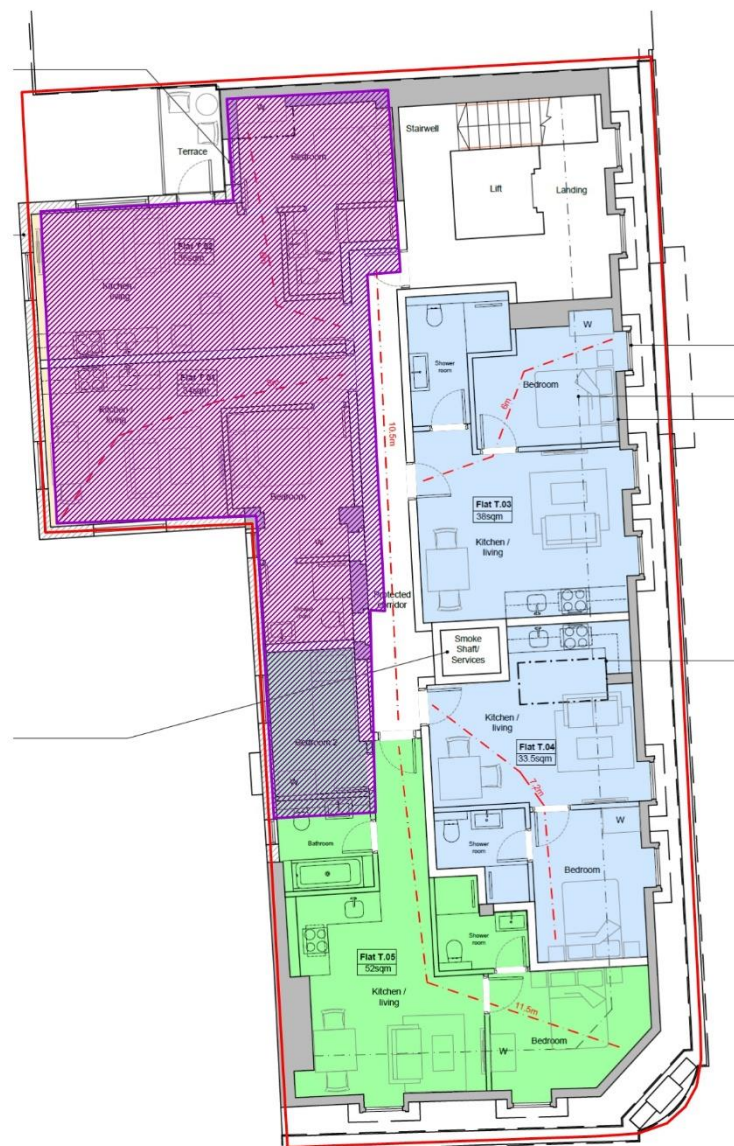
AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
RBC	Reading Borough Council
Z ₀	Roughness length

Figures





Second Floor



Third Floor

Legend



Wider Site Boundary



Proposed Development Boundary



Output Grid



Road Link

Title

Figure 2 - Site Layout

Project

Air Quality Assessment
Station Road, Reading

Project Reference

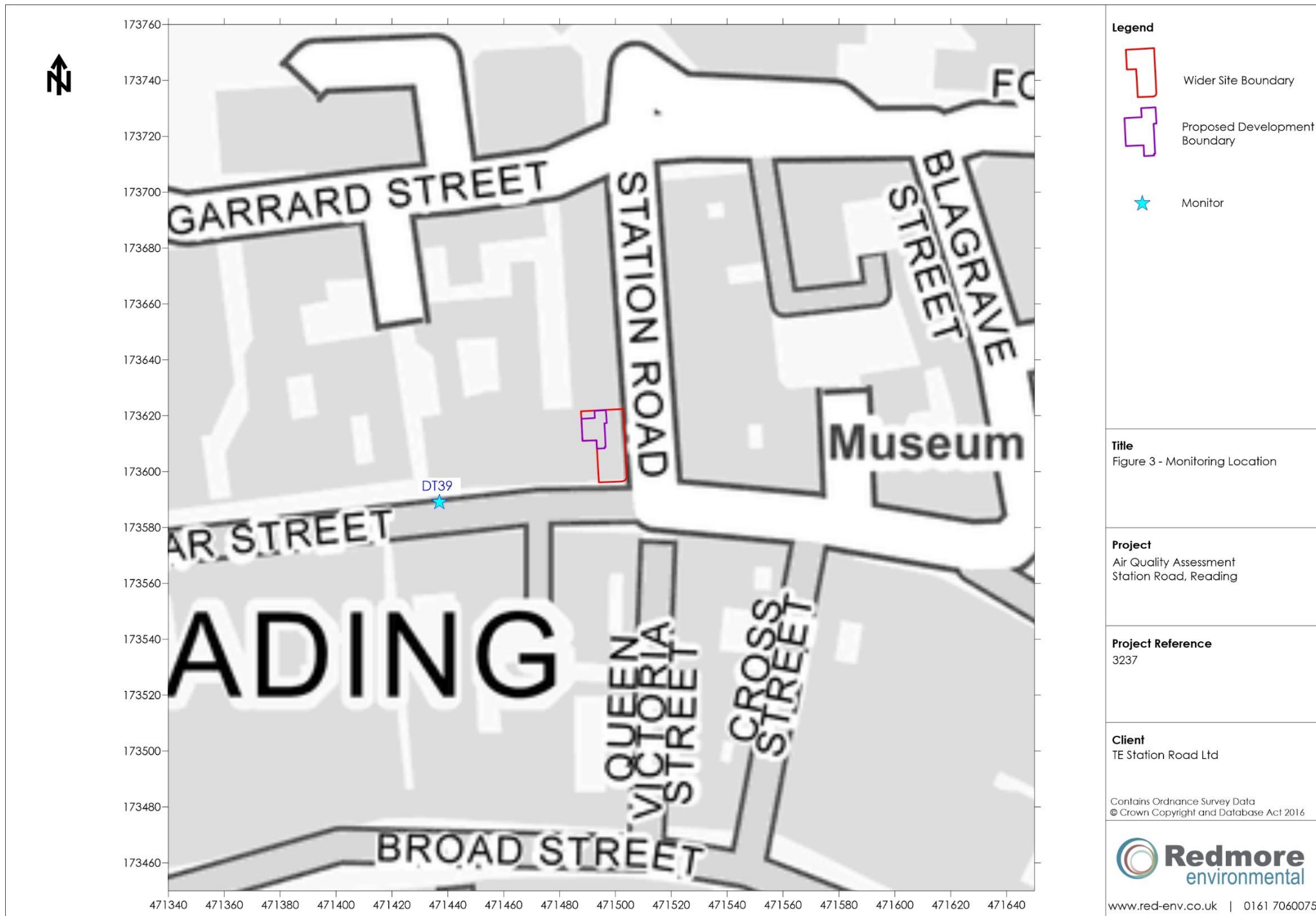
3237

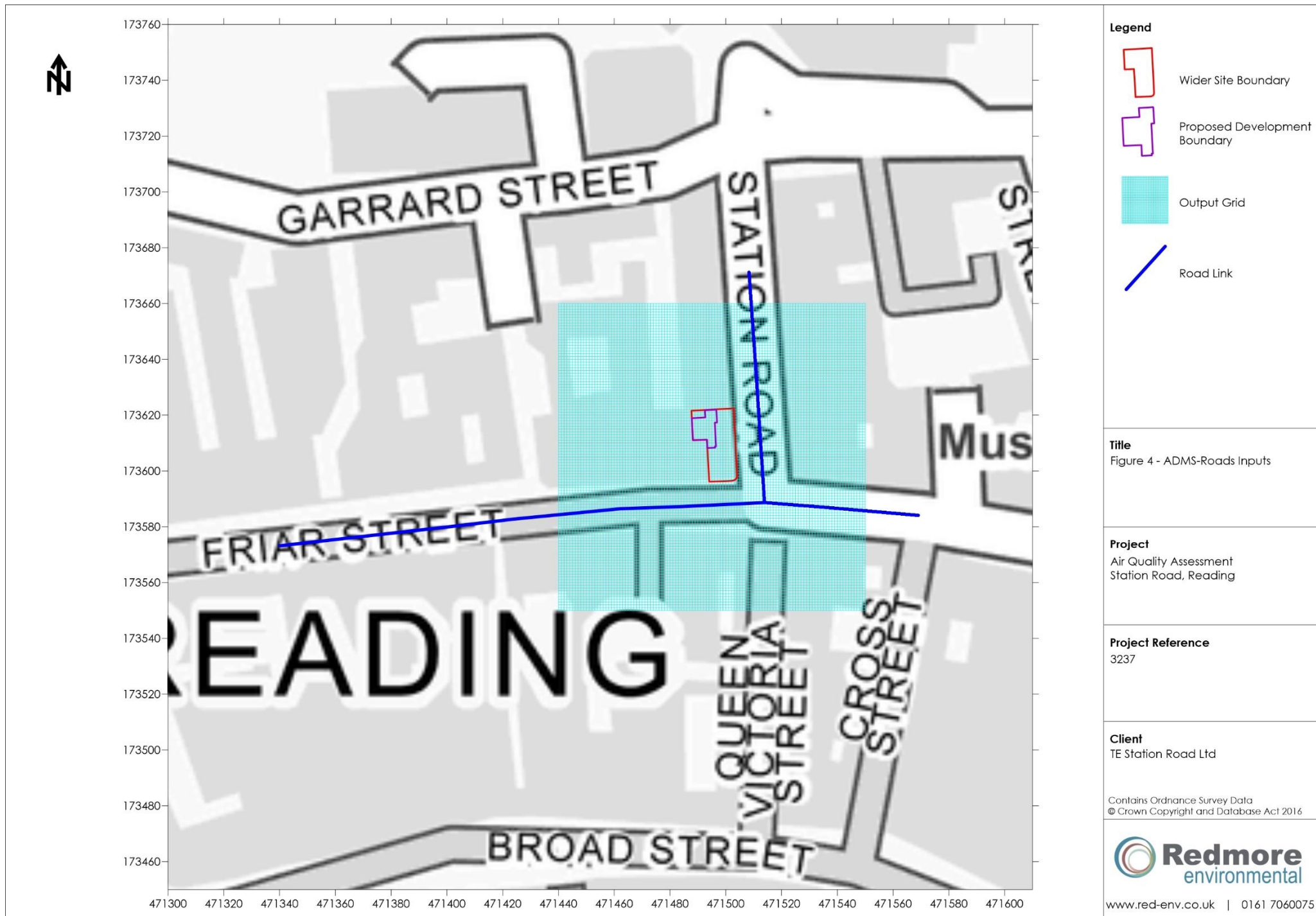
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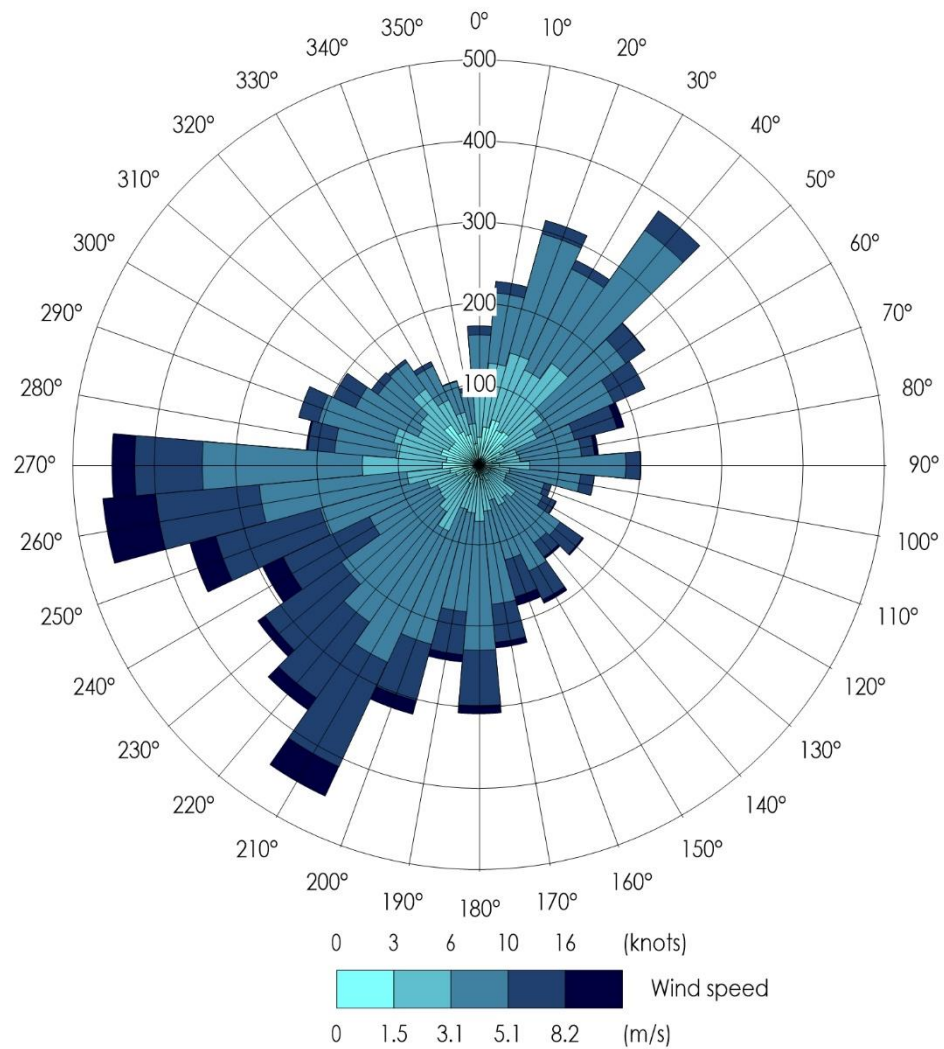
TE Station Road Ltd

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Legend

Title
Figure 5 - Wind Rose of 2018
Heathrow Airport Meteorological
Data

Project
Air Quality Assessment
Station Road, Reading

Project Reference
3237

Client
TE Station Road Ltd

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